

The oral health-related section of the interRAI: evaluation of test content validity by expert rating and assessment of potential reasons for inaccurate assessments based on focus group discussions with caregivers

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Abstract

Objectives: To explore the failure of the oral health-related section of the interRAI (ohr-interRAI), this study investigated test content validity (A.) and reasons for inaccurate assessments (B.).

Background: Poor oral health negatively affects quality of life and is associated with a number of systemic diseases. The interRAI instruments, internationally used for geriatric assessment, should accurately detect oral conditions that require care. Previous research showed that the ohr-interRAI and related precursor versions do not achieve this goal.

Materials and Methods: (A.) A group of 12 experts rated completeness, relevance, clarity of wording and feasibility of the ohr-interRAI. Content validity indices were calculated per item (threshold 0.78). (B.) Focus group discussions with 23 caregivers were organized. A semi-structured question guide made sure that all topics of interest were covered. Qualitative content structuring analysis was applied after transcription.

Results: (A.) Experts agreed on the relevance of the items on chewing, pain, gingival inflammation and damaged teeth. They regarded none of the items as worded clearly and only prosthesis use and pain were considered to be assessable by untrained caregivers. All experts agreed that the ohr-interRAI was incomplete. (B.) Focus group discussions revealed that in the care environment oral health had low priority. Aspects related to the ohr-interRAI itself and aspects related to the assessment situation impeded the oral health assessment. The approach of the caregivers to complete the ohr-interRAI was inappropriate to accurately detect oral care needs.

Conclusions: Findings challenge test content validity of the ohr-interRAI and reveal reasons for inaccurate assessments.

Keywords

InterRAI; geriatric assessment; oral health; mouth diseases; focus groups; caregivers; validity; test

content; inaccurate assessments

Introduction

The interRAI suite of instruments is used internationally for comprehensive assessment of care-dependent individuals ^{1,2}. A first version of the instrument, the Resident Assessment Instrument – Minimum Data Set (RAI-MDS 1.0), was developed and tested between 1987 and 1989 and implemented in 1990 in the United States. It assessed concerns, strengths and needs of care-dependent nursing home residents on multiple dimensions ³. In the following years, versions for other health-care settings (Home Care, Acute Care, et cetera) were released, psychometric properties of the constituting components were evaluated and the instruments were updated regularly. In 2005 the restructured interRAI suite of instruments was released by the international interRAI consortium to facilitate compatibility of the versions available for the different health-care settings ¹.

Based on the assessment, scaled outcome measures are calculated that assist to determine the condition and needs of care dependent individuals. Furthermore, algorithms are used to determine whether a certain Clinical Assessment Protocol (CAP) is triggered or not. These triggers indicate specific risks or resources and help to prioritize and specify individuals care needs ^{1,4}.

The present study focuses on the oral health-related section that is available in the interRAI version for Long-Term Care Facilities (LTCF) and for Home Care (HC), respectively. Care-dependent individuals often lack the cognitive and physical abilities to perform adequate oral hygiene and to access professional dental care ^{5,6}. As a result, oral health of care-dependent individuals is generally poor ^{7,8}. Compromised oral health causes pain and discomfort, which in turn is related to low oral health-related quality of life ^{9,10}. It is also associated with a number of systemic diseases ^{11–13}, deteriorated physical ^{14–16} and cognitive performance ^{17–19}, depression ²⁰, institutionalization ²¹, and even mortality ^{22,23} in frail individuals. This emphasizes the need of a thorough and accurate assessment of oral health which in turn facilitates planning of daily oral care and the referral for professional treatment if needed.

To evaluate the quality of data based on the ohr-interRAI, psychometric properties need to be

examined. Inferences are meaningful, appropriate, and useful only if the instrument is valid. Validity is composed of different aspects that each require particular validation activities: test content, response process, internal structure, relations to other variables, and consequences of testing. Accumulated results allow to indicate if the ohr-interRAI is valid ^{24,25}.

A study based on home care data from 7590 individuals in Belgium revealed a substantial proportion of about 17% missing data for the ohr-interRAI. Prevalence of missing data was higher in clients with cognitive impairment or depression ²⁶. Missing data challenge test content validity of the ohr-interRAI as they might be caused by unobtainable information, misinterpretation, or low relevance of oral health on part of the assessors ²⁵.

Other studies on validity were based on the oral health-related section of the Resident Assessment Instrument – Minimum Data Set 2.0 (ohr-RAI-MDS 2.0) which is the predecessor of the ohr-interRAI. Folse (2001) compared ohr-RAI-MDS 2.0 data of about 3.6 million subjects to data retrieved from dental examination forms in the United States. Pain in the mouth was recorded in 0.8% of the ohr-RAI-MDS 2.0 data, although 56.1% of the dental examinations revealed pain. The same trend was seen for other oral health-related variables ²⁷. Based on ohr-RAI-MDS 2.0 measurements from about 2700 institutionalized individuals in Canada, Hoben et al. (2016) as well found a substantial under-detection of oro-dental problems when compared to prevalence data that were based on oral examinations. Well-known associations between predictors and oro-dental problems were not found in the RAI-MDS 2.0 data ²⁸. In a study with about 200 institutionalized subjects from Sweden, treatment need was not identified correctly by the ohr-RAI-MDS 2.0 when compared to professional oral examinations for 50% of the participants ²⁹. Accordingly, of the 236 Directors of Nursing that participated in the study of Ettinger et al. (2000) only 9% stated that the ohr-RAI-MDS 2.0 was often useful in identifying dental problems ³⁰. Although Arvidson-Bufano et al. (1996) showed that a short training session can improve the ability of caregivers to assess oral health ³¹, study results above indicate that validity based on correlation with external variables is poor for the ohr-RAI-MDS 2.0. Guay (2005) had challenged content validity ³² and Hawes et al. (1995) reported a low average inter-rater reliability of 0.46 for the oral health-related items ³³.

The ohr-interRAI is a shorter, slightly modified version of the ohr-RAI-MDS 2.0 [see additional file 1

for an overview of the different versions and where they are used] and the findings mentioned above raise the question whether the instrument is adequate to detect care-requiring oral health-related conditions.

The overall objective of our research project is the development and validation of an optimized ohr-interRAI. As a preparatory step, limitations of the current instrument need to be investigated more comprehensively. The current study consisted of two equivalent parts that each included a distinct group of participants. In the first part, test content validity was evaluated based on expert rating. It was determined whether the current items were considered complete, relevant, clearly worded and feasible to detect oral health-related treatment need. The second part of the study focused on potential reasons for inaccurate oral health-related assessments with the ohr-interRAI. Based on focus group discussions with caregivers who were acquainted with the use of the ohr-interRAI it was evaluated whether their attitude and approach of data collection was suitable to detect oral health-related treatment need.

Methods

Ohr-interRAI

The interRAI Long-Term Care Facility (LTCF) instrument dichotomously (0=no, 1=yes) registers oral health-related problems occurring in the three days prior to the assessment. The following items are included:

- Wears a denture/removable prosthesis (prosthesis use)
- Has broken, fragmented, loose, or otherwise non-intact natural teeth (damaged teeth)
- Reports having dry mouth (dry mouth)
- Reports difficulty with chewing (chewing difficulty)
- Reports mouth or facial pain/discomfort (pain)
- Presents with gum (soft tissue) inflammation or bleeding adjacent to natural teeth or tooth fragments (gingival inflammation)

Pain and gingival inflammation are not included in the Home Care (HC) version. The interRAI utilization guidelines give a short definition of each item. The instructions advise the assessors to collect the information by interview, observation during meals, or inspection of the mouth.

InterRAI in Belgium

In 2016 the Belgian government decided to incrementally mandate the use of the instruments that in Belgium are named BelRAI³⁴. Currently they are in the state of implementation and applied in multiple pilot projects in different health care settings³⁵. Depending on the individual care facility, the instruments are either completed multidisciplinary or by a single caregiver³⁶. Assessors receive three days of training on how to complete the interRAI instrument³⁷. Based on reports from instructors and training participants, the ohr-interRAI does not receive special attention during training sessions.

A. Expert rating to evaluate test content validity

The ideal ohr-interRAI should identify clients who need to be referred to a dentist or who need help with their daily oral hygiene⁸. By investigating test content validity this part of the study examines, to what extent items are relevant, clearly worded, feasible and complete to be considered adequate for this goal. Expert rating is a procedure that is widely accepted and used to analyze test content validity^{25,38-40}.

In October 2015 an expert meeting was organized in Flanders, Belgium. The 12 experts that were invited agreed to take part. Experts were chosen based on their academic and clinical professional background relevant for oral health of frail individuals. The group comprised three university professors in gerodontology, two experienced dentists working in long-term care facilities, one periodontologist, three geriatricians and one college lecturer in geriatric nursing care. Two experts - one university professor and one experienced dentist - were specialized in prosthetic dentistry.

Using the method outlined by Lynn (1986), relevance of each item of the ohr-interRAI was quantified in a standardized way³⁸. A questionnaire was provided to the experts who rated each item on a 4-point Likert scale (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant). The original method was extended to evaluate further limitations of the items, even if basically the experts considered them relevant. Clarity of wording was assessed per item and the associated utilization guidelines (1 = not clearly formulated, 2 = somewhat clearly formulated, 3 = quite clearly formulated, 4 = very clearly formulated). Additionally, expert opinion on feasibility was evaluated, rating whether the items can be completed by caregivers who were not specifically trained for the

ohr-interRAI (1 = not feasible, 2 = somewhat feasible, 3 = quite feasible, 4 = very feasible). For each item, relevance, clarity of wording, and feasibility was quantified using the content validity index (CVI-I) that defines the proportion of favorable rankings (3 or 4) over the total rankings on item-level³⁸. As recommended by Polit et al. (2007), 0.78 was used as a threshold⁴⁰.

Experts also dichotomously (yes/no) assessed the completeness of the list of items.

B. Focus group discussions with caregivers to evaluate potential reasons for inaccurate assessments

Accurate assessments are threatened when caregivers are not aware of the relevance of oral health and do not seriously attempt to complete the items correctly. Problems caused by the ohr-interRAI instrument itself or challenges related to the assessment situation might also impede accurate assessments. A qualitative approach was chosen to make sure that the whole range of opinions and experiences could be explored. The social interaction of the focus group discussions encourages participants to think about the topic deeply and to clarify individual and shared perspectives^{41,42}.

Development of the question guide

A semi-structured question guide was designed to direct the discussions in a way that all topics of interest would be covered. The guide was designed by one researcher based on the recommendations of Krueger & Casey (2000)⁴¹. It was revised during two meetings of the research group. It was agreed that the first focus group would also be regarded as a pilot test for the question guide.

To initiate the discussion, participants were asked to reflect about oral health-related activities provided by the employing care organizations. They were also invited to share their opinion on the relevance of oral health compared to other care needs of the clients. Furthermore, the question guide covered the following points of interest:

- Attitudes and knowledge related to oral health and hygiene.
- Attitudes and problems related to the ohr-interRAI.
- Approach to complete the ohr-interRAI.
- Reasons to not complete the ohr-interRAI (missingness).
- Perceived competency to complete the ohr-interRAI.
- Suggestions for an optimized version of the ohr-interRAI.

The moderator was also open for additional topics that were brought up by the participants.

To gain insight in their personal oral health-related behavior, participants were asked to fill in a short questionnaire that included the history of dental extractions (excluding wisdom teeth), dental emergency consults during the previous year, frequency of annual dental check-up's, and frequency of daily tooth brushing.

Recruitment of participants

Recruitment of focus group participants was based on a complete list of 102 care projects/organizations in Flanders, Belgium, that used or had used the interRAI-LTCF or -HC. The 76 responsible management executives were contacted by e-mail and by phone and the objectives of the study were explained. They were invited to send one caregiver who actually completed or had completed the ohr-interRAI on a daily basis. No further inclusion- or exclusion criteria were applied. Six contacts could not be reached and participation was refused for 65 projects (Table 1).

Non-participation was predominantly motivated by other priorities and low relevance of the topic. Cessation of interRAI related care projects was also mentioned as explanation for refusal. From the initial 31 participants, 8 dropped out due to illness or other reasons on the day of the discussion.

Practical organization

In March 2016, four focus group discussions were organized at different locations in Flanders. The discussions took place in the meeting room of a care facility and took approximately two hours. Participants completed the questionnaire on their personal oral health-related behavior before starting the discussions. The background and goals of the research project and of the involved researchers were introduced to the participants. A trained researcher (SKH) moderated the groups, guided by the semi-structured question guide. The discussions were conducted in the Flemish Dutch language. A co-moderator (JD) took field notes and assisted with the practical organization. Only participants and researchers were present during the focus groups. All discussions were audio recorded.

Analysis

Discussions were transcribed verbatim. For readability, dialect was translated to standard language and filling words were removed. Para- and non-verbal communication was excluded from the analysis. Coding was done by one researcher (SKH) and validated by another member of the group

(JDAM). Code differences were resolved by discussion between the two researchers. The software program NVivo 11 was used to manage data and to support the coding process.

Qualitative analysis was based on structuring content analysis – also called theme analysis – that combines deductive and inductive coding activities. Main categories were pre-determined by the topics of interest that were also translated to the question guide. First, the material was coded based on these categories. In a second step, further differentiation of the codes was based on the material itself ⁴³.

Results

A. Expert rating to evaluate test content validity

Table 2 shows the content validity indices (CVI) that quantify the proportion of favorable expert rankings over total rankings for relevance, clarity of wording, and feasibility for each item of the ohr-interRAI. Experts unanimously agreed on the relevance of chewing difficulty, pain and gingival inflammation. Based on the 0.78 threshold, damaged teeth was also considered relevant. This was not the case for prosthesis use and dry mouth. None of the items - and the corresponding utilization guidelines - was considered clearly worded by the experts. Pain was assessed nearly satisfactorily. Out of the six items, only prosthesis use and pain were considered feasible to be completed by care givers not particularly trained for the ohr-interRAI. All experts agreed that the list of items was incomplete.

B. Focus group discussions with caregivers to evaluate potential reasons for inaccurate assessments

The average age of the 23 participants (20 female) was 39.8 years (range 25-53 years). While 15 participants had worked with the interRAI-HC, 5 were acquainted with the interRAI-LTCF, and 3 participants had worked with both versions. The participants had varying professional backgrounds, for example, nurses, quality-of-care coordinators, occupational therapists and social assistants. With regard to their personal oral health behavior, all participants reported annual dental check-ups and daily tooth brushing. More than half of the participants had no history of tooth extractions (except wisdom teeth) and only three had a dental emergency consult in the previous year [additional file 2]. For the four focus group discussions the same question guide was applied. Table 3 presents discussion contributions of caregivers after structuring content analysis. Selected contributions

relevant to discuss potential reasons for inaccurate assessments of the ohr-interRAI are summarized below.

Attitudes and knowledge concerning oral health and hygiene: In general and on a personal level, oral health and hygiene were considered to be important. Participants were aware of the impact on general health and on social relationships. However, in the daily care-environment and for clients themselves, priority of oral health was low compared to other problems.

Citation: When time is short, oral care is the first task that is omitted.

This was attributed to low visibility of the results of oral care and aversion towards the oral area of clients.

Complaints and criticism concerning the ohr-interRAI: Participants considered oral health and hygiene uncommon and sensitive topics of discussion. They mentioned that the assessment might evoke feelings of embarrassment and fear.

Citation: Oral health is not a normal topic of conversation, especially not during a first meeting.

It was further criticized that the ohr-interRAI fails to register oral health-related information that was considered important by the participants. For example, oral hygiene, soft tissue lesions, and functionality and fitting of dental prostheses.

Citation: Are they able to brush their teeth and are teeth clean after brushing? Are clients aware that they have to take out their dental prosthesis for cleaning? Do they accept if caregivers do it for them?

Participants also missed an outcome measure based on the ohr-interRAI that would allow interpretation of registrations and emphasize the importance of the oral health assessment. It was further mentioned that the item on gingival inflammation should be removed, as detection by caregivers was not considered feasible.

Situational factors that challenge the assessment of oral health: Participants mentioned that a short contact time with clients impaired the establishment of a trustful relationship that was needed to assess oral health. Client characteristics and needs also played a role, for example, poor communication skills. Completion of the ohr-interRAI was considered inappropriate during a first assessment or during a crisis assessment, when clients performed oral hygiene independently and

when oral health was not relevant for clients.

Citation: It is the same with shoes. When I ask, is it important for you that your shoes are clean and you say no, I will not inquire, when for the last time you have cleaned them. I will just think, OK, never mind.

The background of the assessors and the health-care setting played a role as well. Completion of the ohr-interRAI was considered inappropriate when the organization the caregiver was employed by did not provide daily oral care and when clients with oral care needs were not referred to professional treatment. Some professions were considered to be less common to work with the mouth. Based on their education, competencies and anticipated client expectations, assessment of oral health seemed inappropriate.

Citation: I am a social assistant - I cannot ask them if there is a problem with their teeth.

Approach to complete the ohr-interRAI: In general, the ohr-interRAI was completed hastily and superficially. Clients were observed during conversation, mealtime or care-giving. Completion was also based on conversation. Participants preferred to talk to primary caregivers and oral health-related questions were softened by harmless chatting. Inspection of the mouth was regarded disrespectful, inappropriate, and devaluating and the mouth was considered an intimate area of the body.

Citation: Ask somebody to open the mouth – that is a question you never ask another person. One does not do that, you have to respect other people's dignity.

It was also mentioned that item wording implied active reporting of oral-health related problems by clients.

Missing values due to non-completion of the ohr-interRAI: In general, participants attempted to complete the whole interRAI as this was requested by the employing care-organizations. However, non-completion of the ohr-interRAI was considered inevitable when items were not applicable. For example, the item on chewing problems was left open when nutrition was exclusively provided via a feeding-tube or when clients were comatose. Participants also mentioned that items were not completed when the assessment was considered unfeasible, for example, detection of damaged teeth.

Perceived competency to complete the ohr-interRAI: In general, items were considered clear and

participants felt no need for training. However, it was mentioned that the assessment of damaged teeth, dry mouth, and gingival inflammation was challenging.

Discussion

The ideal ohr-interRAI should detect clients with oral health-related treatment needs. Previous research indicated that the current instrument and related precursor versions do not achieve this goal²⁷⁻³⁰. The present study investigated the underlying problems of this failure by examining test content validity and potential reasons for inaccurate assessments with the ohr-interRAI.

A. Expert rating to evaluate test content validity

An oral assessment instrument that is used by caregivers should identify clients who need help with their daily oral hygiene or who need to be referred to a dentist for further diagnosis and treatment⁸. Experts agreed unanimously that items of the ohr-interRAI were not complete to achieve this goal. For example, registration of oral hygiene is essential as plaque accumulation is the basis for dental decline and correlated to respiratory disease^{11,44-46}. It also needs to be clarified why gingival infection and pain are registered in the interRAI-LTCF, but not in the -HC version.

Rating of individual items showed that experts considered damaged teeth, chewing difficulty, pain, and gingival inflammation relevant for the ohr-interRAI. The American Dental Association (ADA) had recommended these items to be included in the ohr-RAI-MDS 2.0 as well³². Their relevance was also confirmed by numerous publications that found associations with either general health or oral health-related quality of life in older individuals^{9,12,13,19,47-60}. Registration of prosthesis use was not considered relevant by the experts. Non-adequate functionality and fitting of prosthesis might instead be more important for the decision whether clients need to be referred to a dentist⁶¹⁻⁶³. Recommendations of the ADA also suggested to register problems related to the prosthesis³². Dry mouth was not considered relevant by the experts, although literature showed that both hyposalivation (insufficient production of saliva) and xerostomia (perception of dry mouth) affected oral health and quality of life⁶⁴⁻⁶⁶. However, dry mouth does not have to be a problem if oral hygiene is adequate and if oral perception of the client is not negatively affected. ADA recommendations also did not suggest dry mouth to be included in the ohr-RAI-MDS 2.0.³²

Experts challenged clarity of wording for all items of the ohr-interRAI. This might be attributed to the

unspecified method of data collection. While a number of items are worded as 'Client reports' - implying a verbal assessment - guidelines invite assessors to complete the section based on observation, interview or inspection. Suitability of data for research was doubted due to this vague description of the assessment procedure^{67,68}. Dry mouth received the lowest rating for clarity of wording. This might be caused by the ambiguity whether hyposalivation or xerostomia should be detected. Literature showed that the relationship between both phenomena is complex⁶⁹.

Registration of prosthesis use was considered feasible by the experts, probably as the presence of a removable prosthesis can be assessed easily. Pain was rated feasible as well and chewing difficulty was rated nearly feasible to be assessed by untrained caregivers. Clients can be asked about the presence of these symptoms, however, clear instructions are lacking for the assessment of clients who are unable to communicate. Feasibility of the current ohr-interRAI to detect damaged teeth, dry mouth, and gingival inflammation was doubted by the experts. These findings on feasibility are in line with the results of Chalmers et al. (2005) who had invited caregivers to share their experiences concerning the completion of the Oral Health Assessment Tool - a validated oral screening instrument⁷⁰. The ADA had already questioned test content of the ohr-RAI-MDS 2.0 and suggested a revised version of the instrument³². However, it was unclear how test content validity was assessed and how the modified version was developed. In the present study a structured method was applied to evaluate test content validity. The assessment of item relevance was further complemented by the evaluation of clarity of wording, feasibility and completeness to allow for a more detailed view.

B. Focus group discussions with caregivers to evaluate potential reasons for inaccurate assessments

The second part of the study explored whether attitudes and approach of caregivers who complete the instrument were suitable to detect oral health-related treatment need. Personal oral health-related behavior of participants showed that the majority had only their wisdom teeth extracted, had annual dental check-ups and practiced dental hygiene on a regular basis. Participants were also aware of the relevance of oral health on a general and on a personal level. These findings support a thorough completion of the ohr-interRAI. It has been reported that health promotion and provision

of care was influenced by caregivers' own behaviors, attitudes, priority, and awareness towards health ^{71,72}. In the routine of the care environment, however, oral health had low priority compared to other problems. This was confirmed by other studies that evaluated attitudes of caregivers towards oral health of clients ^{71,73,74}. Low relevance of oral health on part of the clients might be a major cause of this divergence of priority. This is also reflected by the perception of inappropriateness when the ohr-interRAI had to be completed for clients for whom oral health was not important. It was reported in the literature as well that respect for the self-determination of clients was an impediment for caregivers to provide daily oral care ⁷¹. Oral health was further considered a sensitive and uncommon topic which is an additional threat for a thorough completion of the ohr-interRAI.

Participants also expressed their complaints with regard to the instrument itself, for example, lack of an item that registers oral hygiene. Findings related to missingness caused by non-completion revealed further deficits such as the absence of a non-applicable response option. But if caregivers perceive the ohr-interRAI as not valuable to detect oral health-related care-needs, their motivation to make effort to complete the instrument could be compromised. Psychological research confirmed that low task significance was negatively associated with work motivation and performance ⁷⁵. Participants further criticized that it was not feasible for caregivers to detect gingival inflammation and damaged teeth. This position also challenges a thorough completion of the ohr-interRAI as it was shown that poor self-efficacy reduces the effort individuals exert on a given task ⁷⁶. The study further revealed a number of situational factors that challenged the oral health assessment. This indicates a lack of training that conveys the skills how oral health has to be assessed accurately and how challenges can be dealt with. Instead, the general approach to complete the ohr-interRAI was hasty and superficially. A further threat to an accurate oral health assessment is, that the approach to complete the instrument did not include an oral inspection. Previous research revealed an extensive discrepancy between normative and self-perceived oral health-related needs in older individuals ⁶ and the value of a superficial observation during meals or care-giving is highly questionable. However, participants considered an oral inspection of the client inappropriate and the mouth was perceived an intimate area. It was reported previously that for caregivers the mouth was an intimate region of the body ⁷⁷.

In summary, findings of the second part of the study indicate potential reasons for inaccurate assessments. The adequate detection of oral health-related treatment needs is impeded by shortcomings of the instrument and a lack of clear guidelines and training. It has been reported in the literature that even a short training enhanced the ability of caregivers to assess the oral health of clients³¹. The training should not be limited to the acquisition of skills, but also raise awareness of the interrelation between oral health, other health aspects, and quality of life.

It is a strength of the present study that two distinct aspects of the ohr-interRAI were investigated. Findings of the two parts complement each other and provide a detailed view of the limitations related to the current instrument and how this is used. These results are valuable for the development of an optimized ohr-interRAI, which is the follow-up project of this research. As an integrated part of the interRAI assessment, the optimized ohr-interRAI should briefly register relevant oral health aspects. It should include questions to evaluate subjective oral health complaints, but also mandate an oral examination.

It is a limitation of the present study that among the experts, groups who complete the items were under-represented, for example nursing scientists. Their expertise would be valuable to more validly assess feasibility of the items. It further needs to be mentioned that the second part of the study did not include the perspective of other parties, for example, clients or management executives. However, caregivers are the most relevant group, as they actually complete the ohr-interRAI. In an early phase of the current study it was planned to conduct focus group discussions with management executives, but these were not aware of the details related to the completion of the ohr-interRAI. The authors also consider to investigate the perspective of the clients in a later stage of the project when the optimized ohr-interRAI will be validated. Another limitation that needs to be discussed is that only a small proportion of the contacted care-organizations sent a participant to the focus group discussions. This reflects and confirms the finding that oral health has only low priority in the care environment. Recruitment of participants required approval of their management executives who had to consider oral health a topic relevant enough worth the expenditure of time and effort. Data saturation is the gold standard for qualitative research⁷⁶ and we can only speculate whether further respondents would have added additional insights. Future research – preferably on a larger and

international scale – could clarify if results of the current study are exhaustive and generalizable.

Conclusions

The presented study contributes to the understanding why the existing ohr-interRAI and related precursor versions fail to adequately assess oral health-related treatment need^{26–30}. Findings challenge test content validity and reveal potential reasons for inaccurate assessments. In a follow-up project the present results will be integrated to develop an optimized and validated ohr-interRAI and an associated training tool.

Declarations

Ethics approval and consent to participate

In July 2015 the protocol of the present study was sent to the Social and Societal Ethics Committee of the KU Leuven. We received the response that – as participants were not subjected to tests or experiments – approval of the committee was not required. The study adhered to standard ethical guidelines as detailed study information for participants, voluntariness of participation and guaranteed privacy. Participants were aware and consented that results of the study will be published.

Competing interests

The authors declare that they have no competing interests.

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