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Knowledge and Attitudes of Dental Patients Toward Botulinum Toxin Treatment

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Abstract

Background: This study aims to evaluate the knowledge, attitudes, and perceptions of patients applying to a dental faculty for treatment regarding botulinum toxin.

Methods: The study was conducted at the İstanbul Yeni Yüzyıl University Faculty of Dentistry Hospital and included a total of 139 patients. A 3-section questionnaire was used: (1) demographic data, (2) knowledge of Botox, and (3) attitudes toward Botox applications. The data were analyzed using IBM SPSS 23.0, and the Kruskal-Wallis test, Dunn's test, Mann-Whitney U test, Chi-square test, and Fisher's Exact tests were applied.

Results: Among the participants, 67.6% were female, 32.4% were male, and 70.6% were between 18 and 44 years old. Only 15.1% of the participants correctly answered the question "What Is Botox?." While 75.5% of the participants stated that Botox is used for cosmetic purposes, their knowledge of its therapeutic applications was limited. Additionally, 20.9% of participants reported being aware of the side effects of Botox, while 33.1% stated that they had considered undergoing Botox treatment. 12.9% of the participants had previously undergone Botox procedures, with 72.2% receiving it for aesthetic reasons and 27.8% for medical purposes.

Conclusion: The results of the study indicate that patients have insufficient knowledge regarding the therapeutic uses of botulinum toxin. Participants predominantly perceive Botox as a cosmetic procedure and have limited awareness of its medical benefits. Furthermore, a significant portion of participants believe that Botox procedures can only be performed by plastic surgeons and dermatologists, demonstrating low awareness of the competency of dentists in administering such treatments. This study highlights the need to increase patient awareness regarding both the aesthetic and therapeutic uses of Botox.

Keywords: Botulinum toxin, cosmetic dentistry, patient awareness, temporomandibular joint disorder, therapeutic applications

What is already known on this topic?

- *In recent years, Botox applications have become increasingly popular due to being a fast, effective, and non-surgical method, and are frequently used in both cosmetic and therapeutic treatments. In dentistry, Botox is therapeutically applied, particularly in the management of facial pain, chronic migraine headaches, bruxism, temporomandibular joint disorders, hypertrophy of the temporalis and masseter muscles, and control of sialorrhea. However, patients often have limited knowledge about Botox as a treatment alternative following an examination. They are more familiar with its cosmetic use rather than its therapeutic applications.*

What this study adds on this topic?

- *This study is one of the first known studies to examine the knowledge, attitudes, and perceptions of patients seeking dental care in Istanbul regarding botulinum toxin treatments. The results show that most participants view Botox exclusively as a cosmetic procedure, with little awareness of its therapeutic uses. The findings highlight the need for increased public education and awareness*

INTRODUCTION

In recent years, cosmetic dentistry has become an important aspect of modern dental practice. Among various aesthetic procedures, botulinum toxin (BTX) has gained popularity as a fast, effective, and non-surgical option for enhancing physical appearance.[1] According to the American Society of Plastic Surgeons,[2] BTX procedures are among the 2 fastest-growing cosmetic treatments of the past decade, with total expenditures on these procedures surpassing the combined costs of breast implants and liposuction.[2]

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regarding Botox treatments. Future research conducted in various geographic areas with larger sample sizes will offer a deeper understanding of patient perceptions and knowledge regarding botulinum toxin, providing valuable contributions to the existing literature.

Botulinum toxin, commonly known as Botox, is a neurotoxin derived from *Clostridium botulinum*.[3] It acts as a protease exotoxin, inhibiting the release of acetylcholine, a neurotransmitter crucial for muscle contraction and glandular secretion.[4] By blocking acetylcholine at the neuromuscular junction, BTX induces temporary muscle paralysis through localized chemical denervation.[5]

Botox injections, particularly those containing botulinum toxin type A (BTX-A), have become widely used in cosmetic procedures worldwide. This increasing demand can be attributed to their minimally invasive nature, ease of application, rapid visible effects, and short recovery period.[6]

The therapeutic use of botulinum toxin dates back to 1815, when Kerner first explored its potential medical applications.[7] However, a major breakthrough occurred in 1968, when ophthalmologist Alan Scott successfully used BTX-A in humans to treat strabismus (crossed eyes) and blepharospasm (uncontrollable blinking). This development led to the establishment of Oculinum, Inc., a company focused on researching and developing BTX-A for medical use.[8]

Botulinum toxin is widely used for cosmetic purposes, reducing the appearance of wrinkles, particularly around the eyes, mouth, and forehead.[9] It also serves as a non-surgical alternative for treating gummy smiles, providing a minimally invasive option for patients seeking aesthetic improvements.[10,11] Beyond its cosmetic benefits, BTX plays a significant role in therapeutic applications, including the management of facial pain,[10] chronic migraines,[10,12] teeth grinding (bruxism), and temporomandibular joint disorders,[10,11] cervical dystonia, severe hyperhidrosis, blepharospasm, strabismus, controlling sialorrhea, treating hypertrophy in temporalis and masseter muscle, chronic facial pain associated with masticatory hyperactivity.[13]

In a study evaluating the effects of bruxism on quality of life in adults, bruxism was found to have strong negative impacts on quality of life, causing physical and psychological discomfort. Even in patients without temporomandibular disorder, bruxism alone led to a decrease in quality of life.[14]

Bruxism can be effectively treated with local intramuscular Botox type A injections, typically administered 2 to 4 times per year. Unlike traditional treatments like nightguards, which mainly help prevent the side effects of teeth grinding, Botox directly targets the root cause of the condition. From both a medical and dental standpoint, Botox provides an efficient solution by addressing key issues related to bruxism, such as excessive occlusion and muscle tension.[15]

Research on patients' knowledge, attitudes, and experiences regarding the non-cosmetic applications of BTX remains limited, particularly in developing countries. Therefore, this survey-based study aims to assess the awareness, perceptions, and experiences of patients in Istanbul, Türkiye, concerning the non-cosmetic use of BTX injections. Understanding these gaps in patient knowledge will contribute to improving treatment awareness and optimizing patient outcomes. Additionally, the findings of this study will assist dentists in providing better education and guidance on BTX applications.

MATERIALS AND METHODS

This study was conducted at İstanbul Yeni Yüzyıl University Faculty of Dentistry Hospital between December 1, 2024, and January 1, 2025. Ethical approval for the study was obtained from the İstanbul Yeni Yüzyıl University Non-Interventional Research Ethics Committee (Approval no: 2023/10-1101; Date: 02.10.2023), and the study adhered to the principles of the Declaration of Helsinki. A total of 139 patients who applied to the faculty hospital for dental treatment and voluntarily agreed to participate in the study were included. Informed consent forms were obtained from the patients.

The questionnaire used in this study consisted of 3 sections and 13 multiple-choice questions. The first section included questions regarding participants' gender, age, occupation, and education level. The second section aimed to assess patients' knowledge of BTX, while the third section evaluated their attitudes toward BTX applications.

The data obtained from the study were analyzed using IBM SPSS (Statistics for Windows, Version 23.0, , IBM SPSS Corp.; Armonk, NY, USA). The normality of parameter distribution was assessed using the Kolmogorov-Smirnov test, which indicated that the parameters did not follow a normal distribution. In addition to descriptive statistical methods (minimum, maximum, mean, SD, median, and frequency), various statistical tests were applied for data analysis. The Kruskal-Wallis test was used to compare educational levels, and Dunn's test was applied to identify which groups contributed to significant differences. The Mann-Whitney U test was used to compare 2 independent groups, including gender and employment status. For categorical data, the Chi-square test, Fisher's Exact Chi-square test, Fisher-Freeman-Halton Exact Chi-square test, and Continuity (Yates) correction were applied. A *P*-value of less than .05 ($P < .05$) was considered statistically significant.

RESULTS

A total of 139 patients participated in the study, with 49 (35.3%) aged 18-29 years, 49 (35.3%) aged 30-44 years, 37 (26.6%) aged 45-64 years, and 4 (2.9%) aged 65 years and older. Among the participants, 67.6% were female and 32.4% were male. The demographic characteristics of the participants are presented in Table 1.

Among the participants, 15.1% correctly answered the question, "What Is Botox?" by identifying it as a type of toxin. In response to the question "Do you know in which conditions Botox is used?", 75.5% of the participants stated that it is used for unwanted wrinkles, 33.12% for bruxism, 16.5% for excessive sweating, 15.8% for a high smile line, 15.1% for a square face shape, 14.4% for facial spasms, and 12.2% for migraines. The accuracy score for this question ranged from 0 to 62.5, with a mean score of 14.48 ± 14.61 and a median score of 12.5. Additionally, 20.9% of the participants reported being aware of Botox's side effects, while 33.1% stated that they had considered undergoing Botox for any reason. Among those who did not consider having Botox, 61.3% indicated that they did not find it necessary.

Table 1. Distribution of Studied Sample According to Demographic Data

		n	%
Age	18-29	49	35.3
	30-44	49	35.3
	45-64	37	26.6
	65 and above	4	2.9
Gender	Female	94	67.6
	Male	45	32.4
Occupation	Employed	86	61.9
	Unemployed	53	38.1
Educational level	Primary school	41	29.5
	High school	30	21.6
	University graduate	64	46
	Postgraduate	4	2.9

Among all participants, 12.9% (n = 18) had previously undergone a Botox procedure. Of these, 77.8% had been receiving Botox for less than 2 years, 5.6% for 2-5 years, and 16.7% for 5-10 years. Among Botox users, 72.2% underwent the procedure for aesthetic reasons, while 27.8% received it for medical purposes. When asked "Who do you think is legally authorized to perform Botox procedures?," 66.9% of the participants responded with plastic, reconstructive, and aesthetic surgeons or dermatologists, 17.3% stated physicians or dentists, 13.7% believed that esthetic professionals in beauty salons were authorized, 4.3% thought all healthcare workers could perform the procedure, and 16.5% stated that they did not know. Only 7 participants (5%) correctly answered this question by selecting plastic, reconstructive, and aesthetic surgeons, dermatologists, physicians, and dentists as authorized professionals (Table 2).

Among female participants, 16% correctly answered the question "What is Botox?", compared to 13.3% of male participants. There was no statistically significant difference between genders ($P > .05$). However, among unemployed participants, 24.5% correctly answered the question, which was significantly higher compared to 9.3% of employed participants ($P = .028$; $P < .05$). No significant difference was found among education levels in terms of correctly answering the "What is Botox?" question ($P > .05$) (Figure 1).

The percentage of correct answers regarding Botox indications was significantly higher among female participants compared to male participants ($P = .001$; $P < .05$). However, no statistically significant difference was observed between employed and unemployed participants regarding their knowledge of Botox indications ($P > .05$). A significant difference was detected among education levels, with higher education levels associated with better knowledge of Botox indications ($P = .001$; $P < .05$). According to the post hoc Dunn's test, university and postgraduate graduates had significantly higher accuracy scores compared to primary school ($P = .001$) and high school ($P = .038$) graduates ($P < .05$) (Figure 2).

Among female participants, 4.3% correctly answered the question "Who is legally authorized to perform Botox?", compared to 6.7% of male participants. No statistically significant difference was found between genders ($P > .05$). Similarly, 7% of employed participants and 1.9% of unemployed

Table 2. Distribution of Answers to Questions About Botox

		n	%
What is Botox? (n = 139)	Type of filling	80	57.6
	Type of toxin	21	15.1
	Type of filling and toxin	3	2.2
	I don't know	35	25.2
In what cases is Botox applied? (n = 139)	Unwanted wrinkles	105	75.5
	Gummy smile	22	15.8
	Strabismus	4	2.9
	Cervical dystonia – cervical muscle spasm	8	5.8
	Migraine	17	12.2
	Involuntary contraction of eyelids	25	18
	Urinary incontinence	2	1.4
	Facial contractions	20	14.4
	Excessive sweating	23	16.5
	In children with cerebral palsy	2	1.4
	Teeth grinding	46	33.1
	Facial pain like lightning	6	4.3
	Square face shape	21	15.1
	Regional muscle pain	10	7.2
	Dry mouth	3	2.2
	Limited mouth opening	8	5.8
	I don't know	31	22.3
Do you know the side effects of Botox? (n = 139)	Yes	29	20.9
	No	110	79.1
Would you consider getting Botox for any reason? (n = 139)	Yes	46	33.1
	No	93	66.9
If your answer is no, what is the reason? (n = 93)	High cost	0	0
	Fear	10	10.8
	Not seeing it as necessary	57	61.3
	Possibility of side effects	8	8.6
	Religious reasons	14	15.1
	Concern that facial expressions may change	11	11.8
Have you had any botox application? (n = 139)	Yes	18	12.9
	No	121	87.1
How long have you been getting Botox? (n = 18)	5-10 years	3	16.7
	2-5 years	1	5.6
	2 years	14	77.8
What is your reason for getting Botox? (n = 18)	For aesthetic reasons	13	72.2
	For health reasons	5	27.8
Who do you think is legally authorized to perform Botox procedures? (n = 139)	Plastic, reconstructive and aesthetic surgeons-Dermatologists	93	66.9
	All healthcare professionals	6	4.3
	Medical-Dentist	24	17.3
	Estheticians in beauty salons	19	13.7
	I don't know	23	16.5

participants answered this question correctly, with no statistically significant difference between groups ($P > .05$). No significant difference was found among education levels regarding the accuracy of responses to this question ($P > .05$) (Figure 3).

DISCUSSION

Botulinum toxin is widely used for both aesthetic and therapeutic purposes. Today, it is preferred not only for cosmetic enhancement but also for the treatment of various medical conditions.[16] This study provides an overview of patients' knowledge and attitudes toward Botox applications in both non-surgical cosmetic and therapeutic procedures at Istanbul Yeni Yüzyıl University Faculty of Dentistry Hospital. The findings indicate that participants generally lacked sufficient knowledge about Botox applications, and only 12.9% had undergone Botox treatment, primarily for aesthetic purposes.

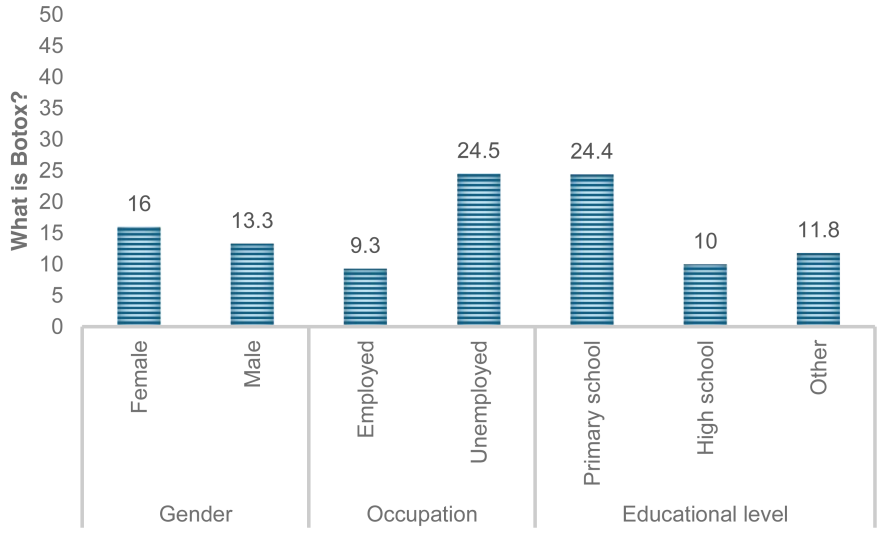

Figure 1. Distribution of correct answers to the question "What is Botox?" according to demographic data.

Among the study participants, 70.6% were aged 18-44 years, 67.6% were female, and 12.9% had received Botox treatment. These results are consistent with the findings of Alharethy et al,[17] who reported that 19% of participants had undergone Botox procedures, and also correspond with the study by Fareed et al,[18] in which 22% of participants had received Botox treatment.

The relationship between economic status and Botox procedures was another notable aspect of the findings of the study. 61.9% of the participants were employed, which is consistent with the studies by Schlessinger et al[19] and Fareed et al[18] Moreover, the fact that "high cost" was never cited as a reason for not undergoing Botox treatment suggests that financial constraints may not be a significant barrier for individuals opting for the procedure. A similar conclusion was reached in the study conducted by Alharethy et al[17] in Syria, where cost was not identified as a limiting factor for cosmetic procedures.

Among the 139 participants, only 21 correctly answered the question "What is Botox?," indicating a generally low level of knowledge. Although there was no statistically significant difference in correct responses based on education levels, it

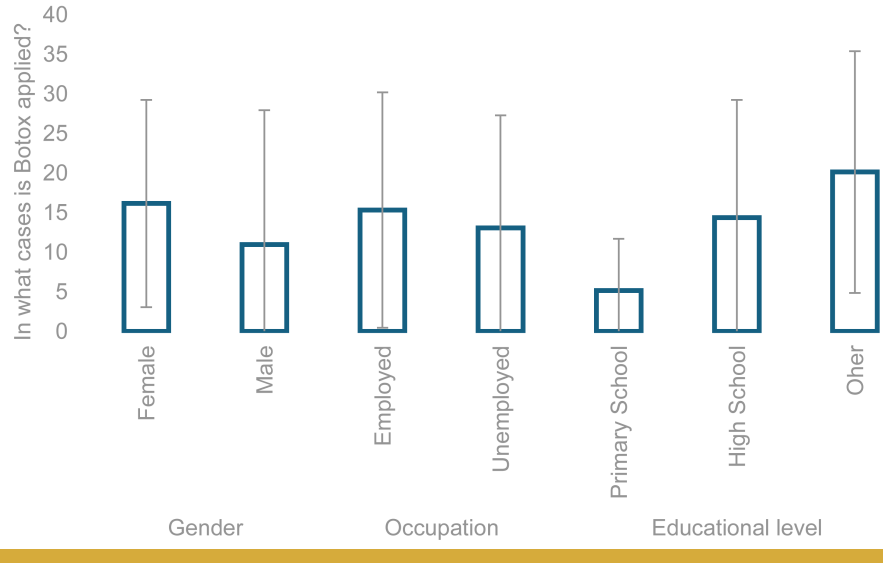

Figure 2. Distribution of correct answers to the question "In what cases is Botox applied?" according to demographic data.

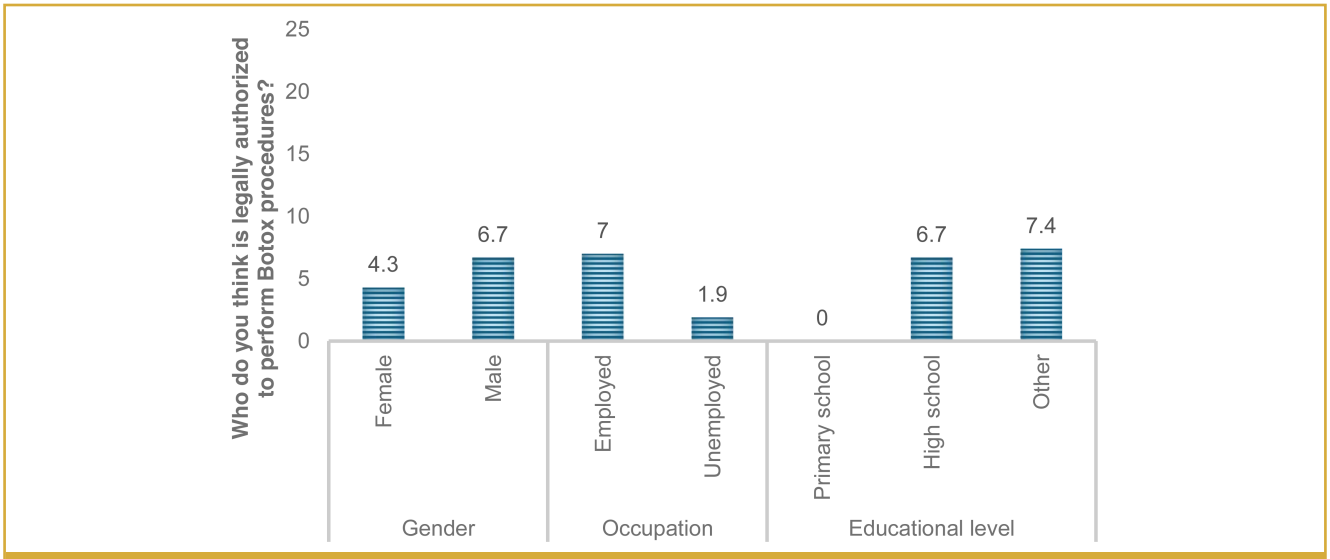

Figure 3. Distribution of correct answers to the question "Who do you think is legally authorized to perform Botox procedures?" according to demographic data.

was surprising that primary school graduates demonstrated a higher accuracy rate than participants with higher educational attainment. This outcome may be attributed to the study's limitation of being conducted within a single institution, potentially affecting the representativeness of the sample.

When analyzing the relationship between education level and knowledge of Botox applications, university graduates and those with postgraduate education demonstrated significantly greater awareness of Botox indications. This finding is consistent with the studies conducted by Al Hindi et al[20] and Fareed et al,[18] both of which reported that higher education levels are associated with increased awareness and understanding of Botox applications.

Furthermore, this study revealed a significant lack of awareness regarding the side effects and therapeutic applications of Botox. Similarly, the study by Demyati et al[21] reported that participants had limited knowledge of Botox-related side effects and medical uses. This finding reinforces the widespread perception that Botox is primarily a cosmetic intervention, rather than a medical treatment option.

When participants were asked, "Who do you think is legally authorized to perform Botox procedures?", 66.9% correctly identified plastic, reconstructive, and aesthetic surgeons or dermatologists, while 17.3% identified physicians and dentists as authorized practitioners. These results are consistent with previous findings reported by Fareed et al,[18] Demyati et al,[21] and Al Hargan et al.[22]

In Türkiye, it is not permissible for non-physicians to engage in medical practices based on knowledge or certificates obtained from various courses.[23] According to Turkish legislation, dentists are authorized to perform all professional practices related to the preservation of oral and dental health, as well as the diagnosis, treatment, and rehabilitation of diseases and disorders affecting the teeth, gums, and directly associated oral and maxillofacial structures.[24] To address the misconception that any healthcare worker or esthetician can administer Botox, greater emphasis should be placed on public awareness campaigns through media, social media, and advertising platforms, highlighting that all medical procedures should only be conducted by qualified specialists who are trained in the relevant field and capable of managing potential complications.

Botulinum toxin plays a key role in medical treatments, such as addressing facial pain,[10] chronic migraines,[10,12] bruxism (teeth grinding), temporomandibular joint (TMJ) disorders,[10,11] and treating hypertrophy in the temporalis and masseter muscles.[13] It is also used for managing persistent facial pain linked to excessive muscle activity in the jaw.[13] Recent studies suggest that Botox injections are emerging as a promising treatment option, especially for patients who have difficulty adhering to conventional therapies or have not found relief through standard methods. Despite its high cost and potential for temporary discomfort, this treatment remains a significant option.[25,26]

This study has certain limitations. Primarily, the research was conducted within one of the many dental faculty hospital in Istanbul, which may limit the generalizability of the findings. Additionally, the relatively small sample size is another limitation that should be considered. Moreover, as the participants were exclusively dental patients, their knowledge and attitudes toward botulinum toxin may not fully reflect those of the general population.

This study is one of the first known studies to examine the knowledge, attitudes, and perceptions of patients seeking dental care in Istanbul regarding BTX treatments. The findings indicate that the majority of participants perceive Botox solely as a cosmetic procedure, with limited awareness of its therapeutic applications.

The data suggest that increasing public awareness and education on Botox procedures is essential. Future studies conducted in diverse geographical regions with larger participant samples will provide a more comprehensive understanding of patient perceptions and knowledge levels regarding botulinum toxin, contributing valuable insights to the literature.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Istanbul Yeni Yüzyıl University (Approval no: 2023/10-1101; Date: 02.10.2023).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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