

Development and Preliminary Validation of the KRSK-DN Questionnaire: A Methodological Study

I Gusti Bagus Ngurah Gilang Angob Subiksa¹, Anak Agung Gede Angga Puspa Negara²

¹Bachelor of Physiotherapy Study Program, Faculty of Medicine, Udayana University, Bali, Indonesia

²Department of Physiotherapy, Faculty of Medicine, Udayana University, Bali, Indonesia

Corresponding author:

Name: I Gusti Bagus Ngurah Gilang Angob Subiksa

E-mail: gilangangobsubiksa02@gmail.com

Phone: +62 812-2100-0236

Received 27 May 2026; Revised 13 June 2026; Accepted 13 June 2026; Published 15 June 2026

©2026 The Authors. Published by the Physiotherapy Study Program, Faculty of Medicine, Udayana University, in collaboration with the Indonesian Physiotherapy Association (Ikatan Fisioterapi Indonesia). This is an open-access article distributed under the terms of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

Abstract

Background: Musculoskeletal disorders are major causes of pain, disability, and reduced productivity worldwide. Although dry needling is widely used in physiotherapy, outcome evaluation is generally limited to clinical indicators, while patients' subjective socioeconomic perceptions and therapy-related decision-making remain insufficiently assessed.

Objective: To develop and conduct a preliminary evaluation of the content validity, readability, and internal consistency of the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN).

Methods: A methodological cross-sectional study was conducted in Denpasar, Indonesia, in January 2026 involving 30 respondents who had undergone dry needling therapy. Instrument development included construct identification, item generation, content validation by four expert validators, readability testing, and internal consistency assessment. Content validity was evaluated using the Item-level Content Validity Index (I-CVI), while reliability was assessed using Cronbach's alpha. Statistical analyses were performed using IBM SPSS Statistics version 24.

Results: The final KRSK-DN consisted of 11 items across three domains: therapy cost and accessibility, activity and productivity, and perceived value and therapy decision-making. All items demonstrated excellent content validity with an I-CVI of 1.00. Readability testing indicated that all items were clearly understood by respondents. Internal consistency analysis yielded a Cronbach's alpha of 0.819, indicating good reliability.

Conclusion: The KRSK-DN demonstrated preliminary evidence of excellent content validity, adequate readability, and good internal consistency for assessing patients' subjective responses following dry needling therapy. Further studies are needed to evaluate additional psychometric properties.

Keywords

Dry Needling; Surveys and Questionnaires; Validation Study; Patient-Reported Outcome Measures; Reproducibility of Results

Introduction

Musculoskeletal disorders (MSDs) represent one of the leading causes of pain, disability, functional limitations, and reduced productivity worldwide. These conditions contribute substantially to the global burden of disease, affecting individuals across different age groups and occupational sectors. The impact of MSDs extends beyond physical symptoms, often resulting in activity restrictions, work absenteeism, reduced quality of life, and increased healthcare expenditures. According to the World Health Organization, musculoskeletal conditions are among the primary contributors to years lived with disability globally and continue to pose significant public health challenges.^{1,2}

The high prevalence of MSDs has encouraged the development and implementation of various physiotherapy interventions aimed at reducing pain and improving function. Among these interventions, dry needling has gained increasing attention as an effective treatment approach for musculoskeletal pain associated with myofascial trigger points and neuromuscular dysfunction. Dry needling involves the insertion of a thin filiform needle into target tissues to modulate pain mechanisms, improve muscle function, and facilitate recovery. Several systematic reviews and meta-analyses have reported beneficial effects of dry needling on pain reduction, functional improvement, and quality of life in patients with musculoskeletal disorders.³⁻⁵

Despite its growing clinical application, outcome evaluation following dry needling remains largely focused on biomedical and functional indicators, such as pain intensity, range of motion, muscle strength, and disability scores.⁶ Although these outcomes are essential for assessing clinical effectiveness, they may not fully capture patients' subjective experiences following treatment. Patients frequently evaluate healthcare interventions not only based on symptom improvement but also on perceived value, treatment accessibility, financial burden, productivity changes, and willingness to continue therapy. Consequently, relying exclusively on conventional clinical outcomes may provide an incomplete understanding of treatment impact.^{7,8}

This perspective is consistent with the biopsychosocial model proposed by Engel, which emphasizes that health outcomes are influenced by the interaction of biological, psychological, and social factors.⁹ In musculoskeletal rehabilitation, treatment success is increasingly recognized as a multidimensional construct involving symptom relief, functional recovery, personal satisfaction, socioeconomic considerations, and patient-centered decision-making. Therefore, comprehensive outcome evaluation should incorporate patient-reported experiences alongside traditional clinical measures.^{8,10}

Patient-reported outcome measures (PROMs) have become important tools for capturing patients' perceptions of health status, treatment effectiveness, and quality of life.¹¹ PROMs provide information that may not be identified through clinical examination alone and support patient-centered healthcare delivery. However, existing instruments commonly used in musculoskeletal research, such as pain scales, disability questionnaires, and productivity measures, were not specifically developed to evaluate subjective responses following dry needling.^{12,13} While instruments such as the Work Productivity and Activity Impairment Questionnaire (WPAI)

assess productivity-related outcomes, they do not comprehensively evaluate therapy-related perceptions, socioeconomic considerations, and treatment decision-making within the context of dry needling.^{14,15}

A review of the current literature indicates that studies investigating dry needling predominantly focus on clinical efficacy outcomes, whereas the subjective socioeconomic consequences of treatment and patient decision-making processes remain underexplored.⁶⁻⁸ Furthermore, no specific instrument was identified that comprehensively assesses patients' perceptions regarding treatment accessibility, financial burden, productivity changes, perceived treatment value, and future therapeutic decisions following dry needling. This limitation highlights an important research gap and underscores the need for a context-specific instrument capable of capturing these dimensions.^{6,15,16}

The development of a dedicated questionnaire may contribute to a more comprehensive understanding of patient experiences following dry needling and support outcome evaluation from a biopsychosocial perspective. Such an instrument may also assist clinicians in identifying factors influencing treatment acceptance, adherence, and perceived effectiveness, thereby facilitating more patient-centered clinical decision-making. In addition, a validated questionnaire may serve as a useful outcome measure for future research investigating the broader impact of dry needling interventions.

Therefore, this study aimed to develop the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN) and to conduct a preliminary evaluation of its content validity, readability, and internal consistency. The study was designed as an initial phase in the development of a patient-reported instrument intended to assess subjective responses following dry needling therapy.

Methods

This study employed a methodological cross-sectional design to develop and conduct a preliminary psychometric evaluation of the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN). The study was conducted in Denpasar, Indonesia, in January 2026 and focused on the development of a patient-reported outcome measure designed to assess subjective responses following dry needling therapy. The instrument aimed to capture patient perceptions regarding treatment-related socioeconomic burden, activity and productivity, and therapy-related decision-making.

The development and validation of the KRSK-DN questionnaire followed a systematic seven-stage process based on established recommendations for patient-reported outcome measure development and preliminary validation, including construct identification, item generation, content validation, readability assessment, and reliability testing. The conceptual framework of the questionnaire was grounded in the biopsychosocial model, which recognizes that treatment outcomes are influenced not only by biological improvements but also by psychological, social, and economic factors.

The first stage involved identifying the conceptual domains through a comprehensive literature review, theoretical framework analysis, and clinical observations related to patient experiences following dry needling therapy. This process led to the identification of three key domains considered relevant to the patient experience: therapy cost and accessibility, activity and productivity, and perceived value and therapy-related decision-making.

In the second stage, an initial pool of 11 questionnaire items was generated to represent the identified domains. All items were written using simple, patient-centered language to facilitate comprehension among respondents with varying educational backgrounds. The questionnaire employed a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The third stage consisted of content validation through expert review. Four experts participated in the validation process, including physiotherapists, academics, and healthcare professionals with expertise in clinical practice, research methodology, and health sciences education. The experts evaluated the relevance, clarity, comprehensiveness, and representativeness of each item in relation to the intended constructs. The characteristics of the expert panel are presented in Table 1.

Following expert evaluation, the fourth stage involved revising the questionnaire items based on the recommendations provided by the experts to improve wording, clarity, and conceptual alignment. The revised version was subsequently subjected to readability testing among members of the target population in the fifth stage. This assessment aimed to determine whether the questionnaire items, instructions, and response options were easily understood and interpreted as intended by respondents.

Feedback obtained during readability testing was incorporated into a final revision process during the sixth stage, resulting in the finalized questionnaire items. The seventh and final stage involved evaluating the internal consistency of the questionnaire as a preliminary measure of reliability. This sequential development process ensured that the KRSK-DN questionnaire underwent both expert evaluation and respondent-based assessment prior to psychometric testing, thereby strengthening its content validity, comprehensibility, and overall measurement quality.

Table 1. Characteristics of Expert Validators

Expert	Professional Background	Academic Degree	Experience	Area of Expertise
Expert 1	Physiotherapist/Lecturer	Master's Degree	10 years	Clinical Physiotherapy, Research Methodology, Health Education
Expert 2	Physiotherapist/Lecturer	Master's Degree	7 years	Clinical Physiotherapy, Research Methodology, Health Education
Expert 3	Physiotherapist	Bachelor's Degree	3 years	Clinical Physiotherapy
Expert 4	Nurse/Vice Director of Hospital	Master's Degree	30 years	Research Methodology, Health Education

To ensure comprehensive evaluation of the questionnaire content, an expert panel was assembled to represent diverse areas of expertise, including clinical practice, research methodology, and health sciences education. This multidisciplinary composition was intended to enhance the relevance, clarity, comprehensiveness, and practical applicability of the questionnaire items. The characteristics of the expert panel are presented in Table 1.

Each expert independently reviewed all questionnaire items and assessed their relevance and clarity. Content validity was quantified using the Item-level Content Validity Index (I-CVI), calculated as the proportion of experts who rated an item as relevant. Consistent with established recommendations, an I-CVI value of 0.78 or higher was considered indicative of acceptable content validity.

Following the expert review process, readability testing was conducted among individuals representing the target population. Participants were asked to assess the clarity and comprehensibility of each questionnaire item, identify any confusing terms or phrases, and provide feedback regarding the complexity of the wording. Suggestions obtained during this phase were incorporated into subsequent revisions to improve the overall comprehensibility and user-friendliness of the instrument before reliability evaluation.

A total of 30 respondents with prior experience receiving dry needling therapy participated in the study. Participants were recruited using purposive sampling to ensure that respondents possessed sufficient experience to evaluate the questionnaire content meaningfully. Eligible participants were adults aged 18–65 years who had undergone dry needling treatment, were able to understand Indonesian, and provided voluntary consent to participate. Individuals with communication difficulties, cognitive impairments, or incomplete questionnaire responses were excluded from the study.

The development and validation of the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN) followed a systematic seven-stage procedure. The first stage involved identifying the conceptual domains through an extensive literature review and the development of a theoretical framework to define the underlying constructs of the instrument. Based on these domains, an initial pool of 11 questionnaire items was generated during the second stage.

The third stage consisted of content validation by four expert reviewers who assessed the relevance, clarity, and representativeness of each item. Following expert evaluation, the questionnaire underwent revision based on the recommendations provided to improve content validity and item quality. In the fifth stage, the revised questionnaire was subjected to readability testing among members of the target population to ensure that the wording, instructions, and response options were easily understood. Feedback obtained during this process informed a final revision of the questionnaire items in the sixth stage.

The seventh and final stage involved evaluating the internal consistency of the questionnaire as an indicator of reliability. Through this sequential development process, the KRSK-DN underwent both expert assessment and respondent-based evaluation prior to psychometric testing, thereby strengthening its content validity, comprehensibility, and overall measurement quality.

The final version of the KRSK-DN consisted of 11 items. Six items (Items 1, 2, 3, 4, 5, and 9) were negatively worded and therefore required reverse scoring using the formula: revised score = 6 – original score. The remaining items (Items 6, 7, 8, 10, and 11) were positively worded and retained their original scoring direction.

After reverse scoring was applied where necessary, all item scores were summed to obtain a total score ranging from 11 to 55. Higher total scores reflected more favorable perceptions regarding treatment benefits, socioeconomic acceptability, and willingness to continue dry needling therapy. The score interpretation categories were developed solely for descriptive purposes and should not be interpreted as diagnostic criteria or clinical cutoff values.

Data were analyzed using IBM SPSS Statistics version 24. Descriptive statistics were used to summarize participant characteristics and questionnaire responses. Content validity was evaluated using the Item-level Content Validity Index (I-CVI). Internal consistency reliability was assessed using Cronbach's alpha coefficient, with values of 0.70 or higher considered indicative of acceptable reliability.

All participants were informed about the objectives, procedures, potential benefits, and voluntary nature of the study before participation. Written informed consent was obtained from all respondents prior to data collection. Participant confidentiality and anonymity were strictly maintained throughout the research process, and all collected information was used exclusively for research purposes. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the relevant institutional ethics committee (approval number to be provided).

Results

A total of 30 respondents who had previously undergone dry needling therapy participated in this study. All respondents completed the questionnaire and no incomplete responses were identified, allowing all collected data to be included in the final analysis. The development and preliminary validation of the KRSK-DN were conducted through a structured process involving content validation by expert reviewers, readability testing among target respondents, and internal consistency assessment.

The overall development process was designed to ensure that the questionnaire possessed adequate conceptual relevance, comprehensibility, and reliability before being considered for broader psychometric evaluation. The sequential stages of questionnaire development and validation are summarized below.

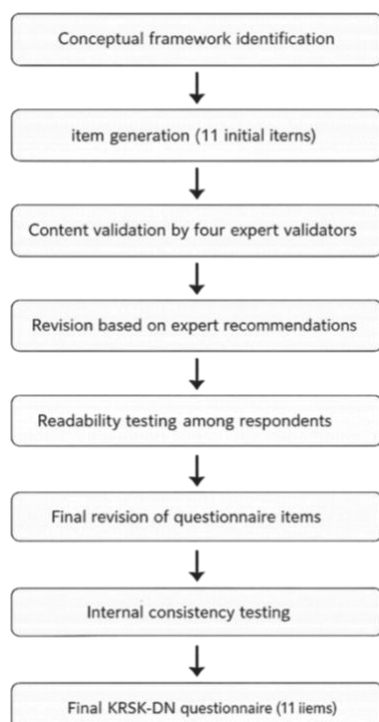


Figure 1. Development and Validation Process of the KRSK-DN Questionnaire

The development and validation process of the KRSK-DN questionnaire followed a structured sequence of expert evaluation and respondent-based assessment prior to reliability testing. This approach was implemented to ensure that the questionnaire items were conceptually relevant, clinically meaningful, and easily understood by the intended population. Through iterative review and revision, the instrument was refined to maximize content validity and comprehensibility while maintaining the theoretical integrity of the proposed domains.

An understanding of participant characteristics is essential for interpreting the context in which the questionnaire was evaluated. The respondents represented the target population for whom the instrument was specifically developed, namely individuals who had previously undergone dry needling therapy. Their demographic characteristics provide important contextual information regarding the applicability and preliminary evaluation of the questionnaire. The distribution of participant characteristics is presented in Table 2.

Table 2. Characteristics of Respondents (n = 30)

Characteristic	n	%
Sex		
Male	20	66.7
Female	10	33.3
Age Range		
18–65 years	30	100
Primary Complaint		
Muscle pain	30	100

As presented in Table 2, the respondent sample was predominantly male, accounting for 66.7% of the total participants. All respondents reported muscle pain as their primary complaint and had previously undergone dry needling therapy. The inclusion of individuals with direct experience of the intervention was considered particularly appropriate for the preliminary evaluation of the KRSK-DN questionnaire, as they were able to assess the relevance, clarity, and applicability of the questionnaire items based on their personal treatment experiences. Consequently, the respondent group provided a suitable population for assessing the comprehensibility and face validity of the instrument during its developmental phase.

Content validity analysis was conducted to determine whether the questionnaire items adequately represented the constructs underlying the KRSK-DN. Four expert validators independently evaluated each item with respect to its relevance, clarity, and representativeness of the intended domains. The Item-level Content Validity Index (I-CVI) was subsequently calculated for each questionnaire item by determining the proportion of experts who rated the item as relevant. This analysis provided quantitative evidence regarding the adequacy of item content and the extent to which individual items reflected the conceptual framework of the instrument.

Table 3. Content Validity Results of the KRSK-DN

Item	Domain	I-CVI	Interpretation
1	Therapy Cost and Accessibility	1.00	Valid
2	Therapy Cost and Accessibility	1.00	Valid
3	Therapy Cost and Accessibility	1.00	Valid
4	Therapy Cost and Accessibility	1.00	Valid
5	Activity and Productivity	1.00	Valid
6	Activity and Productivity	1.00	Valid
7	Activity and Productivity	1.00	Valid
8	Perceived Value and Therapy Decision	1.00	Valid
9	Perceived Value and Therapy Decision	1.00	Valid
10	Perceived Value and Therapy Decision	1.00	Valid
11	Perceived Value and Therapy Decision	1.00	Valid

The results presented in Table 3 indicate excellent content validity across all questionnaire items. All 11 items achieved an Item-level Content Validity Index (I-CVI) value of 1.00, reflecting complete agreement among the four expert validators regarding the relevance of each item to the intended construct. These findings demonstrate that every item satisfied the recommended content validity threshold and adequately represented the conceptual domains underlying the KRSK-DN questionnaire. Consequently, all items were retained for subsequent stages of testing, and no item required removal or substantial conceptual revision following expert evaluation.

Following content validation, readability testing was conducted to assess the comprehensibility of the questionnaire from the perspective of the target population. Participants were asked to evaluate whether the questionnaire items were easy to understand, identify any potentially confusing terms or expressions, and comment on whether the wording was excessively long or difficult to interpret.

The findings indicated a high level of respondent comprehension across all questionnaire items. Participants generally considered the items clear, understandable, and relevant to their experiences following dry needling therapy. No substantial concerns regarding ambiguous terminology, unclear wording, or excessive sentence complexity were reported during the assessment. Based on this feedback, the questionnaire was deemed sufficiently comprehensible for use within the target population, and no items required deletion or major modification prior to reliability testing.

Internal consistency analysis was performed to determine the extent to which the questionnaire items measured related dimensions of the same underlying construct. Reliability was evaluated using Cronbach's alpha coefficient, which assesses the degree of interrelatedness among questionnaire items. A higher Cronbach's alpha value indicates greater internal consistency and suggests that the items function cohesively in measuring the intended concept. The results of the reliability analysis are presented in Table 4.

Table 4. Internal Consistency of the KRSK-DN

Parameter	Value
Number of items	11
Number of respondents	30
Cronbach's alpha	0.819
Interpretation	Good internal consistency

The reliability analysis yielded a Cronbach's alpha coefficient of 0.819, indicating good internal consistency of the KRSK-DN questionnaire. This finding suggests that the questionnaire items were sufficiently interrelated and measured related aspects of the same underlying construct while retaining adequate variability to capture different dimensions of patient responses following dry needling therapy. The observed alpha value exceeded the commonly accepted threshold of 0.70, providing evidence that the instrument possesses satisfactory reliability for preliminary use and further psychometric evaluation.

The results further suggest that the questionnaire items function cohesively without excessive redundancy, indicating an appropriate balance between consistency and conceptual breadth. Collectively, these findings support the reliability of the KRSK-DN as a measure of socioeconomic responses and therapy-related decision-making among individuals who have undergone dry needling treatment.

To provide additional insight into respondent perceptions and response distributions, descriptive statistics were calculated for each questionnaire item. Item-level analyses included measures of central tendency and variability to examine patterns of agreement and identify potential differences in how respondents perceived various aspects of dry needling therapy. These descriptive findings offer a preliminary overview of participant responses across the questionnaire domains and contribute to understanding the overall performance of the instrument. The detailed descriptive statistics for each item are presented in Table 5.

Table 5. Descriptive Statistics of Individual Items

Item	Mean	SD
Item 1	4.03	0.81
Item 2	3.73	1.05
Item 3	3.47	1.17
Item 4	4.03	1.07
Item 5	2.17	1.26
Item 6	4.40	0.72
Item 7	4.33	0.71
Item 8	4.63	0.56
Item 9	3.50	1.33
Item 10	4.53	0.68
Item 11	4.73	0.45

The item-level descriptive statistics revealed generally favorable perceptions of dry needling therapy among respondents. Higher mean scores were observed for items related to perceived treatment value, willingness to undergo dry needling therapy again in the future, and willingness to recommend the intervention to others. These findings suggest that respondents viewed the therapy positively and considered it beneficial in addressing their musculoskeletal complaints.

Conversely, comparatively lower mean scores were observed for items related to activity limitations and functional difficulties experienced prior to treatment. Given the scoring structure of the questionnaire, these responses may reflect respondents' perceptions of improved functional performance and reduced activity-related restrictions following dry needling therapy. The observed response patterns across individual items provide preliminary support for the conceptual framework underlying the KRSK-DN and indicate that the questionnaire domains capture distinct yet related aspects of patient experiences.

Based on the results of content validation, readability assessment, and reliability testing, all 11 questionnaire items were retained in the final version of the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN). No items required deletion because all demonstrated acceptable content validity, were considered understandable by respondents, and contributed positively to the overall reliability of the instrument.

The final KRSK-DN comprises three conceptual domains: therapy cost and accessibility, activity and productivity, and perceived value and therapy-related decision-making. Together, these domains reflect the broader biopsychosocial perspective underlying the instrument and allow for the assessment of patient responses that extend beyond purely clinical outcomes.

Overall, the findings provide preliminary evidence supporting the psychometric quality of the KRSK-DN. The questionnaire demonstrated excellent content validity, satisfactory readability, and good internal consistency, indicating that it is a promising instrument for assessing subjective patient responses following dry needling therapy. Although the present study represents an initial stage of instrument development, the results establish a foundation for future psychometric investigations involving larger and more heterogeneous populations. Further studies are recommended to evaluate additional measurement properties, including construct validity, test-retest reliability, factor structure, responsiveness, and cross-population applicability.

Discussion

This study aimed to develop and conduct a preliminary psychometric evaluation of the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN), a patient-reported instrument designed to assess subjective responses following dry needling therapy. The findings demonstrated excellent content validity, satisfactory readability, and good internal consistency, providing preliminary evidence supporting the feasibility of the instrument for assessing patient perceptions related to socioeconomic burden, activity and productivity, and therapy-related decision-making.

A key finding of this study was that all questionnaire items achieved an Item-level Content Validity Index (I-CVI) of 1.00. According to the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN), content validity is considered the most important measurement property because it determines the extent to which an instrument adequately represents the construct of interest.¹⁷ The complete agreement observed among expert validators indicates that the selected items were considered relevant, understandable, and representative of the proposed domains. These findings suggest that the development process successfully translated the theoretical constructs underlying the questionnaire into measurable and clinically meaningful items.

The strong content validity observed may be attributable to the multidisciplinary composition of the expert panel. The involvement of physiotherapists, academics, and healthcare professionals with expertise in research methodology allowed the instrument to be evaluated from multiple perspectives, including clinical applicability, conceptual relevance, and linguistic clarity. Such an approach is consistent with current recommendations for patient-reported outcome measure development. Nevertheless, although complete agreement among experts provides strong support for item relevance, content validity alone cannot ensure comprehensive coverage of all aspects of the construct across different patient populations and healthcare settings. Further validation studies involving broader stakeholder groups are therefore warranted.

The readability assessment provided additional support for the quality of the KRSK-DN. Respondents reported that the questionnaire items were easy to understand and did not contain ambiguous terminology or excessively complex wording. Readability is a critical component of patient-reported outcome measures because respondents complete the instrument independently, often without assistance from healthcare professionals or researchers. Instruments with poor readability may increase measurement error, reduce response accuracy, and negatively affect data quality. The favorable findings obtained in this study therefore suggest that the questionnaire is capable of effectively communicating its intended concepts to the target population.

The reliability analysis yielded a Cronbach's alpha coefficient of 0.819, indicating good internal consistency. Values between 0.80 and 0.90 are generally considered desirable because they reflect adequate homogeneity among items while avoiding excessive redundancy. The observed coefficient suggests that the questionnaire items measure related aspects of patient experiences following dry needling therapy while maintaining sufficient conceptual diversity. This finding is particularly important because the instrument was intentionally designed to encompass multiple dimensions of patient responses, including socioeconomic considerations, functional consequences, and treatment-related decision-making.

The development of the KRSK-DN addresses an important gap within the existing dry needling literature. Previous research has predominantly focused on clinical outcomes such as pain intensity, functional performance, range of motion, and quality of life.⁶ While these outcomes remain essential indicators of therapeutic effectiveness, they may not fully capture the broader experiences that influence patient satisfaction, adherence, and long-term treatment engagement. Factors such as treatment affordability, accessibility, productivity, and willingness to continue therapy frequently influence healthcare decisions but are seldom incorporated into routine outcome assessment. By addressing these dimensions, the KRSK-DN offers a more comprehensive evaluation of treatment outcomes from the patient's perspective.

The conceptual framework of the instrument was informed by the biopsychosocial model, which recognizes that health outcomes arise from complex interactions among biological, psychological, and social factors.⁹ This framework has become increasingly influential in musculoskeletal rehabilitation, where pain experiences and recovery trajectories are often affected by personal beliefs, social circumstances, and economic conditions. By incorporating domains related to socioeconomic burden and treatment-related decision-making, the KRSK-DN extends assessment beyond symptom improvement and aligns with contemporary patient-centered approaches to healthcare evaluation.

The descriptive findings further support the relevance of the proposed domains. Higher scores were observed for items related to perceived treatment value, willingness to repeat treatment, and willingness to recommend dry needling therapy to others, suggesting generally positive perceptions of the intervention among respondents. At the same time, variability in responses related to treatment costs and financial considerations indicates that socioeconomic factors may influence how patients perceive and evaluate treatment outcomes. These observations reinforce the importance of incorporating nonclinical dimensions into patient-reported assessments of dry needling therapy.

Several limitations should be acknowledged. First, the study included only 30 respondents, which is acceptable for preliminary instrument development but insufficient for advanced psychometric analyses. Consequently, structural validity could not be evaluated using exploratory or confirmatory factor analysis, and the proposed three-domain structure remains theoretically rather than empirically supported. Second, the psychometric evaluation was limited to content validity, readability, and internal consistency. Other important measurement properties recommended by COSMIN, including construct validity, test-retest reliability, measurement error, responsiveness, and cross-cultural validity, were not examined. Third, the score interpretation categories proposed for the KRSK-DN remain exploratory and should not be considered diagnostic thresholds or clinical cutoff values.

Future research should involve larger and more diverse populations to facilitate comprehensive psychometric evaluation. Such studies should include factor analysis to confirm the underlying domain structure, assessment of test-retest reliability to determine score stability over time, and investigations of construct validity and responsiveness. These additional analyses would provide stronger evidence regarding the measurement properties of the KRSK-DN and support its application in both clinical practice and research settings.

Overall, the present study provides preliminary evidence that the KRSK-DN is a promising patient-reported instrument for evaluating subjective responses following dry needling therapy. By integrating socioeconomic, functional, and decision-making dimensions within a single measure, the questionnaire complements traditional clinical outcome assessments and supports a more comprehensive patient-centered approach to evaluating therapeutic outcomes in physiotherapy.

Conclusion

This study successfully developed the Kuesioner Respons Sosioekonomi dan Keputusan Terapi Dry Needling (KRSK-DN), a patient-reported instrument designed to assess subjective responses following dry needling therapy. The preliminary evaluation demonstrated excellent content validity, satisfactory readability, and good internal consistency, supporting the feasibility of the instrument for assessing patient perceptions related to therapy cost and accessibility, activity and productivity, and treatment-related decision-making.

The KRSK-DN extends conventional outcome assessment by incorporating socioeconomic and decision-making dimensions that are often overlooked in musculoskeletal rehabilitation. As a result, the instrument may contribute to a more comprehensive patient-centered evaluation of dry needling outcomes. Although the preliminary findings are promising, further psychometric studies involving larger and more diverse populations are required to establish additional measurement properties and confirm the broader applicability of the questionnaire in clinical practice and research settings.

Clinical Implications

The KRSK-DN provides a practical and patient-centered approach for evaluating outcomes following dry needling therapy. Unlike conventional outcome measures that primarily focus on pain intensity, physical function, or symptom reduction, the KRSK-DN incorporates additional dimensions related to socioeconomic burden, treatment accessibility, perceived treatment value, and therapy-related decision-making. Consequently, the instrument offers a broader understanding of patient experiences and may complement traditional clinical assessments.

In clinical practice, the information generated by the KRSK-DN may assist physiotherapists in identifying factors that influence treatment acceptance, adherence, and overall satisfaction. Understanding patients' perceptions regarding treatment affordability, accessibility, and perceived benefits may help clinicians tailor interventions and address potential barriers that could affect treatment continuation. Furthermore, the questionnaire may facilitate patient-centered communication by encouraging

discussion of treatment expectations, perceived outcomes, and concerns that are not routinely captured through conventional clinical measures.

From a research perspective, the KRSK-DN has the potential to serve as a complementary outcome measure in studies investigating the effectiveness of dry needling interventions. By capturing socioeconomic and decision-making dimensions alongside clinical outcomes, the instrument may contribute to a more comprehensive evaluation of treatment impact. Such information may be particularly valuable when examining long-term treatment adherence, patient satisfaction, and real-world implementation of dry needling within different healthcare settings.

Although the preliminary findings are encouraging, further psychometric evaluation is necessary before widespread implementation can be recommended. Future studies should involve larger and more heterogeneous populations to establish additional measurement properties, including structural validity, construct validity, test-retest reliability, responsiveness, and cross-cultural applicability. Strengthening the psychometric evidence base will enhance confidence in the instrument and support its broader use in both clinical practice and research involving dry needling therapy.

Author Contribution

I Gusti Bagus Ngurah Gilang Angob Subiksa: Conceptualization, methodology, data collection, investigation, formal analysis, writing – original draft preparation, and manuscript revision.

Anak Agung Gede Angga Puspa Negara: Conceptualization, methodology, supervision, validation, data interpretation, writing – review and editing, and final approval of the manuscript.

Acknowledgments

The authors would like to express their sincere gratitude to all expert validators and respondents who participated in this study. The authors also thank the Faculty of Medicine, Udayana University, for providing academic support throughout the research process.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest related to the conduct, analysis, or publication of this study.

Funding Sources

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. All research activities were supported independently by the authors.

Ethics Statement

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. All participants were informed about the objectives and procedures of the study and provided voluntary informed consent prior to participation. Participant confidentiality and anonymity were maintained throughout the research process.

References

1. World Health Organization. Musculoskeletal health [Internet]. Geneva: World Health Organization; 2022 [cited 2026 Jun 11]. Available from: <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>
2. Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10267):2006-17.
3. Navarro-Santana MJ, Sanchez-Infante J, Fernandez-de-las-Penas C, Cleland JA, Martin-Casas P, Plaza-Manzano G. Effectiveness of dry needling for myofascial trigger points associated with neck pain symptoms: an updated systematic review and meta-analysis. *J Clin Med*. 2020;9(10):3300.
4. Chys M, De Meulemeester K, De Greef I, Murillo C, Kindt W, Kouzouz Y, et al. Clinical effectiveness of dry needling in patients with musculoskeletal pain: an umbrella review. *J Clin Med*. 2023;12(3):1205.
5. De Greef I, Chys M, Gerwin RD, De Meulemeester K, Cagnie B. The neurophysiological effects of dry needling: an update of a narrative review. *Am J Phys Med Rehabil*. 2026;105(2):172-80.
6. Lucena-Anton D, Luque-Moreno C, Valencia-Medero J, Garcia-Munoz C, Moral-Munoz JA. Effectiveness of dry needling of myofascial trigger points in the triceps surae muscles: systematic review. *Healthcare (Basel)*. 2022;10(10):1862.
7. Naqvi WM, Sahu A, Arora SP. Patient-reported outcome measures in physiotherapy: an overview. *J Datta Meghe Inst Med Sci Univ*. 2023;18(2):331-6.
8. Barrett DR, Nielsen LM, Rhon DI, Young JL. What are patients' perspectives on the value of physical therapy? A prospective cohort study. *Musculoskeletal Care*. 2024;22(4):e1871.
9. Engel GL. The need for a new medical model: a challenge for biomedicine. *Psychodyn Psychiatry*. 2012;40(3):377-96.
10. Mertens MG, van Kuijk SM, Beckers LW, Zmudzki F, Winkens B, Smeets RJ. Prediction models for treatment success after an interdisciplinary multimodal pain treatment program. *Semin Arthritis Rheum*. 2025;70:152592.
11. Rogge AA, Fischer F, Otto L, Rose M. Empirische Erfassung patient innenberichteter Merkmale: PROMs und PREMs. *Anesthesiol Intensivmed Notfallmed Schmerzther*. 2022;57(3):150-5.
12. Chmielewski B, Wilski M. Psychometric properties of chosen scales evaluating disability in low back pain: narrative review. *Healthcare (Basel)*. 2024;12(11):1139.
13. Robinson CL, Phung A, Dominguez M, Remotti E, Ricciardelli R, Momah DU, et al. Pain scales: what are they and what do they mean. *Curr Pain Headache Rep*. 2024;28(1):11-25.
14. Mamiya H, Wattanakamolkul K, Li N, Wu DBC, Hirozane M, Igarashi A. Including productivity as an element to reflect value of the treatment: a systematic review of published health economic evaluations. *Pharmacoecon Open*. 2025;9(4):723-38.
15. Zhang W, Tocher P, L'Heureux J, Sou J, Sun H. Measuring, analyzing, and presenting work productivity loss in randomized controlled trials: a scoping review. *Value Health*. 2023;26(1):123-37.
16. Trybalski R, Kawczynski A, Muracki J, Lovecchio N, Kuzdzal A. Dry needling and acupuncture for scars: a systematic review. *J Clin Med*. 2024;13(14):3994.
17. Mokkink LB, Herbelet S, Tuinman PR, Terwee CB. Content validity: judging the relevance, comprehensiveness, and comprehensibility of an outcome measurement instrument from a COSMIN perspective. *J Clin Epidemiol*. 2025;185.