

SCREENING TOOLS FOR DEMENTIA RISK ASSESSMENT: A REVIEW OF COGNITIVE QUESTIONNAIRES

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ABSTRACT

The growing global prevalence of dementia, aggravated by population aging, highlights the need for effective strategies for its early identification and prevention. In topics with this scope, narrative reviews allow exploring and synthesizing the existing literature, offering a critical and comprehensive view of screening tools. This study reviews the main cognitive questionnaires used in dementia risk assessment, focusing on their applicability, accuracy, and limitations. The tools analyzed include questionnaires based on self-perception, informant reports, and modifiable lifestyle factors, such as the SCC-Q, AD8, IQCODE, LIBRA, and STAD. The results highlight the relevance of these tools in clinical contexts and public health programs, contributing to preventive interventions and more effective management strategies. Thus, the integration of these tools into health practices is essential to mitigate the impact of dementia on aging populations, although additional validations are needed in different cultural and population contexts.

Keywords: Dementia, Risk Assessment, Cognitive Impairment.

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INTRODUCTION

The increase in longevity and the consequent aging of the world population have increased the prevalence of neurodegenerative diseases, with dementia occupying a central role among them (Prince et al., 2016). Dementia is characterized by the progressive deterioration of cognitive functions, affecting areas such as memory, language, and thinking, which results in a significant impact on functional independence and quality of life for individuals (Livingston et al., 2020). Alzheimer's disease, the most common cause of dementia, accounts for more than 60% of cases, followed by vascular dementia and other less prevalent forms such as Lewy body dementia and frontotemporal dementia (Scheltens et al., 2021). Epidemiological data suggest that by 2050, the number of people affected by dementia could triple, reaching 152 million globally (World Health Organization, 2021). In this context, early identification of at-risk individuals becomes essential to slow disease progression and improve clinical outcomes (Petersen et al., 2018).

The scientific literature points out that the pathological process of dementia can begin up to 20 years before the appearance of the first clinical symptoms (Jack et al., 2018). This long preclinical phase offers a window of opportunity for the implementation of preventive interventions. In addition, the relevance of the study on dementia is evident in the face of the alarming numbers projected for the coming years. It is estimated that by 2050, around 152 million people worldwide will be living with dementia, a significant increase from the 55 million recorded in 2020 (WHO, 2021). This growth is directly related to population aging, as advanced age is one of the main risk factors for the condition (Livingston et al., 2020). In Latin America, for example, the prevalence of dementia in individuals over 60 years of age is expected to triple by mid-century, from 3.4 million to more than 10 million cases (Alzheimer's Disease International, 2019).

This scenario, in turn, represents a global public health challenge, impacting not only patients but also their families and health systems, due to the high costs associated with treatment and continuous care. Thus, strategies for the early identification and management of risk factors become fundamental to mitigate this growing impact. Thus, tools that allow early screening and the identification of risk factors for the development of dementia have gained great relevance (Deckers et al., 2017). In this scenario, dementia risk assessment questionnaires emerge as effective, accessible, and low-cost methods for the early detection of cognitive declines and for the assessment of both modifiable and non-modifiable risk factors (Jessen et al., 2014).

Thus, the main guiding questions of this study include: what are the questionnaire-based screening tools for early assessment of dementia risk and their characteristics and specificities; how lifestyle-based questionnaires help identify modifiable risk factors that can prevent or slow the progression of dementia; and how self-assessment and informant questionnaires complement objective assessments for the detection of early signs of cognitive decline in different clinical and public health settings.

In this context, the objective of this review was to analyze the main questionnaire-based screening tools for early assessment of dementia risk, highlighting their characteristics, specificities, and contributions to the identification of modifiable and non-modifiable risk factors. In addition, we sought to understand how these instruments complement traditional clinical assessments and contribute to preventive strategies, especially in the context of population aging and the projected increase in the global prevalence of dementia.

Therefore, the use of dementia risk assessment questionnaires plays a central role in the overall strategy for the prevention and control of this condition. For this, performing a review of cognitive questionnaires is of fundamental importance in the current context. These tools are essential for early identification of at-risk individuals, enabling preventive and personalized interventions that can delay or even prevent the development of the disease (Jessen et al., 2014; Deckers et al., 2017). Evaluating these tools allows us to identify their characteristics, limitations, and applicability, promoting a more effective use in combating this growing public health challenge (Livingston et al., 2020).

METHODOLOGY

In this study, a narrative review was conducted with a qualitative approach, as guided by Silva and Santos (2020). The narrative review allows a broad and critical analysis of the available scientific literature on a given topic, with the aim of synthesizing and interpreting existing knowledge (Malaquias et al., 2020). This method offers a comprehensive view of the current state of research, enabling theoretical and conceptual discussion about the questionnaires used to assess the risk of developing dementia.

Searches were carried out in the scientific databases PubMed, Scopus, Google Scholar and SciELO, covering publications in English and Portuguese. The aim was to identify the main dementia risk assessment tools and discuss their effectiveness, applicability, and limitations

The inclusion criteria were: 1) peer-reviewed articles; 2) studies published between 2000 and 2023; 3) research that addressed the practical application and validation of screening questionnaires for dementia risk. We excluded studies that focused exclusively on diagnostic tests without an emphasis on risk screening or that did not present data applicable to the target audience of this study, which are individuals in early stages of aging and cognitive risk.

Finally, the data obtained were synthesized to offer a clear view of best practices and gaps in the use of questionnaires for the assessment of the risk of developing dementia, contributing to the advancement of knowledge and the improvement of early screening protocols.

RESULTS AND DISCUSSION

From the global analysis of the articles selected in the scientific databases, four main axes were identified that guided the discussion of the results. Each thematic axis reflects the characteristics and applicability of dementia risk assessment questionnaires, their methodological approaches, and related clinical outcomes. These axes were: 1) Instruments for assessing the risk of developing dementia; 2) Accuracy and Applicability; 3) Dementia tracking integrated with telemedicine and artificial intelligence applied to public health policies.

INSTRUMENTS FOR ASSESSING THE RISK OF DEVELOPING DEMENTIA

Dementia screening questionnaires can be categorized into five main approaches: self-perception, informant reports, lifestyle factors, remote screening, and multidimensional. Among the instruments based on self-perception, the SCC-Q (*Subjective Cognitive Complaints Questionnaire*) stands out, which evaluates the individual's own subjective complaints, allowing the early detection of cognitive alterations. Instruments based on informant reports include the AD8 (*Ascertain Dementia 8-item Informant Questionnaire*) and the IQCODE (*Informant Questionnaire on Cognitive Decline in the Elderly*), which use information provided by family members or caregivers to identify early cognitive changes.

Instruments focused on lifestyle factors, such as the LIBRA Index (*Lifestyle for Brain Health Index*), assess modifiable aspects such as diet and physical activity, while the STAD (*Simplified Telephone Assessment of Dementia Risk*) offers remote screening by telephone interviews, being useful in populations with limited access to face-to-face services.

Multidimensional instruments, such as the QDRS (*Quick Dementia Rating System*), combine informant reports and structured assessments, enabling a rapid and comprehensive analysis of cognitive and behavioral aspects.

The SCC-Q is widely used to identify complaints of cognitive impairment, focusing on subjective symptoms such as memory problems and difficulties with everyday tasks, often reported by older patients (Blazer et al., 2011). The literature suggests that individuals who report subjective cognitive complaints have an increased risk of developing mild cognitive impairment (MCI) or dementia (Jessen et al., 2010).

The AD8 (Ascertain Dementia 8-item Informant Questionnaire) and IQCODE (Informant Questionnaire on Cognitive Decline in the Elderly) questionnaires are widely used to identify signs of dementia through information provided by informants, such as family members or caregivers. These instruments are valuable as patients are often not fully aware of their cognitive deficits, especially in the early stages of dementia (Galvin et al., 2005). The AD8, with its eight short questions, is a quick and easy-to-administer questionnaire designed to be answered by people close to the patient. The sensitivity of AD8 in identifying cases of dementia has been consistently high, with a study by Galvin et al. (2005) showing a sensitivity of 88% and specificity of 92% in detecting Alzheimer's.

The LIBRA Index (Lifestyle for Brain Health) is an innovative tool that assesses dementia risk based on modifiable lifestyle factors. The index is developed to provide a predictive risk score, taking into account factors such as physical activity, diet, smoking, alcohol consumption, blood pressure, diabetes, and mental health (Livingston et al., 2020). The LIBRA Index is based on epidemiological studies that demonstrate that these factors have a significant impact on the development of dementia. For example, regular physical activity has been associated with a reduction in the risk of cognitive decline, while smoking and excessive alcohol consumption substantially increase the risk of dementia (Laurin et al., 2001; Angevaren et al., 2008).

STAD (Simplified Telephone Assessment of Dementia Risk) is an innovative tool that uses telephone interviews to assess dementia risk. Its main benefit is accessibility, especially in populations with difficulties accessing face-to-face health services, such as in rural areas or in countries with limited health infrastructure. STAD is designed to be simple and quick, utilizing a set of closed-ended questions to identify dementia risk factors such as memory problems, family history of dementia, chronic illnesses, and lifestyle habits (Winblad et al., 2016). The main advantage of STAD is its ability to reach vulnerable

populations, who are often underdiagnosed due to lack of access to specialized medical services. In rural areas or in developing countries, dementia diagnosis can be delayed for years due to barriers such as distance to health centers, lack of skilled professionals, and limited resources. STAD eliminates much of these barriers by allowing initial screening to be performed over the phone, which reduces costs and increases the efficiency of the health care system (Paddick et al., 2015). In addition, this approach offers a viable alternative to public health programs that seek to identify individuals at risk of dementia quickly and efficiently.

The QDRS (Quick Dementia Rating System) is an essential tool for the early detection of dementia, standing out for its practicality and accuracy in clinical and community settings. With only 10 items, the QDRS assesses fundamental cognitive and behavioral aspects, such as memory, orientation and judgment, through reports from informants, such as family members or caregivers. Studies have demonstrated its high sensitivity and specificity, correlating well with more extensive assessments, such as the MMSE and CDR, and showing efficacy in identifying Mild Cognitive Impairment, which enables early interventions. By providing a comprehensive view of cognitive status in a rapid manner, QDRS facilitates the implementation of treatment and support strategies, contributing significantly to the quality of life of patients at risk of cognitive decline (Galvin and Roe, 2019; Galvin et al., 2015; Bangen et al., 2019; Siedlecki et al., 2016).

ACCURACY AND APPLICABILITY

The accuracy of the SCC-Q is reinforced by studies demonstrating its ability to differentiate between normal aging and the first signs of dementia. Research conducted by Shao et al. (2015) revealed that patients with subjective cognitive complaints were significantly more likely to develop an Alzheimer's diagnosis compared to those without such complaints. In addition, the questionnaire allows the detection of very subtle cognitive changes, often invisible in conventional clinical tests. However, its greatest limitation lies in the subjectivity of the patients' response, since these reports can be influenced by emotional factors or even by anxiety related to aging (Perrotin et al., 2015).

Another important aspect of the application of the SCC-Q is its use as a screening tool in clinical settings and longitudinal research. When used in at-risk populations, such as older adults with a family history of dementia or those with cardiovascular disease, SCC-Q can help professionals identify individuals who require more intense monitoring or early

interventions. Combining this type of questionnaire with other objective cognitive assessment tools, such as neuropsychological testing, can significantly increase diagnostic accuracy, promoting a more holistic and accurate approach to early detection of dementia (Mitchell & Shiri-Feshki, 2009).

Despite its advantages, the SCC-Q is not without its challenges. The interpretation of subjective complaints can be affected by individual variability and cultural differences, which can make it difficult to generalize them in different contexts. Validation studies of the questionnaire in different populations, such as in countries with different cultures and socioeconomic contexts, are necessary to increase the global applicability of this tool. Thus, a combination of subjective questionnaires with objective cognitive assessments, as well as the involvement of experienced professionals for the interpretation of the data, is essential to ensure a more accurate and earlier diagnosis of dementia.

An important aspect of informant-based questionnaires such as IQCODE is their ability to pick up subtle cognitive changes that the patient may not notice. IQCODE assesses patient cognitive changes over time and is particularly useful in early stages of cognitive impairment, where patient complaints may be minimal or absent. Research by Jorm et al. (2004) indicates that IQCODE has a high sensitivity (81%) and specificity (85%) in detecting dementia, making it a valuable tool for early diagnosis.

In addition, the use of these questionnaires has the advantage of providing an external view of cognitive changes, since informants can perceive signs of decline that the patient himself may not recognize. This is especially important in the case of Alzheimer's disease, where the first symptoms often manifest in areas such as recent memory, which can be difficult for the patient to assess objectively (Gauthier et al., 2010). However, the reliability of the informants is a critical variable for the effectiveness of these instruments. The relationship between the patient and the informant, as well as the degree of daily interaction, can influence the questionnaire responses. Informants who have a closer daily contact with the patient may perceive changes more acutely than those with sporadic contact.

The use of informant-based questionnaires also raises questions about response bias. The informant's perception can be influenced by factors such as stress, fatigue and even prejudices about dementia. In some cases, family members may overestimate or underestimate cognitive changes, which can affect the accuracy of the diagnosis. Therefore, it is crucial for healthcare professionals to consider the quality and consistency

of informants' observations, as well as to combine this data with other clinical and neuropsychological assessments to arrive at a more robust and reliable diagnosis.

Furthermore, regarding the LIBRA Index, great advantages can be found. In this sense, it is noteworthy that this questionnaire focuses on modifiable factors, that is, behaviors and conditions that can be changed over time. This allows for the implementation of targeted preventive interventions, such as promoting physical exercise, healthy eating, and managing cardiovascular disease, to reduce the risk of dementia. The index also incorporates protective factors, such as cognitive engagement, performing challenging mental activities, and managing stress, which have been shown to benefit in maintaining cognitive health (Zhou et al., 2017).

However, the application of the LIBRA Index in populations of different cultural and socioeconomic contexts is still a developing field. Although most of the risk factors associated with dementia are universal, the conditions that favor adherence to lifestyle changes can vary according to cultural, economic, and educational factors. For example, in some populations, factors such as the Mediterranean diet, which is considered protective against dementia, may not be easily accessible due to issues of availability and cost of healthy foods (Martínez-González et al., 2019).

The LIBRA Index can also be a useful tool in public health programs, allowing us to identify at-risk populations and target interventions to those most likely to develop dementia. Programs to raise awareness of the risks associated with lifestyle and promote healthy habits have the potential to significantly reduce the burden of dementia in society, especially if they are implemented early and comprehensively.

Studies have shown that STAD is a reliable and valid tool, with good sensitivity and specificity in the early detection of mild cognitive impairment and dementia. In a study conducted by Müller et al. (2017), STAD was able to correctly identify 85% of dementia cases in a sample of older adults with known risk factors. These results suggest that STAD may be an effective option for dementia screening, especially when compared to traditional methods that require face-to-face consultations and detailed neuropsychological testing, which are not always feasible in resource-limited settings.

In addition to its efficiency in hard-to-reach areas, STAD has been explored as a monitoring tool in long-term health programs. One of the advantages of this approach is the possibility of performing repeated screenings over time, allowing healthcare providers to monitor the progression of dementia risk and implement early interventions whenever

necessary. This is particularly important in patients with known risk factors, such as a family history of dementia, cardiovascular disease, or diabetes, who can be followed regularly without the need to travel to face-to-face appointments (Lin et al., 2013).

However, the use of STAD presents challenges, especially with regard to cultural and linguistic variability. Tools based on telephone interviews need to be adapted to different cultural contexts, since the understanding and expression of cognitive symptoms can vary significantly between different populations. In addition, the accuracy of responses can be influenced by factors such as education level, literacy, and familiarity with the use of telephone technology. A study by Barrett et al. (2018) suggests that in order to maximize the effectiveness of STAD, adequate training is needed for professionals conducting interviews, ensuring that they know how to adapt questions to varied contexts and interpret responses in a way that is sensitive to cultural differences.

In summary, STAD stands out as a promising tool for dementia screening in populations with limited access to health services. Its simplicity, low cost, and large-scale applicability make it an effective alternative for early identification of individuals at risk of dementia, especially in settings where healthcare infrastructure is limited. However, its effectiveness depends on cultural adaptations and the training of professionals to conduct interviews properly. More studies are needed to expand the use of STAD in different populations and contexts, exploring its potential as a central tool in public health strategies focused on the prevention and early diagnosis of dementia.

The accuracy of the QDRS (Quick Dementia Rating System) is widely validated by studies that show its ability to effectively identify early signs of dementia, especially in distinguishing between Mild Cognitive Impairment (MCI) and dementia in more advanced stages. Galvin et al. (2015) demonstrated that the QDRS has a strong correlation with longer assessments, such as the Clinical Dementia Rating (CDR) and the Mini-Mental State Examination (MMSE), indicating its robustness and reliability in screening for cognitive impairment. In addition, by utilizing a 10-item format focusing on critical areas such as memory and judgment, the QDRS provides a rapid and objective assessment, allowing for more accessible and practical screening in different clinical settings (Galvin & Roe, 2019).

In terms of applicability, the QDRS stands out for its format that facilitates use by informants, such as family members or caregivers, which is essential for patients with difficulties in recognizing or reporting their own symptoms. This allows for a more complete and accurate view of cognitive impairment, especially when compared to questionnaires

based solely on the patient's self-perception. Studies suggest that this approach broadens the utility of QDRS, including use in community settings and with populations that have difficulty accessing more complex assessments (Bangen et al., 2019). However, its application depends on the accuracy of informants' observations, which may be limited in situations where there is a lack of knowledge about specific behavioral and cognitive changes.

DEMENTIA SCREENING INTEGRATED WITH TELEMEDICINE AND ARTIFICIAL INTELLIGENCE APPLIED TO PUBLIC HEALTH POLICIES

The integration of telemedicine and artificial intelligence (AI) into public health policies offers significant advances in dementia screening processes. Telemedicine facilitates remote access to healthcare services, while AI improves diagnostic accuracy through advanced data analytics. This synergy makes it possible to overcome the limitations of traditional screening tools and promotes more precise and accessible interventions.

Telemedicine tools, such as STAD, have proven to be cost-effective and accessible solutions, especially in underserved regions. Programs such as the Cognitive Impairment Examination in Hainan prove the effectiveness of digital technologies to extend population reach, train health professionals, and improve screening rates (Li et al., 2024). AI, in turn, enhances cognitive assessments by integrating data from different sources, such as speech patterns and structured questionnaires, allowing for early detection of signs of cognitive decline. AI models, such as those used for voice analysis, have a 95% accuracy in identifying cognitive impairments from conversational samples (Cavedoni et al., 2020; Panwar et al., 2024).

However, the adoption of these technologies requires attention to ethical and cultural issues. Data privacy and adaptations for diverse cultural contexts are essential to ensure accurate interpretations and equitable access (Kumar et al., 2023). Additionally, variability in digital literacy and internet access can limit the use of technologies in vulnerable populations, underscoring the need for adequate training and investments in infrastructure (Ramírez, 2024).

While the integration of AI and telemedicine has great potential to improve dementia screening, it is imperative to address challenges related to equitable access and ethical

issues to maximize the benefits of these innovations in different social and economic contexts.

CONCLUSION

The various questionnaires analyzed to assess the risk of developing dementia represent important advances in the early screening and monitoring of individuals with a greater predisposition to the disease. Tools such as the SCC-Q, STAD, AD8, IQCODE, CogDrisk, and the LIBRA Index address different aspects of cognitive risk, from subjective complaints to modifiable risk factors, providing a diverse range of options to serve different populations and clinical settings. The integration of tools based on modifiable factors, such as lifestyle habits and comorbidities, stands out for its contribution to preventive strategies, aligning with public health goals to delay or prevent the onset of dementia.

Instruments such as STAD and QDRS offer specific solutions for challenging contexts. STAD enables low-cost, large-scale screening in hard-to-reach populations, while QDRS, with its applicability in clinical and community settings, provides a comprehensive, practical view of patient cognition through informants. These tools complement self-perception-based assessments and improve diagnostic accuracy by incorporating multiple perspectives on cognitive and behavioral cues.

The diversity of the questionnaires reflects the need for personalized approaches in screening and prevention of dementia. However, to ensure universal applicability and reduce biases, it is crucial to continuously validate these instruments across different cultures and populations. Integrating these tools into health systems can contribute significantly to early and effective interventions, helping to mitigate the impact of the increased prevalence of dementia in an aging global society.

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