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Predictors of Dental Patients' Satisfaction in a Greek Sample

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Authors' contributions

This work was carried out in collaboration between all authors. All five authors contributed to the study design. Authors DL and DT collected the data, authors DL and TC analyzed the data, and authors DL and TC collaborated on the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To evaluate patient factors, provider factors, and factors related to the patient-provider experience which may predict patient satisfaction with dental appointments.
Study Design: A cross-sectional design was used.
Place and Duration of Study: Data were gathered from dental students and their patients at Aristotle University of Thessaloniki, Greece between October, 2010 and April, 2011.
Methodology: Data from 157 dental students and 484 of their patients were included. Patients completed questionnaires including the Patient Communication Style Scale, the Patient Assessment Questionnaire, and the Dental Visit Satisfaction Scale, and items measuring the patient's prior experience with his/her student dentist. Dental students completed questionnaires included the Toronto Composite Empathy Scale and the Attitudes Toward Patient Education Scale. Participants also provided demographic information, and the type of dental treatment received was recorded.
Results: Patient satisfaction was associated with student communication skills (P<.001) and dyadic congruence about patient participation in treatment-planning (P<.001). Empathy was

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associated with patient satisfaction (*P*=.03), as were higher levels of patient education, income, and religiosity (*P*'s=.007, .04, .02). In addition, having had a prior positive experience with the student (*P*=.004), being treated by a more experienced student (*P*=.003), and not experiencing an invasive dental procedure (*P*=.04) were also associated with patient satisfaction. When considered simultaneously, students' communication skills was the best predictor of patients' satisfaction (*P*<.001), followed by patients' preference for greater treatment involvement (*P*=.008).
Conclusion: Variables related to patients, providers, and the patient-provider experience were each associated with patient satisfaction.

Keywords: Patient satisfaction; provider communication; empathy; treatment planning; patient participation.

1. INTRODUCTION

Patients who are more satisfied with their health care experiences are typically more compliant with their health providers' recommendations, experience faster recoveries and improved outcomes, and are less likely to pursue malpractice suits [1]. Satisfied patients also make more efficient use of the resources of health care offices and tend to influence others to become patients of the offices [1,2].

Patient satisfaction is related to patient characteristics, provider characteristics, and variables related to the patient-provider encounter [1]. In general, young and minority patients are less satisfied [1,3]. The relationships between gender, education and income and satisfaction are more equivocal [1,3-6]. Marital status may also be related to satisfaction, as married individuals are happier and have greater life satisfaction than unmarried individuals [7,8]. Religiosity has not been studied as often as other demographic variables in satisfaction research. One study in Greek samples found that religiosity was not related to self-reported health [9], while others found that religiosity was associated with greater satisfaction with life [10-12]. To our knowledge, no study has examined the relationship between religiosity and dental patient satisfaction. While inclusion in treatment decision-making is often associated with patient satisfaction [1], patients vary in their preference for how much they wish to participate in these decisions [13-16]. In dentistry, one study found that most patients wished to collaborate with their dentists in making decisions [17].

Providers' empathy is often described as an important characteristic in medicine [18]. Communication and interpersonal skills are also related to patient satisfaction [1,5]. In a sample of Greek patients seeking care at a University dental clinic, the dentist's communication, interpersonal skills and empathy were rated as the most important dimension of good dental care [19]. Provider gender has shown a mixed relationship with satisfaction [1].

The patient-provider encounter has also been considered to be important in explaining patient satisfaction. Having a prior relationship with the provider, having a prior positive relationship with that provider, and not having a negative prior relationship with the provider are each associated with higher patient satisfaction [1,20,21]. The congruence between provider and patient preferences for decision-making processes may also be important in patient satisfaction [22]. The importance of congruence between physicians and patients on age, gender and ethnicity and satisfaction is mixed [6,13,23].

The type of dental procedure that the patient experiences is another aspect of the dentist-patient encounter. The most common dental procedures include oral examinations and diagnoses, X-rays, periodontal disease therapies, direct or indirect restorations, endodontic treatments, and fixed or removable dental prostheses. To our knowledge, there are few studies which explore whether the type of dental procedure (invasive vs. non-invasive) affects patient satisfaction. Since procedures requiring dental anesthesia may result in discomfort or produce post treatment sensitivity, they may be associated with lower levels of satisfaction than non-invasive procedures [5,24].

This study's aim was to evaluate the relationships between patient variables, provider variables and patient-provider variables on dental patient satisfaction. We studied patients attending the dental clinics of Aristotle University of Thessaloniki, Greece (AUTh) and their student dentists because the sample allowed us to control for several variables, such as the technical skills of the dentist (because all were student dentists in the same dental school in either their 4th or 5th year of education).

2. MATERIALS AND METHODS

2.1 Participants, Eligibility and Sample Size

Dental students and their patients at Aristotle University of Thessaloniki (Greece; AUTh) participated in this study. Dental training at AUTh occurs over 5 years. Beginning in the 4th year, students provide the full range of dental treatments to patients; 5th year students provide the same range of care but typically in more complex cases. Therefore, students in their 4th and 5th years of study were eligible to participate, as were their patients who attended any of the dental clinics at AUTh from October 2010 to March 2011. Assuming that as many as 15 variables might be significantly related to patient satisfaction, we estimated that a sample size of 300 patients would be sufficient to run a multiple regression analysis with at least 20 cases per variable [25]. In order to restrict the analyses to cases where the data were complete, we aimed to recruit 400-500 patients.

2.2 Questionnaires

2.2.1 Patient questionnaires

Patients filled out a questionnaire before the start of their dental appointment, which included demographic items (gender, age, ethnic background [Greek/non-Greek]), marital status [single/living with partner/married/divorced/ widowed], education level [four levels ranging from none to entered or completed university], and income [four levels ranging from less than €600/month to greater than €1500/month]). Religiosity was measured with a single item *(Would you say that your relationship with religion is:)*,rated on four levels ranging from none to perfect. Patients' desire to participate in treatment decisions was measured by the 7-item Patient Communication Style Scale (PCS) [13]. A sample question is *I ask the doctor to discuss treatment options with me.* Scores range from 7 to 35; higher scores indicate a greater desire to have an active role in decision-making. Patients indicated if they had been treated by the student dentist in the past, if they had a positive relationship with the student dentist, and the type of dental treatment they were having that day. The type of the dental treatment could be as simple as an oral examination, X-rays or periodontal disease therapies or more complex treatments, such as fillings, endodontic treatments or prosthetic procedures.

After the dental appointment, the patients received a second questionnaire containing two scales, the Patient Assessment Questionnaire (PAQ) [26], which assesses dental students' communication and interpersonal skills *(*e.g. *Did he/she ask questions about reasons for your visit and listen carefully to your answers?;* possible scores range from 13-65; higher scores indicate greater skills*),*and the Dental Visit Satisfaction Scale (DVSS; a sample item is: *The dentist told me all I wanted to know about my dental problem(s);* scores can range from 10-50; higher scores indicate greater satisfaction [27,28]).

2.2.2 Dental student questionnaires

All 4th and 5th year students were asked to complete a questionnaire including demographic items (age, gender, year of training, and nationality). Their empathy level was measured by the sum of the professional items of the Toronto Composite Empathy Scale (TCES) [29]. Possible scores range from 26-156, where higher scores indicate greater levels of self-rated empathy. Students' preferences for well-informed patients who participate more actively in treatment decisions were measured by the 6-item Attitudes toward Patient Education scale (ATPE) [30]. A sample items is *I would like the patient to adopt a critical attitude towards his/her treatment.* Scores can range from 6-24; higher scores indicate a greater desire for patients to be involved in treatment decisions.

2.2.3 Questionnaire modifications, translations, and pilot testing

The PCS was originally developed to refer to physician encounters; for this study, "doctor", "health" and "health problems" were changed to "dentist", "dental health" and "dental conditions". Both the PAQ and the DVSS were developed for dental patients. The TCES was developed for use with health professionals and originally tested in a sample of dental students [29]. In this study, the Greek version of the TCES [31] was used. The ATPE scale was developed for physicians; for this study, "illness" and "health problems" were changed to "dental conditions" and "dental problems".

The English versions of the scales used in the present study (PCS, PAQ, DVSS and ATPE) were translated into Greek according to the modified guidelines of the American Association of Orthopedic Surgeons (AAOS) [32]. Translations and back translations were carried out by two pairs of bilingual individuals, who

subsequently agreed on pilot versions. The pilot versions were tested by dental students and patients who were not part of the study samples. Minor changes based on recommendations from the pilot samples resulted in the final versions of the questionnaires.

2.3 Data Entry, Variable Creation, and Statistical Analyses

Data were entered into an Excel spreadsheet and checked for accuracy. Statistical analyses were carried out with SPSS version 19.0 for Windows (SPSS Inc., Chicago, IL, USA). Following Jahng et al. [13], a variable measuring the amount of congruence between the student's and patient's desires for active patient participation was created by subtracting the standardized (z-scored) PCS scores from the standardized (z-scored) ATPE scores (ATPE-PCS). Scores closer to 0 indicate greater congruence. Positive scores indicate that the student has a greater preference for active patient participation than the patient does, while negative scores indicate that the patient has a greater preference to participate, compared with the student. An age-congruence variable was created by subtracting the student's age from the patient's age. In addition to descriptive statistics, non-parametric tests were used to examine the relationships between the potential predictor variables and DVSS, as DVSS was not normally distributed. Variables which were significantly related to DVSS scores in the univariate analyses and which were suitable for regression analysis were included in multiple regression analyses (using the enter method) to measure their relative predictive abilities when combined. In all analyses, only scales which were complete were included.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Summary statistics and univariate results

Of 201 students who were eligible to participate, 157 (78.11%) completed questionnaires and had patients who agreed to be in the study. Ages ranged from 19 to 33 (mean 22.14, SD 2.02), and the majority (97) were female. About half (70) were in the 4th year of training; the remaining 87 were in the 5th year. Of the 850 patients who met the inclusion criteria, 490 (57.65%) agreed to participate. Of these, 484 completed the DVSS. Their mean age was 43.98 years (SD=15.21, range 19-83), and the majority (60.33%) were female. Table 1 presents the descriptive statistics for the continuous variables. As seen in this Table, the DVSS scores were skewed toward greater satisfaction.

Table 2 presents the univariate statistics for the DVSS scores for the categorical variables, while Table 3 presents the univariate statistics for the satisfaction scores for the continuous variables. As can be seen in Tables 2 and 3, the DVSS scores did not vary significantly by either the age or the gender of the patients or the patients' student dentists. Therefore, in subsequent analyses the DVSS scores were not separated by patient or student gender or age.

As seen in Tables 2 and 3, patient nationality, marital status, whether or not the patient had seen the student previously, student-patient gender, nationality, and age congruence were also not related to patient satisfaction. On the other hand, higher religiosity, education and income, not experiencing invasive treatment, being treated by a 5th year student, and having a prior positive relationship with the student were each significantly related to DVSS scores. Higher scores on PCS, TCES, and PAQ were also significantly correlated with higher DVSS scores. While the students' views about patient participation (ATPE) were not related to dental visit satisfaction, dyads which were more congruent in their beliefs that patients should actively participate in treatment decisions (ATPE-PCS) included more satisfied patients.

3.1.2 Selection of variables for multiple regression

In exploring the suitability of the possible predictor variables for multiple regression analysis, it was noted that education was not linearly related to DVSS and there were no significant differences between the four levels when assessed by ANOVA. Therefore, it was a poor candidate for multiple regression. On the other hand, income did show a linear relationship with DVSS. There were no significant differences between either of the two lowest categories or either of the two highest categories. Therefore, the income data were collapsed into two categories (monthly incomes less than or equal to €1000 a month vs. more than €1000 a month), and the revised variable was retained for the regression analysis while education was not. Religiosity was also linearly related to DVSS; as

there were significant differences for each level, this variable was retained as originally scored.

As noted above, both PCS and ATPE-PCS were significantly related to DVSS scores, while ATPE was not. The correlation (rho) between ATPE-PCS and PCS was 0.70. Because PCS showed a higher correlation with DVSS than the congruence variable did, it was selected for the multiple regression analysis. Thus, eight variables (religiosity, income, not having invasive treatment, student year of training, having a prior positive relationship with the student, patient preference for participating in decision-making, student empathy, and student communication skills) were entered into the analysis.

3.1.3 Multiple regression results

As seen in Table 4, when considered simultaneously the best predictor of patients' satisfaction was the effective communication between the patient and the dental student (PAQ), followed by patient preference to be involved in decision-making (PCS). There was a trend for non-invasive treatment to be predictive of patient satisfaction. The overall F was 28.496 ($P < .001$); the model accounted for 43.6% of the variance in DVSS.

3.1.4 Additional analyses of religiosity

Finally, although patient religiosity did not reach significance in the multivariate analysis, because of sparse previous research in this area we assessed the relationship between religiosity and each of the other possible predictors used in that analysis. There was a significant relationship between student empathy and religiosity (KW=8.522, P=.04), although it was non-linear (patients assessing their religiosity as "good" were paired with the students who scored highest on empathy). Patient ratings of student communication skills were also significantly related to religiosity (KW=8.141; P=.04); patients' ratings of the students' communication skills were higher for each level of religiosity. None of the other analyses involving religiosity yielded significant results.

3.2 Discussion

3.2.1 General findings

This study found that a number of variables were related to patient satisfaction, including higher levels of education, income and religiosity, positive ratings of students' communication and interpersonal skills, stronger preferences for participating in treatment decisions, greater congruence between patients' and students' preferences for patient participation in treatment decisions, having a prior positive relationship with the student, not receiving invasive treatment, having a student with more experience, and student empathy. Given that the created congruence variable (ATPE–PCS) was excluded from the multiple regression, when considered simultaneously the strongest predictors were the students' communication and interpersonal skills and the patients' desire to participate in treatment decisions.

3.2.2 Discussion of findings as related to the literature

Communication and interpersonal skills have been identified as strong predictors of patient satisfaction in other studies in the medical and dental literature [33-38]. While Greek patients at a University dental clinic rated communication and interpersonal skills as the most important characteristics that patients wanted their dentists to have, a statistically-significant gap was found between these preferences and their actual experiences of dentists [19]. Similarly, dentist behavior comprising "mutual communication" were rated as the most important aspects of the ideal dentist in a sample of Finnish patients, but were less often actually experienced by the patients [39]. The results of our study highlight the importance of these provider skills to dental patients.

While student preferences *per se* for active patient participation in treatment decisions were not related to patient satisfaction, patients were more satisfied when they and their dental student shared similar beliefs about their involvement in dental treatment. This is consistent with the findings in medical settings [13], and supports the suggestion that dentists strive to match their patients' preferences for participation.

In our sample, patients with higher educational level and/or higher income were more satisfied. The relationship between education and satisfaction is mixed [1,5,40,41]. There are similarly mixed results between income or socio-economic status and satisfaction of medical and dental patients [42-46]. It is possible that differences between samples are related to the different outcomes.

Table 1. Descriptive statistics for the continuous variables (questionnaire scores and patient age)

Variable	N	Mean (SD)	Median	Range
DVSS	484	43.95(4.12)	44	32-50
Patient age	453	44.05(15.19)	46	19-83
PCS	482	24.50(5.12)	25	10-35
TCES	468	96.51(13.70)	96	65-133
PAQ	481	55.80(5.74)	55	40-65
ATPE	488	10.98(2.25)	11	6-19
ATPE-PCS	480	.95(1.34)	.96	-2.74-4.72

Religiosity was linearly and positively related with satisfaction in our sample. As noted previously, religiosity appears to be related to life satisfaction in general, and is typically higher in those with better health and fewer unhealthy behaviors. Therefore, the relationship between religiosity and satisfaction with the dental appointment could be a function of an overall tendency towards greater satisfaction and/or better health. Recently, religiosity has been found to be related to lower levels of oral plaque and better periodontal status, as well as lower levels of sugar intake and lower rates of caries, in samples of Israeli adults [47,48]. The authors suggest that religiosity may contribute to positive oral health via behaviors which are congruent with religious expectations (such as diet) and/or through the positive impact of religious practices on reducing stress, which is similar to how religiosity is thought to be related to positive health in general. Our results suggest that it would be advisable to look at the relationships between religiosity, health, and satisfaction with health care providers more closely in the future.

In the univariate analyses, patients who did not receive invasive treatment and patients who were treated by the more advanced students were each more satisfied, as predicted. We also found that having a prior positive relationship with the dentist, but not simply having seen the dentist before, was related to higher levels of satisfaction. This is consistent with data showing that satisfaction is influenced by previous positive dental experiences [49,50].

While empathy was correlated with patient satisfaction, the coefficient was small in magnitude and the variable failed to reach significance in the multivariate analysis. A recent review of studies in primary medical care found a mixed relationship between empathic physician behaviors and patient satisfaction [51]. In general, relationships between provider empathy and patient satisfaction seem to be stronger when patients or observers rate providers' empathy than when providers rate themselves on empathy scales [52-54]. We found similar results, in that the patients' ratings of the student's communication and interpersonal skills were more strongly related to patient satisfaction than was the students' rating of their empathy.

Contrary to our hypothesis, age was not related to satisfaction. While the medical literature typically finds that older patients are more satisfied [1], the dental literature is mixed [45,49]. Furthermore, Ayala-Luis et al. [55] found a significant relationship when age was measured dichotomously, but not when age was measured as a continuous variable. Again, sampling differences may be related to these mixed results.

We also found no significant relationships between patient gender, student gender, gender congruence, or nationality congruence and patient satisfaction, consistent with previous findings in medicine [13]. Patient satisfaction was very similar across categories of patient marital status, with patients who were cohabitating having slightly greater satisfaction. The relationship between marital status and satisfaction with health care providers is likely to be related to the particular health concern under study, as well as the ways in which marital status is quantified (i.e., whether all non-married participants are combined into one category vs. separated into groups such as never-married, cohabitating, divorced, and widowed).

3.2.3 Possible limitations of the study

This study focused on a sample of patients visiting the Dental School clinics of Aristotle University for treatment by dental students, and therefore our results may not be generalizable to patients in other settings. It would be of interest to repeat this study in samples including more experienced dentists and patients seen in other

settings and locations. Further, the ratings of provider empathy were assessed by a questionnaire completed by the students and it would be useful to also include an additional measure of empathy based on independent observations of the health providers' behaviors.

Table 2. Relationships between patient satisfaction (DVSS scores) and patients' and dental students' categorical characteristics

Variable	Group	Patient N (%)	Mean (SD)	Median	Range
Patient gender	Male	192(39.67)	46.34(4.13)	43	32-50[1]
	Female	292(60.33)	44.16(4.11)	44	33-50
Patient nationality	Greek	455(94.20)	44.03(4.14)	44	32-50[2]
	Non-Greek	28(5.80)	42.79(3.76)	41.5	38-50
Patient education	None	4(0.83)	44.00(4.24)	43.5	40-49[3]
	Primary	97(20.08)	42.74(3.86)	42	35-50
	Secondary	224(46.38)	44.14(4.32)	44	32-50
	University	158(32.71)	44.40(3.86)	45	35-50
Patient marital status	Single	142(29.34)	43.73(.33)	44	32-50[4]
	Cohabitating	26(5.37)	44.88(.86)	45.5	38-50
	Married	253 (52.27)	43.98(.27)	43	33-50
	Divorced	37(7.64)	43.97(.69)	45	37-50
	Widowed	26(5.37)	43.96(.75)	45	38-50
Patient income	< €600	107(34.41)	43.78(4.07)	43	35-50[5]
	€601-1000	105(33.76)	43.92(4.46)	43	32-50
	€1001-1500	73(23.47)	45.10(4.11)	45	35-50
	> €1500	26(8.36)	45.65(3.52)	45.5	38-50
	≤ €1000	212(68.17)	43.85(4.26)	43	32-50[6]
	> €1000	99(31.83)	45.24(3.96)	45	35-50
Patient religiosity	None	31(6.64)	42.13(4.32)	41	35-50[7]
	Moderate	92(19.70)	43.71(4.06)	43	32-50
	Good	220(47.11)	43.99(4.01)	44	33-50
	Perfect	124(26.55)	44.65(4.20)	45	35-50
Prior relationship with student	Yes	284(58.50)	43.76(4.07)	43	32-50[8]
	No	199(41.20)	44.21(4.18)	44	35-50
Prior positive relationship	Yes	121(25.10)	44.84(4.10)	45	32-50[9]
	No	361(74.90)	43.66(4.10)	43	33-50
Invasive treatment	Yes	340(71.28)	43.72(3.99)	43	32-50[10]
	No	137(28.72)	44.53(4.37)	45	33-50
Student gender	Male	60(38.20)	43.97(4.15)	44	32-50[11]
	Female	97(61.80)	43.93(4.12)	44	33-50
Student year of study	4th Year	70(44.60)	43.26(4.13)	43	33-50[12]
	5th Year	87(55.40)	44.38(4.06)	45	32-50
Student nationality	Greek	141(90.40)	43.98(4.11)	44	32-50[13]
	Non-Greek	15(9.60)	43.94(4.14)	43.5	38-50
Patient-dentist gender congruence	Congruent	258(53.64)	43.71(4.17)	43	32-50[14]
	Incongruent	223(46.36)	44.22(4.07)	45	35-50
Patient-dentist nationality congruence	Congruent	432(90.00)	44.03(4.12)	44	32-50[15]
	Incongruent	48(10.00)	43.54(4.04)	43	38-50

[1]U=29,994.500, P=.19; [2]U=5172.000, P=.09; [3]KW=12.165, P=.007; [4]KW=1.619, P =.81; [5]KW=8.085, P=.04; [6]U=12,510.000, P=.006; [7]KW=9.466, P=.02; [8]U=29,932.500, P=.27; [9]U=25,615.500, P=.004; [10]U=20,498.500, P=.04; [11]U=26,427.500, P =.85; [12]U=32,119.000, P=.003; [13]U=7,072.500, P=.88; [14]U=30,884.000, P=.16; [15]U=9,518.00, P=.35

Table 3. Spearman's Rho correlations between patient satisfaction (DVSS scores) and patients' and dental students' continuous variables

Variable	Rho	*P* value	N
Patient age	.001	.98	450
Student age	.078	.09	481
Age difference	-.007	.89	445
PCS	.336	< .001	480
TCES	.099	.03	463
PAQ	.659	< .001	480
ATPE	.028	.54	482
ATPE-PCS	-.241	< .001	478

Table 4. Relationships between predictors and DVSS using multiple regression

Predictor	Standardized beta	95% CI	*P* value
PAQ	.582	.352-.487	<.001
PCS	.125	.028-.183	.008
Invasive treatment	.080	-.085-1.500	.08
Religiosity	.072	-.090-.780	.12
Income	.069	-.185-1.500	.13
Year of training	.066	-.230-1.361	.16
Prior positive relationship with dentist	.019	-.635-.979	.42
TCES	-.011	-.029-.023	.82

4. CONCLUSION

Patient satisfaction was related to patient variables, provider variables, and the patient-provider experience. This study demonstrates the importance of communication and interpersonal relations between patient and dentist, as well as the importance of congruence between patient and dentist's preferences for patient participation in treatment decisions. This study also suggests that religiosity may be an important predictor of patient satisfaction.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. This study was approved by the Institutional Review Board at Aristotle University of Thessaloniki (Code No. 216/29-9-2010). All participants gave informed consent.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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