Original Article

Pain Perception and Personality Trait toward Orthodontic Treatment

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ABSTRACT

Aim: The study was done to evaluate the pain perception, attitude, and personality trait of the patient toward orthodontic treatment.

Materials and Methods: In this cross-sectional questionnaire survey, 100 patients were divided into Group 1, 150 (75 males and 75 females) as untreated group and Group 2, 150 as treated group (75 males and 75 females). Evaluation of the patients was done based on pain perception, attitude, and personality trait. Set of questionnaire was used to assess attitude and pain perception on visual analog scale. The data were tabulated, and statistical evaluation was done using statistical software IBM SPSS Statistics for Windows, (Version 21.0. Armonk, NY: IBM Corp.) using *t*-test and Tukey's test.

Results: The mean pain perception for Group 1 was 4.8 ± 1.30 and 4.17 ± 1.58 in Group 2; the difference was not statistically significant (P = 0.26). The mean value for attitude in Group 1 was 3.57 ± 1.21, and in Group 2, it was 3.39 ± 1.60 (P = 0.09). There was statistically significant difference in pain perception between low (L) level to high level (H) neuroticism (P = 0.009). There was significant difference (P = 0.021) in pain for conscientiousness from very low to very high levels which is directly proportional.

Conclusion: The present study indicated that attitude, personality traits, and pain perception have a definite role in patient cooperation and success of orthodontic treatment.

KEYWORDS: *Attitude, orthodontics, pain perception, personality, treatment*

INTRODUCTION

Orthodontic treatment can be influenced by operator's skill, attitude, pain perception, personality traits, and cooperation of patient.[1,2] Optimal treatment results can be obtained with well-cooperated patients with proper interaction. Patient cooperation is required in wearing the orthodontic appliance, elastics, headgear, modifying the food habits, and oral hygiene maintenance. Uncooperation in these may lead to delayed treatment and increase in number of visits.[1]

Pain and discomfort are commonly experienced during all orthodontic treatments.[1,3,4] Fear of pain may avoid person from taking treatment or discontinuing the orthodontic treatment.[5] Ngan *et al*. observed no significant difference between the gender for discomfort, and they observed a decrease in discomfort from initial time to 7 days after appliance insertion.[6] The main cause of pain during orthodontic treatment is force application to induce tooth movement. Pain can be influenced by personality trait, gender, and motivation.[1] Kavaliauskiene *et al*. from the study observed that there will be a decrease in pain and discomfort during treatment in positively motivated patients.[3] Abu Alhaija *et al*. reported that personality trait and attitude toward orthodontic treatment improve after orthodontic treatment compared to before procedure.[7] Hansen *et al*. mentioned that personality trait has role in identifying the willing of the patient toward treatment.[8] One of the important factors for achieving patient cooperation is by pretreatment assessment of personality.[1] Hence, it is necessary to understand the pain, personality trait, attitude, and cooperation of the

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orthodontic patients toward the treatment for successful procedure.

The present study was done to evaluate the relationship of pain perception, attitude, and personality trait of the patient toward orthodontic treatment.

Materials and Methods

In this cross-sectional questionnaire survey, 100 patients were divided into Group 1, 150 (75 males and 75 females) as untreated group and Group 2, 150 as treated group (75 males and 75 females) with age range of 15–20 years. All the patients were obtained from the Outpatient Department of Orthodontics, Maharana Pratap Dental College, Kanpur, after obtaining ethical clearance from Institutional Ethical Committee (Ref No: MPDC-234/2017). Informed consent was obtained from all the participants. Treated group includes who had fixed orthodontic treatment for minimum of 6 months.

Patients with syndromes, medical condition, problems, treatment under removable appliance, functional appliance or orthognathic surgeries, and treatment done outside the institute were excluded from the study.

The data collection was based on questionnaire which was developed based on existing validated questionnaires.[1,2] The reliability of all questionnaire was tested using Cronbach's alpha with scores of 0.93, 0.83, and 0.81 pain perception, personality, and attitude, respectively, indicating good consistency. Ten individuals answered the questionnaire over a period of 2 weeks twice each time. Reliability was checked on all questions using correlation coefficient test at a range of 0.86–0.88.

This questionnaire study was done with bilingual questionnaire in English with[1] questions pertaining to demography, previousorthodontic knowledge which was assessed by askingwhether he or she underwent orthodontic treatment[2] The personality trait assessment was done using neuroticism extraversion openness-five factor inventory (NEO-FFI) consists of neuroticism (N),extraversion (E), openness (O) Agreeableness (A), and Conscientiousness (C). It consists of five major domains, and each domain was classified as very high (VH), high, average, low, and very low (VL).[3] Pain perception of treated and untreated participants was evaluated using visual analog scale (VAS) and having interval of 10 mm with extremely likely and extremely unlikely ends. The questionnaire consists of nine questions pertaining to pain [Appendix 1] (available online). Each participant was asked to mark on the line near to his/her experience/expectation. The score for pain was obtained by averaging the nine scores. The lowest score indicates lesser pain whereas highest indicates more pain experience.[4] The attitude toward orthodontic treatment was assessed using VAS marking at an interval of 10 mm. It consists of 12 questions relevant to attitude toward orthodontic treatment [Appendix 2] (available online). Score for attitude was obtained by averaging the 12 scores. Lowest score indicates positive attitude, and highest score shows negative attitude for treatment. Patients were encouraged to ask for any clarification or explanation about the study.

The data were tabulated, and statistical evaluation was done using statistical software IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA) using *t*-test and Tukey's test.

Results

The age range was 15–20 years with an average of 17.60 ± 1.32 years in untreated groups and 17.43 ± 1.44 years in treated groups [Table 1].

The mean pain perception for Group 1 was 4.8 ± 1.30 and 4.17 ± 1.58 in Group 2. The mean pain perception for males in untreated group was 4.12 ± 1.28 and 3.96 ± 1.32 for female. In treated groups, mean pain perception of males was 4.01 ± 1.52 and 4.35 ± 1.63 in females. This indicates there was no statistically significant difference in pain perception between the groups and for males and females (P = 0.26). There was no gender effect on pain. The mean value for attitude in Group 1 was 3.57 ± 1.21, and in Group 2, it was 3.39 ± 1.60, and attitude was not statistically significant between the males and females in untreated group (P = 0.49) and treated group (P = 0.58) [Table 1].

There was strong relationship between attitude and pain perception with Pearson's correlation of 0.245 and P = 0.001. The regression coefficient of pain on attitude was 0.39 which shows that one unit increase of attitude was associated with 0.39 unit increase of pain. This shows that better attitude gives lesser pain to patient.

Table 1: Comparison of pain perception and attitude in treated and untreated groups

Variables	Untreated group				Treated group				
	Male (n=75)	Female (n=75)	Total (n=150)	P	Male (n=75)	Female (n=75)	Total (n=150)	P	P
Age	17.60±1.28	17.61±1.36	17.60±1.32	-	17.58±1.43	17.35±1.45	17.43±1.44		-
Pain perception	4.12±1.28	3.96±1.32	4.8±1.30	0.17	4.01±1.52	4.35±1.63	4.17±1.58	0.16	0.26
Attitude	3.68±0.85	3.49±1.34	3.57±1.21	0.49	3.35±1.67	3.45±1.53	3.39±1.60	0.58	0.09

Test used=*t*-test, P<0.005 not significant

Table 2 shows role personality trait on pain perception by comparing various levels of personality traits. The Tukey's test was used to compare the pain perception among individuals at various personality traits for different levels. There was statistically significant difference in pain perception between low (L) level to high level (H) neuroticism (P = 0.009), indicating definite role in pain perception that is more pain with higher levels of neuroticism. There was a significant difference (P = 0.021) in pain for conscientiousness from VL to VH levels. It shows definite role of conscientiousness in pain perception is directly proportional. Table 3 indicates strong correlation of attitude with conscientiousness (P = 0.01) which is directly proportional.

Discussion

Successful orthodontic treatment depends on patient's cooperation and motivation. Personality trait is pervasive styles of thinking and behaving which can affect behavior, interest, and satisfaction. Hence, understating of the orthodontic patient's personality helps in successful orthodontic treatment.[1]

The VAS is widely used method for measuring the pain; it has been found as reliable, sensitive method. We have used VAS method in measuring the pain experience or expectation of individuals. Pain perception is associated with age of the patient, pain threshold, motivation, psychological condition, and previous negative dental experience of the patient.[5] In our study, there was no statistically significant difference between male and females in both untreated and treated groups for pain perception [Table 1]. Our results are in concurrence with results of Kadu *et al*. and Abu Alhaija *et al*.[1,2] In contrary to our results, Bergius *et al*. observed higher pain perception in females compared to males.[9] Abu Alhaija *et al*. observed lower pain perception inpatients with previous orthodontic knowledge[2]

Table 2: Personality traits on pain perception

Traits	Levels					*P*
	VL	L	A	H	VH	
Neuroticism	-	3.32	4.01	4.12	4.56	0.008*
Extraversion	5.08	4.38	4.01	3.77	3.57	0.073
Openness	4.21	4.18	3.85	4.12	2.63	0.301
Agreeableness	4.28	4.02	3.68	3.69	-	0.086
Conscientiousness	4.46	3.87	3.89	3.73	2.1	0.021*

Test used=Tukey's test, P=0.01 significance. L=Low level, H=High level, VL=Very low, VH=Very high, A=Average

Table 3: Personality trait on attitude toward orthodontic treatment

Traits	Levels					*P*
	VL	L	A	H	VH	
Neuroticism	-	3.01	3.45	3.58	3.47	0.278
Extraversion	3.44	3.47	3.48	3.77	4.43	0.131
Openness	3.44	3.59	3.31	3.57	3.75	0.486
Agreeableness	4.28	3.35	3.23	3.55	-	0.286
Conscientiousness	3.49	3.42	3.47	3.45	1.44	0.010*

Test used=Tukey's test, P=0.01 significance. L=Low level, H=High level, VL=Very low, VH=Very high, A=Average

In general, well-informed patients about dental procedures found to have lesser pain. Kavaliauskiene *et al*. stated form their study that most of the patients experienced pain 1 day after appliance insertion and pain decreases over a period of 1 month.[3,10] Firestone *et al*. observed greater effect of pain during leisure activities, in anxious patients and those who had a history of frequent headaches.[11] Pain experienced during orthodontic treatment is not constant; there is initial increase and later decline in the pain intensity.[12] It has been observed that structured telephonic call and reassurance has influence in reducing the pain.[13] It has been found that pain during orthodontic treatment varies from one procedure to other, and it was more with intermaxillary elastic compared to loop activation.[14]

Patient attitude plays a major role in treatment success. It was a general agreement that females have better attitude and interest for orthodontic treatment than males.[2,15] Our results showed that there was no statistically significant difference in attitude between male and female in both the groups [Table 1]. Our results are in harmony with studies by Kadu *et al*. and Abu Alhaija *et al*.[1,2] Some researchers have shown better attitude in treated individuals than in untreated one.[16]

NEO-FFI test is a short, comprehensive, reliable, valid method to assess personality trait of a person.[1,2] The present study has shown that there was a direct role of person's attitude and personality trait on pain perception [Tables 2 and 3].

Our results have shown that neuroticism has statistically significant role on pain perception at lower and higher levels. The higher the levels of neuroticism, the more will be the pain. Similar results were found in Kadu *et al*.'s study.[1] Al-Omiri *et al*. stated that higher the value of neuroticism, the more will be negative satisfaction.[17] Patients with neurotic conditions should be treated with psychological support throughout the procedure.

We observed that role of conscientiousness was directly proportional to attitude; higher levels of conscientiousness have more positive attitude which is required for successful treatment. Amoda *et al*. observed no statistically significant relations between the degree of cooperation and the scales of personality, gender, or age.

The present study indicated that attitude, personality traits, and pain perception have a definite role in patient cooperation and success of orthodontic treatment. There was no gender difference in pain perception. Role of conscientiousness in pain perception is directly proportional. The lower the conscientiousness value, the lesser will be the pain. A positive attitude patient has lesser pain.

Limitation of the present study is smaller sample size and restricted to particular geographic area only.

Further research is required to evaluate the role of pain perception, attitude, and personality trait on larger sample size in different geographic areas.

Conclusion

The present study indicated that attitude, personality traits, and pain perception have definite role in patient cooperation and success of orthodontic treatment. Gender has no role in pain perception. Patients with neuroticism and conscientiousness at lower levels should be treated with psychological counseling. Conscientiousness has a definite role on attitude. A positive attitude patient has lesser pain.

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Conflicts of interest

There are no conflicts of interest.

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Appendixes

Appendix 1: Pain expectation in untreated and pain experience in treated orthodontic patients

1. Placement of separators between teeth was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
2. Placement of bands on your teeth was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
3. Bracket bonding caused/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
4. Placement of archwire was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
5. Wearing of orthodontic elastics was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
6. Wearing of extraoral appliance for orthodontic treatment was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
7. Wearing of orthodontic retainers was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
8. Making of impression was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
9. Debonding was/will be painful?
   Extremely unlikely - - - - - - - - - - Extremely likely ------

Mean score ----------

Appendix 2: Patient's attitude toward orthodontic treatment

1. Braces cause a lot of trouble?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
2. When you wear braces, you need to change your dietary habits?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
3. Orthodontist always says that you have to wear braces more than is really necessary?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
4. Orthodontic treatment often has no use at all?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
5. It is absolutely necessary to care more for your oral hygiene when you are wearing braces?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
6. People wearing braces are often more teased than people without it?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
7. It is of no use to visit orthodontist after braces have been removed?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
8. Elastics which should be worn with braces have no use?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
9. It is not a problem at all you stop treatment as soon as your teeth are straight?
   Extremely unlikely - - - - - - - - - - Extremely likely ------
10. Orthodontists often give incomplete information?
    Extremely unlikely - - - - - - - - - - Extremely likely ------

11. Orthodontists often have something to complain about their patients?
    Extremely unlikely - - - - - - - - - - Extremely likely ------

12. Orthodontists often spend very little time with their patients?
    Extremely unlikely - - - - - - - - - - Extremely likely ------

Mean ----------