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Comparative Study of Home-Based and Hospital-Based Physiotherapy Interventions on Depression and Functional Recovery in Chronic Stroke Patients

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ABSTRACT

Stroke is a major neurological disorder that can result in long-term physical disability, emotional difficulties and reduced functional independence. Although advances in medical treatment have improved the survival of stroke patients, many individuals continue to experience difficulties in walking, maintaining balance, performing daily activities and participating in social life. Depression is another important consequence of stroke that may negatively influence motivation, rehabilitation participation and overall recovery. Physiotherapy plays an essential role in improving physical functioning among chronic stroke patients. However, the location and delivery of rehabilitation may influence patients' accessibility, participation and recovery experiences. Hospital-based physiotherapy provides professional supervision, specialized equipment and structured rehabilitation facilities, whereas home-based physiotherapy offers treatment in a familiar environment and allows functional activities to be practised within everyday surroundings. The present study aims to compare the effects of home-based and hospital-based physiotherapy interventions on depression and functional recovery among chronic stroke patients. A comparative experimental research design is proposed, involving two groups of patients receiving different rehabilitation approaches over an eight-week intervention period. Depression will be assessed through a standardized psychological assessment instrument, while functional recovery will be evaluated using established measures of independence, mobility and motor performance.

Keywords: Chronic Stroke, Home-Based Physiotherapy, Hospital-Based Physiotherapy, Depression, Functional Recovery, Rehabilitation, Mobility, Functional Independence, Neurorehabilitation.

1. INTRODUCTION

Stroke is a major public health concern and an important cause of long-term disability across the world. It occurs when the blood supply to a part of the brain is interrupted or when a blood vessel ruptures, resulting in damage to brain tissue. Depending on the affected brain region and severity of the injury, stroke may produce weakness or paralysis, impaired coordination, speech difficulties, balance problems and limitations in everyday activities.

The consequences of stroke extend beyond physical impairment. Many survivors experience emotional distress, depression, anxiety, reduced confidence and difficulties adjusting to changes in their personal and social lives. Individuals who previously performed daily

activities independently may become dependent on family members for walking, dressing, bathing and other routine tasks. This loss of independence can negatively affect their self-esteem and psychological well-being.

The chronic stage of stroke presents particular rehabilitation challenges. Although some recovery occurs during the early months following stroke, many individuals continue to experience functional limitations for several years. Continued rehabilitation is therefore important for maintaining physical abilities, improving independence and preventing further complications.

Physiotherapy is one of the most important components of stroke rehabilitation. It includes therapeutic exercises, balance training, strengthening, mobility practice, gait rehabilitation and functional activity training. The primary objective is to improve movement and help patients regain the ability to perform everyday activities.

Home-based rehabilitation may be particularly beneficial for patients who experience transportation difficulties, live far from rehabilitation centres or require assistance from family members. It may also improve continuity of rehabilitation by allowing therapeutic activities to become part of everyday routines.

Hospital-based physiotherapy involves rehabilitation in hospitals, rehabilitation centres or specialized clinical facilities. Patients receive structured treatment under the supervision of trained physiotherapists. Such settings may provide specialized equipment, parallel bars, therapeutic exercise facilities, gait-training devices and access to multidisciplinary healthcare professionals.

1.1 Statement of the Problem

The research problem selected for the present investigation is:

"Comparative Study of Home-Based and Hospital-Based Physiotherapy Interventions on Depression and Functional Recovery in Chronic Stroke Patients."

1.2 Aim of the Study

The aim is to compare the effectiveness of home-based and hospital-based physiotherapy interventions in reducing depression and improving functional recovery among chronic stroke patients.

1.3 Objectives of the Study

1. To assess the level of depression among chronic stroke patients before and after physiotherapy intervention.
2. To compare the effects of both rehabilitation approaches on depressive symptoms.
3. To compare the improvement in functional independence between the two groups.
4. To examine the relationship between functional recovery and changes in depression.
5. To identify the advantages and limitations of home-based and hospital-based physiotherapy.

1.4 Research Hypotheses

The following null hypotheses are proposed:

- H01: There is no significant difference in depression scores between chronic stroke patients receiving home-based and hospital-based physiotherapy.

- H02: There is no significant difference in functional recovery between patients receiving home-based and hospital-based physiotherapy.
- H03: There is no significant difference in activities of daily living between the two intervention groups following physiotherapy.
- H04: There is no significant relationship between improvement in functional recovery and reduction in depressive symptoms among chronic stroke patients.

1.5 Conceptual Framework of the Study

The conceptual framework illustrates the relationship between rehabilitation setting, physiotherapy intervention, functional recovery and depression.

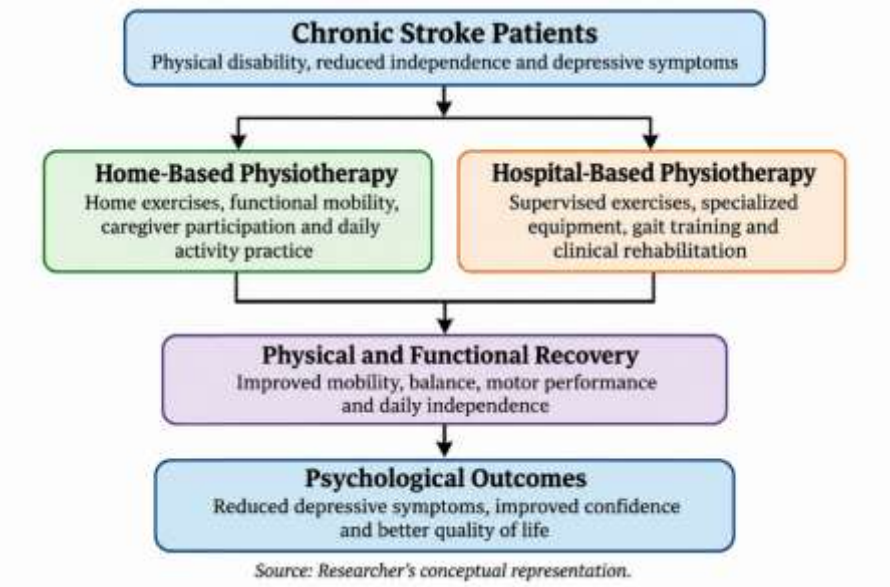


Figure 1. Conceptual framework of home-based and hospital-based physiotherapy

2. REVIEW OF LITERATURE

The review of literature examines previous research concerning stroke rehabilitation, home-based physiotherapy, hospital-based rehabilitation, depression and functional recovery. It provides the theoretical foundation for the present investigation.

2.1 Stroke and Functional Disability

Stroke may result in several physical and neurological impairments that interfere with independent living. Muscle weakness, impaired balance, reduced coordination and difficulty walking can affect an individual's ability to perform routine activities.

The World Health Organization's International Classification of Functioning, Disability and Health (2001) provide a comprehensive framework for understanding disability. According to this framework, recovery is influenced not only by physical impairment but also by personal, social and environmental factors.

2.2 Home-Based Physiotherapy and Stroke Rehabilitation

Home-based physiotherapy has received increasing attention because it allows rehabilitation to take place within the patient's normal living environment.

The approach provides opportunities to practise practical activities such as walking within the home, climbing steps, transferring between furniture and performing personal-care activities.

Mayo et al. (2000) examined the outcomes of rehabilitation delivered in the community following stroke. Their research contributed to the understanding of community-based rehabilitation and its role in supporting functional recovery.

2.3 Hospital-Based Physiotherapy and Functional Recovery

Hospital-based rehabilitation provides access to structured therapeutic programmes and specialized clinical facilities. Patients may receive supervised strengthening, balance training, gait rehabilitation and functional mobility exercises.

Pollock et al. (2014) reviewed physical rehabilitation approaches for restoring function and mobility following stroke. Their findings highlighted the importance of appropriate rehabilitation interventions in improving physical outcomes.

2.4 Depression among Chronic Stroke Patients

Depression is a common psychological problem following stroke. It may involve persistent sadness, reduced motivation, sleep disturbances, loss of interest and feelings of helplessness.

Hackett and Pickles (2014) conducted a systematic review and meta-analysis examining depression following stroke. Their findings demonstrated that depressive symptoms remain an important concern throughout the recovery process.

Ayerbe et al. (2013) also examined the natural history, predictors and outcomes of depression after stroke. Their research highlighted the importance of recognizing depression during different stages of rehabilitation.

2.5 Relationship between Functional Recovery and Depression

Physical recovery and psychological adjustment are closely related. Patients who regain mobility and independence may experience improved confidence and greater participation in everyday activities. However, improvements in physical function do not necessarily eliminate depression. Some patients continue to experience emotional difficulties even after achieving considerable physical recovery.

2.6 Comparative Importance of Home-Based and Hospital-Based Rehabilitation

Home-based and hospital-based physiotherapy differ in terms of treatment environment, accessibility, equipment availability and family participation.

Home-based rehabilitation may offer greater convenience and allow functional exercises to be integrated into daily routines. Hospital-based rehabilitation may offer better access to specialized facilities and multidisciplinary healthcare services.

The Stroke Unit Trialists' Collaboration (2020) emphasized the importance of organized stroke care and coordinated services. This broader perspective supports the need to consider rehabilitation delivery and continuity across different healthcare settings.

3. RESEARCH METHODOLOGY

The research methodology provides a systematic framework for investigating the effects of two physiotherapy delivery approaches. The proposed study will use quantitative measurements to compare changes in depressive symptoms and functional recovery.

3.1 Research Design

A comparative experimental research design will be adopted.
Two groups will be formed:

- Group A: Patients receiving home-based physiotherapy.
- Group B: Patients receiving hospital-based physiotherapy.

Both groups will undergo pre-intervention and post-intervention assessments.
A randomized controlled design is recommended where feasible. If random allocation is not possible, a quasi-experimental pre-test and post-test design may be used, with appropriate adjustment for differences in baseline characteristics.

3.2 Population of the Study

The population will consist of adult chronic stroke patients receiving or requiring physiotherapy rehabilitation.
The study will focus on patients who are medically stable and have continued physical or functional limitations following stroke.

3.3 Sample Size and Sampling Technique

A proposed sample of 60 chronic stroke patients will be selected.
The participants will be divided into two equal groups:

- 30 participants receiving home-based physiotherapy.
- 30 participants receiving hospital-based physiotherapy.

Purposive screening may be used to identify eligible patients. Random allocation should subsequently be undertaken wherever possible.
The final sample size should be determined through a statistical power calculation using the selected primary outcome, expected effect size, significance level and anticipated dropout rate.

Table 1. Proposed sample distribution

Rehabilitation group	Participants	Percentage
Home-based physiotherapy	30	50%
Hospital-based physiotherapy	30	50%
Total	60	100%

3.4 Inclusion Criteria

The following criteria will be considered:

1. Adults aged 40–75 years.
2. Clinically confirmed history of stroke.
3. Presence of functional limitations requiring physiotherapy.
4. Ability to participate in rehabilitation with or without assistance.
5. Willingness to participate and provide informed consent.

3.5 Exclusion Criteria

1. Patients with an acute or unstable medical condition.
2. Individuals with severe cognitive impairment preventing valid assessment or participation.
3. Patients with serious uncontrolled cardiac conditions that make exercise unsafe.

4. Individuals with other major neurological disorders substantially affecting functional recovery.
5. Patients receiving another intensive rehabilitation program likely to interfere with the study outcomes.

3.6 Physiotherapy Intervention Program

The proposed intervention will continue for eight weeks. Both groups will receive physiotherapy three days per week, with each session lasting approximately 45–60 minutes.
The treatment programmes will be designed according to the patient's physical condition, functional limitations and rehabilitation goals.

Table 2. Comparison of home-based and hospital-based physiotherapy interventions

Parameters	Home-based physiotherapy	Hospital-based physiotherapy
Treatment location	Patient's residence	Hospital or rehabilitation centre
Supervision	Physiotherapist home visits	Clinical physiotherapist
Environment	Familiar surroundings	Structured clinical environment
Exercise activities	Household and functional exercises	Therapeutic and functional exercises
Equipment	Basic available equipment	Specialized rehabilitation equipment
Family participation	Greater opportunity for involvement	Participation as required
Main advantage	Accessibility and convenience	Professional facilities and supervision
Main limitation	Dependence on home facilities	Transportation and attendance difficulties

Source: Researcher's proposed intervention framework.

3.7 Tools and Instruments for Data Collection

Standardized assessment instruments will be used to evaluate depression and functional recovery.

1. Beck Depression Inventory-II (BDI-II)

The BDI-II will be used to assess depressive symptoms. It measures different aspects of depression, including sadness, loss of interest, fatigue, sleep difficulties and negative self-perception.

2. Barthel Index

The Barthel Index will assess functional independence in activities of daily living, including feeding, bathing, dressing, toileting, mobility and transfers.

3. Fugl-Meyer Assessment

The Fugl-Meyer Assessment will be used to measure motor impairment following stroke, particularly in relation to motor control and movement performance.

4. Berg Balance Scale

The Berg Balance Scale will assess balance performance through different functional activities, including standing, reaching and transferring.

5. Functional Independence Measure (FIM)

Table 3. Research variables and assessment instruments

Research variable	Assessment tool	Purpose
Depression	BDI-II	Measurement of depressive symptoms
Functional independence	Barthel Index	Assessment of daily living activities
Motor recovery	Fugl-Meyer Assessment	Measurement of motor impairment
Balance	Berg Balance Scale	Assessment of balance ability
Functional independence (additional)	FIM	Assessment of assistance required

3.8 Data Collection Procedure

The data collection process will be completed in five stages.

Stage 1: Initial assessment

Participants will be screened according to the inclusion and exclusion criteria. Demographic information, clinical history, stroke duration and baseline functional status will be recorded.

Stage 2: Group allocation

Eligible participants will be assigned to home-based and hospital-based physiotherapy groups. Random allocation is preferable to reduce selection bias.

Stage 3: Physiotherapy intervention

Both groups will receive their respective rehabilitation programmes for eight weeks. The researcher will maintain records of attendance, exercise duration, treatment intensity and patient compliance.

Stage 4: Post-intervention assessment

After completion of the intervention, participants will undergo reassessment using the same instruments used during the initial assessment.

Stage 5: Data analysis

Pre-test and post-test scores will be compared to examine changes in depression, functional independence, motor recovery and balance.

3.9 Statistical Techniques

The following statistical techniques will be applied:

1. Frequency and percentage for demographic characteristics.
2. Mean and standard deviation for continuous variables.
3. Paired-sample t-test for within-group comparisons, where assumptions are satisfied.
4. Independent-sample t-test or ANCOVA for between-group comparisons.
5. Chi-square test for appropriate categorical variables.
6. Pearson or Spearman correlation to examine the relationship between depression and functional recovery.

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7. Effect size and 95% confidence intervals to evaluate the magnitude and precision of treatment effects.

4. RESULTS AND INTERPRETATION

For the purpose of demonstrating the proposed statistical analysis, hypothetical data from 60 participants have been used, with 30 participants in each group. The results are illustrative and do not represent actual clinical observations. They should be replaced with verified research data before submission for publication.

4.1 Demographic Characteristics of Participants

The proposed study includes 60 chronic stroke patients divided equally into home-based and hospital-based physiotherapy groups. The demographic characteristics include age, gender and duration of stroke.

These variables are important because the recovery process may be influenced by age, severity of disability, duration of illness, family support and other individual characteristics.

Table 4. Demographic distribution of study participants

Demographic variables	Home-based (n=30)	Hospital-based (n=30)
Male	18 (60%)	19 (63.3%)
Female	12 (40%)	11 (36.7%)
Age 40–50 years	8 (26.7%)	7 (23.3%)
Age 51–60 years	13 (43.3%)	12 (40%)
Age 61–75 years	9 (30%)	11 (36.7%)
Stroke duration 6–12 months	11 (36.7%)	12 (40%)
Stroke duration above 12 months	19 (63.3%)	18 (60%)

Interpretation

The hypothetical demographic distribution indicates that both groups have broadly comparable characteristics. Male participants constitute a slightly higher proportion in both groups. The largest age category is 51–60 years, representing 43.3% of the home-based group and 40% of the hospital-based group.

Comparable baseline characteristics are desirable in comparative research because substantial differences between groups may influence rehabilitation outcomes independently of the treatment setting. In an actual study, baseline comparability should be assessed statistically and adjusted for important prognostic factors.

4.2 Comparative Analysis of Depression

Depression is an important psychological consequence of stroke. Patients may experience sadness, reduced motivation, sleep disturbances, loss of interest and feelings of dependence.

The Beck Depression Inventory-II (BDI-II) is proposed to assess depressive symptoms before and after physiotherapy intervention. Higher scores indicate greater depressive symptom severity.

Table 5. Comparison of depression scores before and after intervention

Rehabilitation group	Pre-test mean ± SD	Post-test mean ± SD	Mean reduction

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Home-based physiotherapy	23.60 ± 5.10	15.20 ± 4.60	8.40
Hospital-based physiotherapy	23.30 ± 5.20	17.10 ± 4.80	6.20

The home-based group demonstrates a reduction from 23.60 to 15.20, representing an improvement of 8.40 points. The hospital-based group demonstrates a reduction from 23.30 to 17.10, representing an improvement of 6.20 points.

The greater descriptive reduction in the home-based group may be associated with the opportunity to perform rehabilitation activities within a familiar environment. Patients may experience greater comfort while practising everyday activities in their own homes.

4.3 Comparative Analysis of Functional Recovery

Functional recovery is an essential outcome of stroke rehabilitation. It refers to improvements in the ability to perform activities such as walking, transferring, dressing, bathing and maintaining personal independence.

The Barthel Index is proposed to assess functional independence. Higher scores indicate greater independence in activities of daily living.

Table 6. Comparison of functional recovery before and after intervention

Rehabilitation group	Pre-test mean ± SD	Post-test mean ± SD	Mean improvement
Home-based physiotherapy	48.50 ± 9.20	68.40 ± 10.10	19.90
Hospital-based physiotherapy	49.10 ± 9.00	72.60 ± 9.40	23.50

Barthel Index scores on a 0–100 scale; higher scores indicate greater functional independence.

Interpretation

The hypothetical results indicate improvement in functional independence in both rehabilitation groups.

The home-based group demonstrates an increase from 48.50 to 68.40, representing a mean improvement of 19.90 points. The hospital-based group demonstrates an increase from 49.10 to 72.60, representing an improvement of 23.50 points.

The hospital-based group shows greater descriptive improvement in functional recovery. This difference may be associated with access to specialized rehabilitation equipment, structured exercise facilities and continuous professional supervision.

4.4 Overall Comparative Interpretation

The results indicate different patterns of improvement across the two rehabilitation settings. Home-based physiotherapy demonstrates a greater descriptive reduction in depression, whereas hospital-based physiotherapy demonstrates a greater descriptive improvement in functional independence.

This difference is important because psychological recovery and physical recovery are related but distinct outcomes.

Home-based treatment may provide emotional comfort, family involvement and opportunities to practise activities in familiar surroundings. Hospital-based treatment may provide access to specialized equipment, structured therapeutic facilities and continuous professional guidance.

4.5 Graphical Presentation of Research Findings

4.6 Hypothesis Testing

The research hypotheses will be examined through appropriate statistical procedures. Post-intervention scores should be adjusted for baseline scores, preferably through ANCOVA or a suitable mixed-effects model.

Table 7. Summary of research hypotheses and proposed statistical interpretation

Hypothesis	Research variable	Illustrative observation	Decision
H01	Depression	Greater reduction in home-based group	Not determined
H02	Functional recovery	Greater improvement in hospital-based group	Not determined
H03	Activities of daily living	Barthel Index favours hospital-based group descriptively	Not determined
H04	Depression and functional recovery	Relationship requires correlation analysis	Not determined

5. DISCUSSION AND CONCLUSION

5.1 Discussion

The present investigation examines the comparative effects of home-based and hospital-based physiotherapy interventions on depression and functional recovery among chronic stroke patients. The proposed research recognizes that stroke rehabilitation involves more than the restoration of physical movement. It also includes psychological adjustment, independence, family participation and the ability to return to everyday activities.

5.1.1 Home-Based Physiotherapy and Depression

One of the important observations in the hypothetical results is the greater reduction in depression scores among patients receiving home-based physiotherapy.

Home-based rehabilitation takes place in an environment that is familiar to patients. They can practise movements in the same surroundings where they perform routine activities. This may reduce some practical difficulties associated with travelling to rehabilitation centres.

Family participation may also provide emotional encouragement. Caregivers can observe the patient's progress, support exercise routines and assist with selected daily activities.

Nordin et al. (2019) conducted a randomized controlled trial comparing home-based carer-assisted therapy with hospital-based therapist-delivered therapy. Both groups improved in functional outcomes and quality of life, with no significant differences between the groups. This supports the potential value of home-based rehabilitation when appropriate supervision and caregiver participation are available.

5.1.2 Hospital-Based Physiotherapy and Functional Recovery

The hypothetical results demonstrate greater functional improvement in the hospital-based group.

One possible explanation is the availability of specialized rehabilitation facilities. Hospitals and rehabilitation centres may provide equipment and clinical arrangements that support structured exercise, gait training, balance activities and motor rehabilitation.

5.1.3 Comparative Effectiveness of Both Approaches

The comparative effectiveness of home-based and hospital-based physiotherapy depends on several factors, including:

- Severity of stroke-related disability.
- Duration and intensity of rehabilitation.
- Availability of trained physiotherapists.
- Access to rehabilitation equipment.
- Family and caregiver involvement.
- Patient motivation and treatment adherence.
- Accessibility of healthcare facilities.

A recent systematic review by Do et al. (2025), involving 46 studies in its qualitative synthesis, found no statistically significant difference in activities of daily living independence between home-based and hospital-based rehabilitation overall. The review nevertheless reported that home-based rehabilitation was more effective than usual care. The authors also cautioned about the risk of bias in the included evidence.

5.1.4 Relationship Between Depression and Functional Recovery

Depression and physical disability may influence one another during the recovery process.

Patients with substantial mobility limitations may experience frustration, reduced confidence and social isolation. These experiences may contribute to depressive symptoms.

Similarly, depression may reduce motivation and willingness to participate in rehabilitation activities. This may negatively affect exercise adherence and functional progress.

Improved independence may therefore support psychological adjustment, while appropriate psychological care may help patients participate more actively in rehabilitation.

5.1.5 Clinical Implications

The proposed study has several implications for clinical rehabilitation.

- Physiotherapists should assess psychological symptoms alongside physical limitations.
- Home-based rehabilitation should be considered for patients facing transportation and accessibility difficulties.
- Hospital-based rehabilitation should be available to patients requiring specialized facilities and close clinical supervision.
- Family members should receive appropriate guidance regarding safe exercise and caregiver responsibilities.
- Rehabilitation goals should be based on individual functional requirements.
- Depression screening and referral pathways should be incorporated into stroke rehabilitation services.

- ❖ Treatment intensity, attendance and adherence should be monitored to maintain comparable rehabilitation quality.

5.2 Limitations of the Study

The proposed study has several limitations.

A sample of 60 participants may not represent the entire population of chronic stroke patients. Second, the eight-week intervention period may not be sufficient to establish long-term differences in functional recovery and depression.

The rehabilitation setting may be influenced by socioeconomic status, transportation facilities, caregiver availability and the physical condition of the patient's home.

5.3 Recommendations

Based on the proposed research framework, the following recommendations are suggested:

1. Healthcare institutions should develop accessible home-based rehabilitation services for suitable stroke patients.
2. Hospitals should maintain structured physiotherapy programmes for patients requiring specialized clinical facilities.
3. Hybrid rehabilitation models combining hospital visits and supervised home exercises should be explored.
4. Caregivers should receive practical training in supporting rehabilitation safely.
5. Depression screening should be incorporated into routine follow-up assessments.
6. Future research should include larger samples and longer follow-up periods.
7. Researchers should investigate the cost-effectiveness and long-term sustainability of both rehabilitation approaches.

5.4 Conclusion

Stroke rehabilitation is a continuous process that requires attention to physical recovery, psychological health and functional independence. Chronic stroke patients frequently experience limitations in mobility and daily activities, which may contribute to depression and reduced quality of life.

The present study proposes a comparative examination of home-based and hospital-based physiotherapy interventions. Both approaches have distinct advantages. Home-based physiotherapy offers the benefit of familiar surroundings, accessibility and opportunities for family participation. Hospital-based physiotherapy provides structured clinical supervision, specialized equipment and access to rehabilitation facilities.

The broader implication is that rehabilitation should be individualized according to the patient's physical condition, psychological needs, family circumstances and accessibility requirements. Neither setting should be considered universally superior.

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