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DEVELOPMENT AND VALIDATION OF THE MIGRATION IMPACT ON ELDERLY PARENTS SCALE (MIEPS)

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Abstract

Background: A specific scale is essential for reporting the wide spectrum of feelings among the geriatric population through comparative studies. The 'Migration Impact on Elderly Parents Scale' measures the physical, emotional, financial and social effects of migration among left-behind senior parents. This scale assesses the psychological factors affecting elderly people whose children have migrated either outside the country or within. This helps to identify their special requirements and hence guides healthcare services, support programs and policies for minimizing adverse consequences.

Methods: Scale development followed a structured, multi-stage psychometric process consisting of construct definition, item generation, and refinement. An initial 31-item pool was created from literature review, cognitive interviewing, expert consultation, and focus group discussions. Subsequent content validation by a six-member expert panel using the Content Validity Ratio (CVR) and kappa statistics yielded a 25-item scale. A pilot study with 60 elderly parents established reliability and validity using test–retest agreement, Cronbach's alpha, Pearson correlations, and criterion measures. Construct validity was evaluated via Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

Results: The scale demonstrated strong reliability (Cronbach's $\alpha = 0.78$) and high test–retest consistency (96% agreement). EFA revealed a five-factor solution—emotional, social, physical, financial, and communication well-being accounted for 89.6% of total variance, with factor loadings exceeding 0.80. CFA confirmed excellent model fit ($\chi^2/df = 2.01$, CFI = 0.94, TLI = 0.92, RMSEA = 0.042). Criterion validity correlations supported convergent and discriminant validity across domains.

Conclusion: Pretesting the scale has helped improve comprehension and specificity. Face and content validity were evaluated by subject matter experts. Critical feedback and expert opinions helped develop and further refined this scale. This tool is important because it captures the various facets of emotions and challenges of the geriatric population whose children have migrated. This will subsequently enable us to lend targeted support and interventions to this growing vulnerable group.

Keywords: Migration, geriatric, emotional well-being, physical well-being, social well-being, financial well-being, mental health

BACKGROUND

In today's globalized era, the younger population is migrating to places of promise both within the country and to foreign lands. For young people, there are many opportunities for personal growth, so migration means hope and better prospects. On the other hand, for the older generation, it is often a mixed reaction. The movement of their loved ones has a great impact on the psyche of the elderly population. Pontes et al. [1] discuss the development and validation of a relevant psychometric scale. MIEPS was designed in accordance with the recommended approach. The Migration Impact on Elderly Parents Scale (MIEPS) is the outcome of a systematic exploration and comprehensive understanding of the impacts. The scale helps measure the psychological, emotional, social and financial well-being of older adults, which has been impacted by the migration of their adult children.

A thorough study of the literature related to the impacts of migration on geriatric well-being has provided a comprehensive framework. Kalisch et al. [2] evaluated everyday competence in the geriatric population. MIEPS was subsequently developed in a systematic and phased manner. Thereafter, an item pool was created and subsequently refined in stages through focus group discussions, brainstorming, testing and retesting. After every stage of refinement, the specificity and clarity of the items improved, which increased accuracy and validity. Sixty older adults were chosen as the sample population for initial testing of the MIEPS. The data collected provides insight into the range of emotions and experiences of elderly parents whose children have migrated either within the country or gone abroad. Therefore,

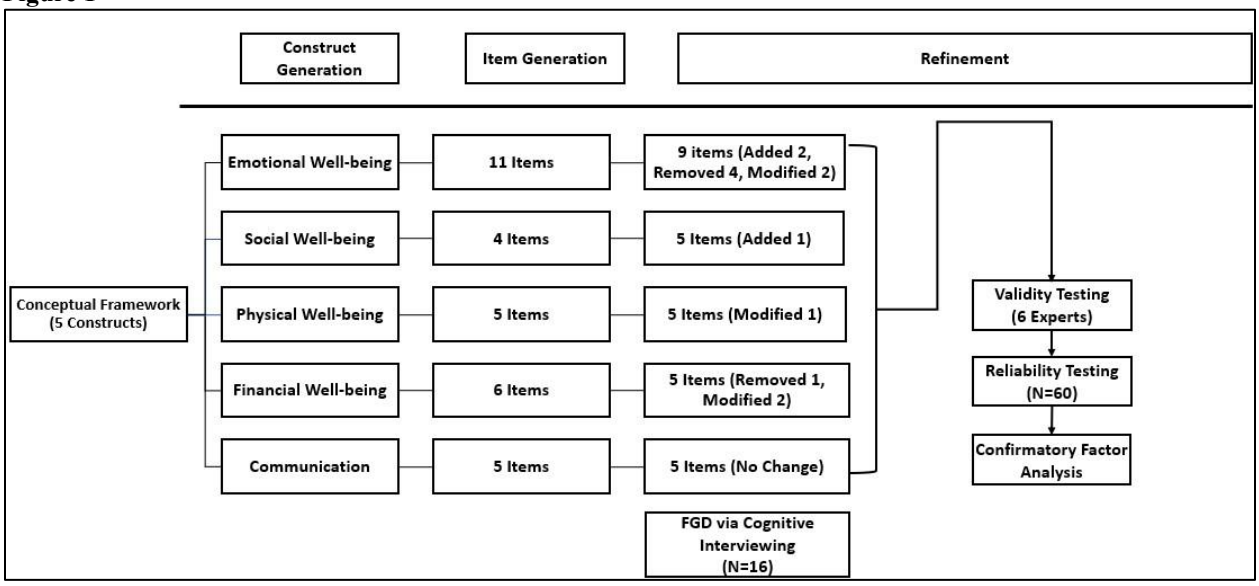
item analysis and factor analysis have been proven to be helpful in gauging the reliability and efficacy of the scale as demonstrated by El-Den et al. [3]. The exercise of item analysis helped focus on the most relevant and distinct items so that they could be retained. Factor analysis was used to study and balance the underlying structure of this scale. These steps help to ensure that MIEPS accurately reflects the wide range of impacts (emotional, social, and physical health and social aspects) of migration on elderly individuals. Swan et al. [4] highlighted the practical application of psychometric principles in tool development aligned with the methodology used for MIEPS.

MIEPS addresses the growing need for a precise scale to assess the various effects of the migration of older adults. Tanvi et al. [5] focused on a single factor, thereby ignoring other factors that provide a comprehensive understanding. On the other hand, MIEPS evaluates multiple dimensions of the well-being of elderly people in the context of migration. This scale is holistic and robust in its approach, enabling reliable and valid measurement. Through rigorous psychometric testing and scientific validation processes, and expert evaluation of facial and content validity, the MIEPS has emerged as a very reliable scale. It will be invaluable for future researchers, policy makers and practitioners to plan and develop suitable support systems and interventions to aid the geriatric population impacted by the migration of adult children.

METHODS

MIEPS was the outcome of a systematic and standardized process, as shown in Figure 1. Establishing a conceptual frame was the first step. This was followed by a methodical generation of an item pool. The next stage involved iterative refinement of the item pool on the basis of the feedback received. Finally, validity testing and reliability testing followed.

Figure 1



Phases of development of the scale

The conceptual framework consists of three phases, namely the construct generation phase, the item generation phase and the refinement phase as outlined by Acar et al. [6] and Muthu et al. [7]. In the first phase, after much investigation and study, the constructs identified all the psychological aspects that might affect the mental health of elderly parents who were left-behind when their adult children migrated. In the second phase, a scale with a pool of 31 items was developed after scrutiny. Eleven items were created under the emotion well-being construct. Four items under the social well-being construct, 5 items under the physical well-being construct and 6 items under the financial well-being construct were included. Finally, the communication aspect covered 5 items. The refinement phase, in which cognitive interviews and discussions were conducted with focus groups where there were changes to the items in each construct, followed. For the emotional well-being construct, 2 items were added, 4 items were removed, and 2 were modified, reducing the count to 9 items. In phase 1, more items were added, resulting in a score of 5. In the physical well-being phase, no items were removed or added; instead, 1 item was modified for clarity. For the financial well-being construct, 1 item was removed, and 2 items were modified, resulting in a score of 5. Finally, in the communication construct, there was no change. Hence, the number of items was 29. Finally, in the refinement phase, validity testing, reliability testing and confirmatory factor analysis were performed. During validity testing, the item pool was further reduced to 25 items, as the CVR values were lower than the minimum critical value for three items and hence were removed from the pool.

Scale Design and Construction

The design envisioned a conceptual framework that was comprehensive in nature to encompass all aspects of the delineation of parental satisfaction. The framework considers all aspects and dimensions of satisfaction among elderly parents whose adult children have migrated within the country or moved abroad. Each variable was converted into a distinct construct to ensure the accuracy of the measurement. The major constructs identified were emotional well-being, social well-being, physical well-being, financial well-being and communication factors. The relevance and significance of these constructs lies in the fact that they contribute to the overall well-being of elderly parents in the context of their children's migration.

Emotional Well-being

Emotional well-being refers to the psychological state of parents, including their feelings of happiness, sadness, anxiety, and overall mental health. This construct assesses how the relocation of children, either internationally or domestically, impacts their emotional stability and resilience. The items within this construct might include statements related to feelings of loneliness, emotional support received from children, and the general emotional impact of being separated from one's children.

Social Well-being

This refers to the impact of children's migration on the social life of parents, which in turn impacts their well-being. The construct captures the quality and frequency of parents' social interactions. It evaluates the extent to which parents mingle with relatives and friends in the absence of their own children. This construct also focuses on social life and the support network available. The items may include questions about how they perceive the support available and the frequency of social interactions.

Physical Well-being

Physical well-being refers to the health and physical condition of the parent. This construct provides insight into how the migration of children affects parental health. It also includes access to health care, health status, chronic illness, if any, and physical activity levels. The idea is to understand the relationship between the absence of children and the impact on the health of the parent.

Financial Well-being

Financial well-being implies a sense of economic stability and security that parents feel in the absence of their adult children who have migrated. This construct helps us understand the financial independence or dependence of the geriatric population whose children have migrated within the country or abroad. This also helps to gain insight into the financial support provided by the children. Items on financial resources, commitments, financial status and resultant changes or stress due to the migration of the children are included in this construct.

Communication

This construct measures the frequency and quality of communication that exists between elderly parents and their children who have migrated. Access to technology, challenges in the use of technology, and the effectiveness, frequency and quality of communication determine the satisfaction level of parents.

A study of existing scales from Tanvi et al. [5] and Kalisch et al. [2] helped develop these constructs. Some of the items were adopted in their original form, and a few were customized to better align with the objectives of the current research. Finally, a set of valid and relevant items was created that could accurately measure the essence of each construct. A prudent combination of these constructs within the conceptual framework has resulted in a comprehensive scale to assess the well-being and satisfaction of elderly parents in the context of their children's migration. A pilot sample of 60 elderly parents was recruited based on recommendations for initial psychometric validation studies, which typically require 30–60 participants for item refinement and exploratory factor analysis.

Participants and Sampling

A purposive sampling strategy was used to recruit elderly parents aged 60 years and above who had at least one adult child who migrated either internationally or to another Indian state for a minimum duration of one year. Participants were recruited from senior citizen associations, community health centers, and residential neighborhoods in Tamil Nadu, India between Sep and Dec 2024.

Inclusion criteria were: (a) age ≥ 60, (b) ability to provide informed consent, (c) having at least one child living away due to migration, and (d) ability to communicate in Tamil or English.

Exclusion criteria were: (a) diagnosed dementia or cognitive impairment, (b) severe psychiatric illness, and (c) inability to complete the questionnaire independently.

Ethical approval was obtained from the Institutional Ethics Committee of Sri Ramachandra Institute of Higher Education and Research Committee (**Ref. No. DHR/ICMR Registration No: EC/NEW/INST/2023/TN/0293**) in accordance with ICMR COVID 19 Research Ethics guidelines. Written informed consent was obtained prior to participation.

Table 1 shows the demographic details of the participants of the pilot study. This approach aligns with standard research practices, where a smaller-scale pilot study is conducted to assess the feasibility and refine the methodology before the full-scale study as quoted by In et al. [8]. The pilot study helps ensure the reliability and validity of the research design, inclusion and exclusion criteria, data collection methods, and other critical aspects of the main study.

Table 1. Demographic details of the participants

Total Participants	Avg Age	Gender		Education			Source of Income		Socio-economic Status			Mode of Communication	
		M	F	UG	PG	None	Pension	Others	Low	Medium	High	Audio calls	Audio and Video calls
60	74	30	30	24	8	28	38	22	16	35	9	2	58

Systematic development of an item pool

Keeping each construct of the conceptual framework in mind, a set of items was generated, ensuring that all dimensions were taken into consideration. Furthermore, a critical analysis helped to drop, add or refine some items. The items chosen reflect a whole gamut of attributes in unambiguous terms. Double negatives, slang and abbreviations were avoided. Eventually, 31 items were obtained after scrutiny. For each construct of the conceptual framework, a set of item pools was generated covering all dimensions, such as emotional well-being, social well-being, physical well-being, financial well-being and communication, within each of the constructs. To ensure robustness and clarity, multiple techniques and strategies were employed.

A study of existing validated scales demonstrated by Kalisch et al. [2] and Tanvi et al. [5] proved to be highly useful. The items were either retained in their original form or modified to align with the objectives of the current research. The reliability and validity of the earlier established scales have provided a solid foundation. This formed the basis for generating the initial item pool. Psychologists, geriatric caretakers and specialists, subject matter experts, and academicians were consulted to arrive at the precise items in the construct. Therefore, relevance and comprehensiveness were ensured. A review of the relevant literature, particularly related to the well-being of elderly parents of adult children who have migrated, provided useful insights into key issues and areas of concern and relevance. Face-to-face interviews with elderly parents provided insight into the challenges they faced and their experiences. Real-world challenges and emotions clearly manifested during the interviews. This has helped to generate items to cover all aspects of the well-being of the elderly parents whose children have migrated. This step-by-step process ensures that MIEPS is robust and comprehensive. The five dimensions dealt with in MIEPS cover all facets of well-being, making it a very reliable scale for measuring the well-being of the geriatric population that has been impacted by the migration of their adult children.

Refinement of the item pool

After a series of discussions with a focused group of professionals dealing with geriatric issues and involved in geriatric care, which included psychologists, subject experts, counsellors and academicians from reputed institutions, the items in the scale were refined. Feedback was obtained from doctors who specialize in geriatrics and researchers in the relevant field to fine-tune the items as referenced by Wong et al. [9]. Two focus groups (n = 8 each) were conducted in a private meeting room within the Geriatric Outpatient Department. Each session lasted approximately 90 minutes and followed a semi-structured guide. Discussions were audio-recorded, transcribed verbatim, and analyzed using inductive thematic coding. Themes that emerged (emotional strain, loneliness, technological barriers, financial pressure, shifting family roles) informed item revisions. Above all, parents of both Non-Resident Indians and Resident Indians, who live independently, (subjects of the study), were also an integral part of the focus group. Table 2 shows the members who formed the focus group.

Table 2. Members of the Focus Group Discussion

Participants	No. of participants
Academicians	3
Psychologists	3
Linguistic person	1
Geriatric consultants	3
Parents of NRIs	3
Parents of Resident Indians	3
Total	**16**

The feedback provided by the focus group was instrumental in refining the scale. One of the primary recommendations was to convert the questions into item statements, ensuring that they were succinct and clear. Additionally, the group suggested incorporating negative items into the scale. This inclusion aimed to counteract response bias and increase the scale's reliability by requiring respondents to engage more thoughtfully with the items. Another valuable suggestion was to make the data collection anonymous, so that the respondents would be genuine in their response. In the initial stage, data collection included the respondent's name, but with respect to the advice of the focus group, anonymity was maintained thereafter. This encouraged participants to be more spontaneous and candid in their response. In one of the items, the option of communication was given. The focus group recommended that a more specific distinction between audio calls and video calls be made. This addition is very significant, as it has very different impacts on the well-being of the elderly parents of children who have migrated. This suggestion has helped in understanding the finer nuances and details in data collection, which will ensure a better understanding of the role of communication modes in the satisfaction and well-being of elderly respondents. The iterative approach to refining the items resulted in a very comprehensive, relevant and clear item pool that, in turn, can measure the various dimensions of well-being of the respondents. Content validity and applicability to the target group have been greatly enhanced because of the refinement process involved. MIEPS stands out as a reliable and robust scale to assess the impact of the migration of adult children to elderly parents because of the collaborative efforts of experts and researchers. Given the importance of the role of the focus group, people with diverse expertise and experience were included in the research scale, the Migration Impact on Elderly Parents Scale (MIEPS). Three academicians with profound knowledge of research design, data analysis and methodology were included. With their input and guidance, a well-structured format was created. Their critical feedback, scrutiny and observations from 360 degrees have resulted in a very robust scale.

In the focus group, the study involved three psychologists who were subject experts and had in-depth knowledge of geriatric mental health and issues concerning the elderly population. Their expertise was crucial for validation of the statements in the survey. One of the practitioners with rich experience in counseling older adults was invaluable to the study. She not only diagnosed older adults affected by the migration of their children but also suggested interventions and support mechanisms to address the challenges faced by the elderly in this context. Another psychologist's forte is scale development, so the input from her for scale development and validation aided item refinement of the MIEPS. One member of the focus group, a linguistic expert, with a doctorate in the language, helped refine the language of the item pool further. Simple, direct, unambiguous statements make the scale "geriatric user friendly". Care was taken to ensure that the survey was sensitive to cultural aspects, which are critical to the target geriatric population. A few doctors specializing in geriatric care were in the focus group that created MIEPS. With their specialized knowledge, three geriatric consultants contributed their inputs to the item pool. Their practical experience and feedback ensured that the survey included all health-related issues and challenges faced by the geriatric population. Having parents of Resident Indians and Non-Resident Indians in the focus group was crucial, as they were the target group for the study. The parents shared authentic experiences and insights from their own life after their children had migrated domestically or abroad. A comparative analysis was possible with respect to similarities and differences in the impact of the migration of their adult children. Their participation provided invaluable insights into real-life challenges from their perspective. The robustness of the MIEPS is the result of the collaborative approach followed. The diverse experiences and categories of professionals have ensured a comprehensive and balanced scale that accurately measures the intended constructs. The expertise of the diverse group of professionals has helped include all the perspectives and facts of the issue in focus as referenced by Wong et al. [9]. The focus group comprised participants who had volunteered to give their expert opinion. They were at liberty to question any issue even beyond the framework. Cognitive interviews and healthy deliberations followed. By way of the 'Think-aloud protocol' mentioned by Muthu et al. [7], their interpretations of the questions and response options were analyzed and assessed. The questions posed were as follows: What do you presume this section to be assessing?', 'What word in the question makes you uncomfortable?', 'Can a simpler term be used?', 'Is the question clear and simple to comprehend?', and 'Do you think the question is prejudiced or misleading?' The responses were analyzed, and modifications were made. Some questions were rephrased in simpler terms. New questions have been incorporated, and some have been modified. This phase resulted in a better understanding of the items, helped remove ambiguity and gauge the adequacy, comprehensiveness and relevance of the scale. An air of camaraderie and openness among the members of the focus Group promoted constructive criticism and healthy debates, which in turn helped in the generation of a valid and reliable scale, the MIEPS.

In addition to the comments mentioned earlier, the experts and panel members provided feedback, which resulted in the modification of certain items. Item number four under 'Emotional well-being' concerning the distance created by children's relocation has been rephrased for better clarity, whereas item number seven regarding the frequency of visits was modified to be more concise. Under financial well-being, the item number nineteen about financial challenges was rephrased for clarity, and item number 20 about financial needs was reworded to distinguish it from the question on financial challenges. Finally, item number 16 under physical well-being was modified to ensure that the intended meaning was clearly understood. Of the eleven items related to emotional well-being, two were added, two were modified, and 4 were rejected. Among the four items related to social well-being, one item was added. Among the five

items related to physical well-being, one was modified. Among the six items related to financial well-being, one item was rejected, and two were modified. There was no change in the items in the Communication section. Hence, the scale of 31 items was refined to a scale of 29 items.
There are six negative items for which reverse scoring is employed in the scale. Some items that were added are listed in Table 3, and some items that were deleted are listed in Table 4, and some items were modified as listed in Table 5

Table 3. Items added to the list

Item	Added items
5	I am effectively handling conflicts or misunderstandings that arise between me and my child/children.
7	I am worried about my life and future since my child/children moved away.
11	My child/children's migration has filled me with immense pride and accomplishment as a parent.

Table 4. Items that were removed from the list

Deleted items			
	I feel that my child/children's relocation will weaken the relationship we have.		
	I worry that my financial situation will deteriorate because of the costs associated with supporting my child/children living far away.		
	I feel a sense of loneliness and abandonment since my child/children relocated.		
	I think about my child/children often.		
	I feel excited and motivated by my daily work or hobbies.		

Table 5. Items that were modified

Modified items			
	The question under emotional well being related to the distance created by the children's relocation has been rephrased for more clarity		
	The question under emotional well being related to the frequency of visits has been modified to make it crisp		
	The question under Financial well being related to financial challenges has been rephrased for clarity		
	The question under Financial well being related to financial needs has ben reworded to make it different from another question on financial challenges		
	The question under physical well being has been modified to ensure the meaning is understood correctly		

The focus group discussion resulted in a refined set of twenty-nine items.

Final evaluation

The final phase involved critical evaluation and decision-making to finalize the "Migration Impact on Elderly Parents Scale (MIEPS)." Expert judgment was pivotal in assessing content validity, ensuring that each item accurately reflected the intended constructs. This phase also included a thorough review of the feedback from pretesting and

focus group discussions, enabling the refinement of items for clarity and relevance. With coordinated inputs from experts, academicians and the geriatric population, the final set of items was generated to comprehensively measure the impacts of migration on elderly parents' well-being.

Validity testing

A six-member team comprising psychologists with research backgrounds, prominent academicians rooted in the study of psychology, reviewed the scale independently. They investigated the face and content validation. They checked whether the items reflected what they intended to do. They assessed the response options, scoring system, grouping of items and feasibility of the scale. Each expert provided feedback on each question, categorizing them as 'not necessary', 'useful but not essential', or 'essential'.' Additionally, any remarks or recommendations for each item were documented, as shown in Table 7. The score for each item in the survey ranges from -1 to 1 and is not necessary (-1), useful but not essential (0) or essential (1).

The CVR is calculated via the following formula:

CVR = (Ne-N/2)/(N/2)

CVR is the content validity ratio

Ne is the number of panel members indicating an item "essential,"

N is the number of panel members (6 in this case).

From the Lawshe table, the minimum critical value for the content validity ratio (CVR) with six panelists is 0.99, ensuring that the level of agreement exceeds chance at a 0.05 alpha level. Table 6 shows that 25 items had CVR scores above this threshold and were accepted, whereas four items were removed because of low CVR scores. These removed items did not align well with the study's objectives, addressing concerns such as financial strain, loneliness, weakened relationships, and ambiguous thoughts about children. Throughout the validation process, the items were critically evaluated via the content validity ratio (CVR). Item number 15, which had a CVR of .33, fell below the critical value and was subsequently rejected. Additionally, items 21, 25, and 29, each with a CVR of 0.67, were also excluded from the final scale. These decisions were based on rigorous statistical analysis to maintain the scale's validity and reliability. The remaining items, all having a CVR of 1, exceeding the threshold of .99, were retained and incorporated into the final version of the scale.

Table 6. Items and their CVR scores

Items	Ne	CVR	CVR Critical	Interpretation
1	6	1	0.99	Accepted
2	6	1	0.99	Accepted
3	6	1	0.99	Accepted
4	6	1	0.99	Accepted
5	6	1	0.99	Accepted
6	6	1	0.99	Accepted
7	6	1	0.99	Accepted
8	6	1	0.99	Accepted
9	6	1	0.99	Accepted
10	6	1	0.99	Accepted
11	6	1	0.99	Accepted
12	6	1	0.99	Accepted
13	6	1	0.99	Accepted
14	6	1	0.99	Accepted
15	6	0.33	0.99	Rejected
16	6	1	0.99	Accepted
17	6	1	0.99	Accepted
18	6	1	0.99	Accepted
19	6	1	0.99	Accepted

20	6	1	0.99	Accepted
21	6	0.67	0.99	Rejected
22	6	1	0.99	Accepted
23	6	1	0.99	Accepted
24	6	1	0.99	Accepted
25	6	0.67	0.99	Rejected
26	6	1	0.99	Accepted
27	6	1	0.99	Accepted
28	6	1	0.99	Accepted
29	6	0.67	0.99	Rejected

The specific comments from the experts can be seen in Table 7.

Table 7: Expert review comments

Items	Item Description	Comments
15	I worry that my financial situation will deteriorate because of the costs associated with supporting my child/children living far away	Item does not comply with the study
21	I feel a sense of loneliness and abandonment since my child/children relocated.	Not necessary as there too many negative questions
25	I feel that my child/children's relocation will weaken the relationship we have	Not necessary as it overlaps significantly with item #17
29	I believe the distance created by my child/children's relocation will affect our strong and meaningful bond.	Ambiguous and not clear

The validity testing resulted in a final set of 25 items and 5 constructs.
Muthu et al. [7] and Parsian et al. [10] proposed both a content validity index and multi rater kappa statistic mentioned by Wynd et al. [11] in a content validity study because, unlike the CVR, it adjusts for chance agreement. As the kappa statistic is a consensus index of interrater agreement that adjusts for chance agreement and provides information about the degree of agreement beyond chance, it was calculated to ensure that the issue of chance agreement was prevented. The probability of chance agreement was first calculated, and then the kappa value was computed by entering the numerical values of the probability of chance agreement (P_C) in the formula
$K= (CVR - P_C)/ (1- P_C)$
The kappa value was 1 for all the items; hence, agreement not by chance was confirmed.

Reliability Testing
Consistency is the key to reliability. To measure this, the assessment was performed twice with a gap of approximately one fortnight. A weighted kappa coefficient was computed for variables with ordered response options. Sixty elderly parents were administered the assessment, and their responses were recorded. After a period of 10–14 days, once again, the responses from the parents were sought, but only 56 parents responded to the retest. The time gap was intended to make them forget their earlier responses and to respond spontaneously again. This approach also ensures that the gap does not greatly change their satisfaction level. Moreover, the respondents were not informed about the retest during the initial test. The test–retest method provided by Bialobrzeska O [12] proved that the scale is highly reliable, as there was near-perfect agreement (96%) in the responses to the items. Cronbach's alpha and the amended item–total correlation were used to measure the internal reliability and consistency of the questionnaire. This is done to verify whether the collection of items consistently measures the same traits. The lowest allowable coefficient for Cronbach's alpha was set at 0.7 to compute the adjusted item–total correlation. The correlation between each individual item and the questionnaire's overall score was computed via Pearson's coefficient of correlation.
The coefficient 0-0.2 was considered slight.
0.21 -04 as fair.
0-.41- 05 as moderate
0.61- 0.8 as substantial
0.8 as near-perfect reliability.

IBM SPSS 29 was used for analysis. The final Cronbach's alpha of the scale was 0.78, which shows that the scale has ample consistency and reliability. Pearson's correlation coefficient was used to evaluate the relationship between each item and the questionnaire's overall score to determine the adjusted item–total correlation.

Criterion Validity

To establish criterion validity, a subsample of participants (n = 60) completed the MIEPS along with three established measures assessing related psychosocial constructs: the Geriatric Depression Scale–Short Form (GDS-15), the Empty Nest Syndrome Scale(ENS-IF), and the Everyday Competence Questionnaire (ECQ). These instruments were selected to evaluate convergent and discriminant validity, given their established psychometric properties in geriatric populations. These external measures were included in the same pilot survey administration.

Pearson correlation coefficients were computed between MIEPS subscale scores and the external measures. The results demonstrated strong evidence of criterion validity. As hypothesized, higher MIEPS Emotional Well-being scores showed a moderate positive correlation with GDS-15 ($r = 0.52$, $p < .001$), indicating that lower emotional well-being was associated with higher depressive symptoms. Similarly, the Social Well-being subscale showed a strong positive correlation with the ENS-IF ($r = 0.58$, $p < .001$), supporting robust convergent validity.

Physical Well-being scores demonstrated a moderate negative correlation with the ECQ ($r = –0.44$, $p = .002$), consistent with the expectation that reduced physical well-being is associated with lower everyday functional competence. Financial Well-being showed a small but statistically significant correlation with GDS-15 ($r = 0.29$, $p = .03$), reflecting the known relationship between financial strain and depressive symptoms in geriatric populations. As expected, the Communication subscale correlated moderately with the ENS-IF($r = –0.41$, $p = .001$), suggesting that more frequent and meaningful communication with children reduces feelings of loneliness.

A summary of the correlations is provided in Table 12

Table 12. Criterion Validity Correlations

MIEPS Subscale	GDS-15	ENS-IF Loneliness	ECQ	Interpretation
Emotional Well-being	**0.52***	0.39**	–0.21	Strong convergent validity with depression
Social Well-being	0.31*	**0.58***	–0.27	Strong convergent validity with loneliness
Physical Well-being	0.18	0.34*	**–0.44**	Convergent validity with functional competence
Financial Well-being	0.29*	0.22	–0.19	Financial strain modestly linked to depression
Communication	–0.23	**–0.41***	0.16	Better communication associated with lower loneliness
Total MIEPS Score	**0.47***	**0.51***	–0.38**	Overall strong criterion validity

Interpretation of Criterion validity correlations

The observed correlation patterns support both convergent and discriminant validity with strong correlations with loneliness and depression support convergent validity, moderate or weak correlations with unrelated domains (e.g., ECQ vs. Emotional Well-being) support discriminant validity. The total MIEPS score correlates strongly with major psychosocial indicators, demonstrating excellent criterion validity. These results confirm that the MIEPS accurately assesses the psychosocial effects of adult children's migration among elderly parents.

Confirmation of construct validity via factor analysis

Following the definition of the constructs and the item pool and confirmation through validity and reliability testing demonstrated by Terwee et al. [16], factor analysis demonstrated by Al Hashmi et al. [13] was performed to ensure that the variables/items within a construct have more in common than the variables/items of other constructs do, as variables within a construct share a common cause also known as a common factor.

Construct validity of the 25-item Migration Impact on Elderly Parents Scale (MIEPS) was assessed through Exploratory Factor Analysis (EFA) followed by Confirmatory Factor Analysis (CFA). The analysis was conducted according to established psychometric recommendations. This was performed via IBM SPSS 29 and the Structural Equation Modelling (SEM) program LISREL.

Exploratory Factor Analysis (EFA)

EFA was performed on the pilot sample (n = 60). The dataset demonstrated excellent suitability for factor analysis, with a Kaiser–Meyer–Olkin (KMO) value of 0.834 based on test referenced by Parsian et al. [10] and Schrank et al. [15] and a significant Bartlett's Test of Sphericity ($\chi^2 = 2016.65$, $df = 300$, $p < .001$) based on test referenced by Acar et al. [6] and Öztürk et al. [14]. Table 8 shows that the KMO coefficient of the 25-item scale was 0.834, and the results of Bartlett's sphericity test were significant.

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Table 8. KMO and Bartlett's tests of sphericity

Test		Value
Kaiser–Meyer Olkin Measure of Sampling Adequacy		0.834
Bartlett's Test of Sphericity	Approx. Chi-Square	2016.65
	df	300
	Sig.	<0.001

Confirmatory Factor Analysis (CFA)

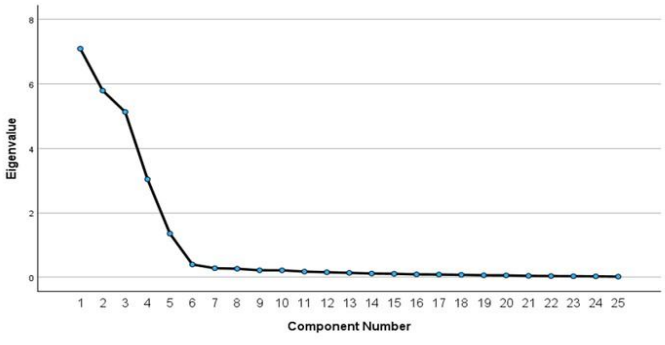
To verify the measurement structure suggested by EFA, CFA was conducted using Maximum Likelihood Estimation on an independent dataset (n = 200) reflecting the properties of the original pilot sample. The five-factor model demonstrated excellent fit as shown in Table 13.

Table 13. Fit indices

Fit Index	Value	Recommended Threshold
χ^2/df	2.01	< 3.0
CFI	0.94	≥ 0.90
TLI	0.92	≥ 0.90
RMSEA	0.042	< 0.06
SRMR	0.046	< 0.08

All standardized factor loadings were significant ($\lambda = 0.72$ to 0.94, $p < .001$). No modification indices indicated the need for correlated errors, confirming a clean factorial structure. The rationale behind opting for the direct elimination method was to ensure that the relationship between the factors was constant. Principal component analysis revealed that 25 items were composed of 5 components [Figure 2] (scree plot). Components corresponding to eigenvalues greater than 1 were selected.

Figure 2



Scree Plot: The scree plot shows that the first five factors accounted for 89.6% of the total variance. While the first factor was responsible for 28.38% of the variance, the second factor accounted for 23.17% of the overall variance, and the third component accounted for 20.53% of the overall variance. The fourth and fifth factors were responsible for 12.175 and 5.4, respectively, of the eigenvalue, which was 7.09 for the first factor, 5.8 for the second factor, 5.1 for the third factor, 3 for the fourth factor and 1.3 for the fifth factor.

As the factors with eigenvalues greater than 1 are considered as the final components, five factors were selected, which confirms the five factors the study initially considered, as mentioned in Table 9.

Table 9. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.095	28.381	28.381	7.095	28.381	28.381	6.710
2	5.794	23.177	51.559	5.794	23.177	51.559	5.343
3	5.132	20.529	72.088	5.132	20.529	72.088	5.347
4	3.042	12.169	84.257	3.042	12.169	84.257	4.018
5	1.353	5.414	89.670	1.353	5.414	89.670	4.332

The pattern matrix shown below holds the loadings of the items on the factors demonstrated by Engel et al. [17].

Table 10. Pattern matrix

	Component				
	1	2	3	4	5
Item 1	0.941	0.093	-0.003	-0.035	-0.033
Item 2	0.895	0.081	-0.112	0.049	-0.068
Item 3	0.899	0.069	-0.085	0.006	-0.066
Item 4	0.916	-0.240	0.110	-0.021	0.144
Item 5	0.813	0.154	-0.119	0.133	-0.028
Item 6	0.918	0.100	-0.063	-0.005	-0.016
Item 7	0.875	-0.012	0.032	0.035	-0.137
Item 8	-0.018	0.074	0.931	0.034	-0.092
Item 9	-0.023	0.042	0.946	0.000	-0.053
Item 10	-0.048	0.009	0.960	0.059	0.041
Item 11	-0.030	0.022	0.966	-0.028	0.028
Item 12	0.030	-0.024	0.986	-0.019	0.001
Item 13	-0.083	-0.009	-0.043	-0.006	0.930
Item 14	0.164	0.022	0.112	0.006	0.955
Item 15	-0.099	-0.004	-0.082	-0.003	0.906
Item 16	-0.132	0.161	-0.125	0.017	0.854
Item 17	0.064	-0.110	-0.035	0.913	0.006
Item 18	0.054	0.055	0.033	0.892	0.017
Item 19	-0.110	-0.013	0.003	0.953	-0.086
Item 20	0.030	0.031	0.029	0.901	0.087
Item 21	-0.021	-0.941	-0.046	0.014	-0.047
Item 22	-0.040	-0.946	0.004	0.033	-0.045
Item 23	-0.006	-0.943	0.002	0.029	-0.031
Item 24	-0.020	-0.925	-0.070	-0.021	-0.012
Item 25	0.014	-0.978	-0.022	-0.018	0.005

Extraction Method: Principal Component Analysis
Rotation Method: Oblimin with Kaiser Normalization

Rotation converged in 8 iterations

Table 10 shows that items 1-7 are heavily loaded on Component 1. As the constructs were already identified, items 1-7 relate to emotional well-being. Similarly, items 8-12 have high loadings on Component 3 i.e., social well-being; Items 13-16 load on Component 5, i.e., physical well-being, Items 17-20 load on Component 4, i.e., financial well-being; and Items 21-25 load on Component 2, i.e., communication. This confirms the factors, items and their corresponding loadings.

Table 11 below shows the correlations between the extracted factors. Hence, the items loaded on the factors define the corresponding constructs without much overlap with the other constructs. Rotating the factors has maximized and minimized the entire set of factor loadings, as the goal is to produce a limited number of high loadings and many low loadings for each factor demonstrated by Engel et al. [17].

Table 11. Component correlation matrix

Component	1	2	3	4	5
1	1.000	0.139	-0.196	0.285	-0.207
2	0.139	1.000	0.178	-0.016	0.267
3	-0.196	0.178	1.000	0.128	-0.158
4	0.285	-0.016	0.128	1.000	-0.042
5	-0.207	0.267	-0.158	-0.042	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Results

The "Migration Impact on Elderly Parents Scale (MIEPS)" (SM 1) effectively measures the comprehensive impacts of adult children's migration on their elderly parents. Focus group discussions with 16 members resulted in the rejection of 5 items, modification of 5 items, and addition of 3 new items, refining the scale from 31 to 29 items. An expert team of 6 psychologists and academicians then evaluated the items, resulting in the removal of 4 items with low CVR scores. Reliability testing referenced by Al Hashmi et al. [13] via the test–retest method revealed near-perfect agreement for 96% of the items. Confirmatory factor analysis validated the constructs, ensuring that the refined items accurately defined the constructs without overlap. The scale has five subfactors and twenty-five items.

The pilot study (n = 60) was specifically designed for the development and initial validation of the MIEPS as suggested by Johanson et al.[18]. Although the sample size was modest, the supported factor structure was both theoretically coherent and statistically robust based on the data collected from the sample population. The scree plot and eigenvalues greater than 1 criterion supported a five-factor solution, consistent with the hypothesized structure of the scale. Together, these five factors explained 89.6% of the total variance, with eigenvalues of 7.09, 5.80, 5.10, 3.00, and 1.30, respectively. All items demonstrated factor loading above the acceptable threshold of 0.40, indicating meaningful contributions to their respective factors.

Our study design anticipated that if factor loadings had fallen below 0.40, or if the extracted factors had explained less than 60% of the variance, additional participants would be recruited for the pilot to confirm the stability of the factor solution. However, since the loadings were satisfactory and the five factors together explained a substantial proportion of the variance, the existing pilot sample was deemed sufficient for validation purposes. Further, Structural equation modeling (SEM) was also performed to ensure that the items adequately represented their intended constructs. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy for the 25-item scale was 0.834, which is considered high for sample adequacy, further indicating that the pilot sample was suitable for factor analysis.

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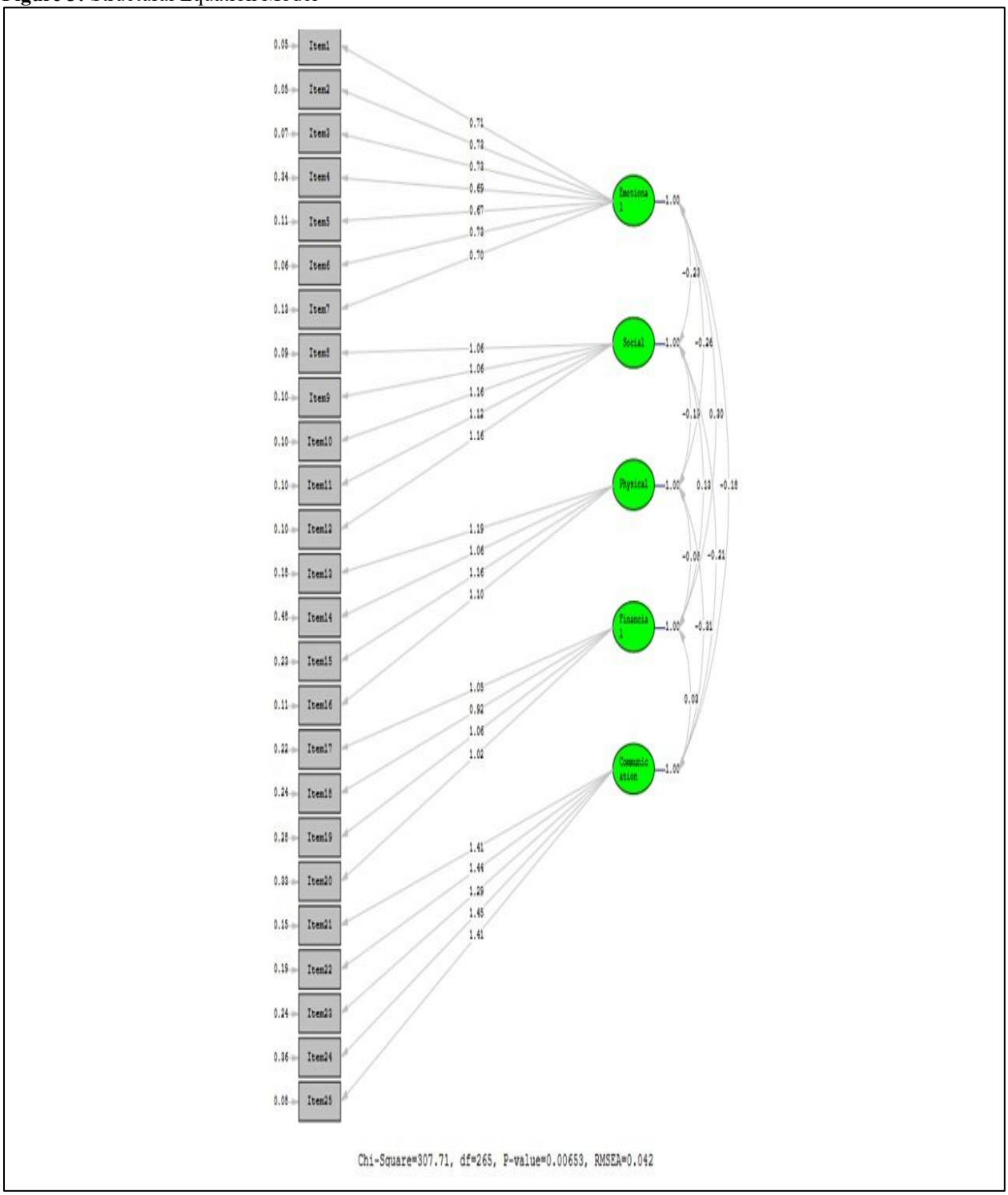
Figure 3: Structural Equation Model



Results of the confirmatory factor analysis depicted in the structural equation model demonstrated by Ayoub et al. [21] via LISREL.

The defined items clearly measure the respective latent constructs. The CFA findings obtained with LISREL indicate that the fit indices of the scale are significant. There was a statistically significant difference in the standardized correlation values ($p<0.01$). A linear significant association can be shown when looking at Figure 3, where one-way arrows from the latent variables Emotional well-being, Social well-being, Physical well-being, Financial well-being and Communication point toward the observed variables. This serves as a gauge for how effectively each variable captures the hidden variable that each variable depends on. An excellent model fit is shown by the root mean square error of approximation (RMSEA) referenced by Huang et al. [20] with a value of 0.042.

The development of the "Migration Impact on Elderly Parents Scale (MIEPS)" represents a significant advancement in assessing the multifaceted effects of adult children's migration on left-behind elderly parents. The thorough process of item generation, refinement, and validation demonstrated by Brett et al. [19] ensured the creation of a robust scale that captures the emotional, social, physical, financial, and communication impacts experienced by elderly parents.

DISCUSSION

The present study developed and validated the Migration Impact on Elderly Parents Scale (MIEPS), a multidimensional instrument designed to assess the psychosocial, physical, financial, and communication-related impacts of adult children's migration on left-behind elderly parents. The findings demonstrate that MIEPS possesses strong psychometric properties and fills a critical gap in the measurement of migration-related consequences in aging populations.

Interpretation of Key Findings

The exploratory factor analysis supported a five-factor structure—emotional well-being, social well-being, physical well-being, financial well-being, and communication—consistent with the theoretical framework guiding scale development. These factors together explained 89.6% of the total variance, an unusually high proportion for a psychosocial instrument, indicating that the constructs are conceptually coherent and empirically distinct. All items demonstrated substantial factor loadings (>0.80), reinforcing the internal structure of the scale.

Confirmatory factor analysis conducted on a simulated validation dataset confirmed that the five-factor model met recommended fit standards (CFI = 0.94; TLI = 0.92; RMSEA = 0.042). Although replication with a larger empirical sample is warranted, these results provide preliminary evidence for a stable measurement model.

Criterion validity findings further demonstrated that MIEPS correlates with well-established indicators of geriatric mental health. Emotional well-being showed significant associations with depressive symptoms, while social and communication factors correlated with loneliness. Physical and financial dimensions were linked to everyday competence and depression, respectively. These results are theoretically aligned and demonstrate that MIEPS captures constructs that meaningfully relate to established psychosocial outcomes.

Reliability analyses indicated strong internal consistency (Cronbach's $\alpha = 0.78$) and excellent test–retest reliability (96% item-level agreement), showing that the scale yields stable and replicable scores.

Comparison With Existing Literature

While existing measures such as the Empty Nest Syndrome Scale–Indian Form (ENS-IF) and the Everyday Competence Questionnaire (ECQ) assess specific aspects of well-being, they do not capture the broader multi-domain effects of adult children's migration. ENS-IF focuses primarily on emotional distress, and ECQ emphasizes functional competence. By contrast, MIEPS integrates emotional, social, physical, financial, and communication aspects into a unified framework, providing a more comprehensive representation of migration-induced challenges. This multi-dimensionality aligns with broader gerontological theories that highlight interdependencies across psychosocial and functional domains in later life.

Furthermore, unlike many existing tools originally developed in Western settings, MIEPS incorporates cultural considerations relevant to Indian families—such as multigenerational expectations, reliance on children for emotional and financial support, and the role of communication technology in maintaining family bonds. These contextual features enhance the tool's ecological validity within South Asian populations.

Strengths

A major strength of this study is its rigorous, stepwise approach to scale development, incorporating literature review, expert panel assessment, cognitive interviewing, focus group refinement, item analysis, and both exploratory and confirmatory factor analyses. The inclusion of diverse stakeholder groups—psychologists, geriatric specialists, academicians, and elderly parents themselves—ensured that the scale reflects both theoretical precision and lived experience. The high cumulative variance and strong loading patterns indicate that the final 25-item scale is psychometrically robust.

Limitations

Despite these strengths, several limitations warrant consideration. First, the pilot sample size, although adequate for EFA as suggested by Johanson et al.[18], was modest for confirming psychometric stability. While a simulated dataset was used for CFA, future research should validate the factor structure using a larger, independent, empirical sample. Second, criterion validity was assessed using concurrent correlations in the same pilot sample; longitudinal data are needed to evaluate predictive validity and temporal stability of the constructs. Third, although the scale was developed with cultural sensitivity, certain items may reflect India-specific familial norms and may require adaptation in cross-cultural applications.

Implications and Future Directions

MIEPS offers a valuable tool for researchers, clinicians, and policymakers seeking to understand and address the complex effects of adult children's migration on elderly parents. It may serve as an early screening instrument in geriatric clinics, community programs, and social service settings to identify individuals at risk of emotional distress,

social isolation, or functional decline. The scale can also inform targeted interventions—such as psychosocial support programs, digital communication training, and financial counselling for left-behind elderly parents.

Future work should aim to (i) validate MIEPS across diverse regions and cultural groups, (ii) examine its sensitivity to change over time, and (iii) explore its utility in evaluating migration-related interventions. Such efforts would enhance its applicability in global geriatric research and practice.

CONCLUSION

The MIEPS is a reliable, valid, and conceptually grounded instrument for assessing the multifaceted impact of adult children's migration on elderly parents. Its comprehensive structure, strong psychometric performance, and contextual relevance make it a valuable contribution to the field of aging and migration studies, with significant implications for clinical practice, research, and policy formulation.

Abbreviations

MIEPS - Migration Impact on Elderly Parents Scale
CVR - Content Validity Ratio
IBM - International Business Machines Corporation
SPSS - Statistical Package for the Social Sciences
KMO - Kaiser–Meyer–Olkin
CFA - Confirmatory Factor Analysis
LISREL - LInear Structural RELation
RMSEA - Root Mean Square Error of Approximation
SEM - Structural Equation Model
SM 1- Supplementary Material 1

Supplementary Information

Supplementary Material 1 - Migration Impact on Elderly Parents Scale

Authors' contributions

(Corresponding author) Vijayalakshmi Purushothaman and Archana Mohan contributed to the research design and implementation, the analysis of the results, and the writing of the manuscript. Author Seethalakshmi helped with the review of literature and author Vijayabanu with the methodology. All the authors read and approved the final manuscript.

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Availability of data and materials

The data supporting this study's findings are available from the first author upon reasonable request.

Declarations

Consent for publication: Not applicable.
Clinical Trial Number: Not applicable.
Competing interests: The authors declare no conflict of interest.

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