

Translation and validation of the brief version of the questionnaire of olfactory disorders-negative statements to Portuguese

Original Article

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Abstract

Purpose: Olfactory dysfunction can lead to anxiety and depressive symptoms. Given the growth in awareness around olfactory dysfunction since the COVID-19 pandemic, there is a need for standardized questionnaires to allow comparison between series and to better understand and deal with our patients' struggles.

Materials and Methods: Translation and validation of the brief version of the Questionnaire of Olfactory Disorders-Negative Statements (bvQOD-NS) to the Portuguese language.

Results: Thirty patients with confirmed olfactory dysfunction by psychophysical olfactory tests met the inclusion criteria. Internal consistency of the bvQOD-NS measured with Cronbach α was 0.589. The intraclass correlation coefficient was 0.925 (confidence interval [CI] 95%: 0.841–0.964), which is indicative of excellent test–retest reproducibility.

Conclusions: Portuguese is the seventh most-spoken first language in the world. The Portuguese version of the bvQOD-NS rapid and valid method to better understand our patients' struggles, ultimately benefiting them and providing important information for the medical community.
Keywords: Smell, Rhinitis, Sinusitis, Quality of Life, Surveys and Questionnaires.

Introduction

Human beings have five basic senses: sight, hearing, smell, taste, and touch. Particularly, olfaction has three main functions: 1) to control food ingestion (e.g., determining food's edibility, appetite regulation); 2) to avoid hazards (e.g., gas leaks); and 3) social communication (e.g., detecting body odors, sharing feelings)¹. Although most patients with olfactory dysfunction (OD) are unaware of it, it is reported that around one-third of

the patients with OD complain of reduced quality of life (QoL).² These patients usually have worries regarding hazard avoidance, insecurities regarding their body smell and reduced enjoyment of food, which can consequently lead to anxiety and depressive symptoms.³

OD is usually secondary to sinonasal disease, mainly chronic rhinosinusitis. However, other causes exist, such as congenital OD, posttraumatic OD, and post-infectious OD, which is trending since 2020 because of the COVID-19 pandemic.⁴ Despite most COVID-19 patients having only transitory OD, some unlucky few are dealing with long-standing effects – a case-controlled study of 100 patients by Boscolo-Rizzo et al. reported that 7% had functional anosmia 1 year after infection.⁵

The Questionnaire of Olfactory Disorders-Negative Statements (QOD-NS) with 17 items was an adaptation of the original version of the Questionnaire of Olfactory Disorders (QOD) by Frasnelli et al., which contained 52 items.^{6,7} Recently, to improve efficiency of the questionnaire and reducing patient burden, Mattos et al. published the brief version of the QOD-NS (bvQOD-NS) with 7 items, with excellent correlations to the original scores.^{8,9} To the best of our knowledge, there is no translation of the bvQOD-NS validated to the Portuguese language. Given the growth in awareness of the importance of OD and the increase in research, there is a need for standardized questionnaires to allow comparison between series and to better understand and deal with our patients' struggles.¹⁰ Thus, we aim to translate, validate, and adapt the bvQOD-NS to the Portuguese language.

Materials and methods

Study population

This study was approved by the Research and Ethics Committee of Centro Hospitalar do Tâmega e Sousa and followed the tenets of the Declaration of Helsinki for biomedical research. Every patient enrolled in the study agreed to participate in the study and signed

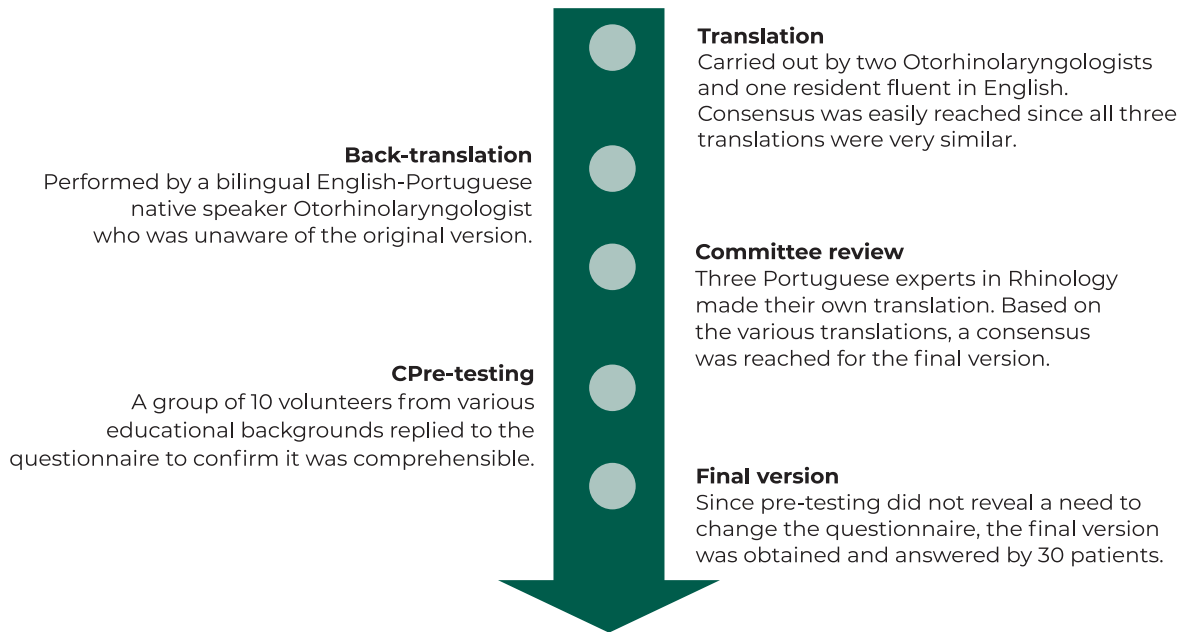
the informed consent paper. Patients who were being followed in our ENT department between June and August of 2022 reporting OD were contacted to participate in the study. Exclusion criteria was refusal to participate and lack of cognitive skills necessary to complete the questionnaire. Clinical and demographic variables were obtained from medical history with full ear, nose, and throat (ENT) examination, as well as through the patient's records. All patients were submitted to psychophysical olfactory testing for odor threshold and identification, as recommended by Hummel et al.⁴ For odor threshold we utilized the Connecticut Chemosensory Clinical Research Center (CCCRC) threshold test with butanol;¹¹ and for odor identification we used the Sniffin' Sticks (SnSt) identification test with 16 pens (Burghart Messtechnik), which is already validated for the Portuguese population.^{12,13}

Translation and validation process of the Brief version of the Questionnaire of Olfactory Disorders-Negative Statements to Portuguese

The score of the original bvQOD-NS is reported on a scale of 0 (I agree) to 3 (I disagree), with a maximum of 21 points.⁸ Since the statements are negative, lower scores reflect worse olfactory-specific QoL. Recommendations for the translation and cross-culture adaptation of health-related QoL measures were followed to translate the original bvQOD-NS.¹⁴

The translation and validation process is summarized in Figure 1. Independent translations were performed by three Portuguese doctors who are fluent in English. These three translations were reconciled into one preliminary Portuguese version, which was sent for back-translation by a bilingual English-Portuguese native speaker doctor. Since the original English version and the back-translated version were similar, the preliminary Portuguese version was then sent to three Portuguese experts in rhinology who are also fluent in English. Each made its own translation and compared the preliminary

Figure 1
Translation and validation process



Portuguese version with the original one. After discussion between the translators, the rhinology experts and the back-translator, a final version of the Portuguese bvQOD-NS was obtained (Figure 2). Pre-testing was performed by asking ten volunteers with different educational degrees and no olfactory dysfunction to complete

the questionnaire, and none of them reported any difficulty in the comprehension of the questions. The final version of the questionnaire was answered by thirty patients with OD in two different occasions: 1) at the time of olfactory testing; and 2) one month after completing the questionnaire, by teleconsultation.

Figure 2
Portuguese version of the bvQOD-NS

	Concordo	Concordo parcialmente	Discordo parcialmente	Discordo
1. As alterações do meu olfato fazem-me sentir isolado/a.				
2. As alterações do meu olfato fazem com que tenha dificuldade em participar em atividades do dia-a-dia.				
3. As alterações do meu olfato deixam-me irritado/a.				
4. Por causa das alterações do meu olfato, vou a restaurantes menos vezes do que costumava.				
5. Por causa das alterações do meu olfato, como menos (ou mais) do que costumava.				
6. Por causa das alterações do meu olfato, tenho mais dificuldade em relaxar.				
7. Tenho receio de nunca me habituar às alterações do meu olfato.				

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 27.0. Armonk, NY. The Cronbach α coefficient was used to assess the internal consistency of the questionnaire, measuring the degree to which each question relates to the rest. The test-retest reliability, referring to the consistency between the scores of repeated measurements from the same participant, was assessed by the intraclass correlation coefficient. We used the independent Samples t Test to compare groups within the population.

Results

Thirty patients with olfactory dysfunction confirmed by psychophysical olfactory tests met the inclusion criteria. Mean age was 46 ± 15 and 18 (60%) were male. Patient demographic and clinical data are presented in Table 1.

Table 1
Clinical and demographic data of the patients included in the study

Variable	N	(%)
Age	46 ± 15	
Patients	30	100
Male	18	60
Female	12	40
Medical history		
Smoker	3	10
Ex-smoker	4	13.3
Allergies	5	16.7
Asthma	6	20
Auto-immune disease	2	6.7
Severe head trauma	1	3.3
Surgical history		
Nasal/Sinonasal surgery	5	16.7
Neurosurgery	0	0
Associated symptoms		
Nasal obstruction	27	90
Rhinorrhoea	18	60
Postnasal drip	13	43.3
Face pain	15	50
Taste dysfunction	22	73.3

Every patient scored below normosmia in the odor threshold test with butanol, and the SnSt identification test revealed that our population was all below the 10th percentile according to the Portuguese normative data, indicating hyposmia/anosmia.¹³ After ENT examination and imagiological evaluation with sinonasal computer tomography (CT) scan, patients' etiologies of olfactory disorders were i) Chronic Rhinosinusitis (CRS) with nasal polyps (CRSwNP), ii) CRS without nasal polyps (CRSsNP), iii) post-COVID19 olfactory dysfunction, or iv) post-traumatic (Table 2). No patient was lost during the 1 month follow up. The Cronbach α of bvQOD-NS was 0.589 (<0.70), showing modest internal consistency of the questionnaire. The level of consistency was the lowest in questions four and five. The intraclass correlation coefficient was 0.925 (confidence interval [CI] 95%: 0.841–0.964), which is indicative of excellent test-retest reproducibility. (Table 3)

Table 2
Etiology of olfactory dysfunction of the patients included in the study

Etiology of Olfactory Dysfunction	N	(%)
CRSwNP	17	56.7
CRSsNP	2	6.7
Post-COVID19 infection	10	33.3
Severe head trauma	1	3.3

Table 3
Internal consistency and intraclass correlation coefficient of the Portuguese version of the bvQOD-NS measured with Cronbach α

Question	Total
Cronbach α	0.589
bvQOD-NS = 1	0.390
bvQOD-NS = 2	0.367
bvQOD-NS = 3	0.564
bvQOD-NS = 4	0.014
bvQOD-NS = 5	0.061
bvQOD-NS = 6	0.318
bvQOD-NS = 7	0.540
Intraclass correlation coefficient	0.925 (CI 95% 0.841-0.964)

Table 4
Average rate of response of the Portuguese version of the bvQOD-NS

Question	Average	Standard Deviation	Min./Max.
bvQOD-NS = 1	1.90	1.125	0/3
bvQOD-NS = 2	1.70	1.291	0/3
bvQOD-NS = 3	0.97	1.066	0/3
bvQOD-NS = 4	2.40	1.163	0/3
bvQOD-NS = 5	2.00	1.232	0/3
bvQOD-NS = 6	1.13	1.167	0/3
bvQOD-NS = 7	0.80	1.157	0/3

Table 5
Answers reflecting negative impact in QoL in each item of the Portuguese version of the bvQOD-NS

“Agree” and “partly agree” answers:
1. Social isolation due to OD: 14/30 (46.7%)
2. Negative impact on daily life activities: 14/30 (46.7%)
3. Changes of character: 22/30 (73.3%)
4. Less visits to restaurants: 6/30 (20%)
5. Loss of appetite: 10/30 (33.3%)
6. Difficulty to stay relaxed: 20/30 (66.7%)
7. Worried about not recovering: 23/30 (76.7%)

Questions three and seven brought up more concern from the patients, whereas question four showed the least impact in their QoL. (Table 4 and 5).

Comparison of post-COVID19 patients with other causes of OD revealed a statistically significant difference ($p < 0.05$) between the mean scores of the bvQOD-NS of both groups (8.1 vs 12.3).

Discussion

The greatest advantage of the bvQOD-NS in comparison with other olfactory specific QoL questionnaires is that is less time consuming, and thus it is likely to elicit better response rates and data quality.¹⁵ While reviewing the literature, we could find that the bvQOD-NS was already translated to Spanish and French, highlighting its usefulness in clinical practice around Europe.^{16,17} With an increasing interest in the study of OD and the lack of validated questionnaires for the Portuguese language, the seventh most-spoken first language

in the world, the authors considered this questionnaire as the most adequate to be used in clinical practice and research.¹⁸

Regarding the translation process, the authors tried to follow the guidelines of cross-cultural adaptation of QoL measures by Guillemin *et al.*,¹⁴ in order to come up with an equivalent translation of the original version to our country. However, there were some recommendations we chose not to implement: i) The authors did not feel it was necessary for the translation to be made by someone other than medical doctors, as all the translators were fluent in English and the back-translator was an English native speaker. The same process was made by Chiesa-Estomba *et al.* in the translation of the bvQOD-NS to Spanish;¹⁶ ii) Similar to other QoL questionnaires that were translated and validated to Portuguese, translation process was done exclusively by medical doctors as we felt capable of doing it ourselves - and neither the pre-testing volunteers, nor the participants in the study reported any trouble

in the comprehension of the questionnaire.^{19,20} As a means to assess the reproducibility of the questionnaire, we decided that the participants should answer the Portuguese version of the bvQOD-NS in two separate occasions one month apart. The first time the questionnaire was completed by the patients was in the same moment they were submitted to olfactory testing.

Since none of the participants reported any difficulty while answering the questionnaire, and because some patients were not willing to come in person to the hospital due to both time and money-consuming reasons, we decided that all the participants should complete the questionnaire for the second time by teleconsultation. Given the excellent test-retest reproducibility in our study, representing great temporal stability of the questionnaire, the authors believe the score of Portuguese version of the bvQOD-NS is not influenced by the way the questionnaire is answered, which can be extremely useful both in follow-up after treatment and in future scientific studies.

However, internal consistency was not as high as expected, particularly regarding eating questions (questions four and five), which were also the ones that showed least impact in QoL. We believe this might be linked with the low socioeconomic conditions of our population, as food enjoyment does not seem to be as related to hedonic-oriented motives (such as pleasure) as in higher socioeconomical groups.²¹

Our study included patients with essentially two different etiologies of OD: CRS and post-infectious. Since SARS-CoV-2 infection was established as a possible cause of OD, the sense of smell that was previously overlooked started to be of major importance.^{22,23} In our study there were 10 patients with post-COVID19 OD whom, in concordance with previous reports, revealed greater impact in QoL than the rest of the group.^{15,24} This is thought to be due to the sudden onset of OD versus a more progressive dysfunction in patients with CRS.¹⁵ Also, it is noteworthy that the patient

who scored highest on the post-COVID19 group was the only one that reported getting psychological help specifically because of her recent OD. With previous studies linking post-COVID19 OD with isolation, stress and depression, psychotherapy might be useful in such cases and should be further investigated.²⁵

An important limitation of the present study is the small sample size, which probably influences the modest internal consistency we found in the Portuguese version of the bvQOD-NS. Another limitation is the follow-up period of only 1 month, which did not allow for an observation of changes in the olfactory specific QoL of our patients after treatment, either medical or surgical. Furthermore, our study did not include a control group. The reason why is that the questionnaire was created specifically for patients with OD, so the authors did not feel it was necessary to validate it, in concordance with other studies.¹⁶ However, it would be interesting in the future to compare the results of a group of patients with OD to a control group in order to evaluate the discriminant validity of the questionnaire. Future studies with bigger sample sizes, including a longer follow up and evaluation pre- and post-treatment are needed to confirm the value of the Portuguese version of the bvQOD-NS.

Conclusion

Portuguese is the seventh most-spoken first language in the world. It is the authors belief that our translation into Portuguese of the bvQOD-NS will allow for a rapid and valid method to better understand the struggles and expectations surrounding olfactory dysfunction, ultimately benefiting the patients and providing important information for the medical community in future studies.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Data Confidentiality

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

Protection of humans and animals

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the 2013 Helsinki Declaration of the World Medical Association.

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Availability of scientific data

There are no datasets available, publicly related to this work.

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Bibliographic references

- 1.Stevenson RJ. An initial evaluation of the functions of human olfaction. *Chem Senses*. 2010 Jan;35(1):3-20. doi: 10.1093/chemse/bjp083.
- 2.Croy I, Nordin S, Hummel T. Olfactory disorders and quality of life - an updated review. *Chem Senses*. 2014 Mar;39(3):185-94. doi: 10.1093/chemse/bjt072
- 3.Schäfer L, Schriever VA, Croy I. Human olfactory dysfunction: causes and consequences. *Cell Tissue Res*. 2021 Jan;383(1):569-579. doi: 10.1007/s00441-020-03381-9.
- 4.Hummel T, Whitcroft KL, Andrews P, Altundag A, Cinghi C, Costanzo RM. et al. Position paper on olfactory dysfunction. *Rhinol Suppl*. 2017 Mar;54(26):1-30. doi: 10.4193/Rhinol6.248.
- 5.Boscolo-Rizzo P, Hummel T, Hopkins C, Dibattista M, Menini A, Spinato G. et al. High prevalence of long-term olfactory, gustatory, and chemesthesis dysfunction in post-COVID-19 patients: a matched case-control study with one-year follow-up using a comprehensive psychophysical evaluation. *Rhinology*. 2021 Dec 1;59(6):517-527. doi: 10.4193/Rhinol21.249.
- 6.Frasnelli J, Hummel T. Olfactory dysfunction and daily life. *Eur Arch Otorhinolaryngol*. 2005 Mar;262(3):231-5. doi: 10.1007/s00405-004-0796-y.
- 7.Simopoulos E, Katotomichelakis M, Gouveris H, Tripsianis G, Livaditis M, Danielides V. Olfaction-associated quality of life in chronic rhinosinusitis: Adaptation and validation of an olfaction-specific questionnaire. *Laryngoscope*. 2012 Jul;122(7):1450-4. doi: 10.1002/lary.23349.
- 8.Mattos JL, Edwards C, Schlosser RJ, Hyer M, Mace JC,

Smith TL. et al. A brief version of the questionnaire of olfactory disorders in patients with chronic rhinosinusitis. *Int Forum Allergy Rhinol*. 2019 Oct;9(10):1144-1150. doi: 10.1002/alr.22392.

9.Mattos JL, Bodner TE, Mace JC, Schlosser RJ, Beswick DM, Ramakrishnan VR. et al. Psychometric properties of the brief version of the questionnaire of olfactory disorders in patients with chronic rhinosinusitis. *Int Forum Allergy Rhinol*. 2021 Oct;11(10):1436-1442. doi: 10.1002/alr.22800.

10.Hopkins C. Two years of COVID-19 – smell is still stealing the spotlight on the rhinology stage. *Rhinology*. 2022 Apr 1;60(2):81. doi: 10.4193/Rhinol22.902.

11.Cain WS, Gent JF, Goodspeed RB, Leonard G. Evaluation of olfactory dysfunction in the Connecticut Chemosensory Clinical Research Center. *Laryngoscope*. 1988 Jan;98(1):83-8. doi: 10.1288/00005537-198801000-00017.

12.Hummel T, Sekinger B, Wolf SR, Pauli E, Kobal G. "Sniffin'sticks": olfactory performance assessed by the combined testing of odor identification, odor discrimination and olfactory threshold. *Chem Senses*. 1997 Feb;22(1):39-52. doi: 10.1093/chemse/22.1.39.

13.Ribeiro JC, Simões J, Silva F, Silva ED, Hummel C, Hummel T. et al. Cultural adaptation of the Portuguese version of the "Sniffin' Sticks" smell test: reliability, validity, and normative data. *PLoS One*. 2016 Feb 10;11(2):e0148937. doi: 10.1371/journal.pone.0148937.

14.Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol*. 1993 Dec;46(12):1417-32. doi: 10.1016/0895-4356(93)90142-n.

15.Zou L, Haehner A, Menzel S, Gunder N, Hummel T. Reliability and validity of a brief version of the Questionnaire of Olfactory Disorders (brief QOD) in patients with olfactory dysfunction. *Rhinology*. 2022 Feb 1;60(1):56-62. doi: 10.4193/Rhinol21.059.

16.Chiesa-Estomba CM, Lechien JR, Calvo-Henríquez C, Mayo M, Maldonado B, Maza J. et al. Translation and validation of the short version of the Questionnaire of Olfactory Disorders-Negative Statements to Spanish. *Am J Otolaryngol*. 2021 Jan-Feb;42(1):102775. doi: 10.1016/j.amjoto.2020.102775.

17.Leclercq C, Chiesa-Estomba CM, Horoi M, Le Bon SD, Hans S, Distinguin L. et al. Validity and reliability of the French short version of the Questionnaire of Olfactory Disorders-Negative Statements (sQOD-NS). *Ear Nose Throat J*. 2021 Aug 31;1455613211032004. doi: 10.1177/01455613211032004.

18.The World Factbook 2021 [Internet]. Washington DC: Central Intelligence Agency; 2021 [accessed 20 October 2022]. Available from: <https://www.cia.gov/the-world-factbook/about/archives/2021/>.

19.de Vilhena D, Duarte D, Lopes G. Sino-Nasal Outcome Test-22: translation, cultural adaptation and validation in Portugal. *Clin Otolaryngol*. 2016 Feb;41:21-24. doi: 10.1111/coa.12465.

20.Cerejeira R, Veloso-Teles R, Lousan N, Pinto Moura C. The Portuguese version of the RhinoQOL Questionnaire: validation and clinical application. *Braz J Otorhinolaryngol*. 2015 Nov-Dez;81(6):630-635. doi: 10.1016/j.bjori.2015.08.015.

21.Moraes JMM, Moraes CHC, Souza AAL, Alvarenga MDS. Food choice motives among two disparate socioeconomic groups in Brazil. *Appetite*. 2020 Dec 1;155:104790. doi:

10.1016/j.appet.2020.104790.

22. Lechien JR, Chiesa-Estomba CM, De Siati DR, Horoi M, Le Bon SD, Rodriguez A. et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. *Eur Arch Otorhinolaryngol.* 2020 Aug;277(8):2251-2261. doi: 10.1007/s00405-020-05965-1.

23. Karamali K, Elliott M, Hopkins C. COVID-19 related olfactory dysfunction. *Curr Opin Otolaryngol Head Neck Surg.* 2022 Feb 1;30(1):19-25. doi: 10.1097/MOO.0000000000000783.

24. Saniasiaya J, Prepageran N. Impact of olfactory dysfunction on quality of life in coronavirus disease 2019 patients: a systematic review. *J Laryngol Otol.* 2021 Nov;135(11):947-952. doi: 10.1017/S0022215121002279.

25. Coelho DH, Reiter ER, Budd SG, Shin Y, Kons ZA, Costanzo RM. Quality of life and safety impact of COVID-19 associated smell and taste disturbances. *Am J Otolaryngol.* 2021 Jul-Aug;42(4):103001. doi: 10.1016/j.amjoto.2021.103001.