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Reliability and Clinical Utility of the DIMAS Tool for Assessing Physical Difficulty in Muslim Prayer among Frail Older Adults

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Abstract

Frail older Muslims often struggle with Salah due to musculoskeletal issues, yet culturally tailored assessment tools are lacking. The Difficulty in Performing Physical Movements in Muslim Prayer (DIMAS) objectively evaluates physical challenges during prayer. This cross-sectional study assessed DIMAS's reliability and clinical utility, analyzing internal consistency, test-retest reliability, Minimal Detectable Change (MDC), and Minimal Clinically Important Difference (MCID). Results showed excellent test-retest reliability (ICC = 0.98), with MDC = 1.17 and MCID = 1.57. Internal consistency was low (α = 0.43), likely reflecting its multidimensional scope. DIMAS is reliable, clinically meaningful tool for assessing Salah-related physical limitations in frail older Muslims, aiding culturally sensitive care.

Keywords: Salah; Islamic prayer; frailty; older adults; occupational therapy

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1.0 Introduction

The global population is ageing rapidly, with Malaysia projected to become an ageing nation by 2035. Older persons often face physical frailty, which impacts their ability to perform daily activities, including religious practices like Salah. Salah, a pillar of Islam, requires specific physical movements that may become challenging for frail individuals. Despite its importance, there is a lack of standardized tools to assess difficulties in performing Salah among older Muslims. According to the Department of Statistics Malaysia (DOSM, 2023), approximately 10.7% of Malaysians are aged 60 years and above, with frailty prevalence estimated between 8% and 12% among

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community-dwelling older adults (Cheong et al., 2021). This study aimed to evaluate the reliability and clinical utility of the DIMAS tool for assessing physical difficulties during Salah among frail older Muslims. The specific objectives were: (1) to establish the validity (content, face, concurrent, and convergent) of DIMAS, (2) to determine its internal consistency and test–retest reliability, and (3) to calculate its Minimal Detectable Change (MDC) and Minimal Clinically Important Difference (MCID).

2.0 Literature Review

2.1 Prevalence of Older Persons

Malaysia's older population is growing, with 3.5 million individuals aged 60 and above in 2020, projected to reach 5.6 million by 2030 (DOSM, 2020). Ageing is associated with physical, cognitive, and psychosocial challenges that affect occupational performance. Recent studies (Lee et al., 2023; Bohannon et al., 2024) emphasize integrating functional mobility and spiritual engagement in geriatric rehabilitation.

2.2 Functional Assessment and Geriatric Needs

Functional assessments like TUG are widely used in geriatric rehabilitation to measure gait and balance, helping identify fall risk (Bohannon, 2006). Pain scales like VAS also serve as effective tools for evaluating discomfort in older adults (Bijur et al., 2001). However, both tools are generic and do not address culturally significant practices such as Salah. According to McDowell (2006), instruments used with older adults must be adapted to reflect their lived experiences, including spiritual activities.

2.3 Cultural Competency in Occupational Therapy

Occupational therapy emphasizes client-centered and culturally responsive care. However, most religious participation assessments focus on spiritual well-being rather than physical performance. Salah involves biomechanical complexity akin to rehabilitative exercises but remains overlooked in standard tools (Tavakol & Dennick, 2011). DIMAS integrates physical, spiritual, and cultural domains for a more holistic approach. Faith-based rehabilitation frameworks have gained attention for improving compliance and psychosocial well-being among Muslim patients (Rahman & Dahlan, 2022).

2.4 Psychometric Limitations in Culturally Specific Tools

Terwee et al. (2007) and Nunnally and Bernstein (1994) stress the need for validation in context-specific populations. Tools like DIMAS must undergo rigorous psychometric testing to assess content validity, internal consistency, and construct specificity. Given the complexity of Salah movements, a multidimensional tool is required to assess distinct capacities such as strength, flexibility, and balance.

3.0 Methodology

This study employed a cross-sectional psychometric validation design to evaluate the Difficulty in Performing Physical Movements in Muslim Prayer (DIMAS) tool. The methodological process followed the COSMIN guidelines for assessing the measurement properties of patient-reported outcome instruments (Gagnier et al., 2021). Three main participant groups were involved: an expert panel, occupational therapists, and frail older Muslim adults. A 7-day interval was selected to balance recall minimization with stability of clinical status, consistent with psychometric validation protocols (Terwee et al., 2007).

The expert panel (n = 10) comprised clinicians and Islamic scholars selected through purposive sampling. These experts had a minimum of five years' experience in either occupational therapy or Islamic jurisprudence and were tasked with establishing content validity. Each item of the DIMAS tool was rated for relevance, clarity, simplicity, and ambiguity using a 4-point ordinal scale. The Item-Level Content Validity Index (I-CVI) and the Scale-Level Content Validity Index (S-CVI/UA) were used for quantification, following Polit and Beck's (2006) recommendations. Items falling below the I-CVI threshold of 0.78 were revised for clarity and relevance.

To assess face validity, 40 registered occupational therapists were recruited from public rehabilitation centers. These therapists, each with at least three years of clinical experience in geriatrics or neurological rehabilitation, were asked to evaluate the tool's layout, clarity, illustrations, and instructions. Feedback was collected through structured Likert-scale surveys and open-ended responses, which led to refinements such as increasing font size and enhancing visual instructions for improved accessibility.

For concurrent, and convergent validity, a convenience sample of 30 frail older Muslim adults aged 60 years and above was selected. Participants were recruited from outpatient rehabilitation settings and met the following criteria: practicing Muslims with at least one frailty-associated condition (Frail scale), cognitively intact (Mini-Mental State Examination score ≥ 24), and ambulatory with or without assistive devices. Individuals with severe cognitive impairment or unstable medical conditions were excluded.

Concurrent validity was evaluated by comparing DIMAS scores with those from the Timed Up and Go (TUG) test, a widely accepted mobility assessment in geriatric care (Bohannon, 2006). Convergent validity was established by correlating DIMAS scores with pain levels measured using the Visual Analog Scale (VAS), which is commonly used in elderly populations for pain assessment (Bijur et al., 2001).

For internal consistency, Cronbach's Alpha (α) and McDonald's Omega (ω) coefficients were calculated. A value of $\alpha \geq 0.70$ was considered acceptable, while values above 0.80 were regarded as good (Tavakol & Dennick, 2011; Dunn et al., 2014). Test-retest reliability was assessed by re-administering the DIMAS tool after a 7-day interval to the same older adult group. Pearson correlation coefficients were used to evaluate temporal stability, with $r \geq 0.80$ interpreted as excellent (De Vet et al., 2011). Inter-rater reliability was

also calculated using the Intraclass Correlation Coefficient (ICC) and Cohen's Kappa.

Finally, the Minimal Detectable Change (MDC) and the Minimal Clinically Important Difference (MCID) to determine the sensitivity of the DIMAS tool. The MDC was derived using the formula: MDC = 1.96 × √2 × SEM, where SEM = SD × √(1 − ICC) (De Vet et al., 2011).

The MCID, representing the smallest patient-recognized beneficial change, was calculated using a distribution-based approach (SD/2), in accordance with Terwee et al. (2007). All statistical analyses were performed using IBM SPSS Statistics Version 25, with descriptive statistics used to summarize participant demographics and correlation analyses used to assess relationships between variables. Correlation thresholds followed De Vet et al.'s (2011) classification: r = 0.10–0.29 (small), r = 0.30–0.49 (moderate), and r ≥ 0.50 (strong).

4.0 Findings

4.1 Validity Testing Content validity

Content validity was assessed by a panel of 10 experts who evaluated the relevance, clarity, simplicity, and ambiguity of each item in the DIMAS assessment. For the static components, which assess balance and strength/endurance in maintained positions such as standing, bowing, and prostration, all items achieved a perfect Item-Content Validity Index (I-CVI) of 1.00, with unanimous agreement (UA = 1.00) among the experts. The experts emphasized the need for enhanced visual aids to facilitate the scoring of static postures, particularly for elderly respondents.

Regarding the dynamic components, which evaluate flexibility and postural transitions between positions, the results were equally robust, with all items scoring I-CVI = 1.00 and UA = 1.00. The panel suggested specific improvements, including the addition of Bahasa Melayu translations to improve accessibility for elderly users and modifications to the severity scale, such as replacing the term "severe" with "very difficult" to enhance clarity. The result showed at table 1 below.

Table 1: Content Validity Index (CVI) for Static vs. Dynamic Components

Component	Number of Items	I-CVI Range	UA
Static Positions	20	1.00	1.00
Dynamic Movements	21	1.00	1.00

4.2 Validity testing (Face Validity)

Face validity was examined through feedback from 40 occupational therapists who assessed the practicality and clarity of the DIMAS assessment. For the static components, 92.5% of respondents agreed that the instructions were clear and relevant, though 65% recommended increasing the font size to improve readability for elderly users. In contrast, the dynamic components were rated slightly lower in clarity, with 87.5% of respondents finding the descriptions of transitional movements easy to follow. A notable suggestion from 70% of the participants was the incorporation of color-coded visual aids to better illustrate the sequences of dynamic movements. The result showed at table 2 below.

Table 2: Face Validity Feedback (n=40 Respondents)

Aspect	Static (%)	Dynamic (%)	Key Suggestions
Terminology clarity	92.5	87.5	Simplify technical terms
Illustration suitability	85.0	82.5	Add step-by-step visuals
Font readability	65.0	60.0	Increase font size

4.3 Validity Testing (Concurrent Validity)

Table 3: Concurrent Validity Correlations

DIMAS Component	Static (r)	Dynamic (r)	p-value
Balance	-0.43	-0.38	<0.001
Strength & Endurance	-0.39	-0.35	0.002
Postural Transition	–	-0.41	<0.001
Flexibility	–	-0.34	0.007

Concurrent validity was established by comparing DIMAS scores with the Timed Up and Go (TUG) test, a widely accepted measure of mobility. The static components demonstrated strong negative correlations with the TUG test, particularly for balance ($r = -0.43$, $p < 0.001$) and strength/endurance ($r = -0.39$, $p = 0.002$), indicating that better performance in static positions was associated with faster TUG times.

Similarly, the dynamic components showed significant correlations, with postural transitions ($r = -0.41$, $p < 0.001$) and flexibility ($r = -0.34$, $p = 0.007$) both negatively associated with TUG scores. These results confirm that the DIMAS assessment effectively captures mobility-related challenges during Salah. The result showed at table 3.

4.4 Validity Testing (Convergent Validity)

Convergent validity was evaluated by examining the relationship between DIMAS scores and self-reported pain levels using the Visual Analog Scale (VAS). For the static components, balance showed the strongest inverse correlation with pain ($r = -0.48$, $p < 0.001$), followed by strength/endurance ($r = -0.40$, $p = 0.001$), suggesting that individuals with better static performance experienced less pain. Among the dynamic components, postural transitions ($r = -0.45$, $p < 0.001$) and flexibility ($r = -0.37$, $p = 0.005$) also showed moderate negative correlations with pain, reinforcing the tool's ability to identify physical limitations linked to discomfort during prayer movements. The result showed at table 4 below.

Table 4: Convergent Validity with VAS Pain

DIMAS Component	Static (r)	Dynamic (r)	p-value
Balance	-0.48	-0.42	<0.001
Strength & Endurance	-0.40	-0.36	0.001
Postural Transition	–	-0.45	<0.001
Flexibility	–	-0.37	0.005

4.5 Reliability Testing

Internal consistency was evaluated using Cronbach's Alpha and McDonald's Omega. The static components showed excellent reliability for Balance ($\alpha = 0.82$) and good reliability for Strength Endurance ($\alpha = 0.78$). The dynamic components demonstrated acceptable reliability, with Balance ($\alpha = 0.73$), Strength Endurance ($\alpha = 0.72$), Flexibility ($\alpha = 0.71$), and Postural Transition ($\alpha = 0.71$). McDonald's Omega values supported these findings, with $\omega = 0.85$ for static positions and $\omega = 0.74$ for dynamic positions, meeting accepted psychometric standards (Dunn et al., 2014; Tavakol & Dennick, 2011).

Test-retest reliability was assessed using Pearson's and Spearman's correlation coefficients over a 7-day interval. The results indicated extremely high temporal stability, with correlation values ranging from 0.95 to 0.98 ($p < 0.001$) across the 41 DIMAS items (Terwee et al., 2007). These findings are consistent with Cronbach's Alpha values for test-retest reliability, where all static and dynamic components demonstrated excellent reliability ($\alpha = 0.982$ for all subcomponents), as shown in Table 5.

Table 5: Reliability testing

	Component			Interpretation
Internal Consistency testing	Static	Balance	0.82	Excellent reliability
		Strength Endurance	0.78	Good reliability
	Dynamic	Balance	0.73	Acceptable reliability
		Strength Endurance	0.72	Acceptable reliability
		Flexibility	0.71	Acceptable reliability
		Postural Transition	0.71	Acceptable reliability
Test-Retest Reliability	Static	Balance	0.982	Excellent Reliability
		Strength Endurance	0.982	Excellent Reliability
	Dynamic	Balance	0.982	Excellent Reliability
		Strength Endurance	0.982	Excellent Reliability
		Flexibility	0.982	Excellent Reliability
		Postural Transition	0.982	Excellent Reliability

4.5 Minimal Clinically Important Difference (MCID) and Minimal Detectable Change (MDC)

To support clinical interpretation of the DIMAS tool, the Minimal Clinically Important Difference (MCID) and Minimal Detectable Change (MDC) were established. The MCID, calculated using the 0.5 standard deviation method (Norman et al., 2003), was 1.579 points for all domains (Static Balance, Strength/Endurance, Dynamic Balance, Flexibility, and Postural Transition). This threshold reflects the smallest change patients would perceive as meaningful.

The MDC_{95}, derived from a standard error of measurement (SEM) of 0.423, was 1.173 points, indicating that score changes beyond this value represent true differences rather than measurement error (Stratford & Riddle, 2022). Critically, the MCID (1.579) exceeded the MDC (1.173), demonstrating that the tool distinguishes not only statistically detectable changes but also those with clinical relevance.

Together, these values offer a practical, evidence-based guide for evaluating individual progress and intervention efficacy in both research and practice. The result showed at table 6 below.

Table 6 Minimal Clinically Important Difference (MCID) and Minimal Detectable Change (MDC)

Component	Component	Statistics / Value	Interpretation
Minimal Detectable Change	Static and Dynamic	1.173 points	Reflects true change beyond error
Minimal Clinically Important Difference	Static and Dynamic	1.579 points	Smallest beneficial patient-recognized change

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5.0 Discussion

5.1 Content and Face Validity

The expert agreement on content validity (I-CVI/S-CVI = 1.00) exceeds the recommended threshold in psychometric validation studies, aligning with Polit and Beck's (2006) criteria for high-quality patient-reported measures. Likewise, face validity feedback from occupational therapists indicated high usability and clinical relevance, reinforcing arguments by Mokkink et al. (2019) that stakeholder involvement is essential for practical adoption.

5.2 Concurrent and Convergent Validity

The moderate to strong negative correlations between DIMAS and both the TUG and VAS scores (r = -0.32 to -0.48) are consistent with previous studies on performance-based mobility tools and pain-function relationships in older adults (Sibley et al., 2021; Caneiro et al., 2020). These findings confirm the construct validity of the DIMAS tool within the biopsychosocial framework of rehabilitation (Gagnier et al., 2021).

5.3 Reliability, MCID and MDC

The internal consistency values (α = 0.71–0.85) are within acceptable to good ranges according to Tavakol and Dennick (2011), while test-retest reliability (ICC = 0.95–0.98) exceeds psychometric benchmarks for clinical tools (Koo & Li, 2016). The MCID of 1.579 and MDC of 1.173 are consistent with best practices for detecting meaningful change (Stratford et al., 2016; Copay et al., 2018). Importantly, MCID > MDC confirms the tool's responsiveness (de Vet et al., 2022).

5.4 Limitations and Future Directions

The current sample, limited to older Malaysians, restricts generalizability. As noted by Middleton et al. (2023), cross-cultural validation is essential for broader clinical adoption. The shift toward digital health assessments highlights the need to adapt DIMAS to electronic formats and examine its usability in virtual care (Bohannon et al., 2024). Furthermore, future research should explore predictive validity and responsiveness to interventions, following the guidance of Walton et al. (2022) on outcome measurement innovation. Beyond psychometric validation, the DIMAS tool offers practical implications for clinical practice. Occupational therapists can use it to tailor rehabilitation programs that respect religious obligations while addressing physical limitations. Moreover, its framework may inspire the development of culturally adapted assessment tools for other faith traditions

6.0 Conclusion & Recommendations

The DIMAS tool is a valid, reliable, and culturally responsive assessment for evaluating physical difficulties in Salah among frail older Muslim adults. It enables more tailored interventions in rehabilitation and supports spiritual participation in clinical care. Future research should validate the tool across diverse populations and explore digital adaptations. This study is limited by its small sample size and focus on older Malaysians, which may restrict generalizability. Future research should include multi-ethnic and cross-national samples to examine cross-cultural applicability. Longitudinal studies are recommended to assess the tool's responsiveness to therapeutic interventions. Adapting DIMAS into a digital or app-based format could enhance accessibility in telehealth settings

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Paper Contribution to Related Field of Study

This paper makes a significant contribution to the field of health sciences.

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