

The Role of Oral Health Literacy and Shared Decision Making



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Mrs. Geneva Williams is a 69-year-old African American woman referred to an endodontist with the chief complaint of throbbing pain for the past 5 days associated with sensitivity and occasional pain in the right region of her lower posterior teeth. The pain kept her awake at night and was originating from the lower right side of her face with radiating pain to her right ear. On clinical examination, the patient had a defective occlusal amalgam restoration. A pulp test suggested irreversible pulpitis. Radiographically, the recurrent caries encroached the pulp. She has a history of well-controlled hypertension, osteoarthritis, and mild hypothyroidism. As a result of the oral pain, Mrs. Williams had modified her diet, eating predominantly soft foods, high in carbohydrates.

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1 Definitions

Health literacy is defined as the capacity to obtain, process, and use basic health information and services needed to make healthcare decisions [1]. It encompasses the skills of listening, reading, integrating, and evaluating health information, analyzing risks, and applying these skills to situations arising when receiving health care [2, 3]. Health literacy is a multidimensional process, including system demands and complexities as well as the skills and abilities of individuals. Health literacy is a dynamic concept that may change with the individual's mental or emotional state, illness, and life stressors [4]. Health literacy also consists of two essential and closely intertwined skills: numeracy and graphical literacy. Numeracy is a set of quantitative abilities needed by patients to comprehend, manage, and manipulate numerical expressions of probability about healthcare information [5, 6]. Lastly, graphical literacy constitutes the ability to comprehend basic graphical representations used to present quantitative health-related information, an increasingly important skill in the era of Internet-based health care [7, 8]. Health literacy may be a labile state, fluctuating with a patient's emotional state, health status, life stressors, or cognitive status, such as in patients with dementia or delirium [9]. In the field of oral health care, oral health literacy (OHL) has emerged as an extension of the overarching concept of health literacy. OHL is the degree to which individuals can obtain, understand, and process oral health information and services necessary for appropriate decisions as they relate to their oral health [10]. Health literacy, specifically as it relates to oral health, is a complex and multifaceted concept, the definition of which is constantly evolving.

Mrs. Williams had completed a high school education and had retired from her job as a postal worker 7 years ago. She reported these symptoms to her dentist who then recommended she seeks further evaluation by an endodontist. Mrs. Williams visited the endodontist who recommended root canal treatment. He explained the risks and benefits of the oral procedure going over multiple studies demonstrating its effectiveness. She told the dentist that she will want to discuss the issue with her older daughter. The endodontist explained that should she not get the procedure, her condition will continue to worsen, and she will have continued pain and possibly need an extraction. Upon returning home, Mrs. Williams told her oldest daughter that she will not undergo the proposed procedure. She is confused and reports "I didn't know other options were available, this was the only way to feel better." She is upset and wonders if she made the right choice.

2 Extent of the Problem

Investigators have reported a high prevalence of inadequate health literacy [11–13] and numeracy [14, 15] in older individuals. The reasons for this differential are various but among the most common are generational differences related to lower levels

of educational achievement [16, 17]. However, age itself may not be an independent risk factor for inadequate health literacy. Factors that represent more important contributors to the higher levels of inadequate health literacy in older adults include multimorbidity, frailty, polypharmacy, and cognitive and sensory impairments [17]. Research shows that after controlling for cognitive ability, age is no longer associated with health literacy [11, 16, 18, 19]. Studies have also documented higher levels of inadequate health literacy and numeracy in minority older populations contributing to further healthcare disparities [11, 19–25].

Mrs. Williams' daughter convinces her mother to see the endodontist once again and promises to accompany her to the next appointment. One week later, both patient and daughter returned to the dental office. The endodontist had recently learned that inadequate health literacy is a serious and common problem in the older population, especially among minorities. He apologizes to Mrs. Williams stating that he may have been a little "too technical" in his explanation of the procedure. He obtains permission to ask her a question to assess her ability to understand health information. To the question "How confident are you filling out medical or dental forms by yourself?" Mrs. Williams replies that her daughter often helps her complete healthcare forms and that she usually accompanies her to medical appointments. However, this has become more difficult as her daughter had just started a new job.

3 Recognition

The identification of health literacy is the first step in the implementation of interventions aimed at mitigating the consequences associated with this problem. Researchers in diverse healthcare fields have developed several instruments to assess health literacy deficits. The most widely instruments are the Rapid Estimate of Adult Literacy in Medicine (REALM), the Test of Functional Health Literacy in Adults (TOFHLA), and the Newest Vital Sign (NVS). The REALM is a word recognition test that is highly dependent on the individual's educational level, and health knowledge and experience, or crystallized intelligence [26], potentially resulting in an underestimation of inadequate health literacy [27, 28]. The TOFHLA is a valid and reliable measure of health literacy that includes 67 items assessing reading comprehension of healthcare information and health numeracy. It takes 22 min to administer [29]. The TOFHLA is one of the commonly used instruments in the health literacy research literature. A shorter version, the S-TOFHLA, has eight items and takes 7–12 min to administer. It was significantly associated with knowledge about medical facts and clinical outcomes [30]. The Newest Vital Sign (NVS) is the most recent addition to the portfolio of health literacy assessment instruments [31]. It consists of a nutritional label and six associated questions. The cutoff for appropriate health literacy is four or more correct answers and it takes approximately 3 min to complete. The instrument is reliable and has demonstrated internal consistency [31]. The NVS and TOHFLA are strongly correlated with each

other reflecting fluid intelligence and independence from the effects of education [27, 32]. A common advantage for both the NVS and S-TOFHLA is that these instruments not only assess reading ability and comprehension but also assess health numeracy [29, 33]. The advantages of the NVS as the preferred instrument to assess health literacy are its brevity and ability to discriminate among high scoring individuals [27].

Oral health investigators have developed or adapted existing health literacy instruments to focus on oral health information. Most of these new oral health literacy tools have used general health literacy instruments as reference standards for their validation. Table 1 shows some of the most common oral health literacy tools in English, organized in ascending order of administration time. The Two-Stage Rapid Estimate of Adult Literacy in Dentistry (TS-REALD) seems like a valid and reliable instrument that according to the authors takes only 1 min to administer. However, despite appearing as a rapid, simple, and practical measure of oral health literacy, the TS-REALD may not be ready for wider use in older populations. The TS-REALD was only validated in women, and the authors did not report the age of the study participants, limiting its applicability [34]. The Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30) is by far the most studied instrument in the oral health literature [35]. The REALD-30 is a reading comprehension instrument that consists of 30-word recognition items with increasing levels of difficulty [36]. A limitation of the REALD-30 is that it does not include assessments of numeracy, or graph literacy. Another disadvantage is that the REALD-30 may overestimate levels of adequate oral health literacy [37]. The Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D) represent an adaptation of the widely used REALM. As its predecessor instrument, it tests the individual's ability to recognize and pronounce medical and dental words as measures of comprehension [38]. The REALM-D seems relatively efficient and feasible, but the mean age of the participants in the original study suggests that during the validation study, the investigator did not enroll many older individuals [38, 39]. The Oral Health Literacy Instrument (OHLI) is another oral instrument testing reading comprehension and numeracy. However, the OHLI can be quite cumbersome and lengthy to administer [40]. The Test of Functional Health Literacy in Dentistry (TOFHLiD) is also a reading comprehension test adapted from the original TOFHLA. The TOFHLiD was originally validated with the parents of children receiving dental care and did not include anybody in the older age group [41]. Furthermore, this test takes the longest to administer making impractical as a health literacy screen for most dental practices.

Although useful for research purposes, most of the oral health literacy tools described earlier may not be feasible for implementation by busy dental practices. A group in the USA validated the single screening question "How confident are you filling out medical forms by yourself?" to assess patients for inadequate health literacy [42]. Although not yet validated in oral healthcare settings, it represents a practical, feasible, and ecologically valid approach to screen for inadequate health literacy in dental offices. The question could be conceivably be adapted to use "dental" instead of "medical" forms.

Table 1 Properties of selected oral health literacy instruments (English) [35]

Instrument	Participants, type of test, number of items, and scoring	Participants in the validation	Reliability and validity	Time it takes to administer (minutes)	Country
Two- Stage Rapid Estimate of Adult Literacy in Dentistry (TS-REALD) [34]	11 items Score: possible range: 0–9 (raw score – transformed)	Adults: age not reported! (women)	Content validation Concurrent validity: newest vital Sign ($r = 0.51$), and REALD ($r = 0.96$) Reliability: Cronbach’s $\alpha > 0.85$.	1	USA
Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30) [36]	Word recognition, 30 items Score: 0–30 (lowest to highest literacy)	Adults: mean age 44.7 years (SD = 14.6), age range not reported	Content validation Concurrent validity: REALM ($r = 0.86$) and TOHFLA ($r = 0.64$) Predictive validity: oral health related quality of life Reliability: Cronbach’s $\alpha = 0.87$	5	USA
Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D) [38, 39]	Word recognition, 84 words Score: 0–84 (lowest to highest literacy)	Adults: 19–87 (mean age: 41 years)	Content validation Concurrent validity: REALM-66 ($r = 0.99$) Predictive validity: confidence filling out medical forms Reliability: Cronbach’s $\alpha = 0.958$	5–7	USA
Oral Health Literacy Instrument (OHLI) [40]	57 items Score: possible range: 0–100 (0–59, inadequate HL; 60–74, marginal HL; and 75–100, adequate HL)	Adults 19–69 (mean age: 39 years)	Content validation Concurrent validity: TOFHLA ($r = 0.61$) and discriminate oral knowledge ($r = 0.57$). Reliability: Cronbach’s $\alpha = 0.898$	20	Canada
Test of Functional Health Literacy in Dentistry (TOFHLiD) [41]	68 reading comprehension, 12 numeracy items Score: weighted score 0–100	Adults: 26–59 (median age: 35 years)	Content validation Concurrent validity: REALD-99 ($r = 0.82$) Reliability: Cronbach’s $\alpha = 0.63–0.86$	30	USA

4 Consequences of Inadequate Health Literacy

Patients with inadequate health literacy suffer from poorer health status, unhealthy behaviors, and worse clinical outcomes than those individuals demonstrating adequate levels of health literacy. Research studies have documented poor knowledge

of disease [43], poor patient-physician communication [44, 45], lower adherence to healthy behaviors [20], impaired self-management skills [46], worse self-perception of health status [47], disability [48], worse clinical outcomes [49–51], diminished ability to participate in shared decision-making [52], and higher healthcare utilization [47, 53]. Regarding oral health, studies have also shown poor oral healthcare outcomes. Using the REALD-20, a study showed that patients with higher OHL had two more teeth on average than those in the lowest score range. This same study also showed a significant association between lower plaque scores and higher REALD-20 scores before and after treatment [54]. The number of missing and filled teeth were significantly higher in those patients with inadequate literacy as compared with participants with adequate levels of health literacy. Limited OHL is also linked to the presence of biofilm in younger adults [55] and severe periodontitis [56]. In terms of healthcare utilization, having lower health literacy was associated with a twofold increase in missed dental appointments [56] and a higher number of emergency dental visits [55]. Others reported higher rates of dental anxiety in individuals with lower levels of OHL [10], dissatisfaction with their own oral health care [57], and impaired quality of life [55]. These studies show that there is an association between lack of OHL and dental outcomes.

The endodontist outlines the risks, benefits, and possible adverse outcomes of the root canal intervention. The dentist uses lay language and graphic illustrations to explain the root canal procedure to save the tooth. He also discusses alternatives to the root canal, including tooth extraction, natural remedies (eliminating processed sugars from her diet, eating high-quality protein and avoiding grains), and irrigating the tooth canal with a calcium hydroxide solution, and he also presents the option of no treatment, explaining this could lead to further recurrent infections. The endodontist wants to make sure that Mrs. Williams understood the procedure and alternatives, so he asks: “Ms. Geneva, I want to be sure that I did a good job explaining the root canal procedure. Would you mind please explaining back to me what we discussed?” After clarifying misunderstandings, the specialist is confident that Mrs. Williams had understood the benefits and burdens associated with the root canal as well as the alternatives he presented. After asking her daughter’s opinion, Ms. Williams agrees to undergo the root canal. Together, they decide on a plan of care for her. She feels supported and confident in their joint decision.

5 Shared Decision-Making and Health Literacy in Dentistry

Shared decision-making (SDM) is the process by which patients and healthcare professionals make assessment and management healthcare decisions together, incorporating the best available evidence [58, 59]. SDM involves a bidirectional information flow between the clinician and the patient, patient knowledge of treatment options, and physician elicitation of patient preferences. Shared

decision-making builds a dentist-patient partnership, working on the oral health problems at hand by laying out the available diagnostic and therapeutic options, including that of no treatment. During the process the dentist explains the benefits and risks, eliciting the patient's views and preferences on these options and agreeing on a joint course of action. SDM aims to empower patients to make better health-care decisions [60–62]. Adequate levels of health literacy are a prerequisite for active participation in the decision-making process [63]. Unfortunately, individuals with inadequate health literacy are less likely to participate in SDM [52, 64, 65]. Although many patients would prefer to play a collaborative role, those with inadequate health literacy most often played a passive role in decision-making [52]. Recent reviews revealed the paucity of studies investigating the process of shared decision-making in dentistry [62, 66]. Small cross-sectional studies of adult patients in dental practices showed that in general patients prefer to play a more active and collaborative role in dental care decision-making [67, 68]. Other studies have addressed how to facilitate SDM by using decisional aids [69–72]. Despite the recognition by oral health experts of the importance of health literacy in SDM [73, 74], there are no studies that specifically examine this topic. On a routine basis, dental professionals will face issues related to assessment and management interventions that will demand patient involvement in the decision-making process. As we have seen throughout this chapter, older adults are a group at higher risk for demonstrating inadequate levels of health literacy. Extrapolating from the large healthcare research literature, we can anticipate that older patients with poor health literacy may not fully engage in the shared decision-making process or comprehend the benefits and risks of proposed dental interventions. In the next section, we will outline interventions designed to improve the process of shared decision-making for patients with inadequate health literacy.

Mrs. Williams undergoes the procedure as recommended by the endodontist. There are no post-procedure complications. She's a little sore afterward but glad that it's over. The endodontist sends her home with age-friendly patient education materials including images explaining post root canal care. He follows up with her by telephone the next day to discuss how she's doing.

6 Interventions

Older adults are high-risk groups for the presence of inadequate health literacy. It is therefore incumbent upon dentists to implement interventions that facilitate dentist-patient communication and improve the process of shared decision among in patients with inadequate health literacy. The American Dental Association has formulated guidelines aimed at improving communication and shared decision-making tools for patients with inadequate health literacy [75]. We complement these recommendations with those of experts in other healthcare fields [76–78].

6.1 Universal Precautions

Given the high prevalence of inadequate health literacy in older adults, it is reasonable to widely implement “lowest common denominator” approaches to address the problem of inadequate health literacy. The US Agency for Healthcare Research and Quality developed the Health Literacy Universal Precautions Toolkit to improve clinician-patient communication in patients with different levels of health literacy [79]. The implementation of universal precautions implies a dental practice commitment to make changes that improve communication and foster older patients’ involvement in shared decision-making regardless of their level of health literacy. The interventions may consist of staff training on the principles of communication and SDM, as well as some of the recommendations in this section.

6.2 Teach-Back

The teach-back is a technique in which a patient is prompted to restate information previously conveyed by a clinician with the purpose of ensuring patient recall and understanding [45, 80]. This involves asking a patient to explain in their own words the diagnosis or treatment plan. The provider then can correct any errors or fill gaps in understanding. A growing body of evidence supports the use of the teach-back technique in improving patients’ knowledge, self-management skills, and adherence [81]. It may not add additional time to the dental encounter.

6.3 Age-Friendly Written Materials

Age-related changes in visual and cognitive performance may impair older adults’ ability to read and understand patient education materials [82, 83]. These changes may be further amplified by the effects of multimorbidity, frailty, and disability. The US the Centers for Medicare and Medicaid Services (CMS) has produced a toolkit with a set of evidence-based guidelines on how to design age-friendly reading materials (Table 2) [84]. Clinicians can use the US Centers for Disease Control (CDC) Clear Communication Index (Index), which provides evidence-based criteria to assess public communication products [85].

6.4 Image-Based Materials (Pictograms)

Pictograms are graphical, nonverbal symbols that are used to convey healthcare information [86]. Figure 1 shows an example of a pictogram explaining the use of a medication. Pictograms may overcome health literacy deficits and improve comprehension, recall, and adherence by patients with inadequate health literacy. Most of

Table 2 Guidelines for preparing age-friendly written materials [84]

<p><i>Content</i></p> <ul style="list-style-type: none"> Use advance organizers Emphasize what patients want and need to know Create content culturally appropriate Repeat new concepts and summarize the most important points. Ensure content accurate and up to date Include information about who produced the resource and when 	<p><i>Organization</i></p> <ul style="list-style-type: none"> Pace readers by grouping content into meaningful chunks Pay attention to the orderly presentation of information Use headings and subheadings Make headings specific and informative Provide patient friendly navigational aids throughout the document (e.g., table of contents, signs, etc.)
<p><i>Writing style</i></p> <ul style="list-style-type: none"> Write in a conversational style Use the active voice Make sentences simple and short. Be direct, specific, and concrete Give the context first, and incorporate definitions into the text Create cohesion Use words that are familiar and culturally appropriate Use technical terms only when readers need to know them Write as simply as you can 	<p><i>Motivation</i></p> <ul style="list-style-type: none"> Use a positive and friendly tone Use devices to get readers actively involved with the material Give specific instructions that are culturally appropriate Refer to trustworthy sources of information (government, healthcare organizations) Assist in reading and interpreting health statistics Offer help support or how to obtain additional information

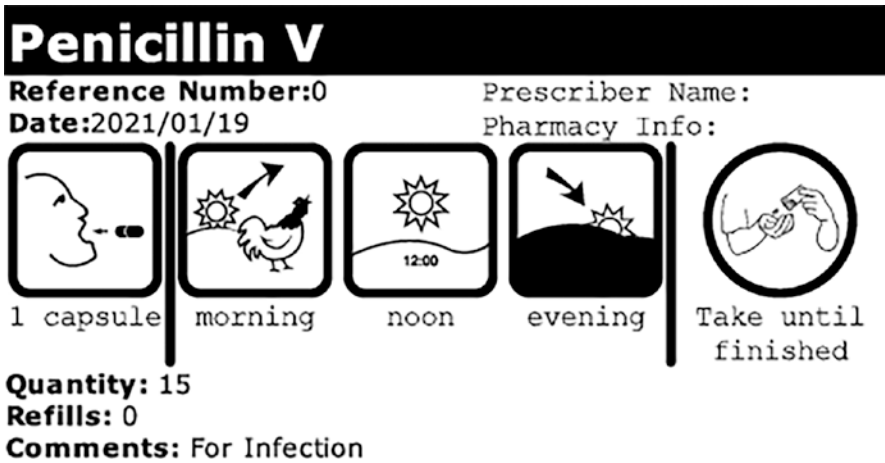


Fig. 1 Pictogram with medication instructions

the research comes from the medication adherence literature. The evidence on the effectiveness of pictograms for older adults with inadequate health is mostly positive in terms of improving patients’ medication adherence [86, 87]. In conjunction with other modalities, the judicious use of pictograms may help dentists convey

healthcare information to their older patients. These tools have been shown to improve patients' recall as well as their adherence to medical treatment [80].

6.5 Decision Aids

These are tools designed to assist individuals participation in the shared decision making process by fostering deliberation of healthcare options between patients, caregivers, and the healthcare professional. The goal of using decision aids is to help patients make informed decisions regarding their healthcare [88]. Dental practitioners can take advantage of decision aids to improve patients' knowledge, comprehension of risk perceptions, and participation in shared decision-making [75]. There is growing evidence of the efficacy of decision aids for improving decision-making in patients with inadequate health literacy [89].

6.6 Caregivers

Recruiting caregivers to assist older patients can go a long way in mitigating the negative effects associated with inadequate health literacy. Older patients become increasingly dependent on caregivers for assistance with their daily care and when interfacing with healthcare professionals. Caregivers' working familiarity with the oral healthcare of their loved ones may be useful in ameliorating the effect of the patient's limited health literacy. Dental professionals must be careful in ensuring that the caregivers have in fact an adequate level of health literacy [90].

7 Practical Considerations for Oral Healthcare Professionals

Time constraints are a barrier for oral healthcare professionals seeking to assess older patients for OHL. However, incorporating a practical and efficient approach may be feasible to implement in a busy dental practice. It is certainly important to be sensitive and avoid stigmatizing language when dealing with older patients who may have inadequate health literacy. Office staff may begin the screening of patients in the waiting area by asking the single question "How confident are you filling out medical/dental forms by yourself?" Staff can then document in the chart those with suspected inadequate health literacy. Thereafter, the dental professional could ask the patients for permission to include available caregivers during the encounter. Caregiver participation may occur on-site or by telephone or secure video conferencing. Keeping handy in the dental office age-appropriate written educational materials that include pictograms allows for further reinforcement of dental information. When discussing proposed diagnostic and therapeutic interventions, decisional aids that may include graphics may assist during shared decision-making

After a week, the patient returns to the dental clinic for her endodontic follow-up visit. The outcome was successful after the procedure with resolution of Mrs. Williams' severe oral discomfort. The patient was advised to receive a full coverage restoration when she returns for her 1-month follow-up visit. A follow-up radiograph after 4 months revealed no periapical changes, and Mrs. Williams is asymptomatic.

8 Future Research

There are multiple gaps in the study of oral health literacy in older adults. However, three priority areas deserve special attention: assessment, impact on dental practice access and satisfaction; and interventions. Regarding the assessment of oral health literacy, this chapter reviewed existing instruments meeting most validity and reliability criteria. However, these instruments may not be feasible in busy dental practices. The obvious advantage of the single question screener for health literacy is its rapid administration. Although validated with medical patients, it has yet to be evaluated with older adult populations in dental settings. Future studies may address the correlation of the single question with existing oral health literacy instruments. The growing diversity of the older population will also demand that investigators develop and validate culturally sensitive tools to measure oral health literacy in the persons' native language. A related research area is the evaluation of the impact that inadequate health literacy has on access to dental care services. Practicing dentists are already dealing with older adults suffering from more oral diseases and associated multimorbidity, cognitive impairment, and disability which may prolong the duration of dental encounters [91]. Inadequate health literacy may pose an additional barrier to the care of older adults. An important area of investigation will be the study of dental providers' attitudes toward older adults with inadequate health literacy. On the patient side, there are other important research gaps. More studies are needed about the experiences of older persons with inadequate health literacy and how that dynamic affects access to dental services and the shared decision-making process. We discussed several different strategies to overcome the challenges of health literacy for older persons. Unfortunately, most of the interventions are based on expert opinion lacking a solid grounding on research evidence. Health literacy is a multidimensional construct and is unlikely that single interventions will suffice. Evaluating multicomponent strategies consisting of combinations of individual approaches may represent a more efficacious and cost-effective approach to deal with the burdens associated with inadequate health literacy in older adults.

9 Conclusions

Inadequate oral health literacy is prevalent in older adults and is associated with dental complications and increased utilization. There are validated instruments that can assist dentists in the assessment of their older patients' levels of health literacy.

A single question screener may be a quick approach to identifying older patients with inadequate health literacy. Adequate levels of health literacy are a prerequisite for active participation in the decision-making process. There are many options that may facilitate the shared decision-making process in patients with inadequate levels of health literacy. An overall commitment to universal precautions, use of the teach-back technique, age-friendly materials, pictograms, and decision aids may mitigate the problems associated with inadequate health literacy. Involving caregivers to help patient during dental encounters may serve to further assist patients during the process. More research is needed into the assessment of oral health literacy, its impact on dental practice access and patient satisfaction, and in the design of multicompetent interventions targeting this important problem.

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