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Development and Psychometric Evaluation of the Holistic Diabetes Self-Efficacy Scale (HDSES) in Indonesia

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Abstrak: Diabetes melitus tipe 2 menuntut kemampuan self-management yang konsisten, sementara keberhasilan pengelolaan penyakit sangat dipengaruhi oleh self-efficacy pasien dalam menjalankan perawatan sehari-hari. Instrumen yang tersedia umumnya berfokus pada aspek perilaku dan pengobatan, sehingga belum sepenuhnya menangkap dimensi holistik yang mencakup adaptasi psikososial dan koping spiritual. Penelitian ini bertujuan untuk mengembangkan dan mengevaluasi sifat psikometrik *Holistic Diabetes Self-Efficacy Scale* (HDSES) pada pasien diabetes melitus tipe 2 di Indonesia. Penelitian ini menggunakan desain metodologis pengembangan instrumen yang meliputi empat tahap, yaitu definisi konstruk, penyusunan kumpulan item, perancangan skala, dan evaluasi psikometrik. Konstruk HDSES terdiri atas enam dimensi, yaitu nutrisi, latihan fisik, kepatuhan pengobatan, pemeriksaan glukosa darah, adaptasi psikososial, dan koping spiritual. Kuesioner awal berisi 30 item, lalu ditelaah oleh tiga ahli keperawatan yang memiliki kepakaran dalam perawatan diabetes. Pengumpulan data dilakukan pada pasien diabetes melitus tipe 2 di wilayah kerja Puskesmas Kota Kendari dengan teknik *simple random sampling*. Versi akhir instrumen terdiri atas 28 item dengan skala Likert 5 poin dari 1 (*very uncertain*) sampai 5 (*very confident*). Uji validitas dilakukan menggunakan korelasi Pearson, sedangkan uji reliabilitas dilakukan menggunakan koefisien Cronbach's alpha.Hasil penelitian menunjukkan bahwa keenam dimensi HDSES memiliki validitas item yang memadai dan reliabilitas internal yang baik. Dimensi nutrisi, latihan fisik, kepatuhan pengobatan, pemeriksaan glukosa darah, adaptasi psikososial, dan koping spiritual seluruhnya dinyatakan valid dan reliabel untuk menilai self-efficacy diabetes secara holistik. HDSES merupakan instrumen yang valid dan reliabel untuk mengukur self-efficacy diabetes secara holistik pada pasien diabetes melitus tipe 2 di Indonesia.

Kata Kunci : Diabetes Melitus Tipe 2; Efikasi Diri; Indonesia; Psikometri;

Abstract: Type 2 diabetes mellitus requires consistent self-management, and successful disease control is strongly influenced by patients' self-efficacy in performing daily care behaviors. Existing instruments mainly emphasize behavioral and treatment-related aspects and may not adequately capture broader holistic dimensions, including psychosocial adaptation and spiritual coping. This study aimed to develop and psychometrically evaluate the *Holistic Diabetes Self-Efficacy Scale* (HDSES) among individuals with type 2 diabetes mellitus in Indonesia. This methodological study followed four stages of instrument development, namely construct definition, item pool generation, scale design, and psychometric evaluation. The HDSES was conceptualized across six dimensions: nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping. The initial questionnaire consisted of 30 items and was reviewed by three nurse lecturers specializing in diabetic care. Data were collected from patients with type 2 diabetes mellitus in the working areas of public health centers in Kendari City using simple random sampling. The final instrument consisted of 28 items rated on a five-point Likert scale ranging from 1 (*very uncertain*) to 5 (*very confident*). Validity was assessed using Pearson correlation, and reliability was examined using Cronbach's alpha. The findings showed that all six HDSES dimensions demonstrated adequate item validity and good internal consistency. The dimensions of nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping were all found to be valid and reliable for assessing holistic diabetes self-efficacy. The HDSES is a valid and reliable instrument for measuring holistic diabetes self-efficacy among patients with type 2 diabetes mellitus in Indonesia.

Keywords: Diabetes Mellitus, Type 2; Indonesia; Psychometrics; Self Efficacy;

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INTRODUCTION

Type 2 diabetes mellitus remains a major chronic health problem because the disease requires lifelong treatment, continuous monitoring, and sustained self-management in daily life (Powers et al., 2021). Effective diabetes care requires patients to regulate diet, maintain physical activity, adhere to treatment, monitor blood glucose, and respond appropriately to symptoms and lifestyle demands (Association of Diabetes Care and Education Specialists, 2021). Structured diabetes self-management education and support improve patients' knowledge, decision-making, and behavioral capacity in managing the disease over time (Powers et al., 2021; Siminerio et al., 2019). Lifestyle-focused interventions also improve glycemic control and self-care performance among adults with type 2 diabetes in diverse settings (O'Donoghue et al., 2021; Martín-Payo et al., 2021). These conditions show that diabetes management depends not only on medical treatment but also on the patient's ability to perform complex self-care behaviors consistently in everyday life (Alibrahim et al., 2021).

Self-efficacy has an important role in diabetes management because confidence in one's ability determines whether patients initiate, maintain, and adapt self-care behaviors in response to disease demands (Amer et al., 2018). Patients with stronger self-efficacy usually demonstrate better adherence to diet, exercise, medication, and blood glucose monitoring in daily practice (Park, 2021; Wang et al., 2020). Nursing and behavioral interventions improve diabetes outcomes partly by strengthening patients' confidence to manage their condition independently and sustainably (Chi et al., 2018; Gürkan et al., 2019). Telehealth and family-based health management programs also support better glycemic outcomes by reinforcing self-management capability and behavioral confidence among patients with diabetes (Lemelin et al., 2020; Wang et al., 2021). Therefore, self-efficacy represents a key psychological resource that supports effective diabetes self-management in both clinical and community contexts (Amer et al., 2018; Park, 2021).

Several instruments have been developed to measure diabetes-related self-efficacy, and these tools have contributed substantially to research and practice in chronic illness management (Vivienne Wu et al., 2008; Mahjouri et al., 2012). The Chinese version of the Diabetes Management Self-Efficacy Scale and the Iranian version of the Diabetes Empowerment Scale demonstrated that self-efficacy can be measured through culturally adapted psychometric instruments (Vivienne Wu et al., 2008; Mahjouri et al., 2012). However, most existing instruments focus mainly on behavioral and treatment-related confidence, while broader dimensions of psychosocial and spiritual adaptation often receive less attention in scale construction (Vivienne Wu et al., 2008; Mahjouri et al., 2012). Patients with diabetes frequently experience emotional stress, social adjustment challenges, and meaning-related struggles that influence their capacity to sustain self-care behaviors over time (Lyu et al., 2019; Sikalidis & Karaboğa,

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2020). This situation indicates that a more comprehensive instrument is needed to assess diabetes self-efficacy from a holistic perspective that reflects the multidimensional experience of living with diabetes (Powers et al., 2021).

A holistic perspective is important in diabetes care because disease management involves physical, psychological, social, and spiritual responses that interact continuously in patients' everyday lives (Powers et al., 2021). Nutrition, physical exercise, treatment adherence, and blood glucose monitoring represent core behavioral domains that directly influence metabolic control and complication prevention among people with diabetes (O'Donoghue et al., 2021; Klimontov et al., 2021). Psychosocial adaptation also shapes diabetes outcomes because emotional distress, social role changes, and coping difficulties can reduce patients' motivation and consistency in self-management practices (Amer et al., 2018; Lyu et al., 2019). Spiritual coping can strengthen resilience, hope, and meaning-making when patients face chronic illness demands, treatment fatigue, and uncertainty related to long-term disease control (Sikalidis & Karaboğa, 2020). Thus, an instrument that integrates these dimensions may provide a more comprehensive assessment of self-efficacy among individuals with type 2 diabetes mellitus (Mahjouri et al., 2012; Vivienne Wu et al., 2008).

The Indonesian context requires special attention because cultural values, health beliefs, service accessibility, and patient education may influence how individuals understand and perform diabetes self-management behaviors in daily life (Powers et al., 2021). Public health centers play an essential role in diabetes management, yet patients in these settings may differ in literacy, resources, family support, and confidence in managing chronic illness independently (Siminerio et al., 2019; Krall et al., 2019). Existing instruments that were developed in other countries may not fully capture the sociocultural and spiritual characteristics that shape diabetes self-efficacy among Indonesian patients (Vivienne Wu et al., 2008; Mahjouri et al., 2012). A culturally relevant and psychometrically sound instrument can help nurses and researchers identify specific areas of low confidence that require targeted education and intervention in community-based care (Wang et al., 2020; Lemelin et al., 2020). Therefore, instrument development in Indonesia is necessary to support accurate assessment and context-sensitive diabetes care in primary health settings (Chi et al., 2018).

Based on these considerations, the development of a new scale is needed to measure holistic diabetes self-efficacy among Indonesian patients with type 2 diabetes mellitus more comprehensively and appropriately (DeVellis, 2017). A valid and reliable instrument can strengthen assessment accuracy, support intervention planning, and advance evidence-based nursing practice in diabetes care across public health centers and community settings (Powers et al., 2021; Wang et al., 2020). Psychometric evaluation is also necessary to ensure that the instrument demonstrates adequate validity and

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reliability before it is used in research and clinical practice (Mahjouri et al., 2012; Vivienne Wu et al., 2008). The Holistic Diabetes Self-Efficacy Scale was designed to include six dimensions, namely nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping, in order to reflect a broader conceptualization of diabetes self-efficacy.

Therefore, this study aimed to develop and psychometrically evaluate the Holistic Diabetes Self-Efficacy Scale (HDSES) in Indonesia.

METHODS

This study was undertaken to develop a new instrument for measuring holistic diabetes self-efficacy among individuals with diabetes in Indonesia. The instrument development process was guided by established scale construction frameworks proposed by DeVellis (2017), which involved four main stages: (1) clarifying the construct, (2) developing an initial pool of items, (3) constructing the instrument, and (4) examining its psychometric properties.

Phase 1: Contruct Definition

After reviewing and synthesizing the conceptual dimensions of diabetes self-management self-efficacy, six key constructs were identified as relevant for further examination. These constructs were operationally defined and used in the present study. The operational definitions of these constructs are as follows: nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping. Nutrition: The ability of individuals with diabetes to regulate food intake appropriately, including meal selection, portion control, meal timing, and adherence to dietary recommendations, in order to support glycemic control and overall health. Physical Exercise: The ability of individuals with diabetes to engage in regular and appropriate physical activity as part of daily self-management to maintain physical fitness, improve metabolic control, and reduce the risk of complications.

Treatment Adherence: The ability of individuals with diabetes to consistently follow prescribed treatment regimens, including medication use, clinic attendance, and compliance with professional recommendations related to diabetes care. Blood Glucose Check: The ability of individuals with diabetes to perform regular blood glucose monitoring, interpret the results appropriately, and use the information to guide daily self-management decisions. Psychosocial Adaptation: The ability of individuals with diabetes to adjust emotionally, cognitively, and socially to living with a chronic illness, including managing stress, maintaining motivation, and coping with the demands of diabetes in everyday life.Spiritual Coping: The ability of individuals with diabetes to draw upon spiritual beliefs, values, and practices to find meaning, maintain hope, and strengthen resilience in managing diabetes and its long-term consequences.

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After establishing and defining each construct operationally, items were developed for each construct.

After establishing the operational definitions of each construct, the initial items were developed by adapting and modifying relevant indicators from previously established self-efficacy instruments, particularly those reported by Vivienne Wu et al. (2008) and Mahjouri et al. (2012), to ensure conceptual relevance and contextual appropriateness for individuals with diabetes in Indonesia.

Phase 2: Generating an Item Pool

In the second phase, an initial pool of items was generated to represent the six constructs identified in the construct definition stage. Item development was guided by the operational definitions of nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping.

Each item was written to represent an individual's perceived confidence in performing specific diabetes self-management behaviors. The wording of the items was kept clear, concise, and easy to understand in order to facilitate comprehension among individuals with different educational backgrounds. Redundant, ambiguous, or overlapping statements were avoided during item construction. At the end of this phase, the preliminary item pool consisted of items covering all six dimensions of holistic diabetes self-efficacy and was considered ready for the next stage of instrument design and expert evaluation.

Phase 3: Designing the Scale

In the third phase, the preliminary version of the scale was constructed based on the item pool generated in the previous stage. The initial questionnaire consisted of 30 items representing the six dimensions of holistic diabetes self-efficacy, namely nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping. The items were organized systematically to reflect the conceptual structure of the scale and to facilitate ease of response among individuals with diabetes.

To assess the appropriateness of the initial scale, content evaluation was carried out by three experts, including nurse lecturers with expertise in diabetic care. The experts reviewed the modified questionnaire to examine the relevance, clarity, and representativeness of each item in relation to the construct being measured and the objective of the study. Their feedback was used to refine the wording, improve conceptual alignment, and ensure that the preliminary scale was suitable for further psychometric testing.

Phase 4: Psychometric Evaluation

In the fourth phase, the psychometric properties of the scale were examined to evaluate its validity and reliability among individuals with diabetes in Indonesia. The scale was administered to eligible participants, and the collected data were analyzed to assess the construct structure and internal consistency of the instrument.

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Psychometric evaluation was conducted to determine whether the items adequately represented the underlying dimensions of holistic diabetes self-efficacy and whether the scale demonstrated satisfactory measurement performance.

Construct validity was examined using factor analysis to identify the underlying dimensional structure of the scale. Prior to factor extraction, sampling adequacy and the suitability of the data for factor analysis were assessed. Items were then evaluated based on their factor loadings and conceptual relevance to the intended dimensions. Reliability testing was performed by calculating internal consistency coefficients to examine the homogeneity of the items within the overall scale and its subdimensions. Through this process, the final version of the Holistic Diabetes Self-Efficacy Scale (HDSES) was established as a psychometrically appropriate instrument for measuring holistic diabetes self-efficacy in the Indonesian context.

Data Collection Procedure

Data were collected from patients with type 2 diabetes mellitus in the working areas of public health centers in Kendari City. Participants were selected using a simple random sampling technique to ensure that each eligible individual had an equal chance of being included in the study. The questionnaire administered in this study consisted of 28 items, which were distributed to respondents who met the inclusion criteria and agreed to participate. All items were rated using a five-point Likert scale, ranging from 1 (very uncertain) to 5 (very confident), with higher scores indicating greater levels of holistic diabetes self-efficacy.

Data Analysis

Data were analyzed to examine the validity and reliability of the Holistic Diabetes Self-Efficacy Scale (HDSES). Item validity was assessed using Pearson product–moment correlation to determine the correlation between each item score and the total score. An item was considered valid if it showed a positive correlation coefficient and met the predetermined significance criterion. This analysis was performed to identify whether each item was able to measure the same underlying construct as the overall scale.

Reliability testing was conducted using Cronbach's alpha coefficient to evaluate the internal consistency of the instrument. A higher Cronbach's alpha value indicated better consistency among the items in measuring holistic diabetes self-efficacy. In addition to the overall reliability coefficient, the contribution of each item to the scale was also examined to determine whether any item reduced the internal consistency of the instrument. Through these analyses, the validity and reliability of the HDSES were established prior to its final use in the study.

RESULTS

The validity and reliability testing of the Holistic Diabetes Self-Efficacy Scale (HDSES) showed that all six dimensions met acceptable

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psychometric criteria, indicating that the instrument was appropriate for measuring holistic diabetes self-efficacy among patients with type 2 diabetes mellitus. Table 1 presents the Pearson correlation coefficients and Cronbach's alpha values for each dimension.

Table 1. Validity and Reliability Test Results of the Instrument by Dimension

Dimension	Number of Items	Pearson Correlation (r)	Cronbach's Alpha
Nutrition	5	0.621–0.781	0.842
Physical Exercise	4	0.598–0.744	0.816
Treatment Adherence	5	0.633–0.802	0.854
Blood Glucose Check	4	0.587–0.729	0.801
Psychosocial Adaptation	5	0.611–0.773	0.835
Spiritual Coping	5	0.645–0.814	0.861

The findings indicate that all dimensions of the HDSES had satisfactory item validity, as reflected by positive Pearson correlation coefficients of moderate to strong magnitude across all dimensions. The nutrition dimension showed item-total correlation values ranging from 0.621 to 0.781 with a Cronbach's alpha of 0.842, indicating good internal consistency. The physical exercise dimension also demonstrated adequate validity, with correlation values between 0.598 and 0.744 and a Cronbach's alpha of 0.816, suggesting that the items consistently measured confidence in exercise-related diabetes management.

The treatment adherence dimension produced correlation values ranging from 0.633 to 0.802 and a Cronbach's alpha of 0.854, indicating strong validity and reliability. The blood glucose check dimension showed acceptable validity coefficients between 0.587 and 0.729, while its Cronbach's alpha value of 0.801 confirmed satisfactory internal consistency. These results suggest that the items within this dimension were sufficiently homogeneous in assessing self-efficacy related to blood glucose monitoring.

The psychosocial adaptation dimension had Pearson correlation values ranging from 0.611 to 0.773 and a Cronbach's alpha of 0.835, demonstrating that the items were valid and reliable in measuring the respondent's confidence in adapting psychologically and socially to diabetes. The spiritual coping dimension showed the highest reliability among all dimensions, with correlation values between 0.645 and 0.814 and a Cronbach's alpha of 0.861. This result indicates that spiritual coping was measured with strong internal consistency and that its items were highly relevant to the overall construct.

Overall, these findings support that the six dimensions of the HDSES possess acceptable psychometric properties and can be used to assess holistic diabetes self-efficacy among patients with type 2 diabetes mellitus in the Kendari City public health center setting

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DISCUSSION

This study developed the Holistic Diabetes Self-Efficacy Scale and demonstrated that the instrument had acceptable validity and reliability across six dimensions. The findings showed that the dimensions of nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping were all retained as meaningful components of holistic diabetes self-efficacy. The results also indicated that each dimension had adequate item-total correlation values, which means that the items within each domain measured the intended construct consistently. The reliability coefficients further showed that all six dimensions had satisfactory internal consistency for use among patients with type 2 diabetes mellitus. These findings suggest that the HDSES can function as a multidimensional instrument for assessing confidence in diabetes self-management behaviors and adaptation processes. Overall, the study supports the feasibility of using a holistic framework to measure diabetes self-efficacy in the Indonesian primary care context.

The first important finding of this study was that the HDSES demonstrated acceptable psychometric performance across all six dimensions, which indicates that the scale captured the multidimensional nature of diabetes self-efficacy adequately in the target population (DeVellis, 2017; Vivienne Wu et al., 2008; Mahjouri et al., 2012). The present result supports the principle that a valid self-efficacy instrument should reflect both conceptual clarity and empirical coherence in each domain of measurement (DeVellis, 2017; Mahjouri et al., 2012). Previous studies also showed that diabetes self-efficacy instruments can achieve good psychometric quality when item development follows theory-based procedures and contextual adaptation processes carefully (Vivienne Wu et al., 2008; Mahjouri et al., 2012). The current study extends that evidence by showing that a broader instrument can still maintain acceptable validity and reliability when it includes not only self-care behaviors but also adaptation-related dimensions (Vivienne Wu et al., 2008; Powers et al., 2021). This result is important because diabetes management in real life does not occur in a single behavioral domain, but develops through interactions between treatment demands, daily habits, and psychosocial responses over time (Powers et al., 2021; Association of Diabetes Care and Education Specialists, 2021). Therefore, the psychometric adequacy of the HDSES strengthens the argument that diabetes self-efficacy should be assessed as a comprehensive and context-sensitive construct rather than as a narrowly biomedical concept alone (DeVellis, 2017; Powers et al., 2021).

The nutrition dimension showed good validity and reliability, which suggests that confidence in managing food intake forms a central part of diabetes self-efficacy among patients with type 2 diabetes mellitus (Sikalidis & Karaboğa, 2020; Powers et al., 2021). This finding is consistent with previous evidence showing that dietary regulation strongly influences diabetes

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outcomes because meal selection, portion control, and adherence to nutritional guidance shape glycemic stability in daily life (Sikalidis & Karaboğa, 2020; Sikalidis & Öztağ, 2020). Lifestyle intervention studies also reported that behavioral programs targeting diet can improve self-management capability and reinforce confidence in carrying out recommended practices consistently (Martín-Payo et al., 2021; O'Donoghue et al., 2021). Patients often encounter practical barriers in nutrition management because social eating patterns, financial limitations, and habitual preferences can reduce their confidence in sustaining dietary changes over time (Powers et al., 2021; Krall et al., 2019). In this context, the strong performance of the nutrition items suggests that the HDSES successfully captured an essential behavioral domain that is highly relevant to everyday diabetes care in community settings (Vivienne Wu et al., 2008; Mahjouri et al., 2012). Thus, the nutrition dimension can help nurses identify specific gaps in patients' confidence regarding dietary self-regulation and guide more focused education in primary care practice (Association of Diabetes Care and Education Specialists, 2021; Siminerio et al., 2019).

The physical exercise and treatment adherence dimensions also demonstrated satisfactory psychometric properties, which confirms that these two domains remain integral to the construct of diabetes self-efficacy in the current scale (Park, 2021; Powers et al., 2021). Exercise-related self-efficacy is important because patients who believe in their ability to perform regular physical activity tend to practice self-care behaviors more consistently in daily community life (Park, 2021; O'Donoghue et al., 2021). Behavioral intervention studies have shown that physical activity programs can improve confidence, motivation, and self-care performance among adults living with diabetes in various settings (Park, 2021; Martín-Payo et al., 2021). Treatment adherence also reflects a crucial dimension because confidence in taking medication, attending health services, and following clinical advice determines the continuity of diabetes management over time (Powers et al., 2021; Wang et al., 2020). Nursing-based and telehealth-supported interventions have demonstrated that better treatment engagement often emerges when patients develop stronger confidence in managing therapeutic routines independently and sustainably (Lemelin et al., 2020; Wang et al., 2020). Therefore, the acceptable validity and reliability of these two dimensions indicate that the HDSES captured both active lifestyle management and sustained therapeutic commitment as core elements of diabetes self-efficacy (Vivienne Wu et al., 2008; Mahjouri et al., 2012).

The blood glucose check dimension showed acceptable validity and reliability, which indicates that confidence in monitoring blood glucose is also a stable and measurable part of holistic diabetes self-efficacy (Klimontov et al., 2021; Powers et al., 2021). Blood glucose monitoring has

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an important role in diabetes management because patients use monitoring results to evaluate control status, recognize fluctuations, and make appropriate decisions regarding diet, activity, and medication (Klimontov et al., 2021; Association of Diabetes Care and Education Specialists, 2021). Previous evidence showed that better self-management support improves the use of monitoring information and strengthens patients' confidence in responding to glycemic changes in a timely manner (Lemelin et al., 2020; Wang et al., 2021). This dimension is particularly relevant in chronic care because poor confidence in checking blood glucose may reduce patients' ability to anticipate complications and maintain metabolic stability in everyday life (Powers et al., 2021; Wang et al., 2020). The current result suggests that the HDSES was able to represent this behavioral confidence adequately within the Indonesian public health center context, where monitoring practices may vary according to access, education, and family support (Siminerio et al., 2019; Krall et al., 2018). Consequently, the inclusion of blood glucose check as a separate dimension adds practical value to the scale because it allows clinicians to identify whether patients lack confidence specifically in monitoring-related self-management tasks (Association of Diabetes Care and Education Specialists, 2021; DeVellis, 2017).

Another meaningful contribution of this study lies in the psychosocial adaptation dimension, which showed valid and reliable measurement properties and broadened the conceptual scope of diabetes self-efficacy beyond purely behavioral tasks (Amer et al., 2018; Lyu et al., 2019). Diabetes often creates emotional burdens, social role disturbances, and coping challenges that influence how consistently patients perform self-care behaviors in the long term (Amer et al., 2018; Powers et al., 2021). Studies on self-management have shown that confidence in coping with disease-related stress and sustaining motivation is closely linked to improved adaptation and better adherence to recommended care behaviors (Park, 2021; Wang et al., 2021). This result indicates that psychosocial adaptation should not be treated as a peripheral issue because emotional resilience and social adjustment shape the actual implementation of self-management in daily contexts (Lyu et al., 2019; Chi et al., 2018). The acceptable reliability of this dimension suggests that the HDSES can detect confidence related to living with diabetes as a chronic condition, not only confidence related to performing technical self-care activities (Vivienne Wu et al., 2008; DeVellis, 2017). Accordingly, the psychosocial adaptation domain strengthens the usefulness of the instrument for nursing practice because it helps identify psychological and social barriers that may otherwise remain underassessed in conventional diabetes instruments (Amer et al., 2018; Siminerio et al., 2019).

The spiritual coping dimension showed the strongest reliability among the six dimensions, and this result suggests that spiritual resources may

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form a coherent and important source of self-efficacy in diabetes management within the Indonesian context (Sikalidis & Karaboğa, 2020; Powers et al., 2021). Chronic illness frequently confronts patients with uncertainty, fatigue, and fear of complications, so spiritual beliefs and practices may support hope, acceptance, and endurance in managing long-term disease demands (Sikalidis & Karaboğa, 2020; Lyu et al., 2019). A holistic care perspective recognizes that spiritual coping can influence motivation, meaning-making, and adherence because patients often draw strength from personal values and beliefs when facing prolonged treatment routines (Powers et al., 2021; Association of Diabetes Care and Education Specialists, 2021). Existing self-efficacy scales have generally emphasized behavioral and empowerment aspects, whereas this study incorporated spiritual coping explicitly as part of the confidence structure of self-management (Vivienne Wu et al., 2008; Mahjouri et al., 2012). The strong internal consistency of this domain indicates that spiritual coping was not merely an added concept, but a measurable and relevant component of holistic diabetes self-efficacy in this sample (DeVellis, 2017; Mahjouri et al., 2012). Therefore, this dimension represents an important contribution of the HDSES because it aligns diabetes assessment with the lived reality of patients whose health behaviors are influenced by spiritual interpretation and culturally embedded coping processes (Powers et al., 2021; Wang et al., 2021).

Taken together, the findings suggest that the HDSES provides a broader measurement framework that can support nursing assessment, diabetes education, and intervention planning more effectively in primary care settings (Siminerio et al., 2019; Wang et al., 2020). A multidimensional instrument can help health professionals identify which domain of confidence is weakest, so education and support can be directed toward nutrition, exercise, adherence, monitoring, psychosocial adaptation, or spiritual coping according to patient needs (Association of Diabetes Care and Education Specialists, 2021; Powers et al., 2021). The present findings also support the view that self-efficacy should be addressed through integrated approaches that combine behavioral education, family involvement, technological support, and continuous nursing interventions (Lemelin et al., 2020; Wang et al., 2021; Chi et al., 2018). This implication is important for Indonesian public health centers because patients often require practical, culturally appropriate, and sustainable support to maintain long-term diabetes management in community contexts (Krall et al., 2019; Siminerio et al., 2019). At the same time, this study indicates that scale development in local settings remains necessary because imported instruments may not fully reflect the sociocultural and spiritual structure of patient confidence in self-management (Vivienne Wu et al., 2008; Mahjouri et al., 2012). Future studies should continue this work by testing the HDSES in larger and more diverse populations, examining its factor structure more deeply, and evaluating

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its sensitivity to educational and clinical interventions across different regions of Indonesia (DeVellis, 2017; Wang et al., 2020).

CONCLUSION

This study concludes that the Holistic Diabetes Self-Efficacy Scale is a valid and reliable instrument for measuring diabetes self-efficacy among patients with type 2 diabetes mellitus in Indonesia through six interrelated dimensions, namely nutrition, physical exercise, treatment adherence, blood glucose check, psychosocial adaptation, and spiritual coping. The findings indicate that the instrument can support a more comprehensive assessment of patient confidence in managing diabetes within primary care settings. The scale also offers practical value for nurses and health professionals because it can identify specific areas of self-efficacy that require targeted education and intervention. Based on these findings, the HDSES should be considered for use in community and public health center services to strengthen holistic diabetes assessment and patient-centered care. Future research should test this scale in broader populations, compare its performance across regions, and examine its usefulness in intervention studies to further strengthen its applicability in Indonesian diabetes care.

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