

# Relationship between Personality and Impacts of Implant Treatment on Daily Living

Mahmoud K. Al-Omiri, BDS, FDS RCS (England), PhD, Jordanian Board;\*  
Raed O. Abu Hantash, BDS, MSc, Jordanian Board;† Mohammad Abu Yunis, BDS, MSc, Jordanian Board;‡  
Edward Lynch, BdentSc, FDS RCSEd, MA, TCD, PhD§

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## ABSTRACT

*Purpose:* The objective of this study was to investigate the relationship between satisfaction with implant-supported fixed rehabilitations (ISFPR), their impacts on daily living, and personality profiles.

*Materials and Methods:* Fifty patients (15 men and 35 women; mean age  $44.3 \pm 9$  years), with fitted ISFPR, and 50 partially dentate controls matched with age and gender participated in this study. A Dental Impact on Daily Living questionnaire was used to assess dental satisfaction and impacts of ISFPR on daily living. NEO Five Factor inventory was used to assess participants' personality profiles. Pearson correlation, analysis of variance, and linear regression tests were used for statistical analysis of the data.

*Results:* Patients with ISFPR were more satisfied with their dentition than controls ( $p < .05$ ). Patients and controls demonstrated different relationships between personality, impacts on daily living, and satisfaction. Neuroticism, extraversion, and conscientiousness had significant relationships with satisfaction and impacts on daily living in both groups ( $p < .05$ ). Openness and agreeableness had significant relationships with satisfaction and impacts on daily living in patients' group ( $p < .05$ ).

*Conclusion:* ISFPR had positive impacts on participants' daily living and dental satisfaction. Personality traits (neuroticism, extraversion, openness, agreeableness, and conscientiousness) impact on daily living and satisfaction with ISFPR, and might predict satisfaction with ISFPR and their impacts on daily living.

**KEY WORDS:** DIDL, impacts on daily living, NEO-FFI, personality profiles, satisfaction with implants

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\*Consultant of Oral and Maxillofacial Surgery and Oral Medicine, Head of Department of Prosthodontics, associate professor and Consultant of Fixed & Removable Prosthodontics and Implants, Department of Prosthodontics, Faculty of Dentistry, University of Jordan, Amman, Jordan; †Head of Department of Prosthodontics, assistant professor and Consultant of Prosthodontics, Faculty of Dentistry, AL-Quds University, Jerusalem, Palestine; ‡Head of Faculty of Dentistry, assistant professor and Consultant of Oral & Maxillofacial Surgery, Faculty of Dentistry, AL-Quds University, Jerusalem, Palestine; §Head of Dental Education and Research, professor and Consultant of Restorative Dentistry & Gerodontology, Warwick Dentistry, Warwick Medical School, Warwick, UK

Reprint requests: Dr. Mahmoud K. AL-Omiri, Department of Prosthodontics, Faculty of Dentistry, University of Jordan, Amman 11942, Jordan; e-mail: alomirim@yahoo.co.uk

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DOI 10.1111/j.1708-8208.2010.00331.x

## INTRODUCTION

Although it is currently considered among the most popular treatment modalities for replacement of missing dentition, little attention has been paid to the psychosocial impacts of dental implant therapy. Oral health status impacts on people's daily living; therefore, assessment of patients' clinical and psychological status could be of value whenever dental needs are assessed.<sup>1,2</sup>

Regardless of the quality of care, some patients might be satisfied with their dentition and dental treatment even when they are unfavorable because of their high levels of psychogenic tolerance.<sup>3,4</sup>

Psychological factors have a recognized role in determining patient's satisfaction and compliance with dental status and treatment.<sup>5</sup> The evaluation of personality characteristics might be useful in predicting patient's behavior and may have an effect on the provision of therapy.<sup>6</sup> This provoked dental researchers to

investigate the effects of different psychological characteristics on the success and acceptance of conventional dental treatment.

Patients' quality of life, oral health impacts, and satisfaction with dentition and dental treatment could be associated with some personality traits that might be considered as predictors for such evaluation. Examples of these traits are: self-respect, self-confidence, compliance, accommodating, quietness, calmness, warmth, extraversion, agreeableness, openness, anxiety, kindness, conscientiousness, neuroticism, and meticulousness.<sup>7-14</sup> Al-Omiri and colleagues concluded that certain personality profiles such as extraversion and neuroticism had influential effects on patients' perception of their dental facial appearance.<sup>9,14</sup>

Implant-supported prostheses are associated with better comfort, stability, and esthetics than conventional prostheses; have positive effects on patients' oral health-related quality of life; and are considered as an integral part of a patient's body.<sup>15-19</sup>

Investigations of the psychological impacts following dental implant therapy are still insufficient. Blomberg and Lindquist reported that edentulous patients experienced severe psychological complications that were reduced by implant-supported prostheses.<sup>20</sup> Also, patients with higher neuroticism showed less satisfaction with their dental implant therapy.<sup>21</sup> Furthermore, dental implant therapy was found to have a significant effect on psychological well-being when compared with conventional prostheses.<sup>22</sup> Abu Hantash and colleagues reported a relationship between neuroticism and satisfaction with implant-supported prostheses among a Jordanian population.<sup>7</sup>

The literature contains many studies that explored the unique and vague relationship between psychological profiles and satisfaction with the dental status in many fields of dentistry. Unfortunately, the literature lacks enough valid studies of the relationship between satisfaction with implant-supported fixed prostheses and personality profiles and the impacts of this on daily living. Further investigation and careful scientific-based evidence are required to explore whether the assessment of certain psychological traits of patients can predict the impacts of implant-supported fixed prostheses on daily living and satisfaction with such treatment.

This study investigated the relationship between satisfaction with implant-supported fixed prostheses

and personality profiles, and the impacts of this on daily living using valid and reliable socio-dental and psychological measures. The null hypothesis was that there is no relationship between psychological profiles and satisfaction with implant-supported fixed prostheses and impacts of this treatment on daily living.

## MATERIALS AND METHODS

Fifty consecutive patients (15 men and 35 women; age range = 23–60 years, mean age =  $44.26 \pm 9$  years), with fitted implant-supported fixed prostheses to replace missing teeth were recruited for this study. All clinical procedures were approved by the Deanship of Scientific Research at Al-Quds University, Jerusalem.

An invitation to participate in the study was extended to the patients. Each participant was given a brief explanation of the study and an informed consent was obtained from each participant before being recruited into the study.

Recruited patients had to be 17 years of age or older for inclusion in the study because patients below 17 years of age were reported to have problems in scoring the NEO Five Factor Inventory (NEO-FFI) test.<sup>23</sup> Patients should also have no medical disease (including mental problems and psychological disorders) that might affect their ability to understand and/or to score the questionnaires. In addition, participants should have received no prosthetic rehabilitation other than fixed implant-supported prostheses. Furthermore, provided implant therapy should be successful throughout the entire period of the study and had no history of any failure.

Patients had either single crowns or fixed partial denture prosthodontic rehabilitation. It was decided to exclude any prosthesis with open margins or poor marginal adaptation, poor occlusion, fractured or cracked ceramic, color mismatch and/or margin discoloration, ill fitting or loose, inadequately functioning, or associated with gingival inflammation. Also, prosthetic rehabilitations should be fitted no less than 3 months before the study. The 3-month duration after prosthetic rehabilitation was shown to be an adequate period for the patients to adapt to new prostheses and give a stable assessment.<sup>15,24</sup>

In this study, all the recruited patients were found to have successful implant therapy (both surgically and prosthodontically), and none was excluded from the study.

All recruited patients in this study were assessed clinically and radiographically by experienced specialist oral and maxillofacial surgeon and prosthodontist to ensure the success of the implant treatment according to the criteria set by Albrektsson and colleagues<sup>25</sup> The assessment also included patient dental and medical histories, complaints, and personal information regarding name, age, gender, education, occupation, address, and marital status. Inter- and intraexaminer reliability was performed on 10 duplicate examinations. Kappa statistics indicated substantial agreement as examination criteria were clear and simple.

A control group of 50 partially edentulous patients who seek replacement of their missing teeth and matched the patients' group with age and gender were also recruited into this study. The number of missing teeth should not exceed six teeth as the number of fitted crowns in implant patients group was six or less. The controls should have no previous experience of fixed prostheses if they were to be included in the study.

The Dental Impact on Daily Living questionnaire (DIDL) and its scale was used to assess patients' dental satisfaction and impacts of implant-supported prostheses on daily living.<sup>1,8</sup>

The DIDL consists of 36 items grouped into five dimensions: comfort, appearance, pain, performance, and eating restriction. Impacts for each item are scored. It measures the impact and proportional importance of each dimension (weight of the dimension) to the patient. Total score of the DIDL ranged from -1 to +1 in all sample individuals. Patients responded to each item by selecting one of three response categories in the form of a Likert response format that includes agree, disagree, or neutral.

The DIDL was selected for this study because it is an efficient tool for use by the patients and clinicians that can be completed within a relatively short time period. Its items were simple and could be easily understood and scored. Reliability, accuracy, and reproducibility of this test has been authenticated by previous studies.<sup>1,7-11,26</sup> This questionnaire was validated for Jordanian population in previous studies and was found to be valid and reliable.<sup>7,9-11,26</sup>

A valid and reliable personality test, the NEO-FFI, was used to assess participants' personality profiles.<sup>27</sup> The test consisted of 60 questions that analyze the five major personality dimensions: neuroticism, extraversion, openness, agreeableness, and conscientiousness.

The NEO-FFI test was used in this study because it measures five dimensions of personality; it is simple and can be completed in a short time; it is valid, reliable, comprehensive, and easy to use statistically; and was validated for Jordanian populations in previous studies.<sup>7-11,27-29</sup>

The DIDL and NEO-FFI questionnaires were administered to the patients and controls, and the process of completing the questionnaires was supervised by the investigator. Each participant was provided with a full explanation of the dimensions as well as the methods of scoring each questionnaire.

### Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 11.0 computer software (SPSS Inc., Chicago, IL, USA). The association between the variables was analyzed using the Pearson correlation test, while the analysis of variance (ANOVA) test was used to compare satisfaction scores and personality profiles among patients and controls. The linear regression analysis was used to predict satisfaction using personality traits. For all statistical analysis, the significance level was set at  $p < .050$ .

### RESULTS

Number of prosthetic units and fixtures had no relation to DIDL or NEO-FFI scores ( $p > .050$ ). Also, gender had no relationship with the DIDL or NEO-FFI scores in patients with implant therapy ( $p > .050$ ), except that males were more satisfied with eating ( $r = -0.307$ ,  $p = .03$ ). Nevertheless, older patients were less satisfied with the general performance ( $r = -0.384$ ,  $p = .006$ ) and pain tolerance ( $r = -0.308$ ,  $p = .029$ ).

On the other hand, in the control group, gender had no relationship with the DIDL or NEO-FFI scores ( $p > .050$ ). Older participants were more satisfied with their appearance ( $r = 0.343$ ,  $p = .015$ ) and scored lower on Neuroticism ( $r = -0.411$ ,  $p = .003$ ) and higher on Extraversion ( $r = 0.316$ ,  $p = .025$ ) personality domains. Also, the higher the number of missing teeth, the less the total satisfaction as well as satisfaction with each dimension of DIDL test ( $p < .050$ ).

### DIDL and NEO-FFI Scores in Patients and Control Groups

In patients group, total satisfaction scores of the DIDL questionnaire showed that 18% of patients were

**TABLE 1 Scores of Individual Satisfaction Dimensions (DIDL Dimensions) Among the Patients and Control Groups ( $n = 100$ ; 50 Patients and 50 Controls)**

DIDL Dimension	Dissatisfied (%)		Relatively Satisfied (%)		Satisfied (%)	
	Patients	Control	Patients	Control	Patients	Control
Appearance	0 (0)	19 (38)	0 (0)	2 (4)	50 (100)	29 (58)
Pain	39 (78)	10 (20)	0 (0)	8 (16)	11 (22)	32 (64)
Oral comfort	25 (50)	15 (30)	0 (0)	2 (4)	25 (50)	33 (66)
General performance	25 (50)	23 (46)	0 (0)	3 (6)	25 (50)	24 (48)
Eating and chewing	9 (18)	15 (30)	0 (0)	2 (4)	41 (82)	33 (66)

DIDL = Dental Impact on Daily Living.

dissatisfied with their teeth and scored below 0, 50% were relatively satisfied and scored between 0 and 0.69, and 32% were totally satisfied with their teeth. The highest total satisfaction score was +0.95 while the lowest total satisfaction score was  $-0.25$  (mean: 0.43; standard deviation [SD]: 0.39).

On the other hand, in the control group, total satisfaction scores of the DIDL questionnaire showed that 30% of patients were dissatisfied with their teeth and scored below 0, 54% were relatively satisfied and scored between 0 and 0.69, and 16% were totally satisfied with their teeth. The highest total satisfaction score was +0.98, while the lowest total satisfaction score was  $-0.97$  (mean: 0.21; SD: 0.48). Table 1 presents the satisfaction with each dimension of the DIDL questionnaire among the patients and control groups.

Table 2 presents the mean, SD, and range of NEO-FFI dimension scores among the patients and control groups. In addition, Table 3 shows distribution of NEO-FFI scores among the patients and control groups.

### Correlations between DIDL and NEO-FFI Scores among the Patients and Controls

In patients group, the higher the Neuroticism scores the less the total satisfaction ( $p = .002$ ) and the higher the satisfaction with pain ( $p = .003$ ). Furthermore, the higher the Extraversion scores the less the satisfaction with pain ( $p = .006$ ). Also, the higher the openness scores the less the satisfaction with pain ( $p = .022$ ) and general performance ( $p = .004$ ), and the higher the satisfaction with eating ( $p = .012$ ). In addition, the higher the agreeableness scores the less the satisfaction with oral comfort ( $p = .001$ ) and general performance ( $p < .001$ ). However, the higher the conscientiousness scores the higher the total satisfaction ( $p = .002$ ), and the lower the satisfaction with oral comfort ( $p = .029$ ) and general performance ( $p < .001$ ).

On the other hand, in the control group, the higher the Neuroticism scores the lower the total satisfaction ( $p = .031$ ) as well as the satisfaction with appearance

**TABLE 2 The Mean, SD, and Range of NEO Five Factor Inventory (Personality Domains) Scores among Patient and Control Groups ( $n = 100$ ; 50 Patients and 50 Controls)**

Personality Domain	Patients ( $n = 50$ )		Controls ( $n = 50$ )	
	Mean (SD)	Range	Mean (SD)	Range
Neuroticism	17.08 (6.12)	10–35	20.48 (6.08)	9–39
Extraversion	30.54 (3.78)	25–36	28.94 (4.41)	20–40
Openness	21.36 (3.91)	17–30	22.20 (4.90)	9–33
Agreeableness	29.90 (4.23)	15–38	26.74 (3.81)	17–35
Conscientiousness	36.48 (5.40)	29–44	35.54 (6.15)	10–45

SD = standard deviation.

**TABLE 3 NEO Five Factor Inventory (Personality Domains) Scores among the Patient and Control Groups ( $n = 100$ ; 50 Patients and 50 Controls)**

Personality Domain	Low Score (%)		Average Score (%)		High Score (%)	
	Patients	Control	Patients	Control	Patients	Control
Neuroticism	20 (40)	13 (26)	22 (44)	21 (42)	8 (16)	16 (32)
Extraversion	0 (0)	9 (18)	22 (44)	25 (50)	28 (56)	16 (32)
Openness	43 (86)	30 (60)	7 (14)	19 (38)	0 (0)	1 (2)
Agreeableness	30 (60)	44 (88)	12 (24)	6 (12)	8 (16)	0 (0)
Conscientiousness	12 (24)	7 (14)	13 (26)	24 (48)	25 (50)	19 (38)

( $p = .028$ ) and general performance ( $p = .004$ ). Also, the higher the Extraversion scores the higher the total satisfaction ( $p = .038$ ) as well as the satisfaction with appearance, general performance, and eating ( $p = .011$ ,  $.014$ , and  $.043$ , respectively). However, openness and agreeableness had no significant relationships with any DIDL scores. Nevertheless, the higher the conscientiousness scores the higher the satisfaction with eating ( $p = .030$ ).

Table 4 shows the correlations between NEO-FFI scores DIDL scores among patients and controls.

### Comparison of DIDL and NEO-FFI Scores among the Patients and Control Group

Using ANOVA test, the DIDL total satisfaction score as well as satisfaction with appearance and pain were significantly different between groups ( $p < .050$ ). Patients' group demonstrated more satisfaction and positive impacts on daily living as they reported significantly higher scores of total satisfaction ( $p = .017$ ,  $F = 5.905$ ) and satisfaction with appearance ( $p < .001$ ,  $F = 34.087$ ), and lower scores of pain tolerance ( $p < .001$ ,  $F = 36.765$ ). Patients with fitted implant-supported prostheses were more totally satisfied with their dentition and appearance; meanwhile, they were less satisfied with their pain tolerance than the controls.

On the other hand, patients with fitted implant-supported prostheses had less neuroticism and higher agreeableness scores than controls.

### Regression Analysis to Predict Satisfaction Using Personality Profiles

The linear regression analysis in patients group showed that neuroticism and conscientiousness were helpful in predicting patients' total satisfaction ( $R = 0.574$ ,  $p = .003$  and  $.002$ , respectively). Also, neuroticism and openness were useful in predicting satisfaction with pain tolerance ( $R = 0.517$ ,  $p = .002$  and  $.014$ , respectively).

Agreeableness was helpful in predicting oral comfort ( $R = 0.454$ ,  $p = .001$ ). Furthermore, general performance was best predicted by openness, agreeableness, and conscientiousness ( $R = 0.765$ ,  $p = .003$ ,  $.001$ , and  $<.001$ , respectively). In addition, satisfaction with eating was best predicted by agreeableness and conscientiousness ( $R = 0.420$ ,  $p = .011$  and  $.012$ , respectively).

Among controls, neuroticism was useful in predicting total satisfaction ( $R = 0.306$ ,  $p = .031$ ). Also, the best predictor for satisfaction with appearance was extraversion ( $R = 0.357$ ,  $p = .011$ ). In addition, general performance was best predicted by neuroticism ( $R = 0.399$ ,  $p = .004$ ), while satisfaction with eating was best predicted by extraversion and openness ( $R = 0.407$ ,  $p = .012$  and  $.035$ , respectively).

## DISCUSSION

The DIDL was used in this study because, unlike other socio-dental indicators, it assesses the dental impact on daily living, the relative importance that respondents attribute to each dimension, and oral status. Furthermore, it allows a respondent to indicate whether a problem is entirely internal or if it has interpersonal or social impacts. Additionally, as impacts seldom occur separately, a single impact score is given to assess total oral impact. Because there are important links between quality of life and clinical oral status, the significant impacts should be used to assess needs. Instruments such as the Oral Health Impact Profile (OHIP) do not weight dimension scores and then combine the weighted scores into a single score, as does the DIDL.

Many previous studies used different types of questionnaires and tools to rate patients' satisfaction with dental implant therapy and the oral health impacts of this treatment. For example, the long version of OHIP<sup>30</sup> was shown to be valid and reliable in assessing patients' satisfaction with dental implants, but it is considered a

**TABLE 4 Correlations between NEO Five Factor Inventory and DIDL Scores among Patient and Control Groups (n = 100; 50 Patients and 50 Controls)**

DIDL scores	NEO-FFI scores				
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Total satisfaction					
Patients	R= -0.420 p= 0.002*	NS	NS	NS	0.431 0.002*
Control	R= -0.306 p= 0.031*	0.294 0.038*	NS	NS	NS
Appearance					
Patients	R= NS p=	NS	NS	NS	NS
Control	R= -0.311 p= 0.028*	0.357 0.011*	NS	NS	NS
Pain					
Patients	R= 0.407 p= 0.003*	-0.386 0.006*	-0.324 0.022*	NS	NS
Control	R= NS p=	NS	NS	NS	NS
Oral comfort					
Patients	R= NS p=	NS	NS	-0.454 0.001*	-0.309 0.029*
Control	R= NS p=	NS	NS	NS	NS
General performance					
Patients	R= NS p=	NS	-0.403 0.004*	-0.502 0.000*	-0.684 0.000*
Control	R= -0.399 p= 0.004*	0.346 0.014*	NS	NS	NS
Eating					
Patients	R= NS p=	NS	0.353 0.012*	NS	NS
Control	R= NS p=	0.287 0.043*	NS	NS	0.308 0.030*

R = Pearson's correlation coefficient, p = probability levels using two-tailed t-test, NS = not significant relation; DIDL = Dental Impact on Daily Living. \*Significant relation.

complex, lengthy test, and may confuse patients because of its psychological evaluation. In addition, structural questionnaires, categorized scales, and visual analog scales were used in order to assess satisfaction among patients with implant therapy.<sup>15,24,31</sup> However, these tools had no reliability and validity tests, and provide only an indication about satisfactory outcomes of the treatment without any mention of the effects of such therapy on various aspects of patients' quality of life.

Previous studies used different psychological tests to assess the psychological impacts of dental implant

therapy. For example, Blomberg and Lindquist<sup>20</sup> used the Eysenk Personality Inventory (EPI), Kiyak and colleagues<sup>21</sup> used the EPI and the Tennessee Self-Concept Scale, while Kent and Johns<sup>32</sup> used Rosenberg's Self-Esteem and Goldbergs's General Health Questionnaire (GHQ). However, these tests suffer from some defects. For instance, the GHQ is very long and does not identify the nature of the measured psychological disorder.<sup>33</sup> Also, the Tennessee Self-Concept Scale is not comprehensive and is used to evaluate a small number of personality traits, which might cause statistical problems

and limit the range of patients' responses.<sup>29</sup> Although the EPI test was shown to have acceptable validity and reproducibility, it only rates three domains of personality: extraversion, neuroticism, and psychoticism. Furthermore, it has only yes or no responses which cause problems during statistical analysis.

The results of this study demonstrated that implant-supported prostheses positively impacts patients' daily living and satisfaction ratings. Also, a relationship could be established between psychological traits and impacts of implant therapy on patients' satisfaction with implant-supported prostheses; therefore, the null hypothesis was rejected.

Among the patients' group, older patients were less satisfied with pain tolerance and general performance than younger patients; however, in the controls, older participants were more satisfied with appearance. This could be explained by that older patients having more critical oral demands because of the nature of their social life; and therefore are more concerned with respect to their performance and function, and less tolerant to pain induced by their dental status. Meanwhile in controls, older participants are less demanding for appearance and thus were more satisfied with their appearance. Also, scoring lower on Neuroticism and higher on Extraversion could have modified the relationship between age and satisfaction with DIDL dimensions among controls.

Among controls, it was found that the higher the age the lower the Neuroticism scores and the higher the Extraversion scores. This can be explained by that older individuals are more stable psychologically and lead a less stressful social life than younger ones. However, such tendency was not present among the patients with fitted implant-supported prostheses. This might be because their prosthetic rehabilitations might have modified the relationship between their age and their Neuroticism and Extraversion scores.

An interesting finding was that the number of fixtures and number of prosthetic units and crowns had no relationship to patient satisfaction. This might be because prosthetic rehabilitations had restored the compromised oral status and thus had reduced the effects of oral disease on satisfaction and quality of life.

It is worth mentioning that 18% of patients with fitted implant-supported prostheses were dissatisfied with their oral status and reported a truly impaired oral health-related quality of life. This can be explained by

their personality profiles which might have affected their satisfaction with the dentition regardless the success of their implant-supported prostheses.

Patients with fitted implant-supported prostheses were more totally satisfied with their dentition. This could be attributed to the ability of implant-supported prosthetic rehabilitations to correct the defects caused by missing teeth and impaired oral status, and therefore, positively impact on patients daily living and satisfaction.

The results of this study showed significant relationships between personality profiles and satisfaction among patients and controls. This might be explained on the bases that psychological factors have a certain role in determining and shaping patients' satisfaction with dental status and treatment which in turn impact daily living.<sup>5,7,9-11,14</sup>

Furthermore, the study findings demonstrated the presence of strong relationships between personality profiles and satisfaction with the dentition and dental prostheses in patients who received implant-supported rehabilitations. This agrees with previous studies using the DIDL instrument and other instruments in other situations and treatments.<sup>7-11,13,14,26</sup> Also, Kiyak and colleagues<sup>21</sup> reported that patients who scored high on neuroticism were more likely to have postoperative problems with implant surgery, oral performance, and social interaction, as well as more likely to be dissatisfied with overall treatment outcomes. However, they failed to find relationships between satisfaction and other personality traits, and this could be because of the use of the EPI personality test, which, although valid and reliable, unfortunately suffers from flaws such as incomprehensiveness.

This study demonstrated an interesting finding that patients' and control groups demonstrated different relationships between personality profiles and satisfaction. Among controls, neuroticism, extraversion, and conscientiousness were found to be significantly related to satisfaction ratings, while among implant patients, neuroticism, extraversion, openness, agreeableness, and conscientiousness were found to be significantly related to satisfaction ratings.

A possible explanation for these observations could be attributed to the fact that among controls, the assessment was mainly related to the present dentition and dental status in general, which would be influenced by certain personality traits. However, among implant

patients, the prosthesis could affect the relation and elicit the role of other traits.

The linear regression analysis demonstrated that personality profiles could significantly predict satisfaction ratings and dental impacts on daily living. This agrees with previous studies that demonstrated a role for personality traits in prediction of patient satisfaction with their dentition and dental treatment in other situations and treatments.<sup>7-9,14</sup>

The above findings showed that patients' personality profiles might potentially modify and explain dental impacts of implant-supported prostheses on daily living and dental satisfaction. They might offer important information for prediction of satisfactory outcomes before commencing dental implant treatment, which might save time and cost if the prediction is not encouraging. So, it does worth to evaluate patients' personality profiles before the beginning of dental implant treatment and give more attention to patients' expectations and response to the offered treatment. It is better to be more cautious in providing the expensive prolonged dental implant treatments that might be confronted with patients' rejection or dissatisfaction before carefully deciding whether to commence implant treatment or simply offer reversible or less expensive treatment options. This calculated action might avoid wasting efforts, money, and time of dentists, patients, and communities.

Cultural or religious issues in different populations might affect the relationships between psychological profiles and impacts of oral health and treatment on patients' satisfaction with the dentition. Further studies are required to identify the possible effects of cultural or religious factors on these relationships. Also, further investigations in this regard are required on larger samples particularly to evaluate the effects of other factors such as treatment costs in a private versus university settings, as well as effects of being treated by general practitioners versus experienced specialist and clinicians.

## CONCLUSIONS

Finally, within the limitation of this study, it was concluded that some psychological aspects (neuroticism, extraversion, openness, agreeableness, and conscientiousness) might potentially modify and explain dental impacts of implant-supported prostheses on daily living and patients' satisfaction with their dentition. They

might also offer important information for the prediction of satisfactory outcomes before commencing dental implant treatment, which might save time and cost if the prediction is not encouraging.

## ACKNOWLEDGMENTS

The authors thank Mrs. AbdelAziz for all her help during the preparation of this article.

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