INPLASY

Orthodontic health literacy: a scoping review

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INTRODUCTION

*R*eview question / Objective Objective: This scoping review aims to identify and examine available instruments to quantify orthodontic health literacy comprehensively by capturing various dimensions of health literacy, to contribute to the quality of orthodontic treatment and improvement of oral health outcomes.

Review question:
What instruments are available for the measurement of orthodontic health literacy?

Sub question 1:
To what extent do the instruments quantify orthodontic health literacy comprehensively?

Sub question 2:
What are the psychometric properties of the available instruments to quantify orthodontic HL?

Background Limited oral health literacy is associated with poorer oral health outcomes, such as edentulism, increased caries experience,

missing teeth, and periodontitis (1–3). Individuals with limited health literacy face problems with accessing, understanding, communicating and appraising information to take informed decisions about their oral health (4). Oral health literacy was defined by 'Healthy People 2010' as "the degree to which individuals have the capacity to obtain, process and understand basic oral health information and access services needed to make appropriate health decisions" (5).

Individuals with lower oral health literacy skills also have lower engagement in preventive and oral hygiene behaviours (1,2). However, health literacy has been applied in various public health areas, including oral health, and higher levels are associated with improved preventive behaviours such as regular tooth brushing, interdental cleaning, and more frequent dental checkups, rather than symptomatic attendance (2). Maintaining good oral hygiene is especially important in in the field of orthodontic treatment (6,7). Orthodontic treatment is effective in correcting dental misalignments, treatment for

malocclusion and for an aesthetic and healthy smile.

Maintaining an optimal level of oral hygiene in orthodontic treatment is pivotal, but also challenging, due to brackets, wires, and other attachments on the teeth. Increased amounts of dental biofilm can lead to a higher risk of gingivitis and development of carious lesions. The prevalence of early carious lesions (white spot lesions) and gingivitis is higher when individuals don't adhere to good oral health behaviours and frequent orthodontic visits, and many cannot foresee the consequences, especially in the long term (6,7). In orthodontic treatment, children and adolescents are an important target group, and they require a more specific approach regarding the explanation of oral health information and adherence to maintaining oral hygiene behaviours and oral health.

To date, there is an increasing awareness and understanding of the importance of health literacy skills for optimal dental and orthodontic treatment (8,9) . Various validated performance-based and self-reported instruments to measure oral health literacy have been developed (8,10). The performance-based instruments, such as the REALD-30 and ToFHLiD, focus on the objective measurement of the level of functional health literacy related to understanding of information, reading ability and numeracy (10). However, only measuring functional health literacy and understanding of information may not be sufficient, since it is not strongly related to adherence to oral health behaviours (6,10).

It is therefore important to have a comprehensive measure including multiple dimensions of health literacy, such as understanding and applying, communicating and appraising information, as developed by Sorensen at all (2012) (4). The review of Ghaffari (2020) (10) showed that only the Oral Health Literacy Adults Questionnaire (OHL-AQ) developed by Sistani et al. (2014) (11) captured the health literacy domain decision making and critical thinking, in addition to literacy, comprehension, numeracy and information seeking. In the field of general health literacy, various self-reported instruments have been developed that also capture the domains of applying, communicating and appraising information (4).

Rationale Compared to general oral health literacy, orthodontic health literacy requires more specific knowledge and skills related to orthodontic care and the maintenance of good oral hygiene (9). Orthodontic health literacy is a relatively new concept and only recently some instruments to measure orthodontic health literacy have been developed (6,7,9). To date, to the authors' knowledge, no scoping review on orthodontic health literacy instruments has been conducted.

An overview is needed of instruments and questionnaires to measure orthodontic health literacy, which are tailored to the specific knowledge and skills related to this field. Also, insight is needed into whether these instruments capture the health literacy dimensions of understanding, applying, communicating and appraising health information (4,10).

In addition, insight is needed into the psychometric properties and quality of the instruments, and whether these instruments can be administered amongst various age groups, for example adults, adolescents and children undergoing orthodontic treatment.

This scoping review will therefore provide an overview of existing orthodontic health literacy instruments, identify current gaps in the field, and support future development or refinement of tools to enhance patient education and adherence within orthodontic care.

METHODS

Strategy of data synthesis The data will be compiled using EndnoteTM software for data extraction. Data will be extracted from included papers using the (draft) data extraction form developed by the reviewers in Excel. Data extraction tool will include:

- Author,
- Year of publication and journal
- The name of the instrument
- Type of health literacy instrument (objective or self-reported)
- Setting & country of study
- Study aim, research question(s), and design
- Instrument characteristics (HL scope of measured components, language, sample size in validation study & population age, number of items and scales, response format, time to administer, participant participation in the development process of the questionnaires)
- Psychometrics (reliability, validity, responsiveness and sensitivity).

Any modifications in the data extraction tool will be detailed in the scoping review. Any disagreements that arise between the primary reviewers (MK and DM) will be resolved through discussion, or by

consultation of the third reviewer (YR). If appropriate, corresponding authors of papers will be contacted to request missing or additional data, where required.

Eligibility criteria   Only peer-reviewed articles published in English, Dutch and Chinese will be considered.

Inclusion criteria are:
- Published until July 2025;
- An abstract written in English or Dutch or Chinese;
- Studies that have been designed or developed to measure health literacy and health knowledge in the field of orthodontics.
- Patients undergoing orthodontic treatment, potential orthodontic patients, parents or caregivers of orthodontic patients, and patients who have recently completed orthodontic treatment.
- Original studies, i.e. both experimental and quasi-experimental study designs. This review will also consider descriptive observational study designs including case series, individual case reports and descriptive cross-sectional studies for inclusion.

Exclusion criteria
Studies will be excluded if they are conference abstracts, systematic reviews and meta-analyses, other review types and expert opinions, protocol studies related to psychometrics and other studies that do not meet the inclusion criteria.

Source of evidence screening and selection   In the literature search we will include keywords and MESH terms related to the concept of orthodontics and combined this with Boolean operator AND search terms related to health literacy AND search terms related to questionnaires and measurement instruments and psychometric properties. The complete search string for Pubmed® is provided below:

("orthodontics"[MeSH Terms] OR "orthodon*"[Title/Abstract])
AND
("health literacy"[MeSH Terms] OR "literacy"[MeSH Terms] OR "literacy"[Title/Abstract] OR knowledge[tiab])
AND
("surveys and questionnaires"[MeSH Terms] OR "behavior rating scale"[MeSH Terms] OR "psychometrics"[MeSH Terms] OR psychometric*[tiab] OR "survey*"[Title/Abstract] OR "questionnaire*"[Title/Abstract] OR "tool*"[Title/Abstract] OR "instrument*"[Title/Abstract] OR reliab*[tiab] OR validit*[tiab])

A systematic search will be conducted by MK and DM, in consultation with a librarian across six databases PubMed®, Scopus, Web of Science, CINAHL, Embase, and Psychinfo. The search strategy will be conducted in several steps. First, to identify articles on the topic, an initial limited search of PubMed will be undertaken. After this, a full search strategy will be developed in collaboration with a librarian using index terms and text words in the titles and abstracts. This search strategy will be adapted to search each included database. Grey literature sources will be searched via Google scholar and in the System for Information on Grey Literature in Europe (SIGLE) (http://www.opengrey.eu/). Reference lists of included articles/titles will be hand-searched to identify potential studies that were excluded.

Following the search, all identified citations will be collated and uploaded into Endnote (version 21/2025). After removal of duplicates, titles and abstracts will be screened by two independent reviewers (MK and DM) for assessment against the inclusion and exclusion criteria. Potentially relevant studies will be retrieved in full, and their citation details will also be imported into Endnote. The full text of selected studies will be assessed in detail against the inclusion criteria by the two independent reviewers. Reasons for exclusion of studies that do not meet the inclusion criteria will be reported in the scoping review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion reaching consensus, or by consultation with a third reviewer (YR). The results of the search and the study inclusion process will be reported in full in the final scoping review and presented in a PRISMA flow diagram.

Data management   The program EndnoteTM will be used to manage the screening and selection processes and data extraction of all eligible materials. Two reviewers will independently screen all titles, abstracts, and full-text studies for inclusion. Endnote will be used to highlight conflicts at risk of bias, screening and extraction to be resolved by the two reviewers MK and DM or by consultation with the third reviewer YR.

Reporting results / Analysis of the evidence
First the study screening and selection process will be presented in a PRISMA flow diagram.
Second, data will be extracted from the included studies and presented in a descriptive table with the instrument name, instrument type, study setting, aim and design, and the instrument characteristics. Data will be extracted by two reviewers MK and DM, any disagreements will be

resolved through discussion or by consultation of the third reviewer YR.

Third, we will report on the health literacy scope of the instruments according to the taxonomy of skills developed by Sorensen (2012) which is also applied in the systematic review of Ghaffari to evaluate oral health literacy instruments. We will present the results in a graph to visually report which aspects are covered.

The health literacy scope will include:
- Reading dimension (basic skills for reading).
- Interactive dimension (ability to communicate about health issues),
- Perceptual dimension (the ability to extract meaning from information resources),
- Computational dimension (ability to perform numeric tasks and mathematic operations)
- Information search (ability to find health information for health management),
- Performance (the ability to use and process, or act upon health information and informed decision)
- Assessment (ability to filter, change and evaluate information)
-Responsibility (the ability to take responsibility and make decisions on health and health care).

Fourth, we will assess the information reported on the psychometric properties and present information in a graph or table accordingly. We will assess the properties with the COSMIN checklist (the consensus-based standards for the selection of health measurement instruments) [29]. This tool examines the quality of instruments in four areas and 12 domains which are: internal consistency, reliability, measurement error, content validity, structural validity, hypothesis testing, cross-cultural validity, criterion validity, responsiveness of theory methods (if applied), interpretability, and generalizability of the tool's properties.

Presentation of the results First, we will present the outcomes of the screening and selection process of the studies in a PRISMA flow diagram.
Second, we will present the extracted data from the included studies in a descriptive table.
Third, we will report on the health literacy scope of the measured components in a graph.
Fourth, we will present the information on psychometric properties of the instruments in a graph or table accordingly.

Language restriction Only studies written in the English, Dutch and Chinese languages will be reviewed.

Country(ies) involved Netherlands.

Keywords orthodontics, dentistry, health literacy, oral health knowledge, oral health, instrument, assessment, psychometrics.

Dissemination plans The results of the scoping review and its progress will be presented at scientific congresses when convenient. Upon completion, the scoping review will be published in a peer-reviewed journal.

Contributions of each author
Author 1 - Marise Kaper.
 - Drafted the protocol and future manuscript
- Developed the search strategy and conducted the search and screening process
- Conducted data-synthesis.
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- Provided feedback on the search strategy and conducted the search and screening process
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Author 3 - Yijin Ren.
Provided feedback on the protocol and future manuscript
- Provided feedback on the search strategy and conducted the search and screening process- Provided feedback on the data-synthesis.
- Was consulted as the third reviewer in case MK and DM had doubts during the review process.
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