

Reliability and Validity of the Arabic Version of the Self-Assessment of Clinical Reflection and Reasoning Questionnaire in Physical Therapy Students

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Background: Clinical reasoning is a critical skill for physical therapy (PT) students to provide effective care. This study aimed to assess the reliability, internal consistency, and construct validity of the Arabic version of the Self-Assessment of Clinical Reflection and Reasoning (SACRR) questionnaire in physical therapy students at Majmaah University.

Materials and Methods: A quasi-experimental, non-randomized design was employed, with 76 students divided into three groups: intern (n = 19), pre-clinical (n = 21), and post-clinical (n = 36). Pretest and posttest assessments were conducted. Internal consistency of the Arabic version of the SACRR was analyzed using Cronbach's alpha coefficient. Statistical analyses were performed using SPSS 19.0.

Results: The mean age was 22.8 ± 1.3 years, 58 (76.3%) were females, and 18 (23.7%) were males. Significant differences were found between pretest and posttest SACRR scores for Items 7–11 and 14–26 ($P < 0.05$), with mean score increasing from 109.36 ± 11.41 to 116.95 ± 7.40 ($P < 0.0001$). Cronbach's alpha values indicated strong internal consistency: pretest $\alpha = 0.915$ and posttest $\alpha = 0.860$.

Conclusion: Clinical exposure improved clinical reasoning skills among physical therapy students, highlighting the importance of clinical education in healthcare curricula. The Arabic version of the SACRR questionnaire demonstrated good reliability for assessing clinical reasoning skills in this population. Further studies are warranted to validate the SACRR questionnaire in diverse cultural and linguistic contexts, as well as to validate the tool across different cultures and healthcare disciplines.

Keywords: clinical reasoning, physical therapy students, SACRR, arabic translation, reliability, validity

Introduction

Clinical reasoning is a complex and integral process that encompasses intricate problem-framing, problem-solving, and decision-making. The concept is integrated into the evaluation and assessment methods used in healthcare professional programs, such as competency-based medical education and entrustable professional activities.¹⁻³ It is a higher-level of cognitive process where the practitioner or learner not only collects data at the bedside but also analyzes and evaluates what to collect before executing any action (ie, decision-making). The concept has been reported in the literature and traced back to the early 1980s.^{1,4-6} Moreover, metacognition, as well as experience, are factors in this multidimensional concept that enable the achievement of higher levels of clinical reasoning.^{7,8}

In physical therapy education, clinical reasoning is critical because students must navigate unstructured and variable patient conditions. They are expected to demonstrate resourcefulness, collaboration, critical thinking, and sound clinical judgment to achieve comprehensive guidance in understanding, describing, and defining the needed approaches.⁹ Insufficient clinical reasoning experience can significantly impact assessment, diagnosis, and treatment planning, particularly among novice therapists who often rely solely on hypothetico-deductive approaches and struggle to accurately

evaluate hypotheses.^{8,10} Studies have shown that students who possess strong clinical reasoning abilities are better equipped to make informed decisions and provide evidence-based interventions, leading to improved patient outcomes.^{11–13}

Assessing clinical reasoning skills during training ensures that graduate students meet competency standards and are well-prepared for professional practice. The Self-Assessment of Clinical Reflection and Reasoning (SACRR) questionnaire is a widely recognized tool for measuring students' perceived development of clinical reasoning. It has been utilized across various health professions, including occupational therapy, nursing, and physical therapy, to evaluate learners' reflective and reasoning capabilities.^{14–18} The SACRR has demonstrated strong psychometric properties in English-speaking populations; however, there is an increasing need for culturally and linguistically adapted tools to evaluate reasoning in diverse educational contexts. For Arabic-speaking programs, such as those in Saudi Arabia, this need is particularly pressing due to the growing demand for competent physical therapy graduates and the emphasis on aligning education with international healthcare quality benchmarks.

Despite its utility, no validated Arabic version has been available, limiting its applicability in the Middle East and other Arabic-speaking regions. Adapting and validating this tool can support educators in identifying gaps, enhancing curricula, and fostering evidence-based learning. It also enables cross-cultural research and comparisons of clinical reasoning development among students in different educational systems.¹⁹

Therefore, the primary aim of this study is to assess the reliability of the Arabic version of the SACRR questionnaire among physical therapy students. The objectives were to 1) translate and culturally adapt the SACRR into Arabic, 2) evaluate the internal consistency and reliability of the Arabic version of the SACRR, and 3) assess differences in SACRR scores before and after clinical exposure as part of construct validity evidence. This work addresses an important gap in physical therapy education and provides an evidence-based tool to enhance training and evaluation in Arabic-speaking contexts.

Materials and Methods

Ethical Approval

The study was approved by the Institutional Ethical Review Committee at Majmaah University, Majmaah Province, Kingdom of Saudi Arabia, under Project Number MUREC-Feb.19/COM-2023/8-3.

Study Design, Setting, and Participants

This pre-post questionnaire-based research study was conducted over one academic year (September 2022 to June 2023) at Majmaah University, Saudi Arabia. The study design involved three distinct cohorts, each representing a different stage of clinical exposure:

- Pre-clinical group: Second-year students surveyed before starting any clinical courses.
- Post-clinical group: Fourth-year students surveyed after completing the clinical sequence.
- Intern group: Students surveyed during their internship period following completion of the curriculum.

These groups were selected to reflect varying levels of clinical exposure rather than tracking the same students longitudinally from the second to fourth year. This cross-sectional approach enabled comparison between students at different stages of their training.

Timeline Explanation

The data collection period spanned 11 months to cover different cohorts during one academic year. Although the study did not follow the same students from second to fourth year, the timeframe was sufficient to recruit participants from each level. Each group's exposure level was defined by their current stage in the curriculum, ensuring representation of novice, advanced, and internship students.

Clinical Courses

The clinical courses included in the curriculum consisted of both theoretical and practical components, encompassing classroom instruction, demonstrations, supervised practice, and hands-on patient care in hospital and rehabilitation settings. These experiences are mandatory and embedded within the program to develop core clinical skills and reasoning abilities.

All physical therapy students at the College of Applied Medical Sciences, Majmaah University, were invited to participate in the present study. The college had a total of 200 students at the time of the study. The questionnaire was sent to all physical therapy students, and 76 agreed to participate (38% response rate). Students who agreed to take part in the study provided written informed consent in advance. Students were asked to complete two online questionnaires via Google Forms, administered before and after their clinical experience within the program. Participants completed the questionnaires at the beginning of their clinical courses in the second year and again at the end of these courses in the fourth year. The pre-questionnaires were administered before students enrolled in clinical courses, and the post-questionnaires were conducted after enrolment. The clinical courses cover topics in the rehabilitation of orthopaedics conditions, neurological disorders, geriatrics, and paediatrics rehabilitation within hospital settings.

SACRR Questionnaire

The primary outcome measure in this study was the assessment of self-perceived clinical reasoning using the Self-Assessment of Clinical Reflection and Reasoning (SACRR) questionnaire. The SACRR is a well-established tool designed to evaluate students' perceptions of their clinical reasoning development across health professions curricula, including physical therapy.^{14–18} It consists of 26 items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), covering domains such as hypothesis generation, data analysis, and decision-making. Previous research has demonstrated strong internal consistency for the SACRR, with Cronbach's alpha coefficients ranging from 0.87 during the pretest and 0.92 during the posttest.²⁰

Arabic Translation and Cross-Cultural Adaptation of the SACRR

For this study, the SACRR was culturally adapted and translated into the Arabic language following established guidelines to ensure linguistic and contextual relevance.¹⁹ This process included forward and backward translation by two bilingual PT experts who independently translated the SACRR into Arabic. The expert review then reconciled discrepancies to produce a unified Arabic version ensuring clarity, content validity, and cultural appropriateness. Pilot testing of 10 PT students from the target population to assess the clarity, cultural relevance, and comprehension of each item. The Arabic version of the SACRR aimed to provide educators and researchers in Arabic-speaking regions with a reliable and accessible tool to assess clinical reasoning. By validating this version among physical therapy students, the study sought to fill an important gap in educational assessment and support evidence-based curriculum development [Supplementary file](#).

Statistical Analysis

All biostatistical analyses were conducted using the IBM Statistical Package for the Social Sciences (SPSS) for Windows, version 19.0 (IBM Corp., Armonk, N.Y., USA). Assuming a moderate effect size, a two-tailed alpha of 0.05, and a desired statistical power of 0.80, the required sample size was calculated to be 34 participants. Data were summarized using frequencies and percentages for qualitative variables and mean \pm standard deviation (SD) for continuous variables. An paired-samples *t*-test was performed for the comparison of pretest and posttest Arabic SACRR scores. Internal consistency of the questionnaire was assessed by calculating Cronbach's Alpha. The level of significance was set at $P < 0.05$.

Results

A total of 76 physical therapy students participated in the study, with the majority being female ($n = 58$, 76.3%). The mean age of the participants was 22.8 ± 1.3 years. Students were enrolled at different stages of the program: pre-clinical (second-year students), post-clinical (Level 10, fourth-year students), and interns (post-graduation training). In the Majmaah University curriculum, Level 10 represents the final year of coursework, including advanced clinical courses. Interns represent students who have completed all academic requirements and are in supervised clinical practice (Table 1).

Table 1 Frequency Distribution of Participants' Demographic and Other Characteristics (n=76)

Characteristics	n (%)
Age (Mean ± SD)	22.8 ± 1.3
Gender	
Male	18 (23.7)
Female	58 (76.3)
Academic Level	
Intern	19 (25.0)
Level 7	10 (13.2)
Level 8	10 (13.2)
Level 9	1 (1.3)
Level 10	36 (47.4)

Notes: Academic levels represent students' progression within the Bachelor of Physical Therapy curriculum at Majmaah University. Pre-clinical group corresponds to Level 7 (second year, prior to clinical courses). Post-clinical group corresponds to Level 10 (fourth year, after completing advanced clinical coursework). Interns represent the final stage, where students have completed the curriculum and are undergoing supervised clinical practice. Participant demographics by academic level.

Abbreviation: SD, Standard Deviation.

Pretest and Posttest Mean Differences in Arabic Version of the SACRR Questionnaire Scores

Table 2 presents the pretest and posttest SACRR scores, showing significant improvements across multiple domains after clinical exposure, indicating enhanced skills in hypothesis generation, decision-making, and reflective reasoning. The mean overall SACRR score increased from 109.36 ± 11.41 before clinical courses to 116.95 ± 7.40 after clinical courses ($P < 0.0001$), underscoring the value of practical training.

Table 2 Pretest and Posttest Comparisons of Self-Assessment of Clinical Reflection and Reasoning

No.	Items	Pretest	Posttest	P value
1	I question how, what, and why I do things in practice.	4.25±0.88	4.49±0.64	0.063
2	I ask myself and other questions as a way of learning.	4.49±0.58	4.54±0.58	0.453
3	I do not make judgments until I have sufficient data	4.57±0.70	4.70±0.54	0.167
4	Prior to acting, I seek various solutions.	4.29±0.75	4.39±0.71	0.270
5	Regarding the outcome of proposed interventions, I try to keep an open mind.	4.64±0.53	4.62±0.52	0.718
6	I think in terms of comparing and contrasting information about a client's problems and propose solutions to them.	4.43±0.64	4.54±0.58	0.184
7	I look to theory for understanding a client's problems and proposed solutions to them	4.30±0.73	4.51±0.60	0.013
8	I look to frames of reference for planning my intervention strategy	4.39±0.69	4.59±0.57	0.021
9	I use theory to understand treatment techniques.	4.13±0.85	4.51±0.62	0.002
10	I try to understand clinical problems by using a variety of frames of reference.	4.45±0.74	4.67±0.50	0.014
11	When there is conflicting information about a clinical problem, I identify assumptions underlying the differing views.	4.17±0.84	4.49±0.64	0.002
12	When planning intervention strategies, I ask "What if" for a variety of options.	4.20±0.78	4.39±0.66	0.050
13	I ask for colleagues' ideas and viewpoints.	4.45±0.64	4.59±0.55	0.094

(Continued)

Table 2 (Continued).

No.	Items	Pretest	Posttest	P value
14	I ask for the viewpoints of clients' family members.	3.87±0.98	4.36±0.67	<0.0001
15	I cope well with change.	4.20±0.80	4.43±0.60	0.021
16	I can function with uncertainty.	3.29±0.98	4.12±0.83	<0.0001
17	I regularly hypothesize about the reasons for my client's problems.	4.16±0.75	4.55±0.55	<0.0001
18	I must validate clinical hypotheses through my own experience.	3.93±0.96	4.37±0.69	0.001
19	I clearly identify the clinical problems prior to planning intervention.	4.54±0.64	4.74±0.47	0.010
20	I anticipate the sequence of events likely to result from planned interventions.	4.28±0.72	4.68±0.50	<0.0001
21	I anticipate the sequence of events likely to result from planned interventions.	4.28±0.62	4.58±0.52	0.001
22	Regarding a particular intervention, I ask, "In what context would it work?"	4.05±0.67	4.38±0.54	<0.0001
23	Regarding a particular intervention with a particular client, I determine whether it worked.	3.93±0.82	4.42±0.64	<0.0001
24	I use clinical protocols for most of my treatment.	4.20±0.82	4.49±0.58	0.005
25	I make decisions about practice based on my experience.	3.70±0.98	4.36±0.63	<0.0001
26	I use theory to understand intervention strategies.	4.17±0.79	4.43±0.68	0.014
TOTAL SCORE		109.36 ±11.41	116.95 ±7.40	<0.0001

Notes: Comparison of pretest and posttest SACRR item scores, demonstrating significant improvements in multiple domains after clinical exposure.

Internal Consistency and Reliability

Tables 3 and 4 display Cronbach's alpha values for the Arabic version of the SACRR. The high values in both pretest ($\alpha = 0.915$) and posttest ($\alpha = 0.860$) confirm strong internal consistency. These findings support the reliability of the questionnaire for measuring clinical reasoning skills.

Table 3 Reliability Analysis of Pretest of Self-Assessment of Clinical Reflection and Reasoning Using Cronbach's Alpha

No.	Items	Cronbach's Alpha if Item Deleted
1	I question how, what, and why I do things in practice.	916
2	I ask myself and other questions as a way of learning.	914
3	I do not make judgments until I have sufficient data	917
4	Prior to acting, I seek various solutions.	912
5	Regarding the outcome of proposed interventions, I try to keep an open mind.	914
6	I think in terms of comparing and contrasting information about a client's problems and propose solutions to them.	913
7	I look to theory for understanding a client's problems and proposed solutions to them	912
8	I look to frames of reference for planning my intervention strategy	911
9	I use theory to understand treatment techniques.	915
10	I try to understand clinical problems by using a variety of frames of reference.	913
11	When there is conflicting information about a clinical problem, I identify assumptions underlying the differing views.	910
12	When planning intervention strategies, I ask "What if" for a variety of options.	910
13	I ask for colleagues' ideas and viewpoints.	914
14	I ask for the viewpoints of clients' family members.	912
15	I cope well with change.	909
16	I can function with uncertainty.	912
17	I regularly hypothesize about the reasons for my client's problems.	909
18	I must validate clinical hypotheses through my own experience.	912
19	I clearly identify the clinical problems prior to planning intervention.	912
20	I anticipate the sequence of events likely to result from planned interventions.	911

(Continued)

Table 3 (Continued).

No.	Items	Cronbach's Alpha if Item Deleted
21	I anticipate the sequence of events likely to result from planned interventions.	912
22	Regarding a particular intervention, I ask, "In what context would it work?"	911
23	Regarding a particular intervention with a particular client, I determine whether it worked.	910
24	I use clinical protocols for most of my treatment.	911
25	I make decisions about practice based on my experience.	911
26	I use theory to understand intervention strategies.	911
Overall Cronbach's Alpha		0.915

Notes: Internal consistency of the SACRR (pretest). Cronbach's alpha values indicate high reliability.

Table 4 Reliability Analysis of Posttest of Self-Assessment of Clinical Reflection and Reasoning Using Cronbach's Alpha

No.	Items	Cronbach's Alpha if Item Deleted
1	I question how, what, and why I do things in practice.	857
2	I ask myself and other questions as a way of learning.	858
3	I do not make judgments until I have sufficient data	860
4	Prior to acting, I seek various solutions.	852
5	Regarding the outcome of proposed interventions, I try to keep an open mind.	852
6	I think in terms of comparing and contrasting information about a client's problems and propose solutions to them.	851
7	I look to theory for understanding a client's problems and proposed solutions to them	855
8	I look to frames of reference for planning my intervention strategy	855
9	I use theory to understand treatment techniques.	865
10	I try to understand clinical problems by using a variety of frames of reference.	855
11	When there is conflicting information about a clinical problem, I identify assumptions underlying the differing views.	848
12	When planning intervention strategies, I ask "What if" for a variety of options.	849
13	I ask for colleagues' ideas and viewpoints.	856
14	I ask for the viewpoints of clients' family members.	857
15	I cope well with change.	849
16	I can function with uncertainty.	863
17	I regularly hypothesize about the reasons for my client's problems.	851
18	I must validate clinical hypotheses through my own experience.	854
19	I clearly identify the clinical problems prior to planning intervention.	853
20	I anticipate the sequence of events likely to result from planned interventions.	852
21	I anticipate the sequence of events likely to result from planned interventions.	855
22	Regarding a particular intervention, I ask, "In what context would it work?"	853
23	Regarding a particular intervention with a particular client, I determine whether it worked.	850
24	I use clinical protocols for most of my treatment.	856
25	I make decisions about practice based on my experience.	862
26	I use theory to understand intervention strategies.	855
Overall Cronbach's Alpha		0.860

Notes: Internal consistency of the SACRR (posttest). Cronbach's alpha values indicate high reliability.

Discussion

This study validated the Arabic version of the SACRR questionnaire and assessed clinical reasoning skills across different stages of education of physical therapy students. The reliability analysis of the Arabic version of the SACRR in both the pre- and post-questionnaires showed high internal consistency, as indicated by the Cronbach's alpha values of

0.915 and 0.860, respectively. This suggests that the items in the SACRR questionnaire are reliably measuring the same underlying construct and exhibit a reasonable level of consistency when administered at two different points in time, indicating its potential as a reliable tool for assessing clinical reasoning. In concordance with the findings of Karen Brady's 2008 study, which found Cronbach's alpha coefficient of 0.762 for the pretest and 0.846 for the posttest among occupational therapy students, the Arabic version of the SACRR showed a high level of internal consistency, affirming its reliability as a psychometric tool for the assessment of clinical reasoning among allied health students.²¹

Our findings underscore the positive impact of the educational intervention on students' clinical reasoning abilities, regardless of whether they had completed their clinical courses or were still enrolled. Notably, students who completed their clinical courses demonstrated a significantly higher average Arabic version of the SACRR scores compared to before their enrollment. Clinical courses are part of the curriculum and include both theoretical instruction and practical, supervised patient care. Thus, in our study, the term *clinical exposure* refers specifically to these structured clinical courses within the curriculum. For example, post-clinical students scored higher in areas such as hypothesis generation, reflection, and decision-making, indicating the positive effect of clinical exposure on reasoning abilities. These findings align with those of Kobal et al (2021), who explored the impact of pedagogical methods, such as paper-based case studies and authentic patient experiences, on the development of clinical reasoning and critical thinking in physical therapy students using the SACRR questionnaire.²² Although their results showed differences in SACRR scores between experimental groups, they did not reach statistical significance.²² Additionally, our findings are consistent with previous research, which indicates that third-year students employ more advanced reasoning strategies compared to first-year students, who primarily rely on basic strategies.²³

The discrepancy in Arabic version of the SACRR questionnaire scores suggests that clinical exposure has a positive influence on students' clinical reasoning abilities, as evidenced by the significant improvements in Arabic version of the SACRR scores. Students who completed their clinical courses likely had the opportunity to apply theoretical knowledge in real-world patient care settings, thereby sharpening their clinical reasoning skills. This highlights the critical role of clinical exposure in the education of healthcare professionals, emphasizing the practical value of classroom learning.

Several factors influence clinical decision-making and reasoning abilities, which can be categorized as either informative or directive. Novice students often rely heavily on informative factors, such as textbook knowledge, case notes, and verbal instructions, to guide their clinical decision-making. In contrast, experienced students and interns increasingly depend on directive factors, including patient feedback, recognition of clinical patterns, and hands-on assessments.²⁴ This progression reflects the natural shift from theoretical learning to experiential practice and helps explain the significant improvements in SACRR scores observed after clinical exposure. In addition to these shifts, contextual constraints, such as institutional policies, patient demographics, and resource availability, may also shape students' clinical reasoning strategies,²⁵ consistent with Holder et al's findings.²⁵ Together, these influences highlight how clinical reasoning develops through an interplay of knowledge acquisition, experiential learning, and environmental context.

While this study provides valuable insights into the reliability and differences in Arabic version of the SACRR scores, it is not without limitations. The gender imbalance in the sample may have introduced potential bias, and the study was conducted within a specific age range, limiting the generalizability of the results to a broader population. Moreover, a small sample size could be an issue, as it may not be representative of all the physical therapy students, specifically those from one geographical area and institution. The sample size of 76, with a response rate of 38%, limits generalizability. However, the collected data were higher than the recommended sample size in our power analysis.

Limitations and Future Directions

This study provides important insights but is not without limitations. The relatively small sample size and the single-institution design limit the generalizability of the findings. The gender imbalance, with a predominance of female participants, may also have influenced the results. Furthermore, the study focused on a narrow age range within one geographical region, which may not reflect the diversity of physical therapy students in other settings. Despite these limitations, the achieved sample size exceeded the calculated requirement from the power analysis, strengthening the reliability of the results. Future research should involve larger, multicenter cohorts with more balanced demographics to further validate the Arabic SACRR. In

addition, advanced psychometric testing, such as factor analysis and predictive validity studies, is recommended to refine the tool and explore its applicability across other healthcare disciplines and cultural contexts.

Conclusion

The Arabic version of the SACRR questionnaire demonstrated high internal consistency and reliability for assessing clinical reasoning skills in physical therapy students. It can serve as a valid tool for curriculum evaluation and student assessment in Arabic-speaking contexts. Further studies are recommended to validate our findings and the translation of the questionnaire among larger and more diverse populations.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Ethical Review Committee at Majmaah University, Majmaah Province, Kingdom of Saudi Arabia under Project Number MUREC-Feb.19/COM-2023/8-3.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

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