



Quality of Life, Body Image and Personality Traits Among Women Receiving Botulinum Toxin Type a for Cosmetic Purposes

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Abstract

Background The demand for minimally invasive cosmetic procedures has rampantly increased in recent decades. The aim of this study was to evaluate the body image, personality traits and quality of life (QoL) in women consuming botulinum toxin type A for cosmetic purposes.

Methods This case–control study was conducted on 89 participants referring to outpatient dermatology clinics in Mashhad from 2019 to 2021. All participants completed a checklist of demographic and clinical characteristics, as well as three other questionnaires, including the World-Health-Organization Quality of Life-Short Form, Big 5 Inventory-10 (BFI-10) and Yale-Brown Obsessive-Compulsive Scale modified for body dysmorphic disorder (Y-BOCS-BDD). A control group of 101 sex and age-matched people from the general population also completed the questionnaires online.

Results All participants were females, and most of them in the case group were 31–50 years old ($n = 68$, 77.1%). Among the case group, QoL was reported higher in all domains; however, this was only significant in ‘physical’ ($P = 0.003$) and ‘psychological’ ($P = 0.036$) aspects. After considering the confounding factors, the case group was

able to significantly predict increased QoL in the ‘physical’ ($P = 0.019$) and ‘environmental’ ($P = 0.015$) domains. In terms of BFI-10 scores, conscientiousness was notably higher among the case group ($P < 0.001$), while the control group scored slightly but significantly higher than the case group in neuroticism ($P = 0.019$). The control group scored significantly higher in Y-BOCS-BDD ($P < 0.001$).

Conclusions In clients receiving botulinum toxin injection for cosmetic purposes, QoL was higher than in the control group. No signs of body dysmorphia or pathological personality traits were found in these individuals.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Personality · Quality of life · Body image · Botulinum toxin

Introduction

The demand for cosmetic procedures has significantly increased in the past decades for both genders. According to American Society of Plastic Surgeons, total cosmetic procedures increased 1.7-fold by 2010 and 2.3-fold by 2020 in comparison with 2000 [1]. Considering its population, Iran has one of the highest rates of cosmetic procedures with over 175,000 cases reported in 2017 [2]. Even though women are the primary seekers of these interventions, the number of men is on the rise among cosmetic clients as well [3]. The population of noninvasive cosmetic clients, however, is not studied in Iran yet. It is important to investigate whether clients demanding these interventions

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share common features like high neuroticism and low self-esteem or exhibit positive characteristics that encourage their attempts for increasing their life quality and self-acceptance. Understanding the motivating forces behind this rising demand has multidisciplinary advantages for both psychiatrists and aesthetic physicians as it can provide valuable insight into psychopathologic issues associated with this growing trend, as well as helping clinicians recognize their patients' needs.

Various factors may have influenced the growth of aesthetic medicine. The almost unattainable aesthetic goals in modern culture could be partly guided by the growth of effective adverts that capitalize on human's innate desire for beauty and perfection. Studies show that increasing popularity of Internet search terms like 'Botox,' 'Juvéderm' and 'Radiesse' is correlated with the number of Instagram and Facebook users [4]. Failing to reach these high standards can negatively influence mental health, infesting individuals with appearance-based rejection sensitivity and negative body image. Therefore, it is not surprising to observe a reduced quality of life (QoL) among people with these negative cognitions. For this reason, seeking cosmetic procedures may have undeniably positive effects on QoL, acting as a strong motivation for these treatments. Considering that the motivating forces behind cosmetic treatments are mostly internal concepts that may not always be evident to an outside view, they signify the relevance of psychology to aesthetic medicine. Personality psychometrics such as BFI-10 [5] can provide valuable insight into fundamental similarities between these individuals by grouping their general traits into 'openness,' 'conscientiousness,' 'neuroticism,' 'extraversion' and 'agreeableness.' It has been shown that neurotic people are more likely to mention body-related topics in their self-narrative use of language [6] and that those with body dysmorphic disorder show high scores of neuroticism while they are in a low range for conscientiousness and extraversion scores [7]. Even so, cultural differences prevent from drawing absolute conclusions about personality traits; therefore, further research is still required in these fields.

As a common minimally invasive procedure, studying *Clostridium botulinum* toxin type A (BT) injections can be an attractive choice for many cosmetic clients. With various applications for eyebrow ptosis, horizontal and vertical glabellar rhytids, crow's feet and eyelid hooding [8], BT experienced remarkable growth by 584% in the 2000s, significantly higher than any other form of minimally invasive procedure [1]. Cosmetic BT has mainly resonated with adults > 34 years old [9]; considering the reports indicating decreased prevalence of body dysmorphic disorder in > 44 year old adults [10], BT provides an opportunity to investigate these age-related presentations of body dysmorphic symptoms.

In this case-control study, we aimed to investigate the difference between clients receiving BT injections and those who have never received such injections in terms of personality traits, QoL and body dysmorphic symptoms. The results of our study may help aesthetic clinicians find commonalities among their clients' personalities and connect with their needs more effectively, while potentially reducing dissatisfaction with the outcome by means of proper communication and consultation. Furthermore, psychiatrists may come closer to answering the question of whether cosmetic procedures should be categorized as enforcers of dysfunctional cognitions or beneficial treatments to psychologic conditions.

Methods

Study Settings and Approval

This case-control study was conducted in 2019 and lasted for two years across outpatient dermatology clinics of Imam Reza and Ghaem Hospitals of Mashhad, Iran, as well as private dermatology clinics. Informed consent was obtained from all participants and the authors ensured their confidentiality. This study was in accordance with the Declaration of Helsinki. Ethics Committee of Mashhad University of Medical Sciences approved this study (IR.MUMS.MEDICAL.REC.1397).

Participants

The case group included females referred to receive botulinum toxin for cosmetic purposes who were selected through the convenience sampling method considering the following inclusion criteria: (1) 18–68 years of age, (2) absence of congenital craniofacial defects or other facial scars, (3) lack of major psychiatric conditions or admission in psychiatry service and (4) literacy to complete surveys. Due to COVID-19 restrictions, our control group was selected from among sex-matched online survey respondents who had never received botulinum toxin for cosmetic purposes. Since cosmetic interventions are not covered by insurance companies, no distinction was made between clients who referred to private institutions as opposed to public ones. Participants who had answered < 80% of questions were excluded, resulting in a total of 190 female participants (89 in case group, 101 in control group).

Survey Tools

The previously validated Persian translation of World Health Organization Quality of Life: Brief Version (WHOQOL-BREF) was used to evaluate QoL among both

groups [11]. Using items designed based on five-point Likert scale, this 26-item questionnaire measures QOL in four different domains: physical health, psychological well-being, social relationships and environment. WHO-QOL-BREF is scored in a positive direction (higher scores indicating higher QOL), while the results may be transformed into either a 4–20 or 0–100 range, and the latter method of scoring was used in our study.

We assessed body dysmorphic symptoms using the self-report Yale-Brown Obsessive-Compulsive Scale Modified for Body Dysmorphic disorder (Y-BOCS-BDD). This questionnaire consists of 12 ordinal items (each ranging 0–4) concerned with two domains of obsessions and compulsions. The cumulative score may range from 0 to 48, with higher scores indicating more severe body dysmorphic symptoms. We used the Persian translation of Y-BOCS-BDD, which was validated in 2010 [12].

The short-form big five inventory (BFI-10), which is the briefest personality questionnaire, was used to analyze personality traits in the five major domains of openness, conscientiousness, neuroticism, extraversion and agreeableness. Each of these domains is scored in a range of 2–10 and determined by two Likert-based items (ranging 1–5). Some items were reverse-scored since they were negatively worded. This scale has been previously translated into Persian, and the validity and reliability of it have been confirmed [13].

Demographic details of each participant, including age, sex, education, job, income and marital status were documented for analysis along with their questionnaire responses. The participants self-reported their previous cosmetic treatments, recent major life events and past psychiatric history (i.e., history of any outpatient psychiatric visit or treatment). The time required to complete the surveys was approximately one hour, and all participants could receive a detailed explanation of their results via e-mail.

Statistical Analysis

Data were analyzed using SPSS, version 16 (IBM Statistics, Chicago, IL, USA). Qualitative variables were described by frequency and percentage, while quantitative variables were described by mean and standard deviation. Independent samples student *t*-test and Mann–Whitney test were used to compare quantitative variables between two groups based on their normal distribution. The case and control groups were not matched for some features; therefore, there was large heterogeneity in a number of characteristics. This was controlled by building backward stepwise linear regression models of the dependent variables, and the variables were removed based on $P \geq 0.1$ at each step. According to a recent

study by Garrusi and Baneshi, the prevalence of dissatisfaction with body image among the Iranian population was reported to be around 34% [14]. While the frequency of dissatisfaction with body image has not been reported among those receiving botulinum toxin injections, it is assumed to be nearly 15% based on anecdotal observations of the authors. The sample size was calculated 81 in each group with respect to alpha of 0.05 and a beta of 0.2 using PASS (PASS 2019 Power Analysis and Sample Size Software, NCSS, LLC; Kaysville, Utah, USA), which was increased to 90 in each group considering a 10% dropout.

Results

Demographic and Clinical Features

In total, 190 female participants were included in this study (89 cases, 101 controls). Most cases and controls were 31–50 years old (77.1 and 86.1%, respectively) (Table 1). The difference in marital status, employment, income level and perceived financial status was statistically significant between the two groups ($P < 0.001$). Table 2 summarizes the psychological features of participants as well as their cosmetic history. Out of 89 participants in case group, 29 (39.8%) had ≥ 4 four BT injections in the past. The case group reported significantly higher frequency of soft tissue filler use ($P < 0.001$). The control group visited a psychiatrist more frequently (31.7% vs. 16.5%; $P = 0.018$), but was less commonly treated for psychiatric problems (6.9% vs. 7.1%; $P > 0.99$). The two groups were not statistically different in terms of recent major life events.

Survey Results

Table 3 summarizes the results of WHOQOL-BREF and BFI-10 among the case and control groups. The mean QoL scores among the case group were higher in all domains; however, this increase was statistically significant in ‘physical’ and ‘psychological’ domains ($P = 0.003$ and $P = 0.036$, respectively), while the difference in ‘social relationships’ and ‘environment’ domains was not statistically significant. In terms of the big five personality traits, conscientiousness was notably higher in the case group (7.37 ± 1.79 vs. 5.87 ± 1.86 , $P < 0.001$). In terms of neuroticism, the control group scored slightly but significantly higher than the case group ($P = 0.019$). Other aspects of BFI-10 were not significantly different between the two groups. The mean Y-BOCS-BDD score was significantly higher in the control group (24.14 ± 8.12 vs. 12.73 ± 7.54 , $P < 0.001$).

Table 1 Demographic features of the participants

Demographic feature		Groups		P-value*
		Case N = 89	Control N = 101	
Age (Years)	18–30	13 (14.9%)	14 (13.9%)	0.087
	31–50	68 (77.1%)	87 (86.1%)	
	51–60	8 (8.0%)	0 (0.0%)	
Marital status	Single	19 (21.34%)	49 (48.51%)	< 0.001
	In relationship	65 (73.03%)	38 (37.62%)	
	Married	1 (1.12%)	10 (9.90%)	
	Divorced or widowed	4 (4.49%)	4 (3.96%)	
Education (years)	Primary	1 (1.1%)	0 (0.0%)	0.312
	Secondary	1 (1.1%)	0 (0.0%)	
	Associate degree	14 (15.7%)	12 (11.9%)	
	Bachelor	42 (47.2%)	43 (42.6%)	
	Master degree	22 (24.7%)	26 (25.7%)	
	Doctoral	9 (10.1%)	20 (19.8%)	
Employment	Unemployed	18 (20.9%)	39 (45.9%)	< 0.001
	Part-time	4 (4.7%)	16 (18.8%)	
	Freelance	16 (18.6%)	9 (10.6%)	
	Private	32 (37.2%)	16 (18.8%)	
	Governmental	13 (15.1%)	5 (5.9%)	
	Retired	3 (3.5%)	0 (0.0%)	
Income level	Low	6 (7.9%)	47 (45.6%)	< 0.001
	Average	41 (53.9%)	31 (30.7%)	
	High	29 (38.2%)	23 (22.8%)	
Perceived financial state	Poor	0 (0.0%)	9 (8.1%)	0.035
	Struggling	14 (15.7%)	17 (16.8%)	
	Average	55 (61.8%)	52 (51.5%)	
	Comfortable	19 (21.3%)	19 (18.8%)	
	Well-off	5 (5.0%)	1 (1.1%)	

* Chi-square test

Table 2 Comparison of psychiatric and cosmetic history of participants

Clinical features		Groups		P-value *
		Case N = 89	Control N = 101	
Abdominoplasty		2 (2.2%)	1 (1.0%)	0.601
Eyebrow lift		3 (3.4%)	1 (1.0%)	0.342
Rhinoplasty		18 (20.2%)	12 (11.9%)	0.162
Liposuction		5 (5.6%)	1 (1.0%)	0.100
Skin resurfacing/hair removal laser		38 (42.7%)	33 (32.7%)	0.177
Soft tissue fillers (face)		24 (27.0%)	4 (4.0%)	< 0.001
Psychiatric visit		14 (16.5%)	32 (31.7%)	0.018
Currently under psychiatric treatment		6 (7.1%)	7 (6.9%)	> 0.999
Psychiatric hospitalization		0 (0.0%)	0 (0.0%)	–
Past year's Major life events	Marriage	6 (6.7%)	8 (7.9%)	0.789
	Child birth	6 (6.7%)	2 (2.0%)	0.150
	Divorce	1 (1.1%)	4 (4.0%)	0.373

* Chi-square test

Table 3 Survey results, compared between the case and control groups

Feature	Group	P-value *		
		Case N = 89	Control N = 101	
WHOQOL-BREF	Physical	53.65 ± 11.26	48.19 ± 13.46	0.003
	Psychological	59.75 ± 12.15	55.98 ± 12.41	0.036
	Social relationships	63.97 ± 21.45	58.13 ± 20.27	0.055
	Environment	64.19 ± 17.51	60.19 ± 16.29	0.105
Big Five	Agreeableness	6.97 ± 1.54	6.66 ± 1.78	0.195
	Conscientiousness	7.29 ± 1.79	5.79 ± 1.66	< 0.001
	Neuroticism	5.49 ± 1.66	5.79 ± 1.66	0.019
	Openness	6.77 ± 1.95	7.25 ± 1.91	0.088
	Extraversion	6.05 ± 1.74	5.70 ± 1.94	0.189

* Independent samples *t*-test

Regression Analysis

Since the groups were only sex- and age-matched, backward stepwise linear regression was used to identify potential independent predictors of the study outcomes out of the following candidate independent variables: group, employment, income level, soft tissue filler use and psychiatric visit. The resulting regression models are summarized in Table 4. The study group was a predictor of ‘physical’ and ‘environment’ QoL domains, Y-BOCS-BDD score, conscientiousness and neuroticism ($P < 0.05$). Conscientiousness was also predicted by a history of psychiatric visit (unstandardized beta = 0.59, 95% CI

[− 0.001 1.19], $P = 0.05$). Income level was a positive predictor of ‘physical,’ ‘psychological’ and ‘environment’ aspects of QoL.

Discussion

In the current study, we investigated the psychological condition of women receiving cosmetic BT injections. Cultural aesthetic standards can leave individuals in a state of dissatisfaction with their body, affecting their mental health, well-being and QoL. The demand for minimally invasive cosmetic procedures has increased significantly

Table 4 Summarized results of stepwise linear regression

Dependent variable model	Independent variable (predictors)	Adjusted sum of R-squared	Unstandardized beta	95% Confidence interval	P-value
Physical QoL	Case-control*	0.085	− 4.8	[− 8.95 − 0.081]	0.019
	Income level		6.27	[1.88 10.66]	0.005
Psychological QoL	Case-control	0.082	− 3.42	[− 7.48 0.64]	0.099
	Income level		5.91	[1.55 10.26]	0.008
	Psychiatric visit		4.08	[− 0.40 8.56]	0.074
Environment QoL	Case-control	0.064	8.76	[− 15.81 − 1.72]	0.015
	Income level		8.31	[2.32 14.30]	0.007
Social relationships QoL	Case-control	0.039	− 6.66	[− 13.36 0.041]	0.051
	Psychiatric visit		6.78	[− 0.70 14.26]	0.075
Y-BOCS-BDD	Case-control	0.311	10.71	[8.18 13.24]	< 0.001
Extraversion	Job	0.056	− 0.742	[− 1.40 0.08]	0.028
Agreeableness	Income level	0.012	0.48	[− 0.07 1.04]	0.089
Conscientiousness	Case-control	0.221	− 1.65	[− 2.19 − 1.11]	< 0.001
	Psychiatric visit		0.59	[− 0.001 1.19]	0.050
Neuroticism	Case-control	0.048	0.62	[1.20 0.03]	0.038

QoL Quality of life; Y-BOCS-BDD Yale-brown obsessive-compulsive symptoms scale adjusted for body dysmorphic disorder

* A positive Beta defines a positive association with being in the control group

since the 2000s [1], and it is essential for both aesthetic physicians and psychiatrists to understand the forces encouraging this demand, as well as its implications on cosmetic clients.

Understanding the common personality traits of cosmetic clients is important in catering for their needs. We found that the clients receiving BT injections scored significantly higher in conscientiousness and lower in neuroticism from among the Big Five traits [5]. Our stepwise linear regression model for neuroticism indicated that variables other than the group do not account for any further variance, while a history of psychiatric visit can predict conscientiousness. Neuroticism refers to a general tendency for negative thoughts, which might seem natural to overlap with negative body image in some cases. However, the relationship between neuroticism and body dissatisfaction is more complex and depends on multiple variants. Studies suggest that in women with lower levels of neuroticism, feminine personality traits (based on Bem sex role inventory) are associated with higher self-evaluated sexual attractiveness, while in high levels of neuroticism, masculine traits are associated with better body image [15]. In other words, the effect of neuroticism on body image is reliant on other personality traits as well. Interestingly, some reports in China that resembles the Iranian culture compared to the West suggest that conscientiousness is strongly associated with masculinity traits [16, 17]. According to these studies, females with high neuroticism may be less prone to body dissatisfaction if they have high conscientiousness; however, no study has directly examined this possibility. We observed higher levels of conscientiousness and lower neuroticism in clients seeking BT cosmetic treatment, while they did not demonstrate body dysmorphic tendencies. The personality features in our study may be influenced by the minimally invasive nature of BT injections because one study on invasive facial cosmetic surgeries in Iran (e.g., rhinoplasty) reported that conscientiousness and agreeableness are notably lower among these patients than in the general population [18]. Nonetheless, with respect to neuroticism, our study is counteractive to some reports that indicate higher levels in cosmetic clients [19, 20]. It is worth noting that the results of such questionnaires may be biased by the situation in which they were completed, that is, when patients are waiting for a medical procedure in a stressful environment.

The implications of cosmetic procedures on well-being and life satisfaction are arguably the most important aspects of aesthetic medicine. We found that according to Y-BOCS-BDD, individuals who received BT injections showed significantly less body dysmorphic tendencies than the control group, which is consistent with the lower levels of neuroticism observed in the case group. This difference

in Y-BOCS-BDD score may be attributed to several causes, which we will discuss later. However, it is important to note that the results of control group were obtained via online surveys and included those who may have experienced cosmetic procedures other than BT injections (even though there was no statistical difference between the case and control groups in terms of past cosmetic procedures other than facial fillers). Thus, it is not without merit to assume that some individuals from the control group consider receiving BT injections in the future. Furthermore, the financial status of our case group was significantly better than the control group, although stepwise regression eliminated income as an independent variable affecting Y-BOCS-BDD; in other words, income level cannot predict body dysmorphic symptoms. More importantly, though, our case group completed surveys before their injections, and the data were not analyzed based on whether it was their first injection or not. Accordingly, the evidence does not directly suggest BT cosmetic procedure as the cause of reduced body dysmorphic tendencies in the case group. One could imagine that individuals with low body dysmorphic tendencies may be seeking BT due to other motivating factors, negating the relevance of underlying psychopathologies related to body image. A study by Schaschmidt et al. on cosmetic clients receiving BT found no significant association between body dysmorphic symptoms and BT injection [20]. Even though we found fewer body dysmorphic symptoms in those who were receiving BT, the report by Schaschmidt et al. is consistent with our conclusion that body dysmorphia is not a factor encouraging BT injection. However, studies on other forms of cosmetic interventions have revealed a significant relationship between negative body image and aesthetic plastic surgery [21]. This may be explained by the invasive nature of plastic surgery, which requires patients to be influenced by strong motivating factors such as negative body image.

We found that the case group not only showed lower body dysmorphic symptoms but also demonstrated a higher QoL in all WHOQOL-BREF domains. However, multivariate regression analyses revealed that only the 'environment' and 'physical well-being' domains of QoL were significantly higher in the case group. Stepwise regression models also found 'social well-being' to be the sole domain that was not predicted by income. Our results replicated the findings of Schaschmidt et al. in this regard, which similarly indicated higher QoL scores in the 'environment' and 'physical health' domains of people receiving BT [20]. Similarly, Molina et al. reported that following BT injection, clients experience an increase in their QoL [22]. These are all consistent with previous observations about the importance of physical appearance on individuals' QoL after cosmetic treatments, which affects self-esteem and interpersonal relationships [23–25].

Our study was conducted with a large sample size, and for the first time evaluated the psychological characteristics of those receiving BT in Iran; however, several limiting factors were present. Firstly, due to COVID-19 limits, our control group was selected through online surveys, and most importantly, it was not matched based on some characteristics; however, we used stepwise regression models to mitigate this aspect. Secondly, the timeframe of injections was not considered and no distinctions were made between people who were experiencing their first BT injection and those who received them for a long time; this limited our ability to analyze the cause-and-effect relationship of cosmetic procedures on well-being. Future prospective studies on BT injections with a focus on differences before and after the injection may provide new insight into the psychiatric aspects of this cosmetic procedure.

Conclusion

The present study provided insight into psychological aspects of cosmetic clients receiving BT injections in Iran. Our case group scored significantly lower in neuroticism and higher in conscientiousness while displaying fewer symptoms associated with body dysmorphic disorder. We report that seeking cosmetic BT injection need not alarm physicians of underlying major psychopathologies, although care should be taken for susceptible clients. Our study supports the fact that BT injections are associated with higher physical and environmental QoL.

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Declarations

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

Ethical Approval This study was in accordance with the Declaration of Helsinki. The Ethics Committee of Mashhad University of Medical Sciences approved this study (IR.MUMS.MEDICAL.REC.1397).

Informed Consent Informed consent was obtained from all participants.

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