Screening for oropharyngeal dysphagia in older adults: A systematic review of self-reported questionnaires

Hipólito V. Magalhães Junior1 | Leandro de Araújo Pernambuco2 | Kenio C. Lima3 | Maria Angela F. Ferreira3

1Department of Speech, Language and Hearing Sciences, Federal University of Rio Grande do Norte (UFRN), Natal, Rio Grande do Norte, Brazil
2Department of Speech, Language and Hearing Sciences, Federal University of Paraíba (UFPB), João Pessoa, Paraíba, Brazil
3Department of Dentistry, Postgraduate Public Health Program (PPGSCol-UFRN), Federal University of Rio Grande do Norte (UFRN), Natal, Rio Grande do Norte, Brazil

Background: Oropharyngeal dysphagia is a swallowing disorder with signs and symptoms which may be present in older adults, but they are rarely noticed as a health concern by older people. The earliest possible identification of this clinical condition is needed by self-reported population-based screening questionnaire, which are valid and reliable for preventing risks to nutritional status, increased morbidity and mortality.

Objective: The aim of this systematic review was to identify self-reported screening questionnaires for oropharyngeal dysphagia in older adults to evaluate their methodological quality for population-based studies.

Methods: An extensive search of electronic databases (PubMed (MEDLINE), Ovid MEDLINE(R), Scopus, Cochrane Library, CINAHL, Web of Science (WOS), PsycINFO (APA), Lilacs and Scielo) was conducted in the period from April to May 2017 using previously established search strategies by the two evaluators. The methodological quality and the psychometric properties of the included studies were evaluated by the COSMIN (Consensus based Standards for the selection of health Measurement Instruments) checklist and the quality criteria of Terwee and colleagues, respectively.

Results: The analysed information was extracted from three articles which had conducted studies on the prevalence of oropharyngeal dysphagia by self-reported screening questionnaires, showing poor methodological quality and flaws in the methodological description to demonstrate its psychometric properties.

Conclusion: This study did not find any self-reported screening questionnaires for oropharyngeal dysphagia with suitable methodological quality and appropriate evidence in its psychometric properties for elders. Therefore, the self-reported questionnaires within the diagnostic proposal require greater details in its process for obtaining valid and reliable evidence.

Keywords: older adults, oropharyngeal dysphagia, questionnaires, systematic review, validity and reliability
1 | INTRODUCTION

Oropharyngeal dysphagia is a swallowing disorder that involves changes in the interaction between the oral and pharyngeal phases, ranging from having minimal difficulty in swallowing foods and liquids to disability, which may involve risks to develop malnutrition, dehydration and aspiration pneumonia.\(^1\)\(^3\)

When these risks are developed, the signs and symptoms of oropharyngeal dysphagia should be evaluated in medical and speech-language practices for decision-making (among other areas) in order to reduce the impact on public health, as it affects a significant number of elderly people with increased morbidity and mortality.\(^4\)\(^5\)

The presence of swallowing disorder generates a negative impact on the functionality and psychosocial well-being of the participants, resulting in a decline in their quality of life\(^6\)\(^7\) and emotional effects ranging from a limitation in their food intake to embarrassment of social isolation, which contributes to vulnerability.\(^8\)

For an early identification of this clinical condition, it is necessary to screen the disease or condition in order to contribute to early actions that bring an important benefit to improving risk factors of the disease, its incidence, morbidity, quality of life as well as reducing costs involved.\(^9\)

Population-based epidemiological studies developed in the community remain poorly designed to screen this outcome.\(^10\) In Brazil, there is the need to apply self-reported instruments for communication disorders with an emphasis on voice, with publications related to functional performance and quality of life,\(^11\)\(^14\) dysphagia in relation to functional performance and quality of life,\(^15\)\(^16\) and others that refer to monitoring the evolution of self-reported dysphagia scenarios,\(^17\) as in the interpretation of the original publication of this Protocol.\(^18\)

In relation to oropharyngeal dysphagia screening in older adults by a self-reported instrument, one must take into account that swallowing should be evaluated among the self-assessment dimensions of health conditions by those who receive an influence of signs, symptoms, functional performance and in the way one asks about this health condition in a form that does not directly confirm the diagnosis of oropharyngeal dysphagia.\(^19\)\(^20\)

In this regard, there must be greater concern with the methodological quality of these self-reported health questionnaires, with proposals for construction and consistent validation using the self-assessment perspective.\(^21\)\(^23\) and its recommendations from preparing the screening instrument to obtain their evidence of validity.\(^24\)

Given the above, the aim of this systematic review was to assess the methodological quality of self-reported questionnaires used in population-based studies in their process of obtaining valid evidence validity in addressing the screening of oropharyngeal dysphagia in older adults.

2 | MATERIAL AND METHODS

2.1 | Search strategy

A systematic review was performed following a predefined protocol\(^25\) in the period from April to August 2017, using questions following the PICO strategy in which the following methodological elements should be answered: \(P = \) population; \(I = \) intervention, replaced by the term “exposure,” in order to review self-reported questionnaire observational studies; \(C = \) control group, as measured by the asymptomatic population, therefore omitted from the table; and \(O = \) outcome which corresponded to the evaluated condition (Table 1). The electronic search took into account publications from 2000 to 2017 in the following databases: PubMed (MEDLINE), Ovid MEDLINE(R), Scopus, Cochrane Library, CINAHL, Web of Science (WOS), PsycINFO (APA), Lilacs and Scielo, using a previously set description of search strategies between the two main evaluators after several attempts of combinations between keywords and words (Table 2).

2.2 | Study selection

Duplicated articles were initially removed and then two reviewers, according to criteria described in Table 1, independently screened the articles by scanning titles and abstracts to evaluate the possibility of its inclusion. In case of disagreement regarding the decision to include an article, a third reviewer was consulted to reach consensus and make the final decision. Regarding the complete analysis of the selected articles, we performed a manual search of the reference lists looking for the possibility of adding new articles.

2.3 | Data extraction and quality assessments

After selecting the articles, an analysis was performed by the COSMIN (COnsensus based Standards for the selection of health Measurement INstruments), a standardised guideline for critical evaluation of the methodological quality of studies that investigate the psychometric properties of measurement instruments in health. COSMIN became known in 2006, when a group of researchers\(^26\) published this initiative to standardise analysis of the psychometric properties of self-reported questionnaires, and its product resulted in a checklist that describes a set of criteria for evaluating measures in health care,\(^22\) as well as a description of how results may be interpreted on a scale of four categories\(^23\) based on the interpretation strategies of recent systematic reviews.\(^27\)\(^30\)

COSMIN was first used to assess whether the screening instruments of studies fit into the patterns of good methodological quality; and secondly, 11 psychometric properties were arranged in a table, namely internal consistency (A), reliability (B), measurement error (C), content validity (D), structural validity (E), hypotheses testing (F), cross-cultural validity (G), criterion validity (H),
responsiveness (I), interpretability (J) and generalisability (K). Each of these properties is composed by a set of five to 18 items for the included article to be analysed, which were assessed according to the scale of four categories established by, in which the evaluators should score as: excellent (+++), good (++), fair (+) or poor (0).

In order to obtain the total score of the properties, the observation of their items were considered so that if any one of them presented the lowest score, the property that also contained it would receive the same evaluation (evaluation method for the worst counted score).

The psychometric evaluation quality of instruments was subsequently re-examined in the following sequence: content validity, internal consistency, criterion validity, construct validity and reproducibility (compliance and reliability), responsiveness, floor and ceiling effects and interpretability, by evaluating the presence or not of these properties using the following categories of evaluation: positive (+), undetermined (?), negative (−) or no information available (0).

For best practice training and calibration to ensure consistent implementation of the COSMIN checklist, and according to the scale of categorisation described by Terwee et al., two reviewers applied the protocol to an article of self-reported oropharyngeal dysphagia questionnaire in older people who did not fit the criteria for eligibility and which was translated and adapted for other languages. Thus, the evaluators discussed their results for establishing criteria for tie breaking between their assessments when there was any disagreement or ambiguity in interpreting the criteria applied to the article.
3 | RESULTS

3.1 | Literature search and study selection

Research in the electronic databases produced 390 entries, which resulted in 234 articles after exclusion of 165 articles and adding nine articles identified by searching in the references, of which only three articles were included for analysis, as presented in the flow diagram (Figure 1).

3.2 | Description of included studies

Descriptive data of the articles included in this review are presented in Table 3.

As provided in Table 4, the underlying definition of oropharyngeal dysphagia was analysed, as well as the way the scales classified the presence or absence of this disorder, in that its design was comprehensive in its implications on population aging.

It was possible to identify three screening instruments of oropharyngeal dysphagia in these articles that were applied to community-dwelling older adult residents, and which were analysed to determine their methodological quality.

3.3 | Quality of design, methods and reporting

The assessment of methodological quality of included studies on the measurement properties through application of the COSMIN checklist is presented in Table 5. None of the three studies followed the eleven categories of psychometric properties of the COSMIN. No article used the analysis by the Item Response Theory (IRT).

In spite of one article having used the Sydney Swallow Questionnaire (SSQ) to determine the prevalence of oropharyngeal dysphagia of older adult residents in the community, this screening instrument has not been validated for older adult population in its initial proposal, but for participants who had neuromyogenic dysphagia (n = 45) with ages between 30 and 96 years old, and control group with ages between 31 and 94 years old. However, as it was applied to screen OD in an older adult population, this article was considered as a possibility for generalising the original protocol. Therefore, this work was analysed following the COSMIN evaluation checklist of psychometric properties (Table 6).

Another study regarding the Ohkuma questionnaire as a screening instrument only quotes that there were good results...
of sensitivity and specificity to capture oropharyngeal dysphagia. However, its original version was published in Japanese and therefore could not be used due to the limitations of accessing the information and obtaining the article. To verify that the same questionnaire was translated and adapted to Greek, an electronic communication was sent to the authors of the article, who replied that the translation of the questionnaire came from the publication of Kawashima et al. From this perspective, the English version of the questionnaire of this publication was considered for analysis of the property of generalising for an older adult population. It is worth pointing out that the Greek version published was not included due to the sample not representing the population of older adults (average age of 51.170 ± 14.235).

### 3.4 Quality of psychometric properties

Evaluating the quality of the psychometric properties of the instruments identified was performed by applying the Terwee et al. quality criteria following the model of analysis performed in another study, as presented in Table 6.

<table>
<thead>
<tr>
<th>Self-reported questionnaires</th>
<th>Authors (Y)</th>
<th>Underlying definition of oropharyngeal dysphagia</th>
<th>Items</th>
<th>Rating of presence of oropharyngeal dysphagia</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRACE</td>
<td>Miura et al (2007)</td>
<td>Swallowing disorder, including masticatory problems, in the preparatory stage of the deglutition</td>
<td>12</td>
<td>Each item has 3-point scale: 0—not present; 1—mild; 2—Acute. The classification “risk” of dysphagia ≥ 5 points</td>
</tr>
<tr>
<td>SSQ</td>
<td>Holland et al (2011)</td>
<td>Swallowing problems in older adults that are correlated with aging and depression</td>
<td>17</td>
<td>Visual Analogue Scale from 0 to 100. A Score from 200 points indicates dysphagia</td>
</tr>
<tr>
<td>The Ohkuma Questionnaire for Dysphagia Screening</td>
<td>Kawashima et al (2004)</td>
<td>Dysphagia is closely associated with other health issues important for the prevention of aspiration and improving activities of daily living</td>
<td>14</td>
<td>Each item is classified into acute, mild or without symptoms. If the protocol to present an acute symptom, it is considered that the patient has dysphagia</td>
</tr>
</tbody>
</table>

### Table 5 Quality of design, method and reporting of studies on psychometric properties

<table>
<thead>
<tr>
<th>Self-reported questionnaires</th>
<th>Authors (Y)</th>
<th>Psychometric properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A  B  C  D  E  F  G  H  I  J  K</td>
</tr>
<tr>
<td>DRACE</td>
<td>Miura et al (2007)</td>
<td>0   0   0   0   +   0   0   0</td>
</tr>
<tr>
<td>SSQ</td>
<td>Holland et al (2011)</td>
<td>0   0   0   0   +   0   0   0</td>
</tr>
<tr>
<td>The Ohkuma Questionnaire for Dysphagia Screening</td>
<td>Kawashima et al (2004)</td>
<td>0   0   0   0   +   0   0   0</td>
</tr>
</tbody>
</table>

DRACE, Dysphagia Risk Assessment for Community-Dwelling Older adults; SSQ, Sydney Swallow Questionnaire; COSMIN psychometric property boxes: A = internal consistency, B = reliability, C = measurement error, D = content validity, E = structural validity, F = hypotheses testing, G = cross-cultural validity, H = criterion validity, I = responsiveness, J = interpretability, K = generalisability. 4-point scale rating: +++ = excellent, ++ = good, + = fair, 0 = poor, empty space = COSMIN rating not applicable (www.cosmin.nl).
### TABLE 6 Quality of psychometric properties

<table>
<thead>
<tr>
<th>Self-reported questionnaire s/Authors(Y)</th>
<th>Content validity</th>
<th>Internal consistency</th>
<th>Criterion validity</th>
<th>Construct validity</th>
<th>Reproducibility (agreement)</th>
<th>Reproducibility (reliability)</th>
<th>Responsiveness</th>
<th>Floor and ceiling effects</th>
<th>Interpretability</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRACE Miura et al (2007)40</td>
<td>?</td>
<td>?</td>
<td>−</td>
<td>−</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>SSQ Holland et al (2011)36</td>
<td>?</td>
<td>?</td>
<td>−</td>
<td>−</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
<tr>
<td>The Ohkuma Questionnaire for Dysphagia Screening/ Kawashima et al (2004)38</td>
<td>?</td>
<td>?</td>
<td>−</td>
<td>−</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>?</td>
</tr>
</tbody>
</table>

4 | DISCUSSION

This systematic review considering the methodological quality of included studies by the COSMIN checklist22,23,26,31 and the psychometric quality of instruments32 found no screening protocols of oropharyngeal dysphagia in older adult participants presenting good methodological quality.

The content validity considered from the design of the study object of this systematic review did not identify any clear definition of what would be oropharyngeal dysphagia in relation to the main signs and symptoms. However, in one study,38 the authors describe the perception of the consequences that the dysphagia brings to the safety and efficacy in swallowing as manifested in ageing. In relation to the hypothesis testing, even though three studies36,38,40 presented and tested their hypotheses, there was a description of how missing items were handled required in the COSMIN initiative, which resulted in allocating fair value (+) for this property.

Content validity, which should reveal the extent of the domain that the items cover in the construct being measured, should also consider internal consistency, which measures how items are related to each other in measuring the same construct.32 The evaluation of these properties was considered deficient in all studies because the methodologies presented important flaws in planning and executing the factorial analysis of the screening instruments for the older adult population in two studies36,40 and the absence of this rotation method of factors in another.36

The first referring to18 to examine factorial scheme indicated that it would be confirmatory41,42 because it is an instrument which had already submitted to this type of factor analysis in another population,38 but that would require obtaining further evidence for the purpose of the study. Another important aspect was that the Varimax rotation was performed in five factors, which generated a proportion of less than three variables per factor, not indicated to analyse the unidimensionality of the instrument, even if it has been administered to a population of 1313 older people.43

The second40 selected factorial analysis indicated to the proposal of the instrument was an exploratory case; however, it showed an error in choosing the number of factors to be rotated, which also spawned the proportion of less than three variables per factor in a sample of 85 participants, which should have been considered in only one factor due to being less than 100 volunteers.43

The third article36 should have carried a confirmatory factor analysis, as their prevalence study could only be applied to a population of older adult residents in the community after obtaining valid evidence based on the internal structure44 that this instrument could be used for a different population, but in which the instrument was used in its original proposal.37

In face of the explanations made as a result of methodological flaws, the structural validity of instruments for the population of older adult community residents showed poor assessment.

In relation to reproducibility, no study performed an evaluation of compliance and reliability of the used instruments that should be applied and reapplied for analysing the consistency of responses after factorial analyses,36,38,40 which resulted in a poor assessment of the measurement error according to the set criteria.23,32

In relation to the transcultural validity, only one work was translated into English from its original publication,38 but as there was no description of how the methodology was implemented, this property was not able to be evaluated.

Criterion validity was inadequate in articles included for not having used any parameter considered as having the gold standard.36,38,40

It was not possible to analyse the responsiveness or the ceiling and floor effects in any work by virtue of not having enough information for analysis of these data.
In the interpretability, the studies showed deficiencies in some aspects related to the descriptive presentation of the “with and without dysphagia groups” and its subdivision for more than four subgroups in relation to age, perception of disease, history of stroke and distribution by gender and by scores of competence, which hampers the interpretation. Only one study approached the requirements outlined in this perspective, but it was not possible to demonstrate the highest and lowest scores found in assessments due to the way the instrument was arbitrarily determined to identify oropharyngeal dysphagia.

5 | CONCLUSION

This study did not find any self-reported screening questionnaires for oropharyngeal dysphagia with suitable methodological quality and appropriate evidence in its psychometric properties for elders. Therefore, the self-reported questionnaires within the diagnostic proposal require greater details in its process for obtaining valid and reliable evidence.

CONFLICT OF INTEREST

The authors have no conflicts of interest, financial or otherwise.

ORCID

Hipólito V. Magalhães Junior https://orcid.org/0000-0002-8469-9570

REFERENCES


How to cite this article: Magalhães Junior HV, Pernambuco LDA, Lima KC, Ferreira MAF. Screening for oropharyngeal dysphagia in older adults: A systematic review of self-reported questionnaires. Gerodontology. 2018;35:162-169. https://doi.org/10.1111/ger.12333