

CHANGES IN FUNCTIONAL INDEPENDENCE AND QUALITY OF LIFE FOLLOWING A STRUCTURED OCCUPATIONAL THERAPY INTERVENTION AMONG INSTITUTIONALIZED OLDER ADULTS: A PROSPECTIVE PRE-POST STUDY

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ABSTRACT

Background: Older adults residing in institutional settings may experience functional dependence, reduced autonomy, and impaired quality of life (QOL). Occupational therapy (OT) may help improve independence through individualized functional training and adaptive strategies.

Methods: A prospective pre-post interventional study was conducted among 79 older adults residing in five old age homes in Agartala, Tripura. Participants underwent baseline assessment of functional independence using the Modified Barthel Index (MBI) and QOL using the WHOQOL-BREF. A structured, individualized OT programme was provided for six months, incorporating activities of daily living training, adaptive devices, task-specific practice, energy conservation, joint protection, and environmental modification. Outcomes were reassessed after completion of the intervention. Pre-post differences were analyzed using the paired t-test test and a p value <0.05 was considered significant.

Results: The mean age of participants was 75.0 ± 9.3 years, and 68.4% were female. Mean MBI score increased from 74.84 ± 20.66 at baseline to 83.15 ± 16.02 post-intervention, with a mean increase of 8.32 points (95% CI: 7.03–9.60; $p < 0.001$). The distribution of MBI dependency categories shifted significantly toward greater independence. WHOQOL-BREF scores also increased significantly across all domains, with the greatest improvement in the psychological domain, followed by the physical domain and general QOL ($p < 0.001$ for all domains).

Conclusion: A structured six-month OT programme was associated with significant improvements in functional independence and QOL among older adults living in old age homes. Controlled, multicenter studies with longer follow-up are warranted to confirm these findings.

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INTRODUCTION

Population ageing is a major demographic and public health transition. India has a rapidly expanding older population, creating an increasing demand for services that support not only survival and disease management but also independence, participation, and quality of life.^{1,2} Ageing is accompanied by progressive changes in physical, sensory, cognitive, psychological, and social functioning, which may impair mobility and activities of daily living (ADLs) and increase dependence on others.³⁻⁵

Quality of life (QOL) in later life is multidimensional and encompasses physical health,

psychological well-being, independence, social relationships, and the surrounding environment.^{6,7} Older adults living in residential facilities may be particularly vulnerable because institutionalization can be accompanied by loss of familiar roles, reduced autonomy, limited participation, loneliness, and dependence in everyday activities.^{8,9} Therefore, functional independence and social participation are important components of healthy ageing and should be addressed alongside medical care.

Occupational therapy (OT) is a client-centre health profession that aims to enable participation in meaningful occupations by addressing personal abilities, activity demands, and environmental

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barriers. In older adults, OT interventions can include ADL training, adaptive and assistive devices, environmental modification, functional mobility training, energy conservation strategies, and strategies to facilitate social participation. Evidence from geriatric and residential-care populations suggests that occupation-focused interventions can improve independence, participation, self-efficacy, and aspects of QOL.¹⁰⁻¹⁴ Despite the growing need for comprehensive geriatric rehabilitation in India, evidence describing structured OT programmes for older adults living in old-age homes remains limited. Institutional settings offer a practical environment in which individualized functional assessments, adaptive strategies, and ongoing reinforcement can be incorporated into routine care. Therefore, the present study evaluated changes in functional independence and QOL following a structured six-month OT intervention among older adults residing in old age homes in Agartala, Tripura.

Methodology

Study design and setting

This prospective pre-post interventional study was conducted among older adults residing in old age homes in Agartala city, Tripura, from February 2024 to January 2025.

Study population and selection criteria

Residents aged ≥ 60 years from selected old age homes were eligible for inclusion. Both men and women who provided informed consent were included in the study. Individuals who were critically ill or from whom informed consent could not be obtained were excluded from the study.

Sample size and sampling

The sample size was calculated using the formula for estimating the population mean: $n = Z^2 \sigma^2 / d^2$. To achieve a 99% confidence level, a Z value of 2.58 was applied. The SD (σ) of the social relationships domain score among older adults was taken as 15.3, based on findings from a previous study.¹⁵ An absolute precision (d) of 5% was considered. The minimum required sample size was calculated as 62.3, which was increased by 20% to account for potential nonresponse or incomplete data, resulting in a minimum required sample size of 75 participants.

A two-stage sampling approach was used in this study. In the first stage, a list of all eight registered old-age homes in Agartala was obtained from the Directorate of Social Welfare and Social Education, Government of Tripura. The sampling frame comprised three government-run and five non-governmental organization (NGO)-managed old-age homes. Using simple random sampling, five old-age homes (two government-run and three NGO-managed) were selected for this study. In the second stage, all residents aged ≥ 60 years in the selected old-age homes were screened for their eligibility. Eligible residents who met the inclusion criteria and

provided written informed consent were recruited consecutively. During the study period, 79 eligible residents consented to participate and were included in the final analysis.

Occupational therapy intervention

A structured OT intervention was delivered for six months and was individualized according to the patients' functional limitations and environmental barriers. Initial assessment considered self-care, functional mobility, balance, and upper-limb function. Adaptive devices were prescribed according to need and included dressing sticks; long-handled brushes; thick-handled/adaptive toothbrushes; adaptive nail cutters; bath benches; long-handled sponges; use of grab bars; and book holders or page turners.

Training included demonstration and supervised use of adaptive devices, task-specific practice in ADLs, energy-conservation and joint-protection techniques, and environmental modification strategies. The participants were monitored during the intervention. A review at approximately two weeks was used to assess compliance, reinforce correct techniques, modify or replace equipment as necessary, and address difficulties or adverse effects. The intervention was subsequently continued and individualized throughout the six-month period.

Data collection and outcome measures

Data were collected using a semi-structured proforma. participants' sociodemographic and health-related information. No personally identifiable information was collected from participants.

Functional independence was assessed using the Modified Barthel Index (MBI), which evaluates feeding, bathing, grooming, dressing, bowel and bladder control, toileting, transfers, ambulation, and stair climbing. MBI scores were interpreted as total dependency (0–20), severe dependency (21–60), moderate dependency (61–90), slight dependency (91–99), and complete independence (100).^{16,17}

Quality of life was assessed using the Hindi version of the WHOQOL-BREF, for which permission was obtained from the World Health Organization. The 26-item instrument provides scores for physical health, psychological health, social relationships, and environment, in addition to general QOL and general health questions.⁶

Baseline assessments were performed after enrolment and before the initiation of OT. The OT programme was then delivered for six months, after which post-intervention QOL and functional assessments were performed within one week of completion of the programme.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Categorical variables were summarized using frequencies and percentages, while continuous variables were

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summarized using mean and standard deviations. Baseline and post-intervention QOL scores were compared using paired t-tests, with $p < 0.05$ considered statistically significant.

Ethical considerations

Approval was obtained from the Scientific Review Committee and the University Ethics Committee of Maharaj Vinayak Global University. Written informed consent was obtained from all participants

Table 1. Sociodemographic and clinical characteristics of the study participants (N=79)

Variables	Frequency	Percentage
Age group (years)		
60–70	26	32.9
71–80	28	35.4
>80	25	31.6
Gender		
Male	25	31.6
Female	54	68.4
Religion		
Hindu	60	75.9
Muslim	10	12.7
Buddhist	5	6.3
Christian	4	5.1
Marital status		
Married	7	8.9
Widow	52	65.8

Functional independence

At baseline, half of the participants (50.6%, 40/79) had moderate dependency on the MBI, and 25.3% (20/79) had severe dependency. Only 3.8% (3/79) were classified as completely independent individuals. Following the six-month OT programme, the proportion of those with moderate dependency decreased to 32.9% (26/79), severe dependency decreased to 11.4% (9/79), and slight dependency increased from 17.7% (14/79) to 48.1% (38/79). The proportion of participants classified as completely independent increased from 3.8% to 7.6% (6/79).

Quality of life

The mean QOL scores increased across all WHOQOL-BREF measures. The largest absolute increase was observed in the psychological domain, followed by the physical domain, general QOL, and social domain. The paired analyses indicated statistically significant improvements in all six measures ($p < 0.001$).

Bars represent mean scores and error bars

before enrolment. Results

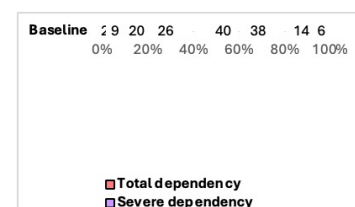
Basic characteristics of participants

A total of 79 older adults were included in this analysis. The mean age was 75.0 ± 9.3 years. The largest age group was 71–80 years (35.4%), followed by 60–70 years (32.9%) and >80 years (31.6%). Women comprised 68.4% of the study population. Most participants were widowed, and multimorbidity was common.

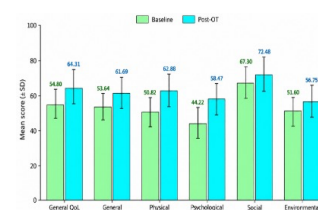
Widower	20	25.3
Family type		
Nuclear	19	24.1
Joint	60	75.9
Socioeconomic class (Modified B.G. Prasad Scale)		
Upper	6	7.6
Upper middle	12	15.2
Middle	14	17.7
Lower middle	27	34.2
Lower	20	25.3
Comorbidity		
Single	41	51.9
Multiple	38	48.1
Type of old-age home		
Government	32	40.5
NGO	47	59.5

NGO: Non-governmental organization

dependency decreased to 32.9% (26/79), severe dependency decreased to 11.4% (9/79), and slight dependency increased from 17.7% (14/79) to 48.1% (38/79). The proportion of participants classified as completely independent increased from 3.8% to 7.6% (6/79).



general health. Less increases were observed in the social and environmental domains. The paired analyses indicated statistically significant improvements in all six measures ($p < 0.001$).



represent standard deviation (SD)

Discussion

The present study evaluated changes in functional independence and QOL following a structured six-month OT programme among older adults living in old age homes. The principal finding was a consistent improvement in both the distribution of MBI categories and all measured dimensions of WHOQOL-BREF. These findings suggest that an individualized programme combining adaptive equipment, ADL training, task-specific practice, and environmental strategies may be useful in addressing the multidimensional needs of institutionalized older adults.

The study population was predominantly female, with a mean age of 75 years and a substantial proportion of participants were aged 71–80 years. This demographic pattern is comparable to studies from India, in which females constituted the majority of institutionalized elderly residents.^{18,19} This profile is compatible with the demographic vulnerability of older women, particularly in relation to widowhood, chronic disease, and institutionalization. The high proportion of participants with multiple comorbidities highlights the complexity of geriatric care. Multimorbidity is recognized as an important determinant of functional limitation and QOL in older adults.²⁰

Functional status improved after OT. At baseline, 75.9% of the participants were classified as having moderate or severe dependency, compared with 44.3% after the intervention. Simultaneously, the slight dependency increased markedly. The shift toward higher levels of independence is clinically relevant because ADL performance is closely related to autonomy, participation, caregiver requirements, and perceived well-being.^{10,20} OT is particularly suited to this aspect of care because it can combine restorative strategies with compensatory techniques when complete restoration of function is not feasible.

QOL improved across all domains. The psychological domain showed the largest increase, rising by 14.25 points. This may reflect the effects of increased autonomy, greater ability to participate in daily activities, purposeful engagement, and improved self-efficacy. Older adults living in institutional settings may experience loneliness and reduced social roles, and meaningful occupational engagement can provide structure, identity, and opportunities for participation.^{9,10,21}

The physical domain had also improved substantially. This is plausible given the intervention's focus on self-care, functional mobility, balance, adaptive devices, and task-specific ADL practice. Previous research has reported the beneficial effects of OT on independence and well-being in older adults, including those living in residential or long-term-care settings.^{11–14} The intervention in the present study did not rely solely on exercise; instead, it

attempted to modify the interaction between the person, task, and environment, which is consistent with contemporary occupational therapy practice.

The social domain showed a smaller but still meaningful improvement. Social participation is an important determinant of QOL in later life, and OT can facilitate participation by enabling individuals to perform self-care more independently and engage more confidently in group or leisure activities.^{9,21} The environmental domain showed the smallest absolute increase, which may be expected because many environmental characteristics of residential facilities are not easily altered through individual-level interventions. Nevertheless, the observed improvement is consistent with the programmer's use of environmental modification and adaptive equipment.

The findings should be interpreted in light of the study design. This was a pre–post study without a comparison group. Consequently, the observed improvements cannot be attributed solely to OT with the same certainty as in randomized controlled trials. In addition, the study was conducted in five old age homes within one city, limiting generalizability. The absence of long-term follow-up also prevents conclusions regarding the sustainability of the gains. Nevertheless, this study has practical relevance for geriatric care in India. Residential facilities may benefit from incorporating occupational therapists into multidisciplinary teams, with an emphasis on individualized assessment, ADL independence, assistive technology, environmental safety, and meaningful participation. Future multicenter controlled studies with larger samples, longer follow-up, and participant-level longitudinal analysis should examine the durability of these effects and identify which components of OT programmes provide the greatest benefit.

Strengths and limitations

This study used standardized measures of functional independence and QOL and implemented an individualized intervention over six months, allowing the assessment of change over a clinically meaningful period. The intervention was multidimensional, addressing functional, adaptive, and environmental barriers. However, the lack of a control group, single-city setting, relatively small sample size, and absence of long-term follow-up limit causal inference and external validity. In addition, participant-level data were not available in the thesis document for the independent recalculation of paired effect sizes and confidence intervals.

Conclusions

A structured six-month occupational therapy programme was associated with improved functional independence and higher QOL scores across physical, psychological, social, environmental, and general QOL, and general health measures among older adults residing in old age

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homes. These findings support the potential role of OT as an integral component of comprehensive geriatric care in residential settings. Given the single-arm pre-post design, these findings should be interpreted as evidence of improvement following the intervention rather than as definitive proof of a causal treatment effect.

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