





# The effect of facial BOTOX injection on quality of life and happiness, a descriptive/prevalence study

Masoumeh Roohaninasab<sup>1</sup> | Parvin Mansouri<sup>2</sup> | Behnam Shariati<sup>3</sup> |  
Roya Zeinali<sup>1</sup>  | Paria Jafari<sup>1</sup> | Abbas Dehghani<sup>1</sup>  | Azadeh Goodarzi<sup>1</sup>  |  
Elham Behrangi<sup>1</sup> | Afsaneh Sadeghzadeh-Bazargan<sup>1</sup> | Vahid Rashedi<sup>4</sup> |  
Fatemeh Rahimi Gaeini<sup>5</sup> 

<sup>1</sup>Department of Dermatology, School of Medicine, Rasool Akram Medical Complex Research Development Center (RCRDC), Iran University of Medical Sciences (IUMS), Tehran, Iran

<sup>2</sup>Department of Dermatology, School of Medicine, Tehran University of Medical Sciences (TUMS), Tehran, Iran

<sup>3</sup>Department of Psychiatry, School of Medicine, Mental Health Research Center, Psychosocial Health Research Institute (PHRI), Iran University of Medical Sciences, Tehran, Iran

<sup>4</sup>Iranian Research Center on Aging, Department of Aging, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

<sup>5</sup>School of Medicine, Iran University of Medical Sciences (IUMS), Tehran, Iran

## Correspondence

Fatemeh Rahimi Gaeini, School of Medicine, Iran University of Medical Sciences (IUMS), Niayesh St, Sattarkhan Ave, Rasool Akram Hospital, Tehran 1445613131, Iran.

Email: [fatemeh.rahimi1375@gmail.com](mailto:fatemeh.rahimi1375@gmail.com)

## KEYWORDS

botox, botulinum toxin, depression, happiness, quality of life

## Funding information

Rasool Akram Medical Complex Clinical Research Development Center (RCRDC)

## 1 | INTRODUCTION

Depression is a type of mood disorder that involves feeling persistently sad or empty, as well as a loss of interest and energy.<sup>1</sup> This condition affects a large number of people worldwide, with the World Health Organization estimating that around 280 million individuals suffer from depression, which has significant impacts on global health.<sup>2</sup> Interestingly, depression is more common in women, with a prevalence rate twice as high as men.<sup>3</sup> Happiness can be broken down into three components: a state of harmony (feeling safe and secure), active involvement in situations (enjoying activities), and a positive outlook on life (believing life is good). Several studies have found a negative relationship between valuing happiness and experiencing symptoms of depression.<sup>4</sup> The more value and emphasis one places on feeling

happy, the more likely they are to experience depressive symptoms.<sup>3</sup>

According to the World Health Organization (WHO), the concept of quality of life refers to an individual's subjective evaluation of their life situation in the context of their cultural and personal values, as well as their alignment with their goals, expectations, norms, and concerns.<sup>5</sup> It is conceivable that a person's quality of life would be negatively influenced by experiencing a state of depression.<sup>6</sup>

Depression is considered an underdiagnosed and undertreated illness. Nevertheless, even with treatment involving various antidepressants, approximately one-third of patients fail to achieve remission and continue to endure chronic depression.<sup>7</sup> Therefore, it is crucial to find more effective treatments for depression, and recent studies have sought other therapeutic approaches such as botulinum toxin A (BTA).<sup>8</sup>

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *Health Science Reports* published by Wiley Periodicals LLC.

BTA is a natural neurotoxin that can temporarily paralyze muscle fibers. It is used in many medical fields, from relieving spasms (torticollis, migraines, hyperhidrosis, urinary tract problems) to esthetic medicine. When a person is depressed, he expresses this emotion in his face. The contraction of the glabellar complex leads to frowning, which leads to the expression of negative emotions and depressed mood in the face, so we can see the "omega melan cholicum" sign and Veraguth wrinkles in these people due to the overactivity of the corrugator muscles.<sup>9,10</sup> According to the facial feedback hypothesis, the feedback signals generated by the facial expression of emotions can support the manifestation of feelings.<sup>11,12</sup>

BTA is an approved treatment for administration into the glabellar complex to improve the visibility of vertical frown lines situated between the eyebrows. By doing so, they not only impart a more youthful and revitalized appearance but also disrupt the feedback loop described earlier. Consequently, this interruption in the feedback loop can lead to an overall more positive and less negative esthetic presentation.<sup>13</sup> This can lead to more self-confidence due to a younger face and better mood.<sup>13-15</sup> Furthermore, studies have shown that after BTA injections, there is reduced activity of the amygdala, the region of the brain that is responsible for responding to negative emotional stimuli.<sup>16-18</sup>

According to recent studies, botulinum toxin injections have historically led to improvements in depression symptoms and overall quality of life.<sup>8</sup> Consequently, this study seeks to broaden the understanding of botulinum toxin's benefits by exploring its effects on nondepressed individuals, specifically focusing on enhancements in happiness and quality of life.

## 2 | METHOD AND MATERIALS

The study enrolled 87 patients aged between 18 and 70 years, consisting of both men and women, who were referred to a dermatology clinic for Botox injections to remove wrinkles on their face. The study was conducted prospectively and excluded patients with a history of neuromuscular disease, recent cosmetic procedures on the face within the past 3 months, a history of suicide attempts, major depression, other psychiatric diseases (such as diagnosed OCD, schizophrenia, or bipolar disorder), or those using any psychiatric drugs, pregnancy, and lactation.

Five hundred units of Clostridium botulinum toxin type A (Masport<sup>®</sup>500, MasoonDarou Company, Iran) were diluted in 3 cc of normal saline, and 0.6-0.8 cc was injected into the upper face according to the study by Borba et al.<sup>19</sup>

Quality of life and happiness were measured before treatment and 1 month after using the WHOQOL and Oxford Happiness questionnaires.

The WHOQOL-BREF questionnaire consists of 26 items, categorized into four main domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items). It also includes additional questions about general health and overall quality of life. Each item is rated on a

5-point scale and then transformed into a 0-100 scale for standardized assessment.<sup>20,21</sup>

The physical health domain covers aspects such as mobility, daily activities, functional capacity, energy levels, pain, and sleep quality. The psychological health section assesses self-image, negative thoughts, positive attitudes, self-esteem, mental state, learning abilities, memory, concentration, religious beliefs, and mental well-being. The social relationships domain focuses on personal relationships, social support, and sexual life. Lastly, the environmental health domain addresses topics like financial resources, safety, access to health and social services, physical living conditions, opportunities for skill development and knowledge acquisition, recreation, and general environmental factors like noise, air pollution, and transportation.<sup>22,23</sup>

The Oxford Happiness questionnaire consists of 29 items that measure happiness on a 6-point rating scale ranging from strongly agree to strongly disagree.<sup>24</sup> All information collected was kept confidential, analyzed anonymously, and approved by the Research Council with an ethics code number IR.TUMS.MEDICINE.REC.1400.454.

Data were analyzed using SPSS software version 25 and a T-test for quantitative variables represented as mean  $\pm$  standard deviation.

## 3 | RESULTS

The mean age of the 87 patients was  $40.76 \pm 34.10$  years, and 73 (83.9%) of them were female. The distribution of patients' quality of life and happiness scores before and after Botox injection is shown in Table 1, in general and by sex.

The comparison of the mean scores of the patients' quality of life before and after botox injection was not significantly different for all cases and each gender, Table 2 ( $p > 0.05$ ). Table 2 shows that the

**TABLE 1** Distribution of patients' quality of life and happiness scores before and after the intervention.

Variable		Min	Max	Mean	SD
Patients' quality of life scores	Before	29	49	39.14	3.99
	After	26	49	39.79	4.10
Patients' happiness scores	Before	19	66	44.98	7.82
	After	25	66	47.46	7.37
Patients' quality of life scores based on gender before the intervention	Male	29	45	39.00	4.54
	Female	29	49	39.16	3.91
Patients' quality of life scores based on gender after the intervention	Male	35	45	40.00	3.11
	Female	26	49	39.75	4.28
Patients' happiness scores based on gender before the intervention	Male	19	51	41.28	4.54
	Female	26	66	45.68	7.43
Patients' happiness scores based on gender after the intervention	Male	25	52	45.71	7.09
	Female	29	66	47.79	7.42

**TABLE 2** Comparison of mean and *t*-test for patients' quality of life and Happiness scores before and after the intervention.

Variable	<i>T</i>	<i>df</i>	<i>p</i> Value	<i>N</i>
Patients' quality of life scores	-1.572	86	0.120	87
Patients' happiness scores	-3.300	86	0.001	
Patients' quality of life scores based on gender	-0.205	85	0.838	
Patients' happiness scores based on gender	0.966	85	0.337	

mean values of happiness before and after the procedure were significantly different ( $p = 0.001$ ). However, the happiness scores showed no significant difference between the two genders ( $p > 0.05$ ).

## 4 | DISCUSSION AND CONCLUSION

The study was conducted with the primary objective of investigating the impact of BTA injection on the quality of life and happiness levels of nondepressed patients presenting with facial wrinkles. The findings revealed a notable elevation in happiness scores subsequent to the BTA injection, whereas the scores related to quality of life exhibited no statistically significant variation before and after the procedure.

The study supports previous research suggesting that facial expressions and feedback signals generated by the facial expression of emotions can impact mood and emotions.<sup>11,12</sup> BTA injection in the upper facial area can improve facial expression and interrupt the feedback loop associated with negative emotions, leading to improved mood and increased self-confidence.<sup>13-15</sup>

The finding that quality of life did not significantly improve after BTA injection is somewhat surprising given the previous research showing that improved mood and self-confidence can lead to increased quality of life.<sup>6</sup> However, it is possible that the relatively short follow-up period of 1 month was not long enough to capture any significant changes in quality of life.

It is worth noting that most previous studies have focused on testing the usefulness of botulinum injection among individuals with depression. In contrast, our study sample consisted of patients seeking BTA injection for cosmetic purposes, and as such, the findings may not necessarily apply to patients with clinical depression or other mood disorders.

Overall, the study provides preliminary evidence that BTA injection in the upper facial area may have positive effects on happiness and mood in patients seeking cosmetic improvement. The findings may have important implications for the use of BTA in clinical settings as a potential adjunctive therapy for depression and other mood disorders.

In our study, BTA injection had a significant positive impact on happiness scores, while quality of life did not significantly differ before and after the procedure. The findings may have

important implications for the use of BTA in clinical settings as a potential adjunctive therapy for mood disorders. Understanding the happiness phenomenon can help us appreciate the interplay between facial expressions and emotions, but it's just one piece of the puzzle in understanding human psychology and well-being.

While further research is needed to confirm these findings and establish the link between changes in wrinkle severity and happiness scores, this study provides evidence supporting the potential use of BTA as a therapeutic approach for depression.

## AUTHOR CONTRIBUTIONS

All authors contributed for preparing and finalization of this article.

## ACKNOWLEDGMENTS

The authors would like to thank to the authorities of the Rasool Akram Medical Complex Clinical Research Development Center (RCDRC) for their technical and editorial assistance.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

Informed consent was obtained from all patients to participate in the project and to publish the results, and the rights of the subjects were respected.

## TRANSPARENCY STATEMENT

This manuscript is an honest, accurate and transparent account of the study; no important aspects have been omitted; and any discrepancies from a study as planned (and, if relevant, registered) have been explained.

## ORCID

Roya Zeinali  <http://orcid.org/0000-0003-1314-8111>

Abbas Dehghani  <http://orcid.org/0000-0001-9277-3606>

Azadeh Goodarzi  <http://orcid.org/0000-0002-1249-4429>

Fatemeh Rahimi Gaeini  <http://orcid.org/0009-0004-8265-7694>

## REFERENCES

- Baldwin DS. A personal account of depressive illness and its antidepressant treatment. *Int Clin Psychopharmacol*. 2019;34(6):286-290. doi:10.1097/YIC.0000000000000273
- Cui L, Li S, Wang S, et al. Major depressive disorder: hypothesis, mechanism, prevention and treatment. *Signal Transduction and Targeted Therapy*. 2024;9(1):30.
- Amado-Boccaro I, Donnet D, Olié JP. [The concept of mood in psychology]. *Encephale*. 1993;19(2):117-122.
- Jackson JL. The pursuit and maintenance of happiness. *N Engl J Med*. 2021;385(14):1327-1328. doi:10.1056/NEJMe2111447

5. Health WHOD of M. WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version. Accessed May 19, 2024. <https://iris.who.int/handle/10665/63529>
6. Bonomi AE, Patrick DL, Bushnell DM, Martin M. Validation of the United States' version of the World Health Organization Quality of life (WHOQOL) instrument. *J Clin Epidemiol.* 2000;53(1):1-12. doi:10.1016/s0895-4356(99)00123-7
7. Rush AJ, Trivedi MH, Wisniewski SR, et al. Acute and longer-term outcomes in depressed outpatients requiring one or several treatment steps: a STAR\*D report. *Am J Psychiatry.* 2006;163(11):1905-1917. doi:10.1176/ajp.2006.163.11.1905
8. Wollmer MA, Magid M, Kruger THC, Finzi E. Treatment of depression with botulinum toxin. *Toxins.* 2022;14(6):383. doi:10.3390/toxins14060383
9. Shorter E. Darwin's contribution to psychiatry. *Br J Psychiatry.* 2009;195(6):473-474. doi:10.1192/bjp.bp.109.072116
10. Schwartz GE, Fair PL, Salt P, Mandel MR, Klerman GL. Facial muscle patterning to affective imagery in depressed and nondepressed subjects. *Science.* 1976;192(4238):489-491. doi:10.1126/science.1257786
11. Izard CE. Facial expressions and the regulation of emotions. *J Pers Soc Psychol.* 1990;58(3):487-498. doi:10.1037//0022-3514.58.3.487
12. McIntosh DN. Facial feedback hypotheses: evidence, implications, and directions. *Motiv Emot.* 1996;20(2):121-147. doi:10.1007/BF02253868
13. Heckmann M, Teichmann B, Schröder U, Sprengelmeyer R, Ceballos-Baumann AO. Pharmacologic denervation of frown muscles enhances baseline expression of happiness and decreases baseline expression of anger, sadness, and fear. *J Am Acad Dermatol.* 2003;49(2):213-216. doi:10.1067/s0190-9622(03)00909-5
14. Lewis MB, Bowler PJ. Botulinum toxin cosmetic therapy correlates with a more positive mood. *J Cosmet Dermatol.* 2009;8(1):24-26. doi:10.1111/j.1473-2165.2009.00419.x
15. Sykianakis D, Stratigos A, Chatziioannou A, Christodoulou C. Botulinum toxin type A treatment is associated with improved social and psychological behavior: a retrospective study. *J Cosmet Dermatol.* 2022;21(1):142-148. doi:10.1111/jocd.14627
16. Baumeister JC, Papa G, Foroni F. Deeper than skin deep—the effect of botulinum toxin-A on emotion processing. *Toxicon.* 2016;118:86-90. doi:10.1016/j.toxicon.2016.04.044
17. Hennenlotter A, Dresel C, Castrop F, Ceballos-Baumann AO, Wohlschläger AM, Haslinger B. The link between facial feedback and neural activity within central circuitries of emotion--new insights from botulinum toxin-induced denervation of frown muscles. *Cerebral Cortex.* 2009;19(3):537-542. doi:10.1093/cercor/bhn104
18. Kim MJ, Neta M, Davis FC, et al. Botulinum toxin-induced facial muscle paralysis affects amygdala responses to the perception of emotional expressions: preliminary findings from an A-B-A design. *Biol Mood Anxiety Disord.* 2014;4:11. doi:10.1186/2045-5380-4-11
19. Borba A, Matayoshi S, Rodrigues M. Avoiding complications on the upper face treatment with botulinum toxin: a practical guide. *Aesthetic Plast Surg.* 2022;46(1):385-394. doi:10.1007/s00266-021-02483-1
20. Skevington SM, Tucker C. Designing response scales for cross-cultural use in health care: data from the development of the UK WHOQOL. *Br J Med Psychol.* 1999;72(Pt 1):51-61. doi:10.1348/000711299159817
21. Power M, Bullinger M, Harper A. The world health organization WHOQOL-100: tests of the universality of quality of life in 15 different cultural groups worldwide. *Health Psychol.* 1999;18(5):495-505. doi:10.1037/0278-6133.18.5.495
22. Nejat S, Montazeri A, Holakouie Naieni K, Mohammad K, Majdzadeh SR. The world health organization quality of life (WHOQOL-BREF) questionnaire: translation and validation study of the Iranian version. *J School Pub Heal Inst Pub Health Resh.* 2006;4(4):1-12.
23. Vahedi S. World health organization Quality-of-Life scale (WHOQOL-BREF): analyses of their item response theory properties based on the graded responses model. *Iran J Psychiatry.* 2010;5(4):140-153.
24. Hills P, Argyle M. The Oxford happiness questionnaire: a compact scale for the measurement of psychological well-being. *Pers Individ Dif.* 2002;33(7):1073-1082. doi:10.1016/S0191-8869(01)00213-6

**How to cite this article:** Roohaninasab M, Mansouri P, Shariati B, et al. The effect of facial BOTOX injection on quality of life and happiness, a descriptive/prevalence study. *Health Sci Rep.* 2024;7:e2303. doi:10.1002/hsr2.2303