ORIGINAL ARTICLE OPEN ACCESS

Predictive Cultural Model for Family Caregivers of Older People with Musculoskeletal Pain in East Coast Malaysia: A Pilot Validation Study

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ABSTRACT

Background: In Malaysia, family members play a major role in caring for the elderly as informal caregivers. Caregiving can be physically, emotionally, financially, socially, and culturally demanding. Despite these challenges, many caregivers continue to provide care because of a strong sense of family responsibility rooted in Malaysian culture and its multiethnic society. Therefore, culturally appropriate assessment tools are important to ensure valid and meaningful results across different populations. This pilot study aimed to validate the psychometric properties of the translated tools to support the development of a predictive cultural model for family caregivers.

Methods: A pilot cross-sectional study involved 30 caregivers from East Coast Malaysia. They completed the translated questionnaires which assess caregiver burden, attitudes, needs, and views on culturally competent healthcare. Internal reliability only was tested using SPSS version 29.

Results: A total of 30 caregivers took part (23.3% male, 76.7% female), and 90% were caring for their own parents. The length of caregiving ranged from 3 to 120 months, with an average of 31 months. All tools showed acceptable to excellent reliability, with Cronbach's Alpha values between 0.610 and 0.916.

Conclusion: The tools are reliable and suitable for measuring caregiver burden, attitudes, needs, and views on culturally appropriate care. Future studies should involve a larger and more diverse group of caregivers to make the findings more general.

Keywords: Family caregiver; Older people; Strain; Musculoskeletal pain, Measurement tools

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Article History:
Submitted: 8 August 2025
Revised: 2 November 2025
Accepted: 11 November 2025
Published: 30 November 2025

DOI: 10.31436/ijcs.v8i3.484
ISSN: 2600-898X

INTRODUCTION

Globally, the family is the primary social structure for the care of elderly individuals, and older people mostly rely on their families for health and monetary assistance. Caregiving by family members is a type of informal care in which family caregivers offer care to elderly members of their families (1). According to one survey, 5.7% of the adult population in Malaysia are informal caregivers (2). Due to strong filial obligations, family caregivers often face significant burdens and may feel frustrated when unable to provide the level of care they desire (3). Family caregivers felt the sense of obligation and perceive caring as important and meaningful for them, as it gives them the ability to connect, attach, and assist as family members. This sense of obligation is emphasized particularly among caregivers influenced by Christian and Muslim beliefs (4). It should be highlighted that, despite the burden of caregiving, the carers emphasized a strong feeling of filial obligation that drove them to continue caring. Yet, there are various aspects of possible risks linked with self-care and caring that must be scrutinised to avoid any harm to both family caregivers and older individuals.

Older people with musculoskeletal pain are more likely to sustain a variety of injuries, including falls. Therefore, to avoid these conditions, it is critical to highlight the framework related to family caregivers who provide care to elderly with musculoskeletal pain, since they will be responsible for caring for frail older individuals once they are discharged from healthcare facilities. Identifying factors influencing the lives of carers will aid in the development of suitable supporting interventions for this vulnerable group (5). Among others, cultural factors are crucial/highly imperative to guarantee that elderly and family caregivers receive adequate care (6). This is very crucial to be considered because Malaysian carers consist of multiple ethnicities and are strongly influenced by their culture in many aspects of their lives. This characteristic held by Malaysian carers could become highly challenging for healthcare providers in providing suitable support for them, particularly in caring for their ill elderly. Thus, it is strongly believed that any intervention or support designed for them should be culturally integrated to be able to address their needs effectively. Therefore, when designing culturally appropriate policies and initiatives to promote caregiver health, the key sociodemographic disparities should be acknowledged (7). However, in developing a predictive cultural model, validation is crucial to ensure the predictive model is constructed on accurate, reliable, and culturally meaningful data; otherwise, the model's predictions and interpretations would lack credibility and scientific rigor.

Many studies have explored the burden and challenges of family caregivers. Similarly, several studies have also focused on the cultural competency among healthcare personnel. However, little has been done to investigate the culturally related factors of family caregivers for older people with musculoskeletal pain, specifically in Malaysia and its validation. Future findings may aid in determining the training needs among family caregiver as it is noted that more research needed to examine the unmet training requirements of Malaysian caregivers as the resources tailored to the requirements of the caregiver is critical in providing support for their caring obligations and health care professionals play an important role in linking informal carers to the resources that they need (2). Thus, this study aimed to validate the preliminary psychometric properties of the tools for a predictive cultural model development for family caregivers of older people with musculoskeletal pain in East Coast Malaysia.

METHODS

Measurement Tools

This study utilized several validated tools that were translated and adapted into Malay. These instruments were chosen to assess caregiver strain, attitudes toward obligation to care, perceived needs, and perceptions of culturally competent healthcare. Only selected items were used to enhance the content validity, cultural relevance, and efficiency of the instrument, ensuring that each retained item accurately represents the construct being measured within the Malaysian caregiving context. The Modified Caregivers Strain Index Questionnaire (M-CSI) (8) consists of 13 items that measure the challenges of caregiving. Responses are scored as: "yes", on a regular basis =2; while "yes" sometimes =1; and "no" =0. Higher score indicates greater caregiver

strain. The M-CSI is a reliable tool for the evaluation of caregiving strain levels experienced by family caregivers. The instruments underwent forward-back translation by experts from English to Malay involves four translators (two forward, two backward). The internal reliability coefficient is slightly higher (0.90) than the coefficient originally reported for the CSI in 1983 (0.86) (12).

Caregivers' attitudes were assessed using the Caregivers' Attitude towards Obligation to Care (9). From the original nine domains, only the six items measuring obligation to care were selected for this study with the response set of [1] not at all true, [2] a little true, [3] somewhat true, [4] quite a lot true, [5] completely true. The higher the score, the higher the feeling of obligation to care. The questionnaire had a reliability of 0.78 (8).

The needs of family caregivers were assessed using the Family Inventory of Needs (FIN) (10). The FIN contains 20 items rated across two subscales: FIN–Importance, which measures the importance of each care need, and FIN–Fulfillment, which assesses whether these needs are met by healthcare professionals. This study only used the FIN–Importance subscale (6 items), rated on a scale from 0 (not at all important) to 10 (very important). The internal consistency of FIN–Importance was high (Cronbach's a of 0.94), supporting its suitability for clinical settings (10).

The Patient Perspective – Cultural Competency in Healthcare Scale (PP-CCHS) (11) was used to evaluate caregivers' perceptions of healthcare personnel's cultural knowledge. Three items were rated on a 4-point Likert scale, ranging from 1 (not important) to 4 (very important), with Cronbach's alpha of 0.83, indicating it is reliable to be used (12). Healthcare personnel's practices regarding culturally appropriate care were assessed using a self-assessment questionnaire (12). It consists of 5 questions with the rate level of frequency from 0 (low/disagree strongly) to 100 (high/agree strongly). The internal consistency was good with Cronbach's alpha 0.86 (9).

Finally, the Clients' Perceptions of Providers' Cultural Competency (CPOPCC) (13) was included to capture caregivers' experiences of culturally competent care at the provider and organizational level (13). The 22-item instrument, revised to a dichotomous yes/no response format for easier use among clients with limited English proficiency, demonstrated strong reliability (Cronbach's α=0.89). Two separate tools were combined into a single scale due to overlapping constructs, demonstrate psychometric coherence, and together enhance content coverage, while pilot testing confirms reliability and validity in the target population. Overall, validating these tools in Malaysia is essential to ensure their cultural and linguistic appropriateness, minimizing misinterpretation and bias in assessing caregivers' needs and perceptions.

Study Setting

The study was conducted in East Coast Malaysia, focusing on family caregivers of the elderly with chronic musculoskeletal conditions from Kelantan, Terengganu, and Pahang. A combination of purposive and convenience sampling approach was used to ensure that participants are both relevant to the study aims and accessible for participation, enabling the collection of context-specific data needed to develop and validate a culturally grounded predictive model. A sample of 30 participants were recruited, which meets the recommended minimum sample size for pilot reliability studies (14).

Study Participants

Eligible participants were family caregivers who met the following inclusion criteria: [1] aged 18 years and older; [2] caring for an older adult (≥ 60 years) with chronic musculoskeletal pain; [3] providing care for at least three months; [4] living with the care recipient for at least three months; [5] own a mobile phone or device to complete online questionnaires; and [6] fluent in Malay or English. Exclusion criteria for this study included: [1] caring for older adults with chronic musculoskeletal pain and any other chronic conditions such as cancer or stroke; [2] caring for older adults with intellectual disabilities and/or cognitive impairment; [3] receiving payment for caregiving or external help from informal caregivers; and [4] caregiving for older adults in institutional settings (e.g. old folks' home, nursing, or residential home). Data was analysed using the Statistical Package for the

Social Sciences (SPSS), Version 29 (IBM Corp., Chicago, Illinois, USA), focusing on participant characteristics and internal reliability while factor analysis was not feasible due to small sample.

Ethical Approval

Ethical approval was obtained from the Kulliyyah of Nursing Postgraduate Research Committee (KNPGRC) and the International Islamic University Malaysia Research Ethics Committee (IREC). Participation was voluntary and written informed consent was obtained from all the participants prior to data collection. Furthermore, the data was kept confidential.

RESULTS

Characteristics of Participants

The sociodemographic characteristics of the 30 caregivers were presented in **Table 1**. Participants' ages ranged from 21 to 80 years, with a mean of 42.17 years. The majority were female (76.7%), and all were Malay (100%). Half (50%) were married, while 14 (46.7%) were single and 1 (3.3%) were divorced. More than half were employed (56.7%), with 10 (33.3%) of unemployed, and 3 (10%) retired. Most participants cared for their parents (90%), while only 1 (3.3%) cared for grandparents and children (6.67%). The duration of caregiving ranged from 3 to 120 months, with an average of 30.97 months.

Descriptive Statistics

Internal consistency of the instruments is summarized in **Tables 2–5**. The Modified Caregivers Strain Index (M-CSI) demonstrated excellent reliability (Cronbach's α=0.916). The Caregivers' Attitude towards Obligation to Care scale showed lower reliability (Cronbach's α=0.610), indicating only an acceptable level of internal consistency. The Family Inventory of Needs – Importance (FIN-Importance) demonstrated good reliability (Cronbach's α=0.863). Finally, the healthcare personnel factors instrument (29 items) showed good reliability (Cronbach's α=0.854).

Table 1: Sociodemographic Characteristics of Caregivers' (N=30)

Sociodemographic characteristics		Frequency (n)	Percentage (%)
Gender	Male	7	23.3
	Female	23	76.7
Ethnicity	Malay	30	100
	Chinese	0	0
	Indian	0	0
Marital status	Single	14	46.7
	Married	15	50.0
	Divorced	1	3.3
Employment status	Employed	17	56.7
	Non-employed	10	33.3
	Retired	3	10
Caregiver to	Children	1	3.3
	Grandparents	2	6.7
	Parents	27	90.0

Table 2: Internal Reliability of the Modified Caregivers Strain Index (M-CSI)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.916	0.917	13

Table 3: Internal reliability of Caregivers' Attitude towards Obligation to Care

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.610	0.654	6

Table 4*:* Internal reliability of Family Inventory of Needs – Importance (FIN - Importance)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.863	0.902	6

Table 5*:* Internal Reliability of the Healthcare Personnel Factors Instruments

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.854	0.935	29

DISCUSSION

The demographic analysis of the participants provides important insights into the caregiving population in East Coast Malaysia. The predominance of female caregivers (76.7%) reflects global patterns indicating that women predominantly take on caregiving responsibilities (2). All participants were Malay. However, the selection of a homogeneous Malay sample is a thoughtful methodological decision intended to ensure cultural uniformity and theoretical clarity in the development of the prediction model. Once validated, the framework can be developed and tested with other ethnic groups to improve its applicability in Malaysia's multicultural circumstance. The fact that most participants cared for their parents (90%), reflecting the strong familial expectations in Malaysian society regarding elderly care (6). This highlights the significance of family-based caregiving in Malaysia, where traditional values emphasize filial responsibility. The average caregiving duration of 30.97 months suggests that many caregivers experience prolonged caregiving responsibilities, which can contribute to long-term strain and stress.

The findings of this study validate the M-CSI as a reliable tool for assessing caregiver strain. The Cronbach's alpha value of 0.916 indicates excellent internal consistency, suggesting that the translated instrument maintains strong reliability similar to the original version. This aligns with previous validation studies conducted in different cultural contexts, such as Sinhala (15) and Malay (16,17). High reliability scores have also been reported in studies assessing caregiver burden using M-CSI, reinforcing its effectiveness as a validated instrument (8,15).

Similarly, the FIN-Importance scale (α=0.863) and the healthcare personnel factors instrument (α=0.854) showed strong internal consistency. In contrast, the Caregivers' Attitude towards Obligation to Care scale demonstrated only acceptable reliability (α=0.610), which is lower than the reliability reported in the original version (α=0.788). This suggests that cultural and linguistic differences may influence how obligation to care is conceptualized, highlighting the need for further refinement or contextual adaptation of this instrument. Overall findings provide the psychometric and conceptual foundation for a predictive cultural model, identifying reliable constructs, culturally relevant items, and meaningful relationships among caregiver variables, which will inform the specification and development of an accurate, context-sensitive predictive framework.

Despite the positive reliability findings, several limitations must be acknowledged. The study employed a relatively small sample size of 30 participants, which may not fully capture the diverse experiences of all Malay-speaking caregivers. Additionally, the purposive and convenience sampling methods may have introduced selection bias, potentially limiting the generalizability of the findings to the broader population (18). While

next phase intends on predictive modeling, future research with a larger and more diverse sample size is recommended to further validate the instrument and explore its applicability across different caregiving contexts. Incorporating qualitative approaches may also enhance the understanding of caregiver strain by capturing the lived experiences of caregivers, as suggested by previous studies on caregiver burden (2,6).

CONCLUSION

This pilot study established the preliminary psychometric validity and reliability of the instruments designed for developing a predictive cultural model for family caregivers of older individuals with musculoskeletal pain in East Coast Malaysia. The tools indicated acceptable to excellent reliability, indicating that they are appropriate for assessing caregiver burden, attitudes, needs, and perceptions of culturally competent care. The great internal consistency adds to their usefulness in both research and clinical settings for identifying caring issues and guiding culturally appropriate solutions. Given Malaysia's aging population and the increased responsibilities assumed by family caregivers, the availability of culturally appropriate and validated assessment techniques is critical for developing effective support programs and evidence-based policies.

Future studies should aim to expand the sample size and include caregivers from diverse socioeconomic backgrounds to enhance the generalizability of the findings. Additionally, qualitative research could complement quantitative assessments by exploring caregivers' lived experiences in greater depth. By strengthening the understanding of caregiver strain within the Malay-cultured community, healthcare professionals and policymakers can better support family caregivers and improve the quality of life for both caregivers and elderly individuals under their care.

CONFLICT OF INTEREST

The authors declared that there is no conflict of interest.

FUNDINGS

The study was self-funded by the authors.

ACKNOWLEDGEMENTS

The authors would like to express our gratitude to all family caregivers who have participated in this study.

AUTHOR CONTRIBUTIONS

NSMJ: Contributed the entire project and was directly involved in both data collection and data analysis.
CACA: Participated in the investigation and conducted formal analysis.
MKCH: Participated in the investigation and conducted formal analysis.
MKZHF: Participated in the investigation and conducted formal analysis.
NAM: Participated in the investigation and conducted formal analysis.

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