








Diabetes mellitus questionnaires validated in Brazilian Portuguese

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ABSTRACT

Study design: Scoping review following the recommendations of the Joanna Briggs Institute and PRISMA-ScR. **Objective:** To analyze and synthesize scientific evidence on questionnaires related to diabetes mellitus validated in Brazilian Portuguese. **Method:** Studies with available abstracts and that described a questionnaire related to diabetes mellitus published in English, Spanish or Portuguese, in journals indexed in PubMed, Scopus, VHL and Web of Science and in the catalog of dissertations/theses of the Portal of the Coordination for the Improvement of Higher Education Personnel, between 2011 and 2022 were included. The descriptors used were: diabetes mellitus; diabetes; surveys and questionnaires; reproducibility of results; psychometrics; validation studies; validation studies as topic; Brazil; and Brazilian. The study protocol was registered on the Open Science Framework platform (<https://osf.io/asbjz/>). **Results:** This review included 39 publications in which selected questionnaires addressed the themes: self-care/self-management/self-efficacy; quality of life; skin, ulcer and wound care; food plan; medication adherence; emotional/psychological stress; knowledge about diabetes; risk for developing diabetes; satisfaction with the quality of diabetes care; diabetes management in schools; and attitudes of healthcare professionals towards diabetes. **Conclusion:** The use of validated questionnaires can contribute to the measurement of barriers and difficulties encountered by people with diabetes mellitus and direct the construction of more assertive intervention strategies.

Keywords: Diabetes Mellitus, Surveys and questionnaires, Validation studies, Review, Nursing.

INTRODUCTION

Diabetes Mellitus (DM) is considered a relevant public health problem and, consequently, a challenge for the health system. Ongoing education and support for self-management is critical for preventing acute complications and reducing the risk of long-term complications (1,2). Healthcare providers and services should provide individualized care using continuum of care approaches, as well as communication and agreed goal setting between the healthcare provider and the patient. These strategies must be easy to apply, guaranteeing satisfactory results and low costs, so that the quality of life of people with DM is preserved (1,2).

The person's perception of DM can influence their choices and coping strategies. Adherence to health behaviors involving DM depends on their

understanding of the health condition, treatment and benefits of lifestyle modification (1,2). Accordingly, in order to identify, measure, understand and intervene in the different factors related to DM (3), it is essential that health teams are familiar with the questionnaires validated for the Brazilian Portuguese language.

The use of adapted and validated measurement questionnaires has the aim of exploring and identifying the causes, diagnoses and prognoses of a given disease, in addition to the psychosocial, emotional, physiological and nutritional aspects involved in this context. In this way, it is possible to establish a common language and a rapprochement between healthcare providers and patients, family members and caregivers. Validated questionnaires can make it possible to measure the perception of the person with DM regarding their own clinical condition, as well as the monitoring, evaluation and

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global and continuous (re)planning of care by the multidisciplinary team (4,5).

A previous integrative review (4) analyzed questionnaires related to DM that had been adapted and validated for the Brazilian culture between 2000 and 2010. In 2020, a systematic review (5) also carried out a survey of questionnaires without a stipulated time period. Both studies were precursors to compile the available questionnaires, however, empirically, it was observed that there were still questionnaires not included in both previous publications. This can probably be related to the type of review, the databases chosen and the descriptors used. Therefore, it became necessary to identify and compile the DM questionnaires applicable to the Brazilian culture through a scoping review to assess the increase in scientific production relevant to the topic in question. Accordingly, the aim of this study was to analyze and synthesize the scientific evidence on questionnaires related to diabetes mellitus validated for Brazilian Portuguese.

METHOD

This scoping review was conducted in accordance with the recommendations of the international Preferred Reporting Items for Systematic and Meta-Analyses - Extension for Scoping Reviews (PRISMA-ScR) (6) and the methodological framework proposed by the Joanna Briggs Institute (JBI) (7). This type of study investigates key concepts underlying an area of research, provides a map of available evidence, and identifies gaps in the knowledge base when other, more specific questions about the topic are unclear. The study protocol was registered on the Open Science Framework platform (<https://osf.io/asbjz/>).

To conduct this study, five stages were followed: 1) identification of the research question and the objectives of the review; 2) identification of relevant studies through descriptors in available electronic databases; 3) selection of studies according to predefined inclusion and exclusion criteria; 4) data extraction and analysis; and 5) grouping by their similarities, synthesis and presentation of data (7).

The PCC strategy was used to construct the guiding research question of the scoping review,

in which P (population) = people with T2DM, C (concept) = questionnaires and questionnaires adapted and validated for Brazilian Portuguese and C (context) = approach in the clinical practice. The research question was: What questionnaires adapted and validated for Brazilian Portuguese are available to be used in the clinical practice with people with diabetes mellitus?

The inclusion criteria for the selection were: methodological studies related to DM, validated for Brazilian Portuguese, published in English, Spanish or Portuguese and published between 2011 and 2022. The delimitation of this period is justified because there is already an integrative review in the literature that initiated this investigation and included studies up to 2010 (4). Duplicate studies, those that did not respond to the research question, review studies, books, letters to the editor, abstracts published in annals and studies that only went through the process of translation or adaptation were excluded.

The bibliographic survey was carried out in May and June 2020 and updated in June 2022 in the following databases: Medical Literature Analysis and Retrieval System Online (via PubMed), Scopus, Virtual Health Library (VHL) - including Latin American and Caribbean Health Sciences Literature (LILACS), *Base de Dados de Enfermagem* (BDENF) *Índice Bibliográfico Espanol en Ciencias de la Salud* (IBECS) and Web of Science. The catalog of dissertations and theses on the Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES) was also included as gray literature. Initially, a search was carried out in the PubMed and Scopus databases, in order to identify the most frequently used descriptors in studies that addressed the topic of interest. Then, the publications were analyzed to identify the keywords referring to each item of the PCC strategy.

Finally, a search was carried out in the reference lists of the sources used. The search strategy carried out in the different databases is described in Figure 1. For all databases mentioned, the search standardization occurred through the use of the CAPES Publications Portal, through the *Comunidade Acadêmica Federada* (CAFe) with access from the institution where the study was conducted.

In order to properly store and organize the studies obtained in the search, the Endnote Web

online software was used. The relevance of the included studies was verified by two independent reviewers, who had access to the same search results. Disagreements regarding inclusion were resolved through peer discussion or the assessment of a third reviewer. The methodological quality of the primary studies was not assessed, as this aspect is not considered in scoping reviews.

To map the information, data were extracted using a form adapted from the JBI recommendations. The following items of the included studies were considered: authors, year of publication, title of the study, journal or institution where the study was carried out, title of the validated questionnaire,

objectives, methodological details and summary of the proposed uses. In the data summarization and synthesis stage, the studies were divided into thematic categories that emerged from the deeper analysis of these investigations, being systematically organized, allowing the visualization of the relevance and applicability of each questionnaire in the clinical practice of the person with DM.

RESULTS

The initial database search identified 4154 potentially eligible studies (MEDLINE/PubMed =

Database	Strategy	Limiters
PubMed	((("diabetes mellitus"[MeSH Terms] OR ("diabetes"[All Fields] AND "mellitus"[All Fields]) OR "diabetes mellitus"[All Fields]) AND ("surveys and questionnaires"[MeSH Terms] OR ("surveys"[All Fields] AND "questionnaires"[All Fields]) OR "surveys and questionnaires"[All Fields])) OR ("reproducibility of results"[MeSH Terms] OR ("reproducibility"[All Fields] AND "results"[All Fields]) OR "reproducibility of results"[All Fields]) OR ("psychometrical"[All Fields] OR "psychometrically"[All Fields] OR "psychometrics"[MeSH Terms] OR "psychometrics"[All Fields] OR "psychometric"[All Fields]) OR ("validation study"[Publication Type] OR "validation studies as topic"[MeSH Terms] OR "validation studies"[All Fields]) OR ("validation studies as topic"[MeSH Terms] OR ("validation"[All Fields] AND "studies"[All Fields] AND "topic"[All Fields]) OR "validation studies as topic"[All Fields])) AND ("brazil"[MeSH Terms] OR "brazil"[All Fields] OR "brazil s"[All Fields] OR "brazils"[All Fields]))	((validation study [Filter]) AND (2011:2022/6/31[pdat]) AND (english[Filter] OR portuguese[Filter] OR spanish[Filter]))
Scopus	(TITLE-ABS-KEY ("Diabetes Mellitus") AND TITLE-ABS-KEY ("Surveys and Questionnaires") OR TITLE-ABS-KEY ("Reproducibility of Results") OR TITLE-ABS-KEY (psychometrics) OR TITLE-ABS-KEY ("Validation Studies") OR TITLE-ABS-KEY ("Validation Studies as Topic") AND TITLE-ABS-KEY (brazil))	(LIMIT-TO (AFFILCOUNTRY , "Brazil")) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013)) AND (LIMIT-TO (LANGUAGE , "English") OR LIMIT-TO (LANGUAGE , "Portuguese") OR LIMIT-TO (LANGUAGE , "Spanish"))
Web of Science	TÓPICO: ("diabetes mellitus") AND TÓPICO: ("surveys and questionnaires") OR TÓPICO: ("reproducibility of results") OR TÓPICO: (psychometrics) OR TÓPICO: ("validation studies") OR TÓPICO: ("validation studies as topic") AND TÓPICO: (Brazil) OR TÓPICO: (Brazilian)	Anos da publicação: (2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013 OR 2012 OR 2011) AND Idiomas: (ENGLISH OR PORTUGUESE OR SPANISH) AND PAÍSES/REGIÕES: (BRAZIL).
VHL	tw: ("diabetes mellitus") AND (tw:("Validation Studies")) OR (tw:(psychometrics)) OR (tw:("Reproducibility of Results")) OR (tw:("Surveys and Questionnaires")) AND (tw:(brazil*))	(year_cluster:[2011 TO 2022])

Figure 1: Database search strategy with Boolean operators. Divinópolis, MG, Brazil, 2022.

2095; Scopus = 189; WoS = 1618; VHL = 246; CAPES Portal = 6). Of these, 238 duplicates were excluded, providing 3916 studies for the title and abstract reading stage, with 51 of these records being eligible. Of these, 17 studies were excluded

for not responding to the review question and five further studies were included based on the references identified. Accordingly, the final sample comprised 39 studies, which were read in full and analyzed by two researchers and authors of the study.

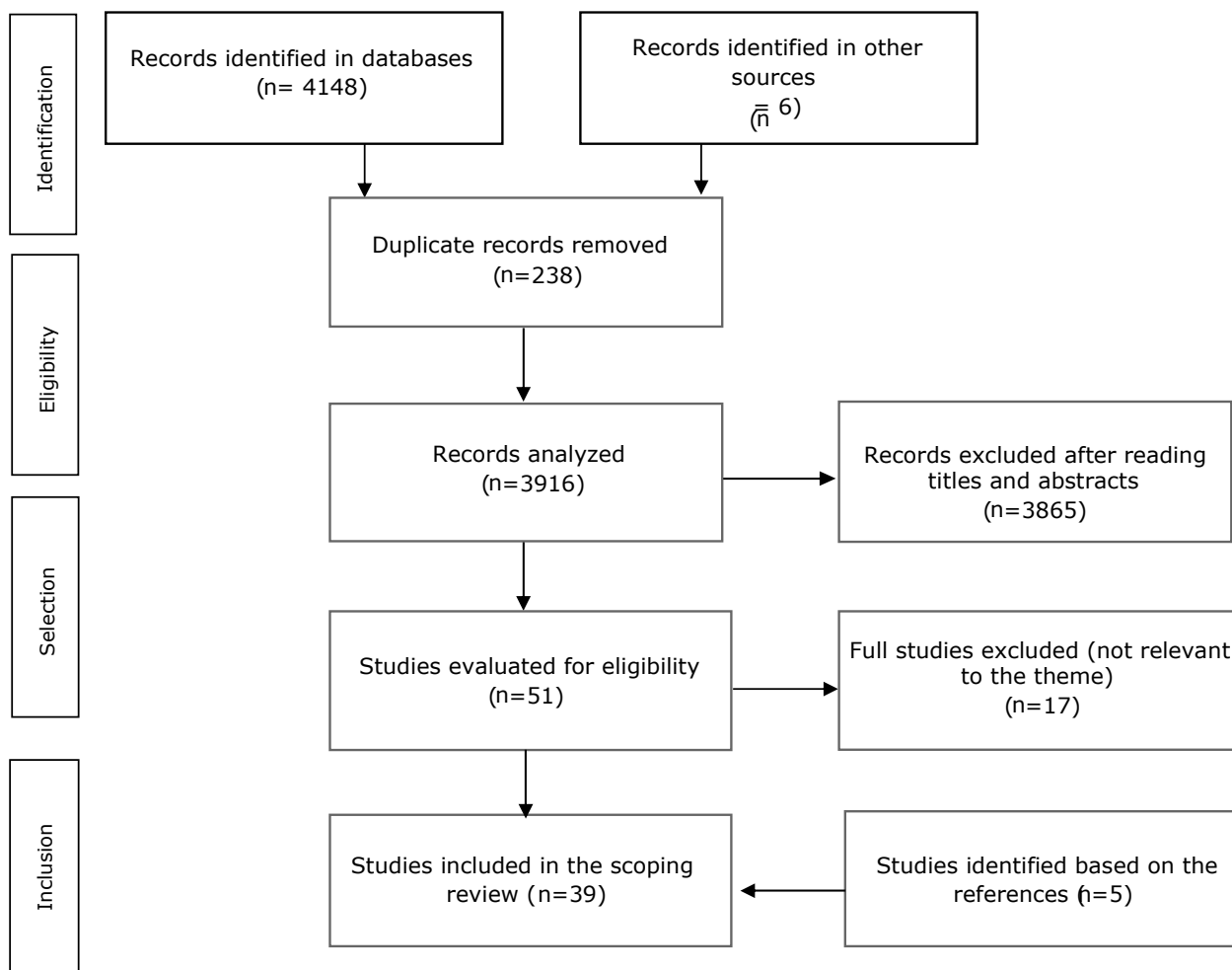


Figure 2: Flow diagram of the selection process of articles for the scoping review, PRISMA-ScR. Divinópolis, MG, Brazil, 2022.

Table 1 presents the studies included in this review according to authorship, year of publication, title, journals responsible for publishing the articles or institution for the defense of the thesis or dissertation, and name of the questionnaire, in chronological order of publication.

The studies were organized into the following conceptual categories: Self-care/self-management/

self-efficacy; Quality of life; Skin, ulcer and wound care; Food plan; Medication adherence; Emotional stress/psychological aspects; DM knowledge; Risk for developing DM; Satisfaction and evaluation of the quality of DM care; Attitudes of healthcare providers towards DM; DM in children and adolescents. Table 2 presents the main recommendations for using each questionnaire.

Table 1

Characteristics of the studies that were part of the scoping review sample, according to authorship, article title, objective, journal/institution of the study and questionnaire (2011-2022). Divinópolis, MG, Brazil, 2022.

	Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
1	Xavier <i>et al.</i> , 2011 (8)	Adaptação cultural e validação do Neuropathy - and Foot Ulcer - Specific Quality of Life (NeuroQol) para a língua portuguesa do Brasil - Fase 1	To adapt the Neuropathy - and Foot Ulcer - Specific Quality of Life - NeuroQol to Brazilian Portuguese, and analyze its psychometric properties.	<i>Revista Latino-Americana de Enfermagem</i>	Neuropathy - and Foot Ulcer - Specific Quality of Life - neuroqol
2	Balaminut <i>et al.</i> , 2012 (9)	Adaptação cultural e confiabilidade para o Brasil do Automated Telephone Disease Management: resultados preliminares	To translate, culturally adapt the ATDM Satisfaction Scales to Brazil and evaluate the reliability of the adapted version in Brazilian adults with DM.	<i>Acta Paulista de Enfermagem</i>	Automated Telephone Disease Management (ATDM) Satisfaction Scales
3	Silva <i>et al.</i> , 2013 (10)	Instrumento para avaliação da integridade tissular dos pés de portadores de diabetes mellitus	To construct and validate a foot assessment scale for people with diabetes mellitus, based on the NOC indicators for the result "Tissue Integrity: skin and mucous membranes".	<i>Acta Paulista de Enfermagem</i>	<i>Questionário de avaliação da integridade tissular dos pés de portadores de diabetes mellitus</i>
4	Sarmiento <i>et al.</i> , 2014 (11)	Reproducibility and validity of a quantitative FFQ designed for patients with type 2 diabetes mellitus from southern Brazil	To evaluate the reproducibility and validity of a previously constructed FFQ to assess the usual diet of patients with type 2 diabetes mellitus (T2DM).	Public Health Nutrition	Food Frequency Questionnaires (FFQ) quantitative
5	Villas Boas; Lima; Pace, 2014 (12)	Adesão ao tratamento do diabetes mellitus: validação de instrumentos para antidiabéticos orais e insulina	To verify the face and criterion validity and the reliability of two different ways of presenting the Measure of Adherence to Treatments instrument, one to assess adherence to the use of oral antidiabetics (Measure of Adherence to Treatments - oral antidiabetics) and the other for the adherence to the use of insulin (Measure of Adherence to Treatments - insulin).	<i>Revista Latino-Americana de Enfermagem</i>	<i>Instrumento/Questionário Medida de Adesão aos Tratamentos (MAT)</i>
6	Stacciarini; Pace, 2014 (13)	Tradução, adaptação e validação de uma escala para o autocuidado de portadores de diabetes mellitus tipo 2 em uso de insulina	To translate, adapt and validate the Appraisal of Self Care Agency Scale-Revised (ASAS-R) for Brazil.	<i>Acta Paulista de Enfermagem</i>	Appraisal of Self Care Agency Scale-Revised (ASAS-R)
7	Stacciarini; Pace, 2017 (14)	Análise fatorial confirmatória da escala Appraisal of Self Care Agency Scale - Revised	To analyze the factorial structure of the self-care capacity assessment scale, Appraisal of Self Care Agency Scale-Revised (ASAS-R), adapted for Brazil.	<i>Revista Latino-Americana de Enfermagem</i>	

(Continuação)

Table 1

Continuation.

	Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
8	Brasil; Pontarolo; Correr, 2014 (15)	Qualidade de vida em adultos com diabetes tipo 1 e validade do DQOL-Brasil	To establish criterion and construct validity, and also to qualitatively evaluate the Brazilian version of the Diabetes Quality of Life Measurement Questionnaire (DQOL-Brazil), when used in adult patients with type 1 diabetes mellitus (DM).	<i>Revista Ciências Farmacêuticas Básica e Aplicada</i>	<i>Questionário de Medida da Qualidade de Vida em Diabetes (DQOL-Brasil)</i>
9	Jannuzzi <i>et al.</i> , 2014 (16)	Crenças relacionadas à adesão ao tratamento com antidiabéticos orais segundo a Teoria do Comportamento Planejado	To identify and analyze prominent beliefs - behavioral, normative, control and self-efficacy - related to the behavior of adherence to oral antidiabetics, for the application of TPB	<i>Rev. Latino-Am. Enfermagem</i>	<i>Levantamento de crenças de aderir ao uso de antidiabéticos orais</i>
10	Telo; Schaan, 2014 (17)	Cross-cultural adaptation and validation to Brazilian Portuguese of two measuring adherence instruments for patients with type 1 diabetes	To carry out a cross-cultural adaptation to Brazilian Portuguese, validation and comparison of two questionnaires to measure adherence in patients with type 1 diabetes.	Diabetology & Metabolic Syndrome	Diabetes Self-Management Profile (DSMP)
11	Brasil <i>et al.</i> , 2015 (18)	Desenvolvimento da versão brasileira resumida do Diabetes Quality of Life Measure (DQOL-Brasil-8)	To make a reduced questionnaire available in Brazil, through the selection of items from the Brazilian version of the Diabetes Quality of Life Measure (DQOL-Brasil).	<i>Revista Brasileira de Epidemiologia</i>	Diabetes Quality of Life Measure (DQOL-Brasil)
12	Coutinho; Consoli (2015) (19)	Cross-cultural adaptation and validation of the original "Diabetes Basic Knowledge Test" (DBKT) into Brazilian-Portuguese version.	To provide a reliable, validated and culturally adapted questionnaire that can be used to assess knowledge about diabetes in Brazilian healthcare providers	Diabetology & Metabolic Syndrome	Diabetes basic knowledge test (DBKT)
13	Fernandes <i>et al.</i> , 2016 (20)	Construção, validação e adequação cultural do protocolo COMPASSO: Adesão ao autocuidado em diabetes	To carry out the construction, content validation and cultural adequacy of the <i>Compasso</i> protocol to promote adherence to self-care practices in diabetes via telephone intervention.	<i>Acta Paulista de Enfermagem</i>	<i>Protocolo compasso</i>
14	Souza <i>et al.</i> , 2016 (21)	Applicability of the Spoken Knowledge in Low Literacy Patients with Diabetes in Brazilian elderly	To translate, adapt and evaluate the properties of a Brazilian Portuguese version of the Spoken Knowledge in Low Literacy Patients with Diabetes, a questionnaire that assesses knowledge of diabetes.	<i>Einstein (São Paulo)</i>	Spoken Knowledge in Low Literacy Patients with Diabetes - SKILLD

(Continuação)

Table 1

Continuation.

Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
15 Torres <i>et al.</i> , 2016 (22)	Tradução, adaptação e validação de conteúdo do Diabetes Medical Management Plan para o contexto brasileiro	To translate, adapt and validate the content of the Diabetes Medical Management Plan for the Brazilian context, a protocol developed by the American Diabetes Association, which guides the conduct of educators for the care of children and adolescents with diabetes mellitus in schools.	<i>Revista Latino-Americana de Enfermagem</i>	Diabetes Medical Management Plan
16 Apolinario <i>et al.</i> , 2016 (23)	Psychometric Performance of the Brazilian Version of the Diabetes Distress Scale in Patients with Diabetes Mellitus Type 2	To evaluate the measurement properties of the Brazilian version of the Diabetes Distress Scale (B-DDS).	Journal of Nursing Measurement	Brazilian version of the Diabetes Distress Scale (B-DDS)
17 Vieira <i>et al.</i> , 2017 (24)	Tradução, adaptação cultural e validação do Diabetes Attitudes Scale - third version para a língua portuguesa do Brasil	To perform the translation into Brazilian Portuguese, adaptation and validation of the Diabetes Attitudes Scale instrument - third version.	<i>Revista Latino-Americana de Enfermagem</i>	Diabetes Attitudes Scale - third version (DAS-3)
18 Pace <i>et al.</i> , 2017 (25)	Adaptação e validação da Diabetes Management Self-Efficacy Scale para a língua portuguesa do Brasil	To perform the cultural adaptation and validation of the Diabetes Management Self-efficacy Scale for Patients with type 2 diabetes mellitus for a Brazilian population sample.	<i>Revista Latino-Americana de Enfermagem</i>	Diabetes Management Self-efficacy Scale for Patients with Type 2 Diabetes Mellitus (DMSES)
19 Mendonça <i>et al.</i> , 2017 (26)	Construção e validação do Instrumento Avaliação do Autocuidado para pacientes com diabetes mellitus tipo 2	To construct and validate the content of the Self-Care Assessment instrument for patients with type 2 diabetes mellitus.	<i>Revista Latino-Americana de Enfermagem</i>	<i>Avaliação do Autocuidado para pacientes com diabetes mellitus tipo 2 - INAAP-T2DM</i>
20 Chaves <i>et al.</i> , 2017 (27)	Tradução, adaptação cultural e validação do Diabetes Empowerment Scale - Short Form	To translate, culturally adapt and validate the Diabetes Empowerment Scale - Short Form for application in the Brazilian cultural context.	<i>Revista de Saúde Pública</i>	Diabetes empowerment scale - short form
21 Passone <i>et al.</i> , 2017 (28)	Translation and validation of diabetes self-management profile (DSMP) into Brazilian Portuguese language: first instrument to assess type 1 diabetes self-management in a pediatric population	To translate into Brazilian Portuguese and validate the instrument Diabetes Self-Management Profile (DSMP) - Conventional and flexible regimes, in order to assess the quality of diabetes self-management in children and adolescents with type 1 diabetes and their caregivers.	Diabetology & Metabolic Syndrome	Diabetes self-management profile (DSMP)

(Continuação)

Table 1

Continuation.

Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
22 Garcia <i>et al.</i> , 2018(29)	Tradução e validação do Pediatric Quality of Life Inventory™ 3.0 Diabetes Module (PedsQL™ 3.0 Diabetes Module) para a língua portuguesa do Brasil	To produce a Brazilian Portuguese version of the Pediatric Quality of Life Inventory™ 3.0 Diabetes Module (PedsQL™ 3.0 Diabetes Module) questionnaire, conceptually equivalent to the original English version, and carry out its linguistic validation with a Brazilian pediatric population with type 1 diabetes mellitus and their parents or caregivers.	<i>Jornal de Pediatria</i>	Pediatric Quality of Life inventory™3.0 Diabetes Module (PedsQL™ 3.0 Diabetes Module)
23 Castro <i>et al.</i> , 2018 (30)	Validação do Patient Assessment of Chronic Illness Care (PACIC) em diabéticos brasileiros	To validate the Patient Assessment of Chronic Illness Care (PACIC) instrument in diabetic patients of Brazil.	<i>Tempus – Actas de Saúde Coletiva</i>	Patient Assessment of Chronic Illness Care (PACIC)
24 Pedrosa <i>et al.</i> , 2018 (31)	Psychometric performance of the Brazilian version the “Insulin Management Diabetes Self-Efficacy Scale” for patient with Type 2 Diabetes Mellitus	To evaluate the psychometric performance of the Brazilian version of the “Insulin management self-efficacy scale” – IMDSES.	<i>Medicina (Ribeirão Preto)</i>	Insulin Management Diabetes Self-efficacy Scale (IMDSES)
25 Maciel, 2019 (32)	Autocuidado em diabetes: adaptação cultural e avaliação das propriedades da medida do “Diabetes Self-Management Questionnaire” - revisado (DSMQ-R) no contexto brasileiro	To culturally adapt and assess the measurement properties of the DSMQ-R Revised Version.	<i>Dissertation - Universidade Estadual de Campinas</i>	“Diabetes Self-Management Questionnaire” - revised (DSMQ-R)
26 Chaves <i>et al.</i> , 2019 (33)	Tradução e adaptação cultural do Behavior Change Protocol para as práticas educativas em Diabetes Mellitus	To perform the translation and cultural adaptation of the Behavior Change Protocol for educational practices in Diabetes Mellitus.	<i>Revista Latino-Americana de Enfermagem</i>	Behavior change protocol
27 Cardoso <i>et al.</i> , 2019 (34)	Validade e confiabilidade da Escala de Avaliação da Alfabetização em Saúde quanto à adesão medicamentosa entre diabéticos	To prepare an instrument to assess health literacy with regard to adherence to drug treatment among diabetics, identify the validity of its content and estimate its reliability.	<i>Einstein (São Paulo)</i>	<i>Alfabetização em Saúde Relacionada à Adesão Medicamentosa entre Diabéticos (ASAM-D)</i>
28 Kaizer <i>et al.</i> , 2020 (35)	Measurement properties and factor analysis of the Diabetic Foot Ulcer Scale-short form (DFS-SF)	To provide assessment of measurement properties and factor analysis of the Brazilian version of the Diabetic Foot Ulcer Scale -short form (DFS-SF).	International Wound Journal	Diabetic Foot Ulcer Scale-short form (DFS-SF)
29 Machado <i>et al.</i> , 2020 (36)	Psychometric validation of the Brazilian Portuguese version of Bandura’s exercise self-efficacy scale in diabetes patients	To investigate the psychometric properties of the Brazilian version of Bandura’s Exercise Self-Efficacy Scale (BESES) to be used in patients with diabetes.	Journal of Diabetes and Metabolic Disorders	Bandura’s exercise self-efficacy scale (BESES)

(Continuação)

Table 1

Continuation.

Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
30 Coelho <i>et al.</i> , 2020 (37)	Brazilian version of "The Insulin Delivery System Rating Questionnaire": translation, cross-cultural adaptation and validation	To translate and cross-culturally adapt the Insulin Delivery System Classification Questionnaire (IDSRQ) for Brazilian users. Measurement validation and reliability analyses were also carried out.	Archives of Endocrinology and Metabolism	Insulin Delivery System Rating Questionnaire (IDSRQ)
31 Conceição <i>et al.</i> , 2020 (38)	Translation, cross-cultural adaptation and validation of the Finnish Diabetes Risk Score (FINDRISC) for use in Brazilian Portuguese: questionnaire validity study	To translate, cross-culturally adapt and validate the FINDRISC for use in Brazil.	São Paulo Medical Journal	Finnish Diabetes Risk Score (FINDRISC)
32 Teló <i>et al.</i> , 2020 (39)	Validation to Brazilian Portuguese of the Self-Care Inventory-revised for adults with type 2 diabetes	To cross-culturally adapt and validate the Brazilian-Portuguese version of the SCI-r for adults with type 2 diabetes	Archives of Endocrinology and Metabolism	Self-care inventory – revised (SCI-r)
33 Costa <i>et al.</i> , 2020 (40)	Construction and Validation of an Instrument for Assessing the Feet of Persons with Diabetes	To construct and validate an assessment instrument to evaluate the feet of people with diabetes mellitus in Brazil.	Advances In Skin & Wound Care	<i>Avaliação para os pés de pessoas com Diabetes Mellitus</i>
34 Jannuzzi <i>et al.</i> , 2020 (41)	Psychosocial determinants of adherence to oral antidiabetic medication among people with type 2 diabetes	To identify the psychosocial determinants of adherence to oral antidiabetic medication, according to the Theory of Planned Behavior (TPB)	Journal of Clinical Nursing	<i>Questionário para avaliação dos fatores relacionados à adesão aos antidiabéticos orais de acordo a TPB</i>
35 Felix <i>et al.</i> , 2021 (42)	Translation, cross-cultural adaptation, and psychometric properties of the Brazilian Portuguese version of the Diabetes Education Questionnaire (DATE-Q)	To translate the DATE-Q and cross-culturally adapt it to Brazilian Portuguese, and test the psychometric properties for its use in Brazil.	Brazilian Journal of Physical Therapy	Diabetes (DATE-Q)
36 Teixeira <i>et al.</i> , 2021 (43)	Brazilian Portuguese version of the Mediterranean diet scale: Translation procedures and measurement properties.	To translate and perform a cross-cultural adaptation of the Canadian Mediterranean Diet Scale and to analyze the measurement properties of the Brazilian-Portuguese version of the MDS (MDS-Brasil) in individuals with DM in Brazil.	Diabetes & Metabolic Syndrome	Mediterranean Diet Scale (MDS)
37 Lourenço <i>et al.</i> , 2021 (44)	Translation, cross-cultural adaptation, and validation of the Canadian Diabetes Risk Questionnaire for the Brazilian population.	To translate, cross-culturally adapt and validate the Canadian Diabetes Risk Questionnaire for use in Brazil.	<i>Revista da Associação Médica Brasileira</i>	Canadian Diabetes Risk Questionnaire (CANRISK)

(Continuação)

Table 1

Continuation.

Authors/Year	Title	Objective	Journal or institution of the study	Questionnaire
38 Oliveira <i>et al.</i> , 2022 (45)	Content Validity of a Questionnaire Based on the Theory of Planned Behavior to Assess the Psychosocial Determinants of Insulin Adherence	To verify the content validity of the questions of an insulin adherence questionnaire based on the Theory of Planned Behavior in outpatients with type 2 diabetes mellitus.	Value in Health Regional Issues	<i>Questionário dos determinantes psicossociais da Adesão à Insulina com base na Teoria do Comportamento Planejado</i>
39 Sousa <i>et al.</i> , 2022 (46)	Validação do instrumento reduzido Diabetes-21 para avaliação da qualidade de vida relacionada à saúde em pessoas com diabetes	To analyze the validity, reliability and interpretability of a reduced instrument for assessing health-related quality of life among people with diabetes mellitus.	<i>Epidemiologia e Serviços de Saúde</i>	<i>Instrumento reduzido Diabetes-21</i>

Table 2

Main recommendations for the use of questionnaires aimed at people with Diabetes Mellitus (2011-2022). Divinópolis, MG, Brazil, 2022.

Self-care/self-management/self-efficacy
<ul style="list-style-type: none"> • Evaluate the ability of people with T2DM, especially people who apply insulin, to engage in self-care actions in accordance with health care guidelines (13,14) • Evaluate the self-management of people with T1DM and T2DM regarding exercise, hypoglycemia, diet, blood glucose test and insulin dose (17,39) • Promote adherence to DM self-care practices (training and motivation to effectively participate in the therapeutic regimen in general) via telephone intervention (20) • Evaluate self-efficacy to perform self-care behaviors with T2DM focusing on essential activities for the treatment of the disease (such as adherence to treatment); self-observation activities (such as monitoring/observing blood or urine glucose levels, body weight, foot skin and general health conditions); and self-regulation activities (such as correction of hypoglycemia and hyperglycemia, preparation for vacation, changes in diet, and self-regulation in situations of weight gain, acute illness and stress) (25) • Measure self-care with a focus on the multidimensionality of T2DM (mutual responsabilization of patients and providers; knowledge about T2DM, discomfort during treatment, drug treatment, coping with the disease) (26) • Measure self-efficacy/psychosocial empowerment in caring for DM (need for behavior change, developing a care plan, overcoming barriers, requesting support, taking care of oneself, managing emotions, personal motivations, and making appropriate decisions about DM care) (27) • Evaluate DM self-care related to glycemic levels (32) • Assist healthcare providers to develop DM educational practices with a behavioral changes approach (33) • Assess self-efficacy for insulin management in people with T2DM (general management, insulin use and diet) (31) • Evaluate self-efficacy for performing physical exercise in people with T1DM and T2DM (36)
Quality of life
<ul style="list-style-type: none"> • Assess the health-related quality of life of people with DM with peripheral diabetic neuropathy and foot ulcers, emphasizing pain, loss/reduction of sensitivity, diffuse sensory-motor symptoms, limitation of activities of daily living, disturbance in social relationships and emotional distress (8) • Assess the health-related quality of life of adults with T1DM (15) • Assess the health-related quality of life for adults with T2DM (18) • Evaluate the quality of life of people with DM with diabetic foot ulcer, highlighting the bother with taking care of the ulcer, daily life, leisure, negative emotions, physical health and concern for the ulcer and the feet (35) • Assess the quality of life of adults and older adults with DM, covering energy and mobility, DM control and social burden, sexual function, anxiety and worry (46)

(Continuation)

Table 2

Continuation.

Skin, ulcer and wound care
<ul style="list-style-type: none"> Evaluate the feet of people with DM based on the NOC indicators for the result "Tissue Integrity: skin and mucous membranes" (1101) and other indicators in the literature (10) Assess and screen for signs and symptoms of diabetic foot syndrome in people with T2DM (pulse, ankle-arm index, amputation, reflexes, interdigital space, pain, skin/turgor, assessment of sensory neuropathy, deformities, and characterization of the feet and nails) (40)
Dietary plan
<ul style="list-style-type: none"> Evaluate the food frequency of people with T2DM according to WFR: portfolio of most consumed foods with respective portion sizes (11) Evaluate adherence to the consumption of standard Mediterranean diet elements in people with T1DM and T2DM (43)
Medication adherence
<ul style="list-style-type: none"> Measure adherence to oral antidiabetics and insulin in people with T2DM (12) Identify behavioral, normative, control and self-efficacy beliefs related to adherence to OADs; measurement of adherence behavior to OADs according to TPB assumptions (16) Evaluate association skills and understanding of words related to DM and its treatment, with emphasis on medication adherence (34) Identify psychosocial determinants of adherence to OADs according to TPB assumptions (41) Evaluate the determinants of adherence to insulin use according to TPB assumptions (45)
Emotional stress/psychological aspects
<ul style="list-style-type: none"> Evaluate the emotional stress of people with T2DM (23) Evaluate general (general quality of life) and DM-specific measures (perception of clinical efficacy, treatment satisfaction and emotional burden, and concerns related to diabetes and social burdens) in relation to insulin administration (37)
Knowledge about DM
<ul style="list-style-type: none"> Evaluate the knowledge of Brazilian healthcare providers regarding DM (19) Evaluate the knowledge of older adults with a low level of education regarding T2DM; especially self-care (21) Evaluate the knowledge of adults regarding DM (self-management, long-term complications, being active, healthy eating and psychosocial well-being) (42)
Risk for developing DM
<ul style="list-style-type: none"> Screen for the risk of DM and encourage the adoption of measures to prevent the onset of T2DM, especially for people at increased risk for the disease (38)
Satisfaction and evaluation of the quality of DM care
<ul style="list-style-type: none"> Measure the satisfaction of people with DM after undergoing intervention or educational programs over the telephone (9) Evaluate the quality of care for chronic patients from the patient's perspective (30)
Attitudes of healthcare providers towards DM
<ul style="list-style-type: none"> Evaluate the attitudes of healthcare providers towards DM (24)
DM in children and adolescents
<ul style="list-style-type: none"> Guide educators' conduct for the care of children and adolescents with T1DM in schools, with emphasis on glycemic monitoring, treatment of hypoglycemia and hyperglycemia, use of insulin, food plan and physical activities and sports (22) Evaluate T1DM self-management in children and adolescents focusing on the frequency of physical exercise and insulin adjustment; management of hypoglycemia and use of diabetes identification accessories; quantity and quality of food and insulin adjustment; frequency of blood glucose monitoring and use of ketonuria/ketonemia strips; regularity and adjustment of insulin doses (28) Assess the quality of life of children and adolescents with T1DM (child and adolescent self-report and perspectives of parents/caregivers) symptoms of diabetes; barriers to treatment, adherence to treatment, concern, communication, physical health, and emotional, social and school functioning (29)

Note: OADs: oral antidiabetics; DM: Diabetes Mellitus; T1DM: type 1 Diabetes Mellitus; T2DM: type 2 Diabetes Mellitus; TPB: Theory of Planned Behavior; WFR: Weighed Food Record.

DISCUSSION

Questionnaires are measuring instruments that are part of the clinical practice and health research, helping in decisions regarding the care, treatments and interventions adopted, as well as being extremely useful in the elaboration of health programs and institutional policies (47,48). The aspects evaluated by the questionnaires are numerous; therefore, identifying the various measurement instruments related to DM facilitates the selection process and specifically directs healthcare providers. In this scoping review, 39 publications directed toward DM were gathered together and strategically organized into thematic categories.

Among the recommendations for people with DM, the importance of directing and helping patients with their self-care stands out (1,2), reinforcing individual practices to maintain life, health and well-being for their own benefit (49). In this context, the theme Self-care, Self-management and Self-efficacy produced 12 available publications (13,14,17,20,25–27,31–33,36,39), which address the different aspects related to the theme and demonstrate the relevance and importance of proper DM management by the patient. The use of self-care measurement instruments is a practical tool that can help healthcare providers to assess a subjective construct that cannot be measured directly; therefore, it helps and allows measurements of how much the person performs these behaviors according to the recommendations of the diabetes guidelines (1,2,13,37).

Also highlighted is the concept of self-efficacy, which can be defined as an individual's belief regarding their ability to perform activities that influence their lives, that is, the ability to take care of themselves. These beliefs determine how people feel, think, motivate themselves and behave (50). In the case of the person with DM, blood glucose monitoring, dietary control, physical activity, foot care, and medication intake are included, as recommended (51). Within this category, only one questionnaire was identified emphasizing the practice of physical activity (36). Its purpose only refers to the ability to assess the confidence to follow a physical exercise routine in people with DM. The literature recommends the

practice of at least 150 minutes per week of aerobic training of moderate to vigorous intensity, in addition to resistance exercises of moderate to vigorous intensity two to three times a week to contribute to the control of the disease (36). Therefore, it is understood that new studies need to be developed to fill this gap.

In addition to promoting self-care and self-efficacy behaviors, it is naturally necessary that care for patients with DM be expanded to monitor medication adherence and a dietary plan in order to control, manage and reduce DM complications (11,12,16,34,41,43,45). Medication adherence is associated with the importance of drug therapy in controlling glycemic levels, however, patients often find it difficult to adhere to this behavior (1,2,52). It is relevant that the choice of instrument to be used be in accordance with the type of drug treatment in use, considering the specific questionnaires for the use of OAD (12,16,34,41), as well as the specific questionnaires for the use of insulin (12,34,45), since taking OAD and insulin involve different behaviors.

Regarding the Food Plan, two questionnaires were included in this review (11,43). There are several methods to assess overall food and nutrient intake, as well as calorie intake, including the 24-hour recall (53), diet records, and biomarkers (53–55), among others. The validated questionnaires included in this review have the ability to specifically measure the diet of people with T2DM and can contribute to the multidimensional assessment of these people and also to assessing the effect of specific educational and nutritional interventions (11,43).

The various difficulties in glycemic control encountered daily by patients can influence other aspects of their lives, such as Quality of Life and Psychological aspects/Emotional stress. In the absence of glycemic control, chronic hyperglycemia is associated with complications such as stroke, cardiovascular disease, kidney failure and chronic wounds (56) that can affect the quality of life of people with DM and, therefore, their treatment management may be compromised (57,58). The DM treatment requirements - such as the patient's adoption of different self-care actions, continuous use of medication, adherence to a diet, blood glucose monitoring and physical

activity - can trigger negative emotions, such as irritability, fear, nervousness and sadness. These emotions can be burdensome in their own right, associated with low well-being and functioning, and resulting in emotional suffering (59). In the psychological care of patients, it is necessary to identify their difficulties in taking an active role in the DM treatment so that they reach the goals of glycemic control and outline health actions that lead to the reduction of stress caused by DM. In the theme Psychological aspects/Emotional stress, two questionnaires were identified for this purpose (23,37).

Foot ulceration is the most common complication of people with DM and is associated with high morbidity and mortality rates (60,61). The lifetime incidence rate of foot ulcers among people with DM ranges from 19% to 34%, with recurrence in 40% during the first year and 65% over 3 years (62). In the theme Skin, ulcer and wound care, two instruments are available; one indicated for the evaluation and screening for signs and symptoms of the diabetic foot syndrome in people with T2DM (40) and the other directed specifically to assess the tissue integrity of the feet of people with DM based on indicators of the Nursing Outcome Classification (NOC) (10).

To achieve the therapeutic goals established at each stage of the disease treatment, it is necessary to accumulate knowledge about DM (63,64) both by the patient themselves and by the team that provides the healthcare. Evaluating the DM knowledge of people with diabetes is essential to understand the knowledge gaps of these patients and possibly outline educational strategies that favor behavior change (65,66); on the other hand, assessing the knowledge of healthcare providers is essential to promote the provision of high-quality care (19,67). In the theme Knowledge about diabetes, this review found three instruments aimed at assessing the DM knowledge of patients (21,42) and healthcare providers (19).

In the theme Satisfaction and evaluation of the quality of diabetes care, two instruments (9,30) emerged as practical tools to assess the satisfaction and quality of care centered and focused on the patient's perspectives, which can be used to track the delivery of self-management support for patients by healthcare organizations and to support general

quality improvement efforts (68). The theme Attitudes of healthcare providers towards diabetes, investigates whether the healthcare providers can make a relevant contribution so that the person living with DM can achieve the goals in relation to glycemic control (24). The behavior that healthcare providers adopt and the way they interact with people who have diabetes can have repercussions on treatment outcomes. Therefore, it is necessary to identify the attitudes of these professionals towards this condition. There is only one instrument available in Brazil for this purpose. By identifying these attitudes, it is possible to establish educational strategies that contribute to a professional practice that considers comprehensive care and the life context of the person with DM (24,69,70).

Considering care based on preventing health problems, in the theme Risk for the development of diabetes, and knowing that Brazil is the 6th country in the world with the highest incidence of DM in the world for adults and older adults (aged 20 to 79) (71), strategies are being sought to easily and economically screen individuals with a high potential for developing T2DM, in order to implement preventive measures against the onset of the disease. In this context, the use of questionnaires has been an ally in the screening for several other diseases, and for this there are two instruments available in Brazil (38,44).

Finally, there are many challenges for children and adolescents living with T1DM and healthcare providers need to understand them, as well as the coping strategies, in order to help children and their families to better conduct the treatment and to adapt to a new way of life. Children experience stressful situations throughout the treatment, which affect social and family life, considering that the therapy to control the disease implies activity limitations, following a specific diet, submitting to painful procedures, bodily changes and repeated hospitalizations (72). This study found only three instruments available for Brazilian Portuguese, namely: one to assess quality of life (29), another self-management (28) and another for managing diabetes in schools (22), which demonstrates a shortage of questionnaires for this specific audience.

Some limitations must be considered since the analysis was restricted to studies from the four

aforementioned databases. It is possible that other relevant studies were not identified and included in this review. The evaluation of the scientific rigor of the studies was not carried out since all the studies were considered to be of the methodological type.

CONCLUSION

This review identified a variety of questionnaires aimed at caring for people with DM, covering aspects such as self-care, adherence to treatment, health education, stress, knowledge and quality of life. The use of questionnaires adapted and validated for the Brazilian context can contribute to measuring the barriers and difficulties encountered by these people and guide them towards intervention strategies. It should be emphasized that this material can be a guide for healthcare providers to identify the questionnaires available in the literature and implement them in their daily practice.

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Author contributions

ATSF, ACM and DDT contributed to data collection and tabulation; ATSF, ACM and DDT: contributed to the conception, design and performed data analysis; DDT, ACM, MMAA, PPA, LBAL, ATSF, AML: contributed to writing and critically reviewing the manuscript. The final version for publication has been approved by all authors.

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