Original Article

Orofacial Uses of Botox in Dentistry and their Associated Risks: A Population-Based Cross-Sectional Study in Saudi Arabia

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Abstract

Background: Various healthcare professionals, including dentists, provide botulinum toxin (Botox) for cosmetic and therapeutic treatment. In dentistry, it has multiple uses, such as gummy smile, bruxism, sialorrhea, muscle spasm, and orofacial pain, yet unwanted side effects may arise. **Aims:** This study aimed to investigate the participants' perspective regarding the scope of Botox in dentistry and its associated risk, provider involvement, and factors affecting the choice of which healthcare professions administer Botox injections in Saudi Arabia. **Methods and Materials:** A cross-sectional study using an online self-administered survey distributed through social media accounts among adults living in the Makkah region of Saudi Arabia. Four hundred male and female adults were invited to participate**.** Descriptive statistics and the Chi-square test were used in the study. **Results:** A total of 256 responses were collected from 204 females and 51 males with a mean age of 33.86 (SD = 10.5) years. Collected data demonstrated knowledge of various Botox indications, which include wrinkle reduction (216 (84.4%)), treatment of muscle spasms (186 (72.7%)), and management of gummy smile (178 (69.5%)). Regarding the side effects, participants chose infections (182 (71.1%)), bruising (180 (70.3%)), and drooping in the eye (176 (68.7%)). Participants selected family and friends as the primary source of their information on Botox treatment. The majority preferred a plastic surgeon, followed by an oral maxillofacial surgeon, to provide the Botox treatment. **Conclusions:** The usage of Botox therapy in the field of dentistry has increased significantly. Participants had an acceptable level of knowledge regarding the use of Botox in esthetic practices but lacked knowledge of the therapeutic scope of Botox therapy. The majority of participants had no doubt about the medical professionals administering Botox. It is advised to educate the public about the extent of Botox treatment and offer a trustworthy source of information required.

Keywords: *Botox, botulinum toxin, dental, esthetics, therapeutic, Saudi Arabia*

Introduction

Botulinum toxin (Botox) is a neurotoxin produced by Clostridium botulinum bacteria.[1] It has several subtypes, of which types A and B have been considerably studied and used safely and effectively in facial rejuvenation procedures.[1] Botox works by hindering acetylcholine release, a neurotransmitter responsible for muscle contraction, thereby resulting in temporary paralysis of the muscles.[1]

The history of Botox started in 1980 when ophthalmologist Alan B. Scott first used it in humans to treat strabismus.[2] Thereafter, in 2002, it was

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approved by the FDA for cosmetic use to improve appearance and was accepted for treating axillary hyperhidrosis.[2] Eventually, the use of Botox has grown to include new areas such as facial esthetics, dermatology, ophthalmology, dentistry, gastrointestinal treatment, and orthopedics.[3]

The data in the literature confirmed that cosmetic Botox injections were both objectively and subjectively effective in improving patient satisfaction, experience, appearance, perception of youthfulness, and self-confidence.[4]

The main indications of using Botox injections include smoothing the appearance of wrinkles on the face, glabellar rhytids, horizontal rhytids, crow's feet, and masseter hypertrophy.[2]

Due to the different needs of Botox consumers or their not having a clear idea as to their needs, a thorough discussion and examination to understand each patient's requirements are essential.[5]

In dentistry, comprehensive head and neck knowledge and the minimally invasive nature of the Botox injection technique allow dentists to learn and practice Botox injections.[6] The general concept of using it in dentistry lies in enhancing oral esthetics, such as the correction of deep nasolabial folds, radial lip lines, gummy smile, and black triangles between teeth.[6] In addition to enhancements of oral esthetics, scientific literature states more advantages of using Botox in dentistry, including treatment of the following conditions: bruxism, sialorrhea, asymmetric smile, salivary fistula, oromandibular dystonia, hemifacial spasm, masseter hypertrophy, temporomandibular disorder (TMD), temporomandibular joint (TMJ) dislocation, facial myopathies, myofascial pain.[6]

The common side effects of Botox include edema, erythema, pain, and temporary drooping eyelids.[2] Rare side effects include headache, malaise, dysphagia, respiratory compromise, generalized muscle weakness, cervical kyphosis, and complications due to the dissemination of toxins to nearby areas.[2]

To reduce the side effects, medical esthetic organizations worldwide have stated that healthcare professionals who administer Botox should be board-certified and competent with adequate training and experience.[7] In different communities, young adults are represented as having a weak economy and weak consumer skills and are at risk of being deceived by cheaper treatments performed by nonmedical estheticians.[7] In addition, a published letter shows that patients' desperation to receive Botox treatment led them to access black market self-administering at-home kits with harmful potential adverse effects.[8] Furthermore, medical esthetic organizations educate the public via websites and leaflets to provide information on safe materials and treatment and protect consumers.[7]

Different healthcare professionals provide Botox for cosmetic and therapeutic treatment.[9] According to a worldwide study in 2013, more than 880 plastic surgeons believed that they themselves and dermatologists were the most capable injectors.[9] This sequence was followed by nurses in plastic surgery, gynecologists, dentists, and, finally, nurses in other fields.[9]

This study aimed to investigate the participants' perspective regarding the scope of Botox in dentistry and its associated risk, provider involvement, and factors affecting the choice of which healthcare professions administering Botox injections in Saudi Arabia.

Material and Methods

A cross-sectional study was conducted between March 2022 and September 2022. A sample size of 345 participants was determined for this study using the estimated prevalence of 50%, precision level of 5%, and confidence interval of 95%. A total of 400 participants were invited. Those interested in cosmetics or pain management or who had received previous Botox treatment in the Makkah region of Saudi Arabia, all of whom gave written consent, completed the study. The Biomedical Ethics Committee of Umm Al-Qura University in Saudi Arabia gave its approval for this study (HAPO-02-K-012-2022-03-1003). The study targeted adult males and females. The exclusion criteria comprised participants younger than 18 years and patients who did not consent to participate in the study.

An online self-completion survey was sent via social media accounts using WhatsApp groups and Instagram invitations. Those interested in participation had open access to the questionnaire created using Microsoft Forms software (Microsoft Corp., Redmond, WA, USA). The survey consisted of a short introduction describing the aim of the study, the confidentiality of responses, and the consent request. The responses were collected immediately after completion. A convenience sample of 15 participants was undertaken to evaluate the format and sequence of the questions for the reliability and validity of the questionnaire.

The questionnaire was developed from a thorough review of available literature on Botox uses in dentistry and their related side effects.[10-13] Consultation with and feedback from experts in questionnaire development were carried out. The questionnaire consisted of multiple-choice questions and was divided into three

parts. The first part of the survey included six questions on participants' demographics, including age, gender, educational achievements, work experience, and type of employment. The second part included eight questions regarding knowledge of possible Botox uses, clinical applications, side effects, how important it is for patients to be aware of the procedure and the related side effects, and the source of this information. The third part included six questions on patient preferences with regard to the healthcare provider's involvement in using Botox.

All of the responses were collected and coded. The data were tabulated and analyzed using IBM SPSS Statistics version 23.0. Descriptive statistics were used to report frequencies and percentages, and the Chi-square test was used to identify the correlation between independent and dependent variables. Means and standard deviations were used to describe the continuous variables. $P \leq 0.05$ was considered to be statistically significant.

Results

The questionnaire was sent to 400 participants and completed by 256 participants with a response rate of 64%. Table 1 summarizes the first part of the questionnaire. The majority of the participants were female 204 (80%), while only 51 (20%) males participated. The mean age was 33.86 (SD = 10.5) years. The educational level of the majority of the sample was a bachelor's degree 172 (67.2%). The participants worked across various institutions in comparison with who did not work at all (59 (23%)). Regarding income, 114 (44%) participants had an average of 5000–15,000 SAR. Nearly half of the participants were single 124 (48.4%).

The participants were asked whether they had used Botox injections previously: 86 (33.6%) had done so, and only 48 (18.8%) were using them regularly. Moreover, knowledge questions on the uses of Botox in the orofacial area were asked and the answers are displayed in Table 2.

Furthermore, the length of the effect of Botox was investigated and only 86 (33.6%) participants knew that the maximum effect appears after 14 days and that retouching may be required. In addition, 132 (52%) participants believed that the Botox effect is reduced after three months and that a new dose may be required.

The participants were asked about the possible side effects of Botox injections in the orofacial area and their answers are summarized in Table 3.

The source of knowledge regarding Botox treatment and its side effects was studied. The responses consisted of family and friends (111 (43.4%)), self-searching on the Internet (43 (16.8%)), talking directly to a healthcare provider (39 (15.2%)), provider's social media account (31 (12.1%)), and celebrities' social media accounts (32 (12.5%)).

Table 1: Demographic data of the study sample

Demographic variables	*n* (%)
Gender	
Female	204 (80%)
Male	51 (20%)
Education	
High school	36 (14%)
Bachelor's	172 (67.2%)
Postgraduate	48 (18.8%)
Work status	
Private	66 (25.8%)
Governmental	45 (17.6%)
Student	49 (19.1%)
Retired	15 (5.9%)
Health sector	22 (8.6%)
Don't work at all	59 (23%)
Income	
<5000 SAR*	92 (35.9%)
5000–15,000 SAR*	114 (44.5%)
>15,000 SAR*	50 (19.5%)
Marital status	
Single	124 (48.4%)
Married	99 (38.7%)
Divorced	21 (8.2%)
Widow	8.2 (4.7%)

*SAR: Saudi riyal

Table 2: Uses of Botox in the orofacial area

Uses of Botox	Responses	*n* (%)
Management of headache and migraine	Yes	121 (47.3%)
	No	134 (52.3%)
Management of jaw and facial pain (TMD)	Yes	125 (48.8%)
	No	131 (51.2%)
Muscle relaxant	Yes	186 (72.7%)
	No	70 (27.4%)
Management of neck and shoulder pain	Yes	72 (28.1%)
	No	184 (71.9%)
Nose opening reduction	Yes	121 (47.3%)
	No	135 (52.7%)
Wrinkle reduction	Yes	216 (84.4%)
	No	40 (15.6%)
Management of gummy smile	Yes	178 (69.5%)
	No	78 (30.5%)
Management of teeth grinding (bruxism)	Yes	68 (26.6%)
	No	188 (73.4%)
Management of increased salivation	Yes	65 (25.4%)
	No	191 (74.2%)
Management of hemifacial spasm	Yes	86 (33.6%)
	No	170 (66.4%)

Table 3: Botox side effects in the orofacial area

Side effects of Botox	Responses	*n* (%)
Headache	Yes	154 (60%)
	No	102 (40%)
Infection	Yes	182 (71.1%)
	No	74 (28.9%)
Asymmetry of the two halves of the face	Yes	165 (64.5%)
	No	91 (35.5%)
Drooping in the eye (sagging)	Yes	176 (68.7%)
	No	80 (31.3%)
Facial muscle weakness	Yes	164 (64.1%)
	No	92 (35.9%)
Bruising	Yes	180 (70.3%)
	No	76 (29.7%)
Formation of antibodies	Yes	111 (43.3%)
	No	145 (56.7%)
Viral infection	Yes	115 (45%)
	No	141 (55%)

Table 4: Healthcare professionals preferred to deliver Botox treatment and the reasons for that choice

Healthcare professions	Responses	*n* (%)
Oral maxillofacial surgeon	Yes	176 (68.8%)
	No	80 (31.2%)
Orofacial pain consultant	Yes	179 (69.9%)
	No	80 (30.1%)
Dermatologist	Yes	142 (55.5%)
	No	114 (44.5%)
Plastic surgeon	Yes	236 (92.2%)
	No	20 (7.8%)
Nurse	Yes	39 (15.2%)
	No	217 (84.8%)
General practitioner	Yes	56 (22%)
	No	200 (78%)
Dentist	Yes	83 (32.4%)
	No	173 (67.6%)
Any healthcare profession that has had training in Botox	Yes	77 (30%)
	No	179 (70%)
Provider who has experience and skills	Yes	238 (93%)
	No	18 (7%)
Provider who educates the patient	Yes	219 (85.5%)
	No	37 (14.5%)
Provider who provides follow-up service	Yes	219 (85.5%)
	No	37 (14.5%)
Provider who provides low price and offers discounts	Yes	180 (70.3%)
	No	76 (29.7%)

Participants reported wanting to learn about Botox in detail from their treating provider (101 (39.5%)) in comparison with who wanted to know general information only (45 (17.6%)). Meanwhile, 13 (5.1%) participants did not want to know at all and 97 (37.9%) were not interested because they believed that they would not need such treatment.

For those who chose to know about the treatment and the side effects, 115 (44.9%) wanted to discuss them every time before the procedure, while 56 (21.9%) believed that the first time that the treatment was delivered was enough.

Female participants possessed better knowledge of Botox uses ($P < 0.001$) and their side effects than did males who participated in the study ($P < 0.001$). However, both genders knew equally about the uses of Botox for wrinkle reduction and muscle relaxation. Botox injections were more utilized by single ladies ($P = 0.03$) and those with an average income of 5000–15,000 SAR ($P = 0.04$).

The participants were asked about their preference with regard to healthcare staff who deliver Botox treatment and the reasons for that choice [as shown in Table 4]. The majority preferred a plastic surgeon (236 (92.2%)), followed by an oral maxillofacial surgeon, orofacial pain consultant, and, finally, a dermatologist. The skills and expertise of the treating doctor constituted the most crucial point in their selection (238 (93%)). Participants significantly preferred to be treated with Botox by a plastic surgeon in comparison with other professions ($P < 0.001$).

Discussion

The current study gathered a general insight into the perception of using Botox in both nonsurgical cosmetic and therapeutic procedures among people living in Saudi Arabia. The participants were predominantly females in their 30s. Among the participants, 33.6% used Botox treatment. A similar study conducted in 2017, including in different regions of Saudi Arabia, found that 19% of the respondents underwent Botox treatment.[14]

There is an increase in using Botox treatment for appearance enhancement. This finding is also supported by Almuhaya *et al*.[15] in 2019, who showed that Saudi Arabia has been experiencing a trend toward cosmetic procedures, and the most common procedure reported in the study was Botox injection (41%).

The main motivation for participants to undergo Botox was to reduce facial wrinkles and maintain a youthful appearance. Their perspective is influenced by the effect of social media, which is reflected among the study participants, as about 60% followed social media influencers concerned with trendy looks. In addition, 24.6% used the doctor's and celebrities' social media accounts as a source of information regarding Botox.

A similar result found by Al-Saiari and Bakarman[16] in Saudi Arabia showed that 46% who had undergone cosmetic procedures believed that social media had impacted their

decision. The key influence of esthetic procedures in Saudi Arabia was that of improving self-esteem.[17]

For cosmetic procedures, the participants' perception of using Botox in the head and neck was reported as being concerned with using Botox for wrinkle reduction, followed by nose reduction and treatment of a gummy smile. With regard to therapeutic usage of Botox, however, the participants were asked about using Botox as a muscle relaxant and to manage headaches, migraine, hemifacial spasms, bruxism, increased salivation, and pain (arising from the face, TMJ, neck, and shoulder). The most predominant answer was that Botox was used as a muscle relaxant, and the study demonstrated a lack of knowledge of other therapeutic uses.

These results match those obtained in a previous study, which evaluated the knowledge and attitude of dentists regarding Botox and showed that knowledge was confined to cosmetic uses and that there was a lack of knowledge of therapeutic uses.[11]

After the anticipated result of Botox is reached, Botox treatment has a temporary effect and will diminish; thus, it needs to be repeated to maintain the desired result. Moreover, the anticipated result of Botox is not immediate after the injection.[18] This information was investigated in our study, and only 33.6% of the participants knew that the Botox effect would be apparent in 14 days. In addition, more than half of the participants (52%) were aware that the length of the Botox effect would be reduced after three months.

Regarding the side effects of using Botox, the commonly reported side effects in the current study were infections, bruising, and drooping in the eye (71.1%, 70.3%, and 68.7%, respectively). These results contradict those of Abu Khalid *et al*.[11] and Al-Hamdan *et al*.,[19] who stated that their studies' commonly reported side effect was an allergic reaction to Botox. Another study conducted by Zagui, *et al*.[20] in 2008 that reported different side effects found that headache and eyelid ptosis were significantly different in Botox treatment application.

At present, Botox is very popular and not limited to one profession. Experienced professionals with training are capable of injecting Botox for different uses and are allowed to do so.[12] As for the finding with regard to the preference of medical professionals who deliver Botox, a higher percentage of participants preferred a plastic surgeon (92.2%), followed by an oral and maxillofacial surgeon, orofacial pain consultant, and, finally, dermatologist. These findings are similar to those of a study conducted by Abdullah H. AlHargan *et al*. in Saudi Arabia, which found that most participants favored plastic surgeons for a Botox injection.[13]

Choosing which healthcare profession to administer Botox depends on the treatment provider's skills and expertise (93%), as reported in our study. According to our results, 39.5% of the participants seeking Botox treatment need to feel assured and want to learn the details of Botox from their treatment provider, while 17.6% want to know general information without the details. A small percentage, 5.1%, did not want to know.

This study will help to close the gap in knowledge of patients' perception of Botox treatment in dentistry and can help future research and educational programs to be planned for the general population and the advantages and, most importantly, the risks associated with treatment provided by untrained or knowledgeable providers.

However, this study has a few limitations, such as the sample size and the narrow geographical location. In the current sample, the respondents were predominantly female, which is not representative of the typical Saudi demographic. Furthermore, the survey was limited to Arabic-speaking participants. Online surveys are easy to fill in and distribute. Yet, they require access to the Internet and available social media sources to view the recruitment invitation and participate. As a result, our findings cannot be applied to those who neither utilize social media nor have access to the Internet. In addition, the ease of using social media to distribute the overwhelming number of surveys places a burden on the participants to contribute, thereby leading to a low response rate.

Moreover, because the questionnaire was self-completed, the responses may not be accurate, as the findings depend on how participants interpreted the questions. Such factors may cause selection bias and sampling error, thereby preventing the generalizability of our results.

Closed-ended questionnaires do not allow the freedom for participants to express their thoughts or provide justifications for their responses. Despite these limitations, the survey was piloted for its validity and reliability to test for difficulties in understanding the survey and to modify it accordingly.

Future research should consider these limitations, increase the sample size, and encourage more males to participate.

Conclusions

The usage of Botox therapy in the field of dentistry has increased significantly. The results of this study revealed that participants had an acceptable level of knowledge regarding the use of Botox in esthetic practices. However, the responses demonstrate that the participants

were not familiar with the full scope of the usage of Botox treatment, remarkably in managing headaches and migraine, bruxism, increased salivation, hemifacial spasms, neck, and shoulder pain. The majority of participants had no doubt about the medical professionals administering Botox treatments, and their responses indicated that they desired to be well-informed about the procedure from the specialized healthcare profession. Nonetheless, it is advised to educate the public about the extent of Botox treatment and offer a trustworthy source of information required.

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Conflicts of interest

There are no conflicts of interest.

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