

# Translation and validation of the “Self-Reported Mini Olfactory Questionnaire (Self-MOQ)” into portuguese (PT)

## Original Article

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### Abstract

**Objectives:** To translate, culturally adapt, and validate the Self-Reported Mini Olfactory Questionnaire (Self-MOQ) for use in the Portuguese population.

**Materials and Methods:** The translation process adhered to internationally recognized guidelines. Validation was performed with 50 participants: a test group of 25 individuals reporting olfactory complaints with confirmed olfactory dysfunction according to the Portuguese Smell Test, and a control group of 25 participants without olfactory complaints. All participants completed the questionnaire twice, with an average interval of three weeks. Statistical analyses were conducted using SPSS.

**Results:** The Portuguese version of the Self-MOQ demonstrated excellent internal consistency (Cronbach's  $\alpha = 0.937$ ) and outstanding test-retest reliability (mean intraclass correlation coefficient = 0.98). Discriminant validity was supported by a statistically significant difference in questionnaire scores between the test and control groups.

**Conclusions:** The Portuguese version of the Self-MOQ is a reliable and valid instrument for screening olfactory dysfunction.

**Keywords:** olfactory dysfunction; questionnaire; Self-MOQ.

### Introduction

Smell plays a vital role in our daily lives, from identifying odors and perceiving taste to detecting harmful substances; it also influences our emotions, memory, and social behavior.<sup>1</sup> Olfactory dysfunction is frequently associated with a significant decline in a patient's quality of life and safety; its primary causes are sinonasal diseases, neurodegenerative diseases, and trauma.<sup>1</sup> It is estimated that approximately 20% of the adult population suffers from olfactory dysfunction;<sup>2</sup> however, spontaneous complaints of olfactory changes

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Article received on April 10, 2025.

Accepted for publication on December 12, 2025.

are rare, leading to the underdiagnosis of this condition. Olfactory assessments can be conducted subjectively or objectively. For subjective assessment, we can use visual analoguescales (VAS), validated questionnaires for this purpose, or Likert-type scales. Ideally, targeted questionnaires should be used, as they have proven superior to other subjective assessments in distinguishing between normosmic and hyposmic individuals.<sup>3</sup> An objective assessment through psychophysical tests allows for a quantitative evaluation of olfactory function, though it depends on patient cooperation and understanding. There are rapid psychophysical tests that help us distinguish between normosmia and olfactory dysfunction as well as more comprehensive psychophysical tests that allow the evaluation of olfactory thresholds and performance suprathreshold testing.<sup>4</sup> The gold standard for diagnosing olfactory dysfunction is psychophysical testing, which is validated and reliable; however, in daily clinical practice, these tests are rarely used because they are costly and time-intensive. One example of such a test is the Portuguese smell test, which was developed and adapted for the Portuguese population.<sup>5</sup> The “Self-Reported Mini Olfactory Questionnaire (Self-MOQ)” is a simple, reliable, and validated questionnaire for screening olfactory dysfunction in clinical practice. The questionnaire consists of five true/false questions that evaluate the patient’s olfactory complaints in their daily life. According to its authors, Lai-quan Zou and Thomas Hummel, it proved superior to a VAS in distinguishing between normosmia and olfactory dysfunction.<sup>3</sup> Prior to this study, this questionnaire had not been translated into or validated in Portuguese.<sup>3</sup>

## Materials and methods

### Questionnaire Description

This instrument consists of five statements reflecting the patient's daily olfactory complaints. For each statement, the participants should indicate whether it applies to their personal experience by choosing one

of the two available response options: "Yes" or "No" (Figure 1). Each "Yes" earns 1 point, and each "No" earns 0 points. Therefore, the test scores range from zero (0) to five (5).

### Questionnaire translation

Following standardized cultural adaptation recommendations,<sup>6,7</sup> we validated the Self-MOQ in Portuguese. The German version was translated into Portuguese by co-author Dr. Cátia Azevedo, a native Portuguese-speaking healthcare professional fluent in German. Subsequently, we evaluated the translated version and made minimal changes for cultural adaptation purposes.

The questionnaire was then back-translated into German by a healthcare professional who is a native German speaker and fluent in Portuguese. Both the back-translated and original versions were compared by the two translators and a third translator fluent in both languages, confirming that the back-translated version was very similar to the original. This pre-final version was administered to 20 native Portuguese speakers—whose professions do not rely on their sense of smell—to test its comprehension and clarity. No changes were made, resulting in the final version (Figure 1).

To assess the validity and reliability of the Portuguese version of the Self-MOQ, we obtained consent from the original scale's author.

### Participants

The study received approval from the Local Ethics Committee (CEHB-211\_2024) and conducted in accordance with the Declaration of Helsinki. All participants volunteered and were fully informed about the study's objectives, anonymity, and confidentiality. Patients received the questionnaire and informed consent form to complete during their otolaryngology appointment. For test-retest statistical analysis, the participants were asked if they would be available to complete the questionnaire again 3 weeks later. Additionally, the patients rated their perception of smell on

**Figure 1**  
The Self-MOQ (Portuguese translation)

Please mark an X in the box that best applies to you for each statement.

	YES	NO
Nas perfumarias, tenho muita dificuldade em sentir as fragrâncias.		
Não me apercebo do cheiro do café e do pão fresco.		
Quando entro numa florista, não consigo sentir cheiro nenhum.		
Não sinto o cheiro do alcatrão fresco num local de obras de estrada.		
Não reconheço o cheiro da relva acabada de cortar.		

a VAS from 0 to 10, where 0 represents a total loss of smell (anosmia) and 10 indicates no smell-related complaints.

Our sample was composed of 50 participants, divided into two distinct groups:

- Test group: patients with olfactory complaints and criteria for olfactory dysfunction on the Portuguese Smell Test (% odor detection or identification [1st cranial nerve] < 60%), with diseases and sample frequencies detailed in Table 1.
- Control group: participants without olfactory complaints.

We included participants aged  $\geq 18$  years who attended otolaryngology outpatient clinics. Individuals who were not fluent in Portuguese, those with cognitive impairment or dementia, and those who declined to participate were excluded from the study.

### Statistical analysis

A statistical analysis was conducted using the IBM SPSS Statistics software, version 28.

The Student's t-test was used to compare the mean age between groups, while Fisher's exact test was used to compare categorical variables, including sex and diseases associated with olfactory changes.

Cronbach's alpha was used to evaluate the internal consistency of the Portuguese version of the Self-MOQ. Values greater than 0.9 are considered "excellent."

A test-retest reliability analysis was used to evaluate the questionnaire's reproducibility

using the intraclass correlation coefficient (ICC), where a value greater than 0.8 indicates adequate reproducibility. To evaluate this, the 50 participants completed the Self-MOQ again 3 weeks after the initial administration. This interval was sufficiently long to minimize the recall bias. Considering that the variables did not follow a normal distribution (based on the Kolmogorov-Smirnov test), non-parametric tests were used to analyze the construct and discriminant validity. The Self-MOQ was compared with the VAS to evaluate the olfactory function and analyze construct validity; the correlation between the instruments was assessed using the Spearman test. The discriminant validity of the Self-MOQ was evaluated by comparing the Self-MOQ scores between the olfactory dysfunction group and control group using independent samples T-tests. A p-value < 0.05 was considered statistically significant.

## Results

### Descriptive statistics

The average age of the test group was 44.6 years ( $\pm 15.1$ ) and that of the control group was 43.4 years ( $\pm 14.2$ ). No statistically significant differences were observed between the groups ( $p = 0.75$ ). In the control group, 17 participants (68.0%) were women and eight (32.0%) were men, while in the test group there were 14 women (56.0%) and 11 men (44.0%). No statistically significant differences were found in the sex distribution between the groups ( $p = 0.56$ ).

No statistically significant differences in associated diseases were found between the groups. The control group included two cases of diabetes mellitus (8.0%), no cases of hypothyroidism, seven cases of hypertension (28.0%), and 17 cases of SARS-CoV-2 respiratory infection (68.0%). The test group included one case of diabetes mellitus (4.0%), one case of hypothyroidism (4.0%), five cases of hypertension (20.0%), and 22 cases of SARS-CoV-2 respiratory infection (88.0%). Comparisons between groups using Fisher's exact test showed no statistically significant differences ( $p > 0.05$  for all variables).

In the test group, the most frequent disease was chronic rhinosinusitis, present in 22 participants (88%). Two participants (8%) had a viral infection and one participant (4%) had Rendu-Osler-Weber syndrome.

#### Internal consistency

The internal consistency of the Portuguese version of the Self-MOQ, evaluated by Cronbach's alpha coefficient, was 0.937, and is therefore considered excellent.

#### Reliability

The intraclass correlation coefficient (ICC) was  $>0.9$  for both the total Self-MOQ score and each individual item, indicating excellent results. (Table 2)

#### Construct validity and discriminant validity

The mean total Self-MOQ score for the control group was  $0.08 \pm 0.277$ , and for the group with

olfactory dysfunction, it was  $4.32 \pm 0.802$ .

The mean VAS for the control group was  $8.12 \pm 1.394$ , while the mean VAS for the group with olfactory dysfunction was  $3.28 \pm 2.407$ .

Using Spearman's correlation, we observed a strong negative correlation between the questionnaire score and the VAS score, meaning that the lower the VAS score, the higher the questionnaire score, both of which indicate worse olfactory function.

These differences in scores between groups, in both the Self-MOQ and VAS, were statistically significant ( $p < 0.001$  for both). Therefore, the Self-MOQ is able to distinguish between healthy individuals and individuals with olfactory dysfunction.

#### Discussion

Although the human sense of smell has received relatively little attention over the last century, recent evidence indicates that it is not a negligible entity, fulfilling a vital function beyond its widely recognized social role.

The use of subjective methods to detect and evaluate olfactory dysfunction has become a common practice during ENT appointments as they are considered fast, reliable, non-invasive, and low-cost tools.

A recent systematic review<sup>8</sup> identified 21 validated questionnaires and scales related to smell, only seven of which focus on olfactory dysfunction. In general, in clinical practice, questionnaires or scales are useful tools for screening patients with suspected olfactory dysfunction, allowing a systematic evaluation

**Table 1**  
Test-retest reliability analysis (intraclass correlation coefficient [ICC]; n = 50)

Item	Intraclass Correlation Coefficient (ICC)
1	1,000 (1,000-1,000)
2	1,000 (1,000-1,000)
3	0,920 (0,863 – 0,954)
4	0,956 (0,923 – 0,975)
5	1,000 (1,000-1,000)
Total Self-MOQ Score	0,957 (0,924 – 0,976)

in a time-efficient manner. However, for a formal diagnosis, there is a need to perform objective tests of olfactory function.

In 2019, Lai-quan Zou and Thomas Hummel created the Self-MOQ, initially composed of 14 true/false questions. Following adjustments, a final version was developed with five items, phrased in the first person and focused on everyday situations. In a comparative analysis, the authors administered the Self-MOQ alongside an objective olfactory test, the Sniffin' Sticks, and observed a negative correlation between both instruments. Based on these results, the authors concluded that the Self-MOQ is an effective tool for screening olfactory dysfunction. A cutoff of 3.5 was established on its scale of zero (0) to five (5), indicating that scores above 3.5 on the Self-MOQ are suggestive of olfactory dysfunction. Compared to other existing olfactory function assessment scales, the Self-MOQ has the advantage of being shorter and, therefore, less burdensome for patients. The Portuguese version of the Self-MOQ showed excellent internal consistency (Cronbach's alpha = 0.937) and test-retest reliability (the intraclass correlation coefficient was >0.9 for both the total score and individual items). Construct validity, evaluated through the correlation between the Self-MOQ and VAS score, showed a strongly negative relationship.

A discriminant validity analysis showed that the Self-MOQ was able to distinguish between normosmic individuals and those with olfactory dysfunction as the mean Self-MOQ scores differed significantly between the groups. Therefore, the Portuguese version of the Self-MOQ can be considered a good screening method for olfactory dysfunction and may be routinely administered during ENT clinic visits in Portugal.

A drawback of our study is that the participants were recruited from patients treated at an Otolaryngology clinic, which may have introduced selection bias. Consequently, the sample may not reflect the characteristics of the general Portuguese population, limiting the generalizability of the results.

Additionally, although the study recognizes that psychophysical tests are the gold standard for diagnosing olfactory dysfunction, the validation of the questionnaire did not include a direct comparison with a comprehensive psychophysical test. Nevertheless, the use of the Portuguese smell test as a reference represents a suitable alternative, since it is a validated psychophysical test adapted to the Portuguese population.

Future studies should validate these results in more representative samples of the Portuguese population and compare the questionnaire with more comprehensive psychophysical testing.

## Conclusion

In our study, the Portuguese version of the Self-MOQ demonstrated excellent internal consistency, test-retest reliability, as well as strong construct and discriminant validity. It is quick to administer, low cost, and can be used as a screening test for olfactory dysfunction.

## 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.

## Privacy policy, informed consent and Ethics Committee Authorization

The authors declare that they have written consent for the use of photographs of patients in this article.

## Funding Sources

This work did not receive any contribution, funding or scholarship.

## Availability of scientific data

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

## Statement on the Use of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors did not use any artificial intelligence-assisted tools or services.

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