




# Statistical analysis of the correlation between body perception and desire to undergo plastic surgery

*A análise estatística do risco relativo entre a percepção corporal e o interesse em realizar cirurgias plásticas*

JOÃO VITOR PITHON NAPOLI <sup>1\*</sup>   
JOSÉ VINICIUS SILVA MARTINS <sup>1</sup>  
VITOR VILANO SALVO <sup>1</sup>  
GABRIELA DUCIONI MATOS <sup>1</sup>  
EDGARD DA SILVA NETO <sup>1</sup>

Institution: Universidade Nove de Julho,  
Liberdade, SP, Brazil.

Article received: January 7, 2019.  
Article accepted: January 22, 2019.

Conflicts of interest: none.

DOI: 10.5935/2177-1235.2019RBCP0206

## ■ ABSTRACT

**Introduction:** Social media has generated an increase in self-evaluation and the search for the ideal appearance. Thus, the motivation to use surgical methods to improve physical appearance has grown exponentially. **Methods:** The Body Shape Questionnaire (BSQ), Body Investment Scale (BIS), and Questionnaire of Interest in Future Plastic Surgeries (QIFPS) were administered to 64 students. Once the data were collected, a quantitative statistical analysis using the chi-square test and relative risk (RR) was conducted. **Results:** The BSQ mean was 98.04, the relation of greater punctuation in this questionnaire with QIFPS presented an RR of 2.41; ( $p = 0.002$ ). The mean BIS score was 91; compared to the QIFPS, it was not statistically relevant ( $RR = 0.94$ ;  $p = 0.83$ ). Regarding the objective question of body satisfaction and QIFPS, highest body dissatisfaction was a risk factor for desiring more plastic surgeries ( $RR = 1.94$ ;  $p = 0.003$ ), as was female sex ( $RR = 3.01$ ;  $p = 0.01$ ). **Conclusions:** Our findings suggest that a high BSQ score, high body dissatisfaction, and female sex are risk factors for a desire to undergo plastic surgery.

**Keywords:** Aesthetics; Physical appearance; Plastic surgery; Body Mass Index; Personal satisfaction; Bullying; Overweight; Body image.

<sup>1</sup> Universidade Nove de Julho, São Paulo, SP, Brazil.

## ■ RESUMO

**Introdução:** A maior exposição nas mídias sociais gerou uma maior autoavaliação e a consequente busca pela aparência ideal. Dessa forma, a motivação de utilizar métodos cirúrgicos para melhora da aparência física cresce exponencialmente. **Métodos:** Foram distribuídos 3 questionários para 64 alunos: “Body Shape Questionnaire” (BSQ), “Escala de Investimento Corporal” (EIC) e “Questionário de interesse em cirurgias plásticas futuras” (QICPF). A partir da tabulação dos dados, foi realizada a análise estatística quantitativa por meio do teste qui-quadrado e risco relativo, para estudo objetivo e cruzado dos questionários. **Resultados:** O BSQ médio foi de 98,04, a relação de maior pontuação nesse questionário com QIRCP apresentou Risco Relativo (RR=2,41 e p=0,002). A média do EIC foi de 91 e, quando relacionado com QIRCP, não se apresentou estatisticamente relevante (RR=0,94 e p=0,83). Quanto à pergunta objetiva de satisfação corporal e o QIRCP, nota-se que a maior insatisfação corporal é fator de risco para querer realizar mais cirurgias plásticas (RR=1,94 e p=0,003) e as mulheres apresentam-se como o gênero de maior interesse (RR=3,01 e p=0,01). **Conclusões:** A análise estatística para a população estudada sugere que BSQ elevado, insatisfação corporal e mulheres apresentam maior interesse em realizar cirurgia plástica. **Descritores:** Estética; Aparência física; Cirurgia plástica; Índice de massa corporal; Satisfação pessoal; Bullying; Sobrepeso; Imagem corporal.

## INTRODUCTION

The concept of “body image” as a psychological phenomenon was first described in 1935 by the German writer Schilder as the mental image of one’s body, which may explain the way the body is presented to oneself<sup>1,2</sup>.

Changes in body image can be found in diagnosed neurological and psychiatric disorders such as anorexia, depression, and bulimia<sup>3,4</sup>. Many authors have recognized the cultural and social pressure of modern media as a driving and imposing mechanism for maintaining a body considered “ideal” (thin, slim, and fit)<sup>5,6</sup>; thus, even one’s body shape perception can be distorted, leading to pathological states of anorexia or bulimia<sup>7</sup> as well as great influence on the number of plastic surgeries performed<sup>8</sup>. Dissatisfaction with one’s body appearance is considered particularly common in young women. However, studies have shown that men are increasingly overly concerned with their body image as well<sup>9,10</sup>.

There are several studies using unique casuistry of people who are dissatisfied with their body image, and this feeling can be quantified through different questionnaires such as the Body Investment Scale (BIS)<sup>7</sup> and the Body Shape Questionnaire (BSQ)<sup>11,12</sup>. Based on this body image quantification, one can assess a person’s interest in undergoing plastic surgery (PS).

In 2013, a survey was conducted of the number of PS procedures performed ranked Brazil as the number one country worldwide. This fact can be attributed to the country’s tropical climate, where bodies are often exposed. The affordability of these aesthetic procedures, increase in some social classes, and international success of Brazilian plastic surgeons are justifications<sup>11</sup>. In relation to this increase in PS to improve body contours, correct aesthetic abnormalities, or increase aesthetic satisfaction<sup>13</sup>, it is believed that body image questionnaires can help surgeons understand patients’ wishes for future aesthetic procedures<sup>7</sup>.

## OBJECTIVE

The present study aimed to analyze differences in body assessments using the BIS and BSQ and by quantify the intention to undergo aesthetic procedures using the Questionnaire of Interest in Future Plastic Surgeries (QIFPS). Through relative risk (RR) statistical analysis, information from the three questionnaires was crossed, aiming at body image results with the intention of undergoing plastic surgeries (Figures 1 to 4).

## METHODS

The study received approval from the Human Research Ethics Committee as defined in resolution CNS 466/12 via an online Brazilian platform (no. CAAE 59154416.0.0000.5511).

The sample included 64 students from Nove de Julho University - UNINOVE, Campus Vergueiro. All participants were volunteers 18-40 years of age of both sexes and all ethnicities regardless of the history of previous PS.

A Consent Form for Participation in Clinical Research was presented to and signed by each volunteer. The first questionnaire was the BSQ, which was validated and currently used by the scientific community to evaluate body image, consists of 34 questions regarding body perception quantified by the frequency of each question from 1 (never) to 6 (always), is self-explanatory, and takes 3-10 minutes to complete.

The second questionnaire was the BIS, which consisted of 24 questions rated from 1 to 6 regarding concern and investment assigned to body care, was also self-explanatory, and took 3-8 minutes to complete.

The third questionnaire was the QIFPS, which quantified from 0 to 5 the participants' interest in undergoing future plastic surgeries.

The statistical analysis of the variables studied were calculated by measures of central tendency (mean) and dispersion (minimum and maximum value, standard deviation) by age, sex, body mass index (BMI), BSQ, BIS, and QIFPS. The qualitative

analysis was performed using the chi-square test to study the RR of each of the hypothesis raised, with QIFPS being the comparative variable (Table 1).

## RESULTS

A total of 64 volunteers (13 men, 51 women; mean age, 20.9 years; range, 18-35 years) were recruited. The relationship between age above and below 26 years and QIFPS presented an RR = 4.35 and p value = 0.48. The relationship between female sex and QIFPS presented an RR = 3.01 and p = 0.01, revealing in this population a greater desire to undergo PS.

The mean participant weight was 60 kg (range, 48-75 kg), while the mean height was 1.63 m (range, 1.50-1.80 m). The mean BMI was 22.62 (range, 19.1-29.9); most volunteers (79.5%) were eutrophic (BMI, 18.5-24.5), 2.2% were underweight (BMI < 18.5), and 18.8% were overweight (BMI 25-29.9). The relationship between a BMI higher or lower than 23 on the QIFPS had an RR = 1.62, suggesting that eutrophic patients are more interested in undergoing PS (p = 0.076).

The mean BSQ was 98.04; the mean body dissatisfaction increased as BMI increased. The interviewees who obtained a high BSQ score (>100) had an RR of 2.41 and p = 0.01 compared to the group with a low BSQ; this result matches the result that the first group has more interest in undergoing PS.

The mean BIS was 91 (moderate), and the variation was low (range, 70-108). Participants with a high BIS showed no correlation with more or less interest in PS, with an RR = 0.94 and p = 0.83.

The mean body satisfaction score was 6.16 on a scale of 0-10. People with greater body dissatisfaction (<7) showed greater interest in undergoing PS, with an RR = 1.94 and p = 0.003.

Bullying was reported by 32% of the respondents. A relationship was observed between a higher BMI and bullying as well as greater body dissatisfaction. However, there was no relationship between the presence or absence of bullying with body investment and interest in undergoing PS.

The mean monthly family income was 6,223 Brazilian real, with a mean of 3.55 dependents (Tables 1, 2 and 3 and graphic 1).

**Table 1.** Study variables.

Number of volunteers	Age	Weight	Height	BMI	BSQ	BIS	Interest in PS	Satisfaction
				> 18,5	66	93	6	7
50	20,9 (18 - 35)	60 (48-75)	1,63 (1,5 - 1,8)	18,6 - 24,9	92 (35 - 163)	91,3 (70 - 104)	8,1 (3 - 15)	6,3
				25 - 29,9	111,8 (56 - 167)	86,5 (75 - 100)	8 (3 - 8)	5

**Table 2.** Presence of bullying according to mean BMI, body satisfaction, BSQ, BIS, and interest in PS

	Mean BMI	Body satisfaction	BSQ	BIS	Interest in PS
Presence of bullying	24,4	5,4	110,3	90,3	7,5
Absence of bullying	21,2	6,5	97,5	90,2	7,7

**Table 3.** Risk factors for interest in undergoing future plastic surgeries.

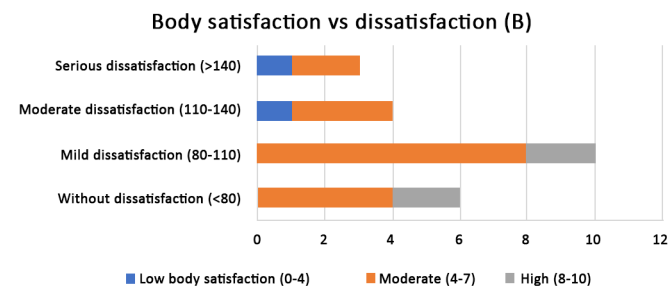
	High QIFPS (>4)	Low QIFPS (>4)	Total	RR
Female sex	28	23	51	3,01
Male sex	2	11	13	
Age ≥ 26 years	2	1	3	4,35
Age < 25 years	28	33	61	
BMI < 23	19	14	33	1,62
BMI > 23	11	20	31	
BSQ score > 100	19	9	28	2,41
BSQ score < 100	9	23	32	
BIS score > 90	16	19	35	0,94
BIS score < 90	14	15	29	
Body dissatisfaction score < 7	24	15	39	1,94
Body satisfaction score > 7	6	19	25	

Table relating risk factors (first column) with interest in performing future plastic surgery.

RR > 1; risk factor.

RR = 1; has nothing to do with the outcome.

RR < 1; protective factor for outcome.



**Graphic 1.** Body satisfaction vs dissatisfaction.

## DISCUSSION

Body satisfaction assessment and quantification is an important factor in the characterization of an individual's well-being, since, according to the World Health Organization, well-being encompasses one's mental, social, and physical health.

This observation reaffirms the importance of understanding questionnaires such as the BSQ and BIS as well as evaluating their application to each patient and their relationship with the interest in undergoing future PS and increasing their physical well-being.

To make progress in this assessment, we use two questionnaires: the BSQ (aimed at quantifying body self-satisfaction) and the BIS (which quantifies

concern about the investment assigned to body care). Both questionnaires are validated by the international literature and were judiciously applied to the Brazilian reality through bibliographic reviews<sup>1-7</sup> and translation by specialized groups that guaranteed semantic validity.

We prepared the QIFPS to relate to the BSQ and BIS to obtain information regarding the desire to undergo aesthetic procedures and relate them to the risk factors presented in Table 3.

In the current study, the mean BSQ score was 98.04, similar to the findings in the literature of the study conducted by the Federal University of São Paulo in 2009, with a mean BSQ score of 97<sup>1</sup>.

Regarding the interest in undergoing aesthetic procedures, a predominance was found in women over men. This finding coincides with the results of Kakeshita et al. in 2006, in which men were less concerned about their physical state.

For Conti et al., in this specific population, the BSQ was considered the gold standard for evaluating body dissatisfaction. In 2000, Madrigal et al. pointed out good documentation in the literature about the relationship between body weight and body image perception<sup>16</sup>, which was reinforced by the present study's findings.

The presence of bullying in this sample was 32% of respondents. In 2011<sup>14</sup>, Moura et al. studied bullying

among 1075 students from first to eighth grade and reported a prevalence of 17.5%. A relationship was observed between a higher BMI and bullying as well as greater body dissatisfaction (Table 2). In 2012<sup>15</sup>, Souza et al. observed that 70% of bullying victims were dissatisfied with their body image.

In the current study, it was possible to quantify the body perception of the studied sample and demonstrate a directly proportional relationship with the desire to undergo aesthetic procedures.

## CONCLUSION

The statistical analysis of the three applied questionnaires showed the adequacy of the methods used to study body image perception. Furthermore, its usefulness at highlighting the risk factors for a greater interest in undergoing future PS. The advancement of knowledge in this area contributes to our understanding of the physical and psychological profile of the population interested in undergoing aesthetic procedures.

## COLLABORATIONS

<b>JVPN</b>	Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Supervision, Validation, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing
<b>JVSM</b>	Conceptualization, Project Administration, Writing - Review & Editing
<b>VVS</b>	Analysis and/or data interpretation, Data Curation, Formal Analysis, Investigation, Software
<b>GDM</b>	Writing - Review & Editing
<b>ESN</b>	Analysis and/or data interpretation, Final manuscript approval, Supervision, Visualization, Writing - Original Draft Preparation, Writing - Review & Editing

## REFERENCES

- Di Pietro M, Silveira DX. Internal validity, dimensionality and performance of the Body Shape Questionnaire in a group of Brazilian college students. *Rev Bras Psiquiatr.* 2009 Mar;31(1):21-24. DOI: <https://doi.org/10.1590/S1516-44462008005000017>
- Cordero MJA, Sánchez MN, Villar NM, Valverde EG. Influencia del contexto social en la percepción de la imagen corporal de las mujeres intervenidas de cáncer de mama. *Nutr Hosp.* 2013 Oct;28(5):1453-1457.
- American Psychiatric Association. Manual diagnóstico e Estatístico de Transtornos Mentais: DSM-5. Tradução de Maria Inês Corrêa Nascimento, et al. 5ª ed. São Paulo (SP): Artmed Editora; 2014.
- Alves E, Vasconcelos FAG, Calvo MCM, Neves J. Prevalência de sintomas de anorexia nervosa e insatisfação com a imagem corporal em adolescentes do sexo feminino do Município de Florianópolis, Santa Catarina, Brasil. *Cad Saúde Pública.* 2008 Mar;24(3):503-12. DOI: <https://doi.org/10.1590/S0102-311X2008000300004>
- Vardanian AJ, Kusnezov N, Im DD, Lee JC, Jarrahy R. Social media use and impact on plastic surgery practice. *Plast Reconstr Surg.* 2013 May;131(5):1184-93. PMID: 23629099 DOI: <https://doi.org/10.1097/PRS.0b013e318287a072>
- Fogel J, King K. Perceived realism and Twitter use are associated with increased acceptance of cosmetic surgery among those watching reality television cosmetic surgery programs. *Plast Reconstr Surg.* 2014 Aug;134(2):233-8. PMID: 25068324 DOI: <https://doi.org/10.1097/PRS.0000000000000322>
- Gouveia VV, Santos CA, Gouveia RS, Santos WS, Pronk SL. Escala de Investimento Corporal (BIS): evidências de sua validade fatorial e consistência interna. *Aval Psicol.* 2008 Abr;7(1):57-66.
- Montemurro P, Porcnik A, Hedén P, Otte M. The influence of social media and easily accessible online information on the aesthetic plastic surgery practice: literature review and our own experience. *Aesthetic Plast Surg.* 2015 Apr;39(2):270-7. PMID: 25697277 DOI: <https://doi.org/10.1007/s00266-015-0454-3>
- Cohane GH, Pope Júnior HG. Body image in boys: a review of the literature. *Int J Eat Disord.* 2001 May;29(4):373-9. DOI: <https://doi.org/10.1002/eat.1033>
- Alves D, Pinto M, Alves S, Mota A, Leirós V. Cultura e imagem corporal. *Motricidade.* 2009;5(1):1-20. DOI: [https://doi.org/10.6063/motricidade.5\(1\).184](https://doi.org/10.6063/motricidade.5(1).184)
- Coelho FD, Carvalho PHB, Fortes LS, Paes ST, Ferreira MEC. Body dissatisfaction and influence of media in women who undergo plastic surgery. *Rev Bras Cir Plast.* 2015;30(4):567-573. DOI: <https://doi.org/10.5935/2177-1235.2015RBCP0195>
- Oliveira FP, Bosi MLM, Vigário OS, Vieira RS. Comportamento alimentar e imagem corporal em atletas. *Rev Bras Med Esporte.* 2003 Nov;9(6):348-356. DOI: <https://doi.org/10.1590/S1517-86922003000600002>
- Santos MTS, Tedesco ACB, Hochman B, Juliano Y, Garcia EB, Ferreira LM. Imagem corporal em mulheres submetidas a cruroplastia medial após cirurgia bariátrica. *Rev Soc Bras Cir Plast.* 2013;28(3):90.
- Moura DR, Cruz ACN, Quevedo LA. Prevalência e características de escolares vítimas de bullying. *J Pediatr (Rio J).* 2011 Feb;87(1):19-23. DOI: <https://doi.org/10.1590/S0021-75572011000100004>
- Souza EGC, Rech RR, Mello GT, Melo MO, Halpern R. Obesidade, imagem corporal e bullying em uma população de escolares de uma cidade no Sul do Brasil. *Revista da AMRIGS.* 2012 Out/Dez;56(4):330-334.
- Pesa JA, Syre TR, Jones E. Psychosocial differences associated with body weight among female adolescents: the importance of body image. *J Adolesc Health.* 2000 May;26(5):330-7. DOI: [https://doi.org/10.1016/S1054-139X\(99\)00118-4](https://doi.org/10.1016/S1054-139X(99)00118-4)

\*Corresponding author:

**João Vitor Pithon Napoli**

Rua Vergueiro, 235/249, Espírito Santo do Pinhal, SP, Brazil.

Zip Code: 13990-000

E-mail: [joaovitorpithon@gmail.com](mailto:joaovitorpithon@gmail.com)