

Botulinum Toxin Type A in the Treatment of Hyperhidrosis: Case Study

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Resumo

A hiperidrose é uma patologia que acomete 1% da população e se caracteriza pelo suor imoderado que leva a problemas psicológicos e dificulta o convívio social. O estudo teve como objetivo analisar os impactos causados na qualidade de vida do paciente com hiperidrose antes e após a realização do tratamento com toxina botulínica tipo A. O procedimento foi realizado na cidade de Jundiaí-SP/Brasil, na Clínica Day Hospital Nova Plástica, onde um profissional habilitado, médico cirurgião plástico, realizou aplicação intradérmica em um paciente que sofre de hiperidrose na região palmar. Foi aplicado um questionário adaptado de Baroncello et al. (2014), contendo questões fechadas avaliando a qualidade de vida do paciente antes e depois do tratamento. As questões foram pontuadas em um escore de 0 a 100, sendo que quanto mais próximo de 100, melhor a qualidade de vida. O questionário foi aplicado ao paciente antes do procedimento e trinta dias após o procedimento, e com isso foram avaliados os impactos causados na qualidade de vida do voluntário. O questionário foi aplicado em um paciente do sexo masculino, 22 anos. O resultado antes da aplicação de toxina botulínica foi de 28 pontos e depois da aplicação, de 90 pontos. Além de suceder efeitos adversos temporários, não foi relatado hiperidrose compensatória, o que resultou em melhora na qualidade de vida e satisfação pelo paciente. Portanto, o uso terapêutico da toxina botulínica tipo A para hiperidrose primária se mostrou seguro, minimizou a sudorese e impactou positivamente a qualidade de vida do paciente, dessa forma corroborando com a literatura correlata.

Abstract

Hyperhidrosis is a pathology that affects 1% of the population and is characterized by immoderate sweat that leads to psychological problems and hinders social interaction. The purpose of this study was to analyze the impact of hyperhidrosis patient's life quality before and after treatment with botulinum toxin type A. The procedure was performed in the city of Jundiaí-SP/Brazil, at Day Hospital Nova Plástica Clinic, where a qualified professional, medical plastic surgeon, has performed intradermal application in a patient suffering from hyperhidrosis in the palmar region. A questionnaire adapted from Baroncello *et al.* (2014), containing closed questions assessing the patient's life quality before and after treatment. The questions were pointed out on a score from 0 to 100, and closer to 100, it means better life quality. The questionnaire was applied to the patient before the procedure and thirty days after the procedure, and with that the impacts caused on the life quality of the volunteer were evaluated. The questionnaire was applied in a male patient, 22 years old. The result before application of botulinum toxin was 28 points and after the application, 90 points. In addition to temporary adverse effects, no compensatory hyperhidrosis was reported, which resulted in improved life quality and patient satisfaction. Therefore, the therapeutic use of botulinum toxin type A for primary hyperhidrosis was shown to be safe, minimized sweating and positively impacted patient's life quality, thus corroborating with the related literature.

Palavras-chave: *Clostridium botulinum*; Sudorese; BTX-A

Introduction

Sweating is the mechanism by which homeotherms control body temperature. The hypothalamus controls the internal temperature through receptors sensitive to heat and cold. When homeostasis deviation occurs, the thermoreceptors located below the epidermis send impulses through the afferent pathway to the hypothalamus, which promptly makes the physiological changes efferent so that the thermal equilibrium returns².

The hypothalamus is a region of the central nervous system (CNS) that performs functions such as regulation of emotions, thermal sensations, sensations of pain, and activates the endocrine system with the goal of homeostasis.

It operates through the peripheral nervous system (PNS), nerves and ganglia, and its response may be the autonomic nervous system (ANS) sympathetic or parasympathetic³.

Autonomic nervous system (ANS) controls glandular, cardiac and neural secretions, and is divided into sympathetic (ANS-S) and parasympathetic (ANS-P) secretions. The ANS-S is responsible for active responses such as fight or flight, has preganglionic neurons, called nicotinic, which has as neurotransmitter acetylcholine (Ach) and postganglionic nerve fibers that has neurotransmitter called noradrenaline. However, in the case of sweat gland secretions, the postganglionic neurotransmitter is Ach, that is, in this case the response is cholinergic^{2,3,4}. Vasodilation is of great importance for this process, as the sweat gland receives

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more water and electrolytes that pass through the duct towards the surface of the skin^{5,6}.

Hyperhidrosis is the production of sweat above the amount considered normal, caused without external stimulation, that is, excessive sweating is produced both in heat and cold, in situations of anxiety, nervousness or not, in physical activities or not in an autonomous way and uncontrollable way. Its origin is still unknown^{7,8}.

It can occur in the plantar, palmar, craniofacial or axillary regions and can also affect several regions simultaneously. Although it does not trigger any physical illness, the affected individuals feel uncomfortable and frustrated, since hyperhidrosis generates consequences in the day to day: normal activities such as handshake in the form of length, personal, professional, intimate relationships cause embarrassment^{9,10,11}. Primary hyperhidrosis is localized, and onset of symptoms may occur in childhood, adolescence or adulthood, and there may be linkage with genetic factors¹⁰. Secondary hyperhidrosis is due to a primary disease such as hyperthyroidism, menopause, or due to hormonal disorders that trigger the increase of sweating. In this case, it is essential to treat the primary disease so that hyperhidrosis ceases^{11,12}.

Among sweat treatment or control options are topical products such as specific astringent deodorants. There is also oral treatment with medications, or through invasive procedures such as the application of botulinum toxin type A (BTX-A)^{13,14,15}.

Clostridium botulinum is a gram-positive anaerobic bacillus with oval spores. Its natural habitat is soil, dust and marine sediments, and its spores survive at high temperatures, germinate under anaerobic conditions and produce the botulinum toxin^{15,16}.

The botulinum toxin used clinically is type A, which is the most used and the most studied both clinically and aesthetically. However, botulinum toxin type B has been recently studied and it has shown considerable therapeutic and aesthetic effects; due to this, type B toxin is already being marketed in the USA¹⁶.

The ophthalmologist Alan B. Scott began in 1960 studies for the use of BTX with the objective of an alternative treatment to the surgical correction of strabismus. This study was approved for human intake by the Food and Drug Administration (FDA) in 1977, obtaining a positive therapeutic result¹⁶.

In 1990, the National Institutes of Health (NIH) introduced BTX-A into the list of the most efficient and safe medicines. Although it is a toxin, BTX-A is a great option for the treatment of some pathologies^{17,18}. The application of BTX-A for therapeutic purposes, as in the case of hyperhidrosis, is one of the safest, most effective and almost non-existent side-effects according to scientific research. The onset of effects occurs from three to eight days and its durability is generally 6 months to 1 year, depending on the degree of the pathology¹⁹.

Before to commercialization, the purification of BTX-A should be performed by industry, thus avoiding the risk of

adverse effects and increased antigenicity. The process consists in passing the solution of the culture by precipitation in acidic media until the formation of a free crystalline complex of the ribonucleic acids and contaminating materials. Later, this complex is filtered, redissolved in saline and associated with albumin and hemagglutinin, which aims to stabilize and protect the active component¹⁴.

The mechanism of action of BTX-A is the cleavage of a membrane protein of the postganglionic neuron, called SNAP-25, important for the function of the synaptic vesicles. Thus, Ach remains in the vesicles, accumulating in the neuron due to irreversible blockade and it cannot be released to go to the nerve terminal. There is, therefore, an inhibition of the stimulus for sweat production. The nerve terminal and the sweat glands remain uninjured^{5,6,14,20}.

The process takes place in stages: first BTX-A binds to the nerve terminal through its heavy chain. Following binding, internalization takes place via receptor-mediated endocytosis. The terminal membrane couples the toxin-receptor, forming a vesicle containing BTX-A into the nerve terminal, and from this vesicle the light chain will be released into the cytoplasm. The light chain is responsible for the cleavage of the vesicular SNAP-25 enzyme, thus preventing the release of Ach and consequently chemical deprivation by reducing muscle contraction and blocking glandular secretions. The nerve terminal remains intact, the synthesis and storage of Ach continue to stimulate sprouts of lateral axons, which reestablish a new neuromuscular junction (JNM), thus maintaining its normal activity^{9,18,21,22}.

The effect is temporary and reversible, as neural shoots form as a second outlet to Ach; then, after a time, the neurotransmitter is released through the new shoots, thus resuming its original activity^{4,9,21}.

In the literature, no cases of compensatory hyperhidrosis involving BTX-A have been reported, and an improvement in the psychological and emotional state has been reported that reflects on people's daily lives^{7,12,13,23}. However, overdose may cause local, generalized and profound neuromuscular paralysis²². Research has shown that adverse reactions are usually minimal and, when they do occur, they are temporary and, most of the time, only at the site of application. These reactions were characterized by schistosomiasis, pain, edema, bleeding, inflammation, pruritus, paresthesia, sensitivity, hypersensitivity, hemorrhage and irritation, with hours duration, which were not very relevant^{22,24}. The objective of this study was to report, through the follow-up of a case study, the relationship between the life quality of a patient before and after 30 days of the application of botulinum toxin type A for the treatment of hyperhidrosis.

Materials and Methods

The case study was descriptive, relating the treatment of hyperhidrosis with a possible improvement in a patient life quality. The study was carried out with only one volunteer as object of study, added to the bibliographical research with concrete information based on books, articles and electronic journals with public content of pertinent scientific literature.

The procedure was performed in the city of Jundiaí-SP, at the Day Hospital Nova Plástica Clinic. The team consists of doctors, nurses, dentists and biomedical, and the facilities are suitable for invasive procedures and even plastic surgeries, regulated by the Local Surveillance (VISA).

A qualified professional for the present procedure, medical plastic surgeon (CRM 90204), performed intradermal applications for the first time in the patient's palmar region. The patient signed the Written Informed Consent Form (WICF) and answered the questionnaire on life quality assessment.

The type of botulinum toxin was type A, manufactured by Allergan, known as BOTOX (batch: C4330C3; expiration date: October 2019).

Data collection was performed using a closed life quality questionnaire for only one patient suffering from hyperhidrosis in the palmar region, before treatment and 30 days after application, in order to evaluate the results of the procedure. The questionnaire was standardized and adapted from Baroncello *et al.*¹, containing closed questions, on a scale from '0' to '4', with 0 being considered poor and 4 being excellent, (APPENDIX A). The points of the questions were summed up and the result was evaluated as follows: the closer to 100, the better life quality.

This study was approved by the Research Ethics Committee of the Paulista University (UNIP) CAAE: 90793718.0.0000.5512 under the number: 3,285,629.

Case Report

A 22-years-old male, clinically diagnosed with primary hyperhidrosis, sought treatment complaining of embarrassment and frustration due to bilateral palmar hyperhidrosis, which began in adolescence. This, after signing the WICF, opts for treatment through the intradermal application of BTX-A.

Treatment Protocol

1. Signature of the WICF;
2. Answer to the life quality questionnaire before treatment of BTX-A for palmar hyperhidrosis adapted from Baroncello *et al.*¹;
3. Anesthesia: Topical anesthetic in the affected region;
4. Assepsia of the bilateral palmar region;
5. Marking the points in pencil (Figure 1);
6. Application of BTX-A in the demarcated area (Figure 2);
7. Recommendations: Do not tighten the region; not to perform physical activities after the next 24 hours;
8. Follow-up in the next four weeks and after 30 days answer another questionnaire to evaluate the life quality after the application.

Figure 1: Marking of points (before intervention)



Source: Prepared by the author (2019)

Figure 2: Application of BTX-A (during the intervention)

Source: Prepared by the author (2019)

Results and Discussion

Before the treatment reported here, the patient answered the life quality questionnaire and the score was 28 points out of 100, reaffirming that hyperhidrosis is a pathology that caused the patient serious psychological and social problems⁷. In a study by Baroncello *et al.* (2014)¹ with 51 patients with primary hyperhidrosis in the palmar, axillary and axillary-palmar regions, before undergoing surgical intervention, the reported complaints were also of a decreased life quality due to hyperhidrosis¹⁴.

Tamura *et al.* (2011)¹² carried out a study with seven patients with plantar hyperhidrosis treated with BTX-A. The post-application results were satisfactory, with reduction of sweating with onset of effect between 48 to 72 hours, and complete effect after one week. In the present report, the action of BTX-A started 72 hours after application and its full effect was observed in the second week after the procedure.

Reis *et al.* (2011)¹³, in a 10-year retrospective analysis of individuals with hyperhidrosis treated with botulinum toxin, evaluated 39 patients treated between July 2000 and July 2010. The results were satisfactory, treatment was considered safe and effective. 95.3% of the patients reported being very satisfied and there was no compensatory hyperhidrosis. Of the 39 patients, 2 reported pain at the application site, the same occurred with one single patient in the present study, where the symptom lasted at most four hours. The sum of points in the life quality of the volunteer of the present report after 30 days of application of BTX-A was 90 points out of 100, therefore, there was a decrease in sweating and improvement in life quality. The patient was fully satisfied with the outcome of the treatment.

Lessa and Fontenelle (2011)²⁵ reported the case of a 20-years-old boy with symptoms of social phobia and

psychiatric disorders who had an independent diagnosis of palmar, plantar and axillary hyperhidrosis. The complaint was of discomfort and desire to avoid social situations due to excessive sweating. The cognitive-behavioral treatment was performed for social phobia, which did not present positive results. BTX was then applied to the axillary region, and in the first week the patient presented improvement of the symptoms, which was maintained in a progressive manner until the fourteenth week, resulting in the absence of social phobia due to BTX application.

Andrade *et al.* (2011)²⁶ reported a case involving four volunteers, all of whom had bilateral palmar hyperhidrosis. All felt interference in personal, professional, and emotional relationships due to hyperhidrosis, as in the current case study. Two of the participants were submitted to treatment with BTX-A conveyed by iontophoresis, and the other two were BTX-A conveyed by phonophoresis. Both results were satisfactory, the decrease in sweating was on average 76.5% and there were no adverse effects.

Dias *et al.* (2001)²⁷ reviewed the literature on the efficacy of BTX in hyperhidrosis from six studies with patients with hyperhidrosis. Satisfactory reduction in sweating, as well as side effects that lasted for hours and satisfaction with treatment, were reported in all cases. Among them, there were two studies on hyperhidrosis in the palmar region, one of them with four individuals. Two of these individuals had muscle weakness of the transient thumb. In the other study with twenty volunteers, all had pain only during the application of BTX, and four complained of temporary muscle weakness.

The description of the present case study is consistent with what has been reported in the literature and corroborates with the results demonstrating that the treatment of BTX-A for hyperhidrosis is efficient and has a positive impact on patient's life quality.

Conclusions

In the present report, although temporary adverse effects occurred, no compensatory hyperhidrosis was reported, which resulted in improved life quality and patient satisfaction. Therefore, the therapeutic use of botulinum toxin type A for primary hyperhidrosis decreased sweating, had temporary side effects and significantly improved the patient life quality. These data corroborate with the related literature.

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References

- Baroncello, JB. Baroncello, LRZ. Schneider EGF. Martins, GG. Quality of life evaluation before and after video-assisted thoracoscopy sympathectomy for treatment of primary hyperhidrosis. *Rev. Col. Bras. Cir.* 2014, 41 (5): 325-330.
- Hersgel R, Levitzky M. *Medical Physiology: An Integrated Approach*. Porto Alegre: AMGH; 2012. 786 p.
- Curi R, Son JPA. *Basic Physiology*. Rio de Janeiro: Guanabara Koogan; 2011. 857 p.
- Scope MMM. Botulinum Toxin Type A: mechanism of action. *Acta Fisiatr.* [Internet]. 2009 [quoted 2018 Aug. 21], 16 (1): 25-37. Available at: <http://www.revistas.usp.br/actafisiatr/actafisiatr/103037/101317>
- Rhoades RA, Tanner GA. *Medical Physiology*. 2nd ed. Rio de Janeiro: Guanabara Koogan; 2005. 741 p.
- Guyton AC, Hall JE. *Guyton and Hall Fundamentals of Physiology*. 12th ed. Rio de Janeiro: Elsevier; 2012. 728 p.
- Gontijo GT, Gualberto GV, Madureira NB. Update on the treatment of axillary hyperhidrosis. *Surgical & Cosmetic Dermatology* [Internet] 2011, 3 (No month): [quoted 2018 Mar. 25] Available from: <http://www.redalyc.org/articulo.oa?id=265519664011> > ISSN 1984-5510
- Hamm H. Impact of Hyperhidrosis on Quality of life and its Assessment. *Dermatol Clin* [Internet]. 2014 [quoted 2018 Feb. 19], 32 (4): 467-476. Available at: <https://www.sciencedirect.com/science/article/pii/S0733863514000710?via%3Dihub>
- Marques JRS, Pina C. *The Botulinum Toxin: Its clinical use* [Master's Degree] .Porto: Universidade Fernando Pessoa, 2014.
- Katzung BG, Masters SB, Trevor AJ. *Basic and Clinical Pharmacology*. 12th ed. Porto Alegre: AMGH; 2014. 1228 p.
- Albert Ainsten. Hyperhidrosis [Internet]. [s.l. : s.n.]; [20--?] [Quoted 2018 Feb. 17]. Available At: <https://www.einstein.br/doencas-sintomas/hiperidrose>
- Tamura BM, Biasi TB, Souza RL, Cucé LC. Botulinum toxin in plantar hyperhidrosis evaluated through digital imaging system. *Surg Cosmet Dermatol* [Internet]. 2011 [quoted 2018 Feb. 20], 3 (1): 23-7. Available at: <http://www.surgicalcosmetic.org.br/detalhe-artigo/110/Toxina-botulinica-em-hiperidrose-plantar-valued-traves-de-system-of-digitalimaging>
- Kings GMD, War AC, Ferreira JP. Study of hyperhidrosis patients treated with botulinum toxin: retrospective analysis of 10 years. *Rev. Bras. Cir. Plást.* [Internet]. 2011 [quoted 2018 Feb. 15], 26 (4): 582-90. Available at: <http://www.scielo.br/pdf/rbcp/v26n4/a08.pdf>
- Lion L. What is hyperhidrosis [Internet]. [20--?] [Quoted 2018 Oct. 01]. Available at: <http://hiperidrose.com.br/o-que-e-hiperidrose/>
- Carvalho AVC, Gagliani LH. Botulinum toxin migraine treatment. *Revista UNILUS Teaching and Research* [Internet]. 2014 [quoted 2018 Oct. 02]; 11 (22): 64. Available at: <http://revista.unilus.edu.br/index.php/ruep/article/view/153/u2014v22n11e153>
- Sposito MM. Botulinum toxin type A - Pharmacological properties and clinical use. *Acta Fisiatr.* 2004; (Suppl 1).
- Maturana CS, Camargo EA. Therapeutic uses of botulinum toxin type A. [cited 2018 Feb. 15]. Londrina; [201-?]. Available at: http://www.moreirajr.com.br/revistas.asp?id_materia=1693&fase=imprime
- Brooks GF, Carroll KC, Butel JS, Morse SA. *Jawetz, Melnick and Adelberg: Medical Microbiology*. 24th ed. Rio de Janeiro: McGraw-Hill Interamericana do Brasil Ltda; 2009. 817 p.
- Lima KTB, Bezerra QP, Pereira MC. The use of botulinum toxin in the treatment of gingival smile-case report. *Boa Vista, RR: [s.n.]; [20-?].* 14 p.
- Oliveira IM. Use of botulinum toxin in Gingival Smile Cosmetics. Aracaju [Internet]. Aracaju: University of Tiradentes; 2014 [quoted 2018 Oct. 03]. 9 p. Available at: <http://openrit.grupotiradentes.com/xmlui/bitstream/handle/set/1940/USO%20DA%20TOXINA%20BOTUL%3%8DNI%20CA%20NA%20COSM%3%89TICA%20DO%20SORRISO%20GENGIVAL%20%28UNIT-SE%29.pdf?Sequence=1>
- Naumann M, Boo LM, Ackerman AH, Gallagher CJ. Immunogenicity of botulinum toxins. *J Neural Transm* [Internet]. 2012 [quoted 2018 Feb. 16]. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3555308/>
- BOTOX. [Bull]. São Paulo: Allergan Produtos Farmacéuticos LTDA
- Crop OCG, Boeing M, Ortega LB. Botulinum toxin in the treatment of pain. *Rev Bras Anestesiol.* [Internet]. 2009 [quoted 2018 set. 22], 59 (3): 366-381. Available at: <http://www.scielo.br/pdf/rba/v59n3/13.pdf>
- Gemperli R, Gimenez RP, Salles AG, Ferreira MC. Retrospective analysis of facial wrinkle alterations after serial applications of botulinum toxin type A. *Rev Bras Cir Plast.* [Internet]. 2010 [quoted 2018 Feb. 22]: 25 (2): 297-303. Available at: www.rbcp.org.br/export-pdf/590/v25n2a12.pdf
- Lessa LR, Fontenelle FL. Botulinum toxin as a treatment for generalized social phobia with hyperhidrosis-Case report. *Rev. psiquiatr. clin.* [Internet]. 2011 [quoted 2018 Oct. 02]; 38 (2). Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0101-60832011000200008&lng=en&nrm=iso&tlng=En
- Andrade PC, Flores GP, Uscello JFM, Miot HA, Morsoleto MJMS. Treatment of palmar hyperhidrosis with onabotulinumtoxinA conveyed by iontophoresis or phonophoresis - case reports. *An Bras. Dermatol.* [Internet]. 2011 [quoted 2018 Oct. 22], 86 (6). Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0365-05962011000600037

27. Dias L, Marçal L, Rodrigues M, Alves TCA, Pondê MP. Efficacy of Botulinum Toxin in the Treatment of Hyperhidrosis. *Rev. Neurosciences* [Internet]. 2001 [quoted 2018 Oct. 02]: 9 (3): 93-96. Available at: <http://www.hsp.epm.br/dneuro/neurociencias/Neurociencias%2009-3.pdf#page=5>

APPENDIX A- Life quality questionnaire relating to hyperhidrosis before and after treatment with botulinum toxin type A, applied to the patient, adapted from Baroncetto *et al.*¹

Name:

Coming from:

Natural:

Birth:

Age:

Gender: M F

Telephone:

Clinical Data:

1. Location of hyperhidrosis:

Axillary

To plant

Palmar

Facial skull

2. How long does the treatment last in months?

Less than 12 months

More than 12 months

3. Did you have compensatory hyperhidrosis?

Yes

Not

4. If positive for compensatory hyperhidrosis, it is:

Acceptable

Disturbing

Debilitating

5. Were you satisfied with the treatment?

Unsatisfied

regular

good

great

6. Did you experience any side effects?

Pain

Esquimoses

Decrease in strength

Anything

7. How do you evaluate your life quality before and after treatment:

Life quality	Before					After				
	0	1	2	3	4	0	1	2	3	4
Decreased sweating	0	1	2	3	4	0	1	2	3	4

8. With regard to this set of functions or acts, how would you rate your life quality in the following items:

	Before					After				
	0	1	2	3	4	0	1	2	3	4
Favorite hobby	0	1	2	3	4	0	1	2	3	4
Playing sports	0	1	2	3	4	0	1	2	3	4
Being with friends	0	1	2	3	4	0	1	2	3	4
Socially dancing	0	1	2	3	4	0	1	2	3	4
Wearing sandals	0	1	2	3	4	0	1	2	3	4

Wear socks	0	1	2	3	4	0	1	2	3	4
Handicrafts	0	1	2	3	4	0	1	2	3	4
Write	0	1	2	3	4	0	1	2	3	4
Picking objects	0	1	2	3	4	0	1	2	3	4
Shaking hands	0	1	2	3	4	0	1	2	3	4

9. With regard to partners, how would you rate your life quality in relation to the act of:

	Before					After				
Intimate touch	0	1	2	3	4	0	1	2	3	4

10. How would you rate the sweating excessively:

	Before					After				
It was necessary to justify	0	1	2	3	4	0	1	2	3	4
Observed demonstrations of rejection	0	1	2	3	4	0	1	2	3	4
He wanted to leave the place	0	1	2	3	4	0	1	2	3	4
He tried to keep distance from other people	0	1	2	3	4	0	1	2	3	4

11. How would you rate your life quality of when you were:

	Before					After				
Indoors	0	1	2	3	4	0	1	2	3	4
In hot environments	0	1	2	3	4	0	1	2	3	4
Tense or worried	0	1	2	3	4	0	1	2	3	4
Thinking about it	0	1	2	3	4	0	1	2	3	4
With problems at school or work	0	1	2	3	4	0	1	2	3	4
Wearing colorful clothes	0	1	2	3	4	0	1	2	3	4
Before the tests	0	1	2	3	4	0	1	2	3	4
Before public performances	0	1	2	3	4	0	1	2	3	4

Total before treatment:

Total after treatment:

Caption: Poor 0; Bad 1; Regular 2; Good 3; Excellent 4. Score classification between 0 to 100. The closer to 100, the better the life quality.