



Factors Affecting Patient Satisfaction in Fixed Orthodontic Patients. A Questionnaire Study

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Abstract

Aim: The objective of present study was to assess factors contributing to patient satisfaction after orthodontic treatment as patient satisfaction is important for ensuring patients adherence in orthodontic treatment. This study also aims at exploring any difference gender wise in perception of the satisfaction with orthodontic treatment through a questionnaire.

Material and Methods: A total of 45 patients who had completed their fixed orthodontic treatment in the Department of Orthodontics, were selected. The number of female patients were 30 and male patients were 15 with the age of the patients from 12 to 28 years. At the end of the fixed orthodontic treatment i.e. after debonding a questionnaire to assess patients satisfaction with orthodontic care was given to the patient. The questionnaire had 65 questions which were placed under 7 subgroups. The patient had to answer as yes or no to the questions.

Results: Both sexes were comparable in their satisfaction in all subgroups except in the Doctor- patient relationship where the difference in male and female perception was statistical significant. Regression test showed that the effect of each subgroup individually on the post treatment satisfaction was statistically significant.

Conclusion: This study concludes that factors like the situational aspects of the orthodontic clinic; the improvement in dentofacial features, the psychosocial improvement and the dental function; pain and discomfort perceived by the patient during the course of the treatment; the doctor patient relationship; are significantly important in determining the post treatment satisfaction of the patient. On the basis of gender, difference is there in doctor - patient relationship.

Keywords: Orthodontics; Dental Function; Pain

Introduction

Patient satisfaction is an important and widely accepted measure of health care efficiency [1]. Satisfaction is the contentment one feels on fulfilment of a need or expectation and is important for ensuring patients adherence in orthodontic treatment [2,3]. Patient satisfaction with care concept is now increasingly being reported in dentistry [4]. The number of adolescents receiving orthodontic treatment has increased throughout the world but only

few studies have been done on patient satisfaction after orthodontic treatment and the factors contributing to their satisfaction [5-7].

Levels of patient satisfaction in previous studies range between 34% and 95% and one likely reason for this wide range is difficulty associated with finding relevant tools that reflect patient satisfaction and health benefits [8,9]. Research showed that only 34% of orthodontic patients were totally satisfied, 62% were relatively satisfied and 4% were actually dissatisfied [8]. This necessitates the

orthodontist to identify which patient who may be less satisfied with the treatment outcome, prior to the treatment and also to intervene in order to improve patient satisfaction for these patients.

Orthodontic patients expect that their relationship with the orthodontist should be warm and comfortable and also that the doctor should be technically competent providing adequate information about orthodontic problems or the procedure which he will perform. The patients may be dissatisfied in case these expectations are not met which later reduces patient compliance, eventually leading to less than optimal orthodontic result. For Sinha, *et al.* lack of professional efficiency in exposing the problems inherent to the case could lead to a mismatch of information [6]. Bos, *et al.* concluded that professionals agree on the importance of gaining and maintaining patients cooperation to ensure treatment success [2]. In orthodontics, few studies have been done to measure satisfaction provided with care. Now as there is emerging interest in the study of patient satisfaction and expectation, hence the need of such more studies arises [10].

Patient satisfaction provides important information on what are the expectations of the patient and how they perceive the quality of care. It is difficult to quantify the patient expectations and satisfaction due to the need of evaluating patients opinion and to the long term nature of orthodontic treatment.

This study aims at exploring the effect of certain factors like doctor patient relationship; the situational aspects of the orthodontic clinic; the improvement in dentofacial features, the psychosocial improvement and the dental function; pain and discomfort perceived by the patient during the course of the treatment on post treatment satisfaction. This study also aims at assessing any difference in patient satisfaction on the basis of gender.

Material and Methods

The present study was conducted in the Department of Orthodontics and Dentofacial Orthopedics. A total of 45 patients who had completed their fixed orthodontic treatment were selected. The number of female patients were 30 and male patients were 15. The age of the patients were from 12 to 28 years with the mean age of 20.4 years. The inclusion criteria for all patients were as follows: young patients with permanent dentition in need of orthodontic treatment followed by fixed appliances in both jaws.

At the end of the fixed orthodontic treatment i.e. after debonding a questionnaire developed to assess patients satisfaction with orthodontic care was given to the patient [2,11]. The questionnaire

had 65 questions which were placed under 7 subgroups (Appendix 1). The first subgroup had 10 items which dealt with the satisfaction of the patient with the doctor. The second subgroup had 15 questions which told about the patient satisfaction with the situational aspects of the orthodontic clinic. The third subgroup included 9 questions which gained information about patient satisfaction with respect to dentofacial improvement in their faces. The fourth subgroup based on 9 questions, assessed how the patients felt regarding their psychosocial improvement. The fifth subgroup included 4 questions showing patient satisfaction with regard to dental function and sixth subgroup including 10 questions formed a residual category. The seventh, the last subgroup had 8 questions, pertaining to pain and discomfort perceived by the patient. The questions were answered as yes or no as to agree or disagree respectively.

The data were analyzed using SPSS (version 16.0) and statistical analysis were carried out. Descriptive statistics were obtained, and means, standard deviation and frequency distribution were calculated. Comparison between male and female groups were made using T Test. Correlation of each subgroup individually with overall patient satisfaction was done using Regression test.

Results

A total of 45 patients completed their questionnaire, of which 33.33% were males and 66.66% were females. The mean age of the patient was 12 to 28 yrs. The treatment time on the average was 24.7 months. Descriptive statistics was done showing mean scores of answers of the whole sample (Table 1) computed in each subgroup.

The mean value scores were calculated of all the questions in the respective subgroups for the male and female sample separately also (Table 2).

The comparison of male and female perception towards each aspect was analysed by comparing their mean scores in each subgroup using T Test. Statistical analysis was done to find the difference in their perception if any with $p < 0.01$ as significant. Both sexes were comparable in their satisfaction in all subgroups except in Doctor patient relationship where the difference in male and female perception was statistical significant as shown in table 3.

Regression test was done to show the effect of each subgroup score individually on the total satisfaction. All the subgroups were found to be statistically significant in the descending order from 1 to 7 (Table 4).

Subgroup 1: Doctor-patient relationship	
1	I personally liked the orthodontist who treated me.
2	Greater efforts should have been made to reduce the pain from braces.
3	The orthodontist always checked their work carefully.
4	The orthodontist was gentle when treating me.
5	Before treatment began, my orthodontist carefully explained what treatment would be like.
6	I liked the way the orthodontist treated me.
7	Questions I had about my treatment were answered promptly.
8	The orthodontic staff treated me with respect.
9	The orthodontist treated me with respect.
10	The orthodontic care I received could have been better.
Subgroup 2: Situational aspects	
11	Orthodontic treatment was a good value for the money.
12	My treatment took about as long as I expected it would.
13	I missed too much school for orthodontic appointments.
14	Even though some appointments were short, each was necessary for my treatment to be successful.
15	Problems that arose during treatment were quickly taken care of.
16	The treatment area was modern and up to date.
17	The orthodontic treatment fees were too high.
18	The orthodontist's office was conveniently located.
19	I was satisfied with the selection of days and times when I could be seen for orthodontic appointments.
20	Plenty of time was spent with me during each appointment.
21	I was rarely kept waiting for appointments.
22	The waiting area was comfortable.
23	The treatment area was clean and sanitary.
24	I had to travel far to reach the orthodontic clinic.
25	The treatment took much too long.
Subgroup 3: Dentofacial improvement	
26	Now that orthodontic treatment is complete, my teeth are straighter
27	Now that orthodontic treatment is complete, I have a better bite
28	Now that orthodontic treatment is complete, I think I have a more attractive face
29	I really thought that my appearance would improve better than it actually did
30	My appearance has changed exactly like I expected
31	My teeth fit very well since I have been treated
32	When I look in the mirror, I feel very satisfied about the way my appearance is improved since orthodontic treatment
33	After my orthodontic treatment, I feel really happy when I took in the mirror
34	I feel very happy because I look so much better since I have been treated

Subgroup 4: Psychosocial improvement	
35	I feel better about myself because of orthodontic treatment
36	I believe I will have better career opportunities because of my orthodontic treatment
37	I believe my school performance is better because of orthodontic treatment
38	I feel more outgoing because of orthodontic treatment
39	I feel more confident because of orthodontic treatment
40	I think I will be able to get a better job once out of school because of orthodontic treatment
41	I feel more popular because of orthodontic treatment
42	Even people who do not know me very well have made positive remarks about my appearance after I have been treated
43	When I meet people for the first time, they react much more positively to me since I have been treated
Subgroup 5: Dental function	
44	Eating is more easy since I have been treated
45	Chewing is easier since I have been treated
46	I can bite food more easily since I have been treated
47	I would recommend orthodontic treatment to everyone who has difficulties chewing food
Subgroup 6: Residual category	
48	My orthodontic treatment was inconvenient for me
49	I take better care of my teeth since having braces
50	I am satisfied with the results of my orthodontic treatment
51	If I had it to do over again, I would still want orthodontic treatment
52	My braces gave me a lot of discomfort
53	It was difficult for me to wear my headgear or activator
54	If I had to do it all over again, I would do it
55	I would recommend orthodontic treatment to others
56	I am dissatisfied with the treatment result
57	Generally speaking, I have bad experiences with orthodontic treatment
Subgroup 7: Perceived Pain and Discomfort	
58	Did you experience pain and discomfort with anchorage device when placed
59	Did you experience pain and discomfort when teeth were extracted
60	Did you experience pain and discomfort when braces were bounded
61	Did you experience pain and discomfort in first week with braces
62	Did you experience pain and discomfort the week after visit
63	Did you experience pain and discomfort with anchorage device
64	Did you experience pain and discomfort when braces were removed
65	Did you experience pain and discomfort from your stabilization appliance

Appendix 1: Questionnaire regarding patient satisfaction.

	N	Minimum	Maximum	Mean	Std. Dev.
Subgp 1: Dentofacial improvement percent	45	55.56	100.00	86.4198	9.14065
Subgp 2: Doctor-patient relationship percent	45	70.00	90.00	79.7778	6.56744
Subgp 3: Perceived pain and discomfort percent	45	68.42	94.74	79.2203	7.68329
Subgp 4: Psychosocial improvement percent	45	22.22	100.00	77.0370	15.60598
Subgp 5: Dental function percent	45	.00	100.00	73.3333	41.76504
Subgp 6: Situational aspects percent	45	40.00	86.67	67.1111	13.73633
Subgp 7: Residual category percent	45	30.00	80.00	50.4444	10.21486

Table 1: Descriptive Statistics of answers of the whole sample of different subgroups.

N = Total no. patients.

Subgroups	Male/ Female	N	Mean	Std. Dev.	Std. Error Mean
Doctor-patient relationship percent	Male	15	83.3333	6.17213	1.59364
	Female	30	78.0000	6.10257	1.11417
Situational aspects percent	Male	15	66.6667	16.71422	4.31559
	Female	30	67.3333	12.29896	2.24547
Dentofacial improvement percent	Male	15	82.9630	11.00478	2.84142
	Female	30	88.1481	7.68324	1.40276
Psychosocial improvement percent	Male	15	82.9630	12.50514	3.22881
	Female	30	74.0741	16.33341	2.98206
Dental function percent	Male	15	80.0000	41.40393	10.69045
	Female	30	70.0000	42.24314	7.71251
Residual category percent	Male	15	52.0000	14.73577	3.80476
	Female	30	49.6667	7.18395	1.31160
Perceived Pain and Discomfort percent	Male	15	81.1696	9.29438	2.39980
	Female	30	78.2456	6.70192	1.22360

Table 2: Descriptive statistics of answers of the male and female subjects in seven subgroups.

N = no. of patients.

	t-test for Equality of Means						
	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Doctor-patient relationship percent	2.753	43	.009**	5.33333	1.93699	1.42702	9.23965
Situational aspects percent	-.152	43	.880	-.66667	4.39285	-9.52570	8.19237
Dentofacial improvement percent	-1.842	43	.072	-5.18519	2.81500	-10.86217	.49180
Psychosocial improvement percent	1.850	43	.071	8.88889	4.80453	-.80038	18.57816
Dental function percent	.753	43	.455	10.00000	13.27263	-16.76682	36.76682
Residual category percent	.718	43	.476	2.33333	3.24814	-4.21716	8.88382
Perceived Pain and Discomfort percent	1.210	43	.233	2.92398	2.41697	-1.95031	7.79826

Table 3: Results of T test for seven subgroups.

**Significant at p < 0.01.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.759(a)	.577	.567	2.88208	.577	58.598	1	43	.000
2	.843(b)	.711	.697	2.41161	.134	19.414	1	42	.000
3	.904(c)	.816	.803	1.94354	.106	23.666	1	41	.000
4	.946(d)	.895	.884	1.48898	.078	29.854	1	40	.000
5	.971(e)	.943	.936	1.10815	.048	33.218	1	39	.000
6	.989(f)	.979	.976	.68361	.036	64.480	1	38	.000
7	1.000(g)	1.000	1.000	.00000	.021	.	1	37	.
a Predictors: (Constant), Situational aspects									
b Predictors: (Constant), Situational aspects, Psychosocial improvement									
c Predictors: (Constant), Situational aspects, Psychosocial improvement, Dental function									
d Predictors: (Constant), Situational aspects, Psychosocial improvement, Dental function, Perceived Pain and Discomfort									
e Predictors: (Constant), Situational aspects, Psychosocial improvement, Dental function, Perceived Pain and Discomfort, Residual category									
f Predictors: (Constant), Situational aspects, Psychosocial improvement, Dental function, Perceived Pain and Discomfort, Residual category, Dentofacial improvement									
g Predictors: (Constant), Situational aspects, Psychosocial improvement, Dental function, Perceived Pain and Discomfort, Residual category, Dentofacial improvement, Doctor-patient relationship									

Table 4: Results of regression analysis for patient satisfaction.

Discussion

Patient satisfaction after treatment is influenced by number of factors [2,3,12,13]. The need to discuss the findings concerning the role of different factors governing patient satisfaction is crucial to potentially increase patient satisfaction. For a better use of data obtained in this study the results were discussed in subheadings. The questionnaire was used to measure the responses of patients to different questions under given seven subgroups. Our study showed that all the seven subgroups affect the patient satisfaction in a statistically significant manner in the descending order as discussed below.

Situational aspect

There are many situations in this subgroup which may prove significant in patient satisfaction after the treatment. Our study shows that situational aspects have statistically the most significant affect on patient satisfaction. One such situation was fully informed costs before treatment. The patients with financial problems become disinterested in collaborating with the professional and simi-

larly the orthodontist also is discouraged to give his utmost in the consultation thereby compromising the outcome of orthodontic treatment. Atta said that there is a tendency for professionals to treat more patients in less time and at a lower cost but with favourable results to the professional and the patient [14]. Hence the efficiency in clinical care allows the maximization of financial revenue to the professional. In our study the patients revealed good sense of satisfaction regarding other situations like waiting period and duration of completion of treatment. The orthodontic treatment done is based on scheduled appointments which may lengthen the treatment period compared to the patients expectations. The study by Hans and Valiathan showed that in the absence of a manual for assessing the quality of orthodontic appointment, patients rely on office setting, doctor’s personality and his professional team to make the choice of the specialist [15]. Gerbert., *et al.* assessed that professionals qualities like technical competence, friendliness, courtesy and ability to inform patients about procedures decide satisfaction level of the patients [16]. This is in accordance with our study which is showing that different situational aspects are

statistically significant in determining patient satisfaction. The significance level of this subgroup is highest among all the subgroups.

Psychosocial aspect

Prof. Langloes., *et al.* showed that even children other than adults pay greater attention to people with a more attractive face [17]. Motivational factor to undergo treatment plays an important role in patient satisfaction. Sinha., *et al.* determined that when the professional does not motivate the patient, making negative criticism, he is negatively impacting on patient adherence to treatment [6]. The more energized patients are by thinking about future possible selves and the more focussed they are, the more satisfied they will be after the treatment. Patients motivation is dynamic and can be affected throughout the course of the treatment. Anderson., *et al.* concluded that the more focussed the patient is prior to the treatment the more satisfied he or she will be with the outcome of the treatment [18]. Better dental and facial esthetics play an important role in finding better jobs and making social contacts. Our study is in agreement to these studies as it shows that the positive response of the patients towards their psychosocial improvement is a statistically significant factor in patient satisfaction.

Dental function

Orthodontically treated patients demonstrated high level of satisfaction with their teeth in general which coincides with the results of previous studies that revealed higher level of satisfaction with the dentition after the orthodontic treatment [19]. The presence of certain level of dissatisfaction with the dentition after the orthodontic treatment might be because of patient compliance or unrealistic expectations. Our study also shows that satisfaction with dental function plays a statistically significant role in post treatment satisfaction with the orthodontic treatment.

Perceived pain and discomfort

Feldmann showed negative significant correlation between the patients perception of pain and discomfort during treatment or during placement of anchorage device and satisfaction with the treatment [20]. In contrast our study shows that pain and discomfort during treatment play a statistically significant role in patient satisfaction but to a lesser degree comparatively suggesting that efforts should be made to make the treatment less painful and more comfortable.

Residual category

This category concerns with the general experiences of the patient during the treatment period. The patients good experiences

leads to good level of patient satisfaction after the treatment as is seen in our study. The patients who considered themselves happy would further recommend the professional to their friends and relatives. Morgenstern., *et al.* in a survey of students and teachers of orthodontics showed that the main referral source for the patients are the patients themselves [21]. This subgroup is showing statistically significant result it means that general experiences also play an important role in determining patient satisfaction after the treatment but it is comparatively lesser in significance as compared to other subgroups.

Dentofacial improvement

Pabari., *et al.* found that a desire to improve the smile was a prime motivating factor of the patient to undergo orthodontic treatment [22]. Hence the satisfaction of patients with their dental and facial appearance is related to the satisfaction after orthodontic treatment. Oral health professionals generally agree that esthetic issues are preponderant in patients. The major motive behind young adults seeking orthodontic treatment is the displeasure and frustration with the dental and facial esthetics. Better dental and facial esthetics plays an essential role in finding better jobs and social contacts. Our study suggests that dental and facial improvement after the orthodontic treatment is statistically significant in determining patient satisfaction after the treatment. The statistical significance of this subgroup is lower down in the sequence.

Doctor patient relationship

The last factor contributing to patient satisfaction was patients satisfaction with the doctor patient relationship which corresponds with earlier findings [6,23]. The patients are more likely to be more positive when effort is made to build good relationship with them and not where effort is focussed on technical excellence alone [24]. The technical competence of the orthodontist is a key determinant factor contributing to patient satisfaction. The enthusiasm and dedication of dental faculty and technical staff towards the patient raises the satisfaction level of the patient. Abrams., *et al.* determined that the patient does not realize that he is receiving a high level of treatment simply by observing the technical quality of the professional [25]. According to Sinha., *et al.* the psychological impact of a dissatisfied patient may present itself through higher anxiety, less cooperation and eventually poor orthodontic results [6]. The critical factor which is an indicator for quality of care for the patient is the psychological attention given to him as concluded by Nanda and Kierl [26]. Our results are also in favour of all these studies suggesting that the patient were relatively satisfied with

their interaction with the orthodontist leading to their satisfaction with the treatment. However the statistical significance of this subgroup is the least amongst all the subgroups.

Gender

The ratio of 1:2 of male: female ratio for the sample of our treated patients shows that females are more concerned about their esthetics. However this difference in expectations was not translated to a significant difference in patient satisfaction in this study which is in agreement with other studies [8]. The only difference was in doctor patient relationship where a statistical significant difference was found on basis of gender as has also been shown in other studies [27]. Phillips., *et al.* found that males have different expectations than females of orthodontic treatment [28]. The gender difference suggested that females are more dissatisfied with the appearance of their dentition than males [29].

Conclusion

The most important goal of dental care is helping patients in their attempts to reach an acceptable level of satisfaction with their oral cavity and dentition. Satisfaction with treatment is a complex issue and depends on many factors. This study concludes that factors like the situational aspects of the orthodontic clinic; the improvement in dentofacial features, the psychosocial improvement and the dental function; pain and discomfort perceived by the patient during the course of the treatment; the doctor patient relationship; are significantly important in determining the post treatment satisfaction of the patient. This study emphasizes the importance of considering all these different factors by the orthodontist other than their technical knowledge, for the patients to be satisfied after the treatment. Regular surveys monitoring patient satisfaction are needed to obtain adequate patient feedback during the treatment time and also for the assessment as to where the orthodontist is lacking.

Orthodontists should focus more on their quality of care, the improvement in personality of the patients, the improvement in dentofacial features etc so that at the end of the orthodontic treatment the aims are achieved according to patients personal satisfaction along with orthodontic professional satisfaction.

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