

Cultural Adaptation and Feasibility Testing of Adapted Lifestyle-integrated Functional Exercise Programme for Chinese Older Adults in the UK: A Mixed-Methods Study

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Research Article

Keywords: ethnicity, community, lifestyle-integrated exercise, feasibility studies, mixed-method study, co-design workshop

Posted Date: August 31st, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10836516/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

The adapted Lifestyle-integrated Functional Exercise (aLiFE) programme integrates balance, strength and physical activity tasks into daily routines to support long-term adherence. Evidence on culturally adapted aLiFE for minority ethnic older adults remains limited. This study evaluated feasibility and acceptability of a culturally adapted Chinese version of aLiFE (CLiFE) among Chinese older adults living in UK.

Methods

Following Medical Research Council framework for complex intervention development, a co-design workshop was conducted to refine CLiFE, followed by four-week single-arm feasibility study. Participants were recruited from earlier focus groups. Feasibility outcomes included recruitment, retention, attendance, adherence, habit formation, intervention and outcome-measure acceptability. Exploratory outcomes were physical function (Short Physical Performance Battery), and concerns-about-falling (Short Falls Efficacy Scale-International). Descriptive statistics were used and open-ended responses summarised.

Results

Seven Chinese older adults informed modifications to activity progression, delivery format, materials and data collection. Fifteen participants enrolled in the feasibility study, (recruitment rate = 83%), with 100% attendance and retention. No adverse events were reported. Fourteen participants returned Activity Recorder/weekly adherence sheets (93% return rate). All outcome measures were completed. Twelve participants were included in adherence analysis, of whom ten demonstrated full adherence. Acceptability ratings were moderate to high. Habit-formation scores suggested activities became increasingly integrated into daily routines. Minimal changes were observed in physical function and concerns-about-falling.

Conclusions

The CLiFE programme appeared feasible, acceptable and safe for Chinese older adults living in UK. Findings support further refinement and larger-scale evaluation, particularly regarding literacy, social support, activity progression and culturally appropriate outcome assessment.

BACKGROUND

Falls are a major public health concern among older adults and are associated with injury, reduced independence, decreased quality of life, and increased healthcare utilisation [1]. International estimates suggest that approximately 28–35% of people aged of 65 and over fall each year, increasing to 32–42% for those > 70 years [2]. Exercise interventions incorporating balance and functional strength training are among the most effective falls prevention strategies, reducing falls rates by approximately 24% [3]. However, maintaining long-term adherence to traditional exercise programmes remains challenging for many older adults. Common barriers include lack of motivation, time constraints, low confidence, and difficulties maintaining exercise as a long-term behaviour [4].

The adapted Lifestyle-integrated Functional Exercise (aLiFE) programme was developed within the PreventIT project to address these challenge by integrating balance, strength, and physical activity tasks into everyday routines for younger older adults to improve functional ability and reduce future risk of falls [5]. Compared with original LiFE programme [6, 7], aLiFE incorporates more graded activity levels and progressive challenge, while also aiming to promote habit formation and long-term adherence through repeated practice within daily life[5]. Habit formation is central to the lifestyle-integrated approach, as embedding activities within existing routines may support automaticity and reduce reliance on conscious motivation over time [8]. Initial development and feasibility studies have suggested that aLiFE is acceptable to participants and trainers and can be integrated into daily life [5, 9, 10], supporting its potential as a lifestyle integrated approach to falls prevention.

However, similar with most falls prevention interventions [11], aLiFE research has been conducted within predominantly with Western populations [5, 9, 10]. When implementing evidence-based interventions in minority ethnic populations, cultural adaptation may be required to ensure that intervention content, delivery, materials, and implementation procedures are acceptable and meaningful within the target population's cultural and practical context [12]. Cultural beliefs, language, health literacy, family influences, and preferences regarding exercise may therefore affect the acceptability and implementation of falls prevention interventions among minority ethnic groups [13]. An adapted Thai version of aLiFE, which included modifications to intervention content and delivery, was found to be feasible and acceptable among community-dwelling older Thai adults [14, 15]. This provides an important precedent for adapting aLiFE within an Asian context. However, the need for modification also suggests that direct transfer of aLiFE across cultural settings may not be appropriate and that adaptation should be responsive to the specific linguistic, cultural, and implementation context of the target population.

Chinese older adults represent one of the largest minority ethnic populations in the UK [16], yet remain underrepresented in falls prevention research [17]. Previous qualitative work within this research programme identified several factors that may influence engagement with aLiFE-based activities among Chinese older adults, including preferences for group-based learning, simplified materials, visual demonstrations, and culturally appropriate adapted

activities [18]. These findings suggested that direct implementation or simply language translation of the existing aLiFE programme may not adequately address the needs and preferences of Chinese older adults living in the UK. The aim of this study was to develop a culturally adapted Chinese version of the adapted Lifestyle-integrated Functional Exercise (CLiFE) programme and evaluate its feasibility and acceptability among Chinese older adults living in the UK. Specific objectives were to assess recruitment, retention, adherence, and intervention acceptability, while also exploring the feasibility of outcome assessment procedures and identifying areas for further intervention refinement.

METHODS

Study design

This study forms part of a larger complex intervention development project guided by the Medical Research Council (MRC) Framework for Developing and Evaluating Complex Interventions [19]. This paper focuses on two phases of this project: Firstly, a co-design workshop, informed by findings from a previous study [18], in which participants collaboratively refined the CLiFE programme content and delivery. Secondly, a four-week single arm feasibility study to assess the feasibility and acceptability of the CLiFE programme.

Participants

Participants were community-dwelling Chinese older adults living in Manchester, UK. Individuals were eligible if they were aged 60 years or above, self-identified as Chinese, and were able to communicate in Mandarin or Cantonese. Participants were required to have sufficient cognitive and physical capacity to understand instructions and safely take part in the intervention. Those living in residential or nursing care settings were excluded. Participants were recruited from previously study [18] or peer referred if applicable. All participants were contacted by telephone to assess interest in participation.

Phase 1: Co-design workshop

Setting and procedure

The co-design workshop was conducted at the local Chinese community centre to refine the preliminary CLiFE manual. The draft CLiFE manual was developed from the early stage of this research [18] and provided to participants during the workshop. The workshop included demonstration and practice of all activities to facilitate experiential feedback. A semi-structured discussion guide was used: (1) activities to be included; (2) appropriate settings for training; (3) manual format; (4) data to be collected; and (5) methods of data collection. Open group discussion was encouraged to allow participants to share perspectives and practical suggestions. The workshop lasted approximately 90 minutes and was conducted in Mandarin and Cantonese based on participants' preference. Discussions were audio-recorded using an encrypted digital recorder and the secure recording function within Microsoft Teams, with participants' consent, and were supplemented by field notes. Recordings were transcribed to support accurate categorisation of feedback.

Data analysis

Feedback from the workshop was summarised by the main researcher with a pragmatic qualitative description approach [20]. Decisions regarding modifications were informed by participant input, alongside considerations of intervention feasibility, safety, and alignment with core principles of the aLiFE approach.

Phase 2: four-week feasibility study

Setting and procedure

All sessions were conducted at the University of Manchester (Table 1). This intervention lasted four weeks, which is the same timeline as the aLiFE feasibility study. The CLiFE was delivered through group teaching sessions rather than individual home visits, which is suggested by participants from previous work [18]. To facilitate session management, participants were divided into two groups. The intervention was led by the main researcher, with additional research assistants to support participant safety and session organisation. During the first teaching session, a subset of CLiFE activities were introduced, demonstrated, and practised under supervision. Participants were provided with a printed CLiFE manual and combined Activity Recorder and Weekly Adherence Report for further self-monitoring at home. Follow-up phone calls were made by the main researcher at Week 2 to check for engagement and adverse events. The second teaching sessions was conducted at Week 3, and the remaining CLiFE's activities were introduced and practised. Each teaching session lasted approximately three hours. At Week 4, participants returned for follow-up assessments and submitted their combined Activity Recorder and Weekly Adherence Report. Baseline and follow-up assessments were conducted with the assistance of researchers not involved in intervention delivery to minimise assessment bias.

Table 1 Timeline of sessions performance

Week 0	Baseline assessment
Week 1	1st Teaching sessions
Week 2	15 minutes follow-up phone calls
Week 3	2nd Teaching sessions
Week 4	Follow-up assessment

Outcomes measurements

Baseline data included demographic information and cognitive status assessed with the Montreal Cognitive Assessment (MoCA) [21]. Physical function and concerns about falling were assessed at both baseline and follow-up using the Short Physical Performance Battery (SPPB) [22] and the Short Falls Efficacy Scale-International (Short FES-I) [23], respectively. The primary aim of the feasibility study was to assess feasibility, including recruitment, retention, session attendance, adherence, habit formation, acceptability of outcome assessments and intervention. Recruitment feasibility was assessed by the number of eligible participants recruited and the time required to complete recruitment. Retention was assessed as the proportion of participants who completed the follow-up assessment, and session attendance was recorded for both teaching session. Adherence was assessed using the return rate of the combined Activity Recorder and Weekly self-reported adherence sheet (See Supplementary Table 5). Moreover, participants also completed the Exercise Adherence Rating Scale (EARS) [24] and a “What helps or hinders doing your exercise” questionnaire, which were used in previous aLiFE study [10], to explore factors influencing engagement. Habit formation was assessed using the Self-Report Behavioural Automaticity Index (SRBAI), which measures the extent to which a behaviour is experienced as automatic [8]. Participants also completed a questionnaire assessing overall acceptability, perceived helpfulness, adaptability, level of difficulty, safety, and willingness to recommend the programme, used in previous aLiFE study [5].

Data analysis

Descriptive statistics were used to summarise quantitative data. Continuous variables are presented as mean (SD) or median (25- and 75-percentiles), while categorical variables are presented as frequencies and percentages. Weekly self-reported adherence responses were scored as full adherence (2), partial adherence (1), or non-adherence (0). Participants who provided $\geq$ three weeks responses were included in the adherence analysis. Scores were summed across the four-week intervention period (range 0–8) and categorised into three levels: full adherence (total score 6–8), partial adherence (3–5), and non-adherence (0–2). This categorisation approach was adapted from a previous aLiFE study [10]. Missing data were not retrospectively imputed. SPPB scores were calculated as total scores ranging from 0 to [5], with higher scores indicating better physical performance. Short FES-I scores ranged from 7 to 28, with higher scores indicating greater concern about falling. Scores were categorised as low concern (7–8), moderate concern (9–13), and high concern (14–28) [23]. All quantitative data analyses were analysed with SPSS. Responses to open-ended questions were summarised using a descriptive approach. Key points were identified and used to support quantitative findings.

RESULTS

Stage 1

Seven individuals participated in the workshop. Participants characteristics are presented in Table 2. Feedback from the workshop informed modifications to the CLiFE programme across four key domains: activities, materials, delivery, and data collection (Table 3).

Table 2
Stage 1 Baseline characteristics of participants

Demographics	N = 7
Gender N=, %	
Women,	4 (57%)
Men,	3 (43%)
Age, Mean (SD)	71.4 (6.3)
64–69	3 (43%)
70–79	3 (43%)
≥ 80	1 (14%)
Years in the UK, N= %	
2–9	2 (29%)
10–40	2 (29%)
41–60	3 (43%)
Education level N=, %	
Primary school	5 (71%)
Lower secondary	2 (29%)
Occupation N= %	
Retired	15 (100%)
Reported falling within last 6 months	
None	7 (100%)
Number of co-morbidities N=, %	
0	2 (29%)
≥ 2	5 (71%)
MoCA score, mean (SD) *	20 (5.1)
*Higher scores mean better cognition	

Table 3
Modifications made to the translated aLiFE programme in the development of CLiFE

Domain	Translated aLiFE manual	Modification made
Activities progression	• Steep progression between difficulty levels	• Smoother progression with additional support
Intervention materials	• Heavy text instructions • Scientific demonstration language	• Simplified manual with lay language demonstrations
Delivery format	• Individual, home- based delivery	• Group- based delivery
Data collection	• Separate Activity Planner • Handwriting with Activity Recorder • Weekly adherence report sheet	• Removed Activity Planner • Box ticking instead of handwriting • Combined Activity Recorder and Weekly adherence report into a single page

Exercises

Participants highlighted the importance of gradual progression between activity difficulty levels and suggested inclusion of additional intermediate steps to improve confidence and safety during balance activities. For example, participants recommended increasing external support during one-leg standing activities before progressing to more challenging variations.

Supporting documents

Participants noted that the translated aLiFE manual was text-heavy and contained scientific demonstration language that was difficult to understand. The manual was subsequently simplified, adopting lay language with visual demonstrations to enhance accessibility and comprehension.

Programme delivery

Participants preferred group teaching over individual, home-based delivery format, highlighting the value of peer interaction and shared learning experiences. Regarding data collection, participants found the separate Activity Planner, handwritten Activity Recorder, and weekly adherence report sheet to be burdensome. In response, the Activity Planner was removed, the Activity Recorder and Weekly adherence report were combined into a single page, and handwriting was replaced with box ticking to reduce participant burden.

Stage 2

A total of 17 individuals were approached, and one additional participant was recruited through peer referral. Three individuals declined participation because of health-related issues or concerns from family members. Participant flow is presented in Fig. 1. Overall, 15 participants were enrolled, resulting in a recruitment rate of 83%. Recruitment was completed over one week. All participants attended both teaching sessions, giving an attendance rate of 100%. All participants completed the follow-up assessment, yielding a retention rate of 100%. Participants characteristics are presented in Table 4. Participants were evenly distributed across age groups, and the mean age was 74 years (SD 6.7). 80% were women and most had primary school education (67%) and at least one comorbidity (80%). Two participants (13%) reported a history of falls within the previous six months. The mean MoCA score was 17.7 (SD 5.5).

Table 4
Stage 2 baseline characteristics of participants

Demographics	N = 15
Gender N (%)	
Women,	12 (80%)
Men,	3 (20%)
Age, Mean (SD)	74 (6.7)
64–69	5 (33%)
70–79	6 (40%)
80–87	4 (27%)
Years in the UK, N (%)	
2–9	2 (13%)
10–40	4 (27%)
41–60	9 (60%)
Education level N (%)	
None	2 (13%)
Primary school	10 (67%)
Lower secondary	3 (20%)
Occupation N (%)	
Retired	15 (100%)
Reported falling within last 6 months N (%)	
≥ 2	2 (13%)
Number of co-morbidities N= %	
0	3 (20%)
1	3 (20%)
≥ 2	9 (60%)
MoCA score, mean (SD) *	17.7 (5.5)
*Higher scores mean better cognition	

Feasibility outcomes

Adherence

14 participants returned the combined Activity Recorder and Weekly self-reported adherence sheet, resulting in a return rate of 93%. One participant did not return it because she disliked the recording format. Two individuals had more than one-week of missing data due to confusion regarding the recording dates. Therefore, 12 participants were included in the adherence analysis (See Fig. 1). 10 participants (83%) demonstrated full adherence, one participant (8%) demonstrated partial adherence, and one participant (8%) demonstrated non-adherence. Participants' mean EARS score was 21.1 (SD 1.9) out of 24, indicating high adherence. The mean "What helps or hinders doing your exercise" score was 28.5 (SD 4.4) out of 40, with higher scores reflecting greater support for exercise engagement.

Acceptability

Several participants required assistance completing questionnaires due to literacy difficulties. Participants reported moderate to high acceptability of the CLiFE programme in CLiFE 7-point Likert Scale questionnaire, with mean scores ranging from 4.9 (SD 1.3) to 6.1 (SD 1.0) across questionnaire (Supplementary Table 6). For habit formation (SRBAI), high scores were observed across all four items, ranging from 6.0 (SD 1.3) to 6.5 (SD 0.6) (Supplementary, Table 7), suggesting that participants increasingly perceived the activities as automatic and integrated into their daily routines. Based on responses to open-ended questions, tandem stand/walk, one leg stand, sit to stand, and knee bending activities were identified as the most frequently practised and preferred activities. Details of answers are in Supplementary Table 8.

Exploratory measures of physical function and concerns about falling

15 participants completed baseline and four-week follow-up assessments (Supplementary Table 9), resulting in a retention rate of 100%. Minimal changes were observed in SPPB and Short FES-I scores between baseline and follow-up. Baseline SPPB scores were relatively high, with 10 participants scoring 11–12 out of 12, suggesting a possible ceiling effect. Completion of assessments by all participants supports the feasibility of the outcome measurement procedures.

Adverse Events

No adverse event was reported.

Discussion and Implications

This study followed the MRC framework for complex intervention development [19] to culturally adapt and evaluate the CLiFE programme for Chinese older adults living in the UK. Overall, findings suggested that the programme was feasible, acceptable, and safe within this population, with high recruitment, attendance, retention, and adherence rates, and no adverse events reported. These findings support the feasibility of progressing towards further optimisation and larger-scale evaluation of the CLiFE programme.

A key finding of this study was that culturally responsive adaptation appeared to improve programme accessibility and engagement. Consistent with the development phase of the MRC framework [19], participants feedback informed modifications not only to intervention content, but also to delivery format, materials, and data collection procedures. The adaptation process incorporated group-based teaching, simplified Chinese-language materials, greater visual support, and reduced recording burden through simplified box ticking recording method [18]. These findings suggest that culturally adapting falls prevention interventions should extend beyond language translation alone and include consideration of literacy demands, preferred learning styles, and the practical accessibility of intervention materials and assessment procedures. This is consistent with existing literature on culturally adapted health interventions for Chinese older adults [13].

Recruitment

Recruitment and engagement may also have been supported by collaboration with Chinese community organisations and trusted community leaders. Previous research suggests that working through familiar community networks can help build trust and improve access to minority ethnic older adults in health promotion research [25, 26]. In this study, recruitment through established Chinese community may have enhanced the credibility of the study and contributed to high recruitment, attendance, retention, and adherence.

Literacy consideration

Literacy consideration is an important component of the cultural modification [27]. Low literacy level were observed within the current population, which aligns with a previous study suggesting that older Chinese migrant populations may experience lower literacy levels because of educational, linguistic, and socioeconomic factors [28]. The CLiFE manual was simplified from heavy text, scientifically worded instructions into lay Chinese language materials with greater visual support to improve accessibility and understanding. Data collection procedures were also adapted following participant feedback, with handwriting activity recording replaced by a simplified box ticking combined recording format to reduce the need for written responses. This was particularly relevant because some participants were able to understand and discuss the activities verbally, but experienced difficulty completing written records or questionnaires independently. These findings suggest that, for this population, cultural adaptation needed to go beyond translation and include consideration of how written materials, visual information, and recording procedures affected accessibility and engagement.

Similar considerations may also apply to the feasibility and interpretation of cognitive screening measures. Previous studies have suggested that the MoCA may be more suitable for younger and more highly educated Chinese older adults [29], and that educational attainment may exert a stronger influence on MoCA performance than cognitive status itself [30, 31]. Therefore, the relatively low MoCA scores observed in the current study may partly reflect educational and literacy influences on cognitive screening outcomes rather than cognitive impairment alone. Future studies involving Chinese

older adults with lower educational backgrounds may therefore benefit from considering alternative cognitive assessment approaches or additional supportive assessment methods to improve accessibility and interpretability.

Social interaction consideration

Social factors also appeared to influence engagement with the CLiFE programme. Previous evidence suggests that functional social support, including companionship, emotional, informational, and instrumental support, may facilitate physical activity participation among community-dwelling older adults [32]. In this study, participants valued face-to-face group teaching and opportunities for peer support during intervention delivery. This may have supported engagement by allowing participants to observe activities, learn from one another, and feel supported within a familiar social environment. For Chinese older adults living in the UK, this group-based and community-connected delivery format may have been particularly relevant, as it aligned with participants' preference for collective learning and trusted community-based interaction identified in earlier stages of the research [18]. A previous review has similarly suggested that group-based delivery may provide both practical and social benefits for Chinese older adults within community settings [13]. Thus, group teaching in early stages of the intervention may therefore have contributed to the high attendance, retention, and adherence rates observed in the feasibility study.

Moreover, it suggests that family members may influence older adults' exercise engagement through concerns about safety, physical vulnerability, or perceived appropriateness of activity. Previous evidence indicates that social support from family and peers can facilitate physical activity participation, whereas lack of support or negative influence may act as a barrier [13, 33]. Future larger scale CLiFE studies may therefore consider involving family members as supportive partners in falls prevention.

The majority of participants were women, which is consistent with previous community-based physical activity and falls prevention studies, where women are often overrepresented [11]. Within Chinese populations, previous research has further suggested that older women may be more likely than men to engage in health promotion and community-based activities [29, 34]. The underrepresentation of men in the current study suggests that future research should explore barriers to participation and develop recruitment strategies tailored to older Chinese men.

Adherence

Adherence findings were generally positive, with most participants demonstrating full adherence and reporting that CLiFE activities had become increasingly automatic and integrated into daily routines. High SRBAI scores further supported early habit formation, which aligns with the theoretical basis of the aLiFE approach. Participants appeared to prefer simpler and more practical activities, such as Tandem Stand/Walk and sit to stand activities, which could be more easily incorporated into existing daily routines. In contrast, more challenging balance activities, particularly eyes-closed exercises, were lesser perform and sometimes perceived as unsafe or difficult to perform within limited home environments. These findings may suggest that the successful integration of activities depends not only on exercise content itself, but also on the compatibility of activities with participants' perceived safety [35–37], home environment [36], and existing lifestyle routines [9]. Activities that are simple, practical, and easily embedded into everyday life may therefore be more likely to support behavioural automaticity and long-term adherence.

However, successful lifestyle integration does not necessarily equate to progression towards more challenging activity levels. This distinction is important because the broader falls prevention exercise literature suggests that balance and strength programmes are most likely to be effective when they provide sufficient challenge and progression [3, 38]. In the current study, participants appeared willing to engage with activities perceived as safe and achievable, some also appeared hesitant to increase activity difficulty because of concerns regarding instability or fall risk. This may limit the potential for balance improvement, as activities that are integrated into daily routines but remain at a low level of challenge may not sufficiently improve balance or maximise falls-prevention benefits. This may partly explain the limited changes observed in SPPB outcomes during the intervention period. This finding is consistent with previous digital aLiFE programme findings, which suggested that potentially people were not challenging themselves enough [10]. Together, these findings highlight a key implementation challenge for CLiFE: supporting participants to embed activities into everyday life while also helping them progress safely towards more challenging activity levels. In future studies, particularly with relatively younger and more active older adults, additional trainer touch points over a longer intervention period may be needed to review activity performance, encourage appropriate progression, and ensure that activities remain sufficiently challenging while maintaining participants' confidence and perceived safety.

Physical Outcomes

All participants completed the follow-up assessments, supporting the feasibility of the selected outcome measures within this population. Despite positive adherence and engagement findings, only minimal changes were observed in SPPB and Short FES-I scores. One possible explanation is the relatively high functional status of participants at baseline, as most were already attending community centres regularly and travelling independently to intervention sessions. Previous studies have reported ceiling effects when the SPPB is used among higher-functioning community-dwelling older adults, potentially limiting its sensitivity to detect small changes [39]. In addition, strength and balance training may sometimes be perceived by participants as increasing immediate risk, particularly when activities involve moving more, reducing support, or deliberately challenging stability [40]. Moreover, as discussed previously, participants often favoured simpler activities and demonstrated limited progression towards more challenging activity levels, which may also have contributed to the absence of measurable functional changes. The short intervention duration may have further reduced the likelihood of observing measurable improvements. Future studies may therefore benefit from recruiting older adults at greater falls risk and extending intervention duration. These findings should be interpreted cautiously given the small sample size and exploratory nature of this feasibility study and are intended to inform the design of a future fully powered trial.

Limitations

As a small single arm feasibility study, conclusions regarding intervention effectiveness cannot be drawn. Participants were recruited through community organisations and were already regularly attending community activities, which may limit the transferability of findings to more socially isolated Chinese older adults or those experiencing mobility and transportation barriers. The four-week intervention period may also have been insufficient to observe meaningful changes in physical function or concern about falling. Finally, some participants had been involved in earlier stages of intervention development, which may have positively influenced engagement and acceptability findings.

Conclusions

In conclusion, this study provides preliminary evidence supporting the feasibility and acceptability of the culturally adapted CLiFE programme for Chinese older adults living in the UK. The findings highlight the importance of culturally responsive adaptation, social support, and accessibility considerations in intervention implementation. Further optimisation and larger scale evaluation are needed to determine the effectiveness of CLiFE in reducing falls and improving physical function.

Abbreviations

Adapted Lifestyle-integrated Functional Exercise – aLiFE

Chinese version of adapted Lifestyle-integrated Functional Exercise – CLiFE

Short Physical Performance Battery - SPPB

Short Falls Efficacy Scale-International – Short FES-I

Montreal Cognitive Assessment - MoCA

Medical Research Council - MRC

Exercise Adherence Rating Scale – EARS

Self-Report Behavioural Automaticity Index - SRBAI

Declarations

Ethical Approval and consent to participate

Ethical approval was obtained from the ethics committee of the University (Review Reference: 2025-21643-39687). All participants received written information about the study and provided written informed consent prior to participation. Confidentiality and anonymity were assured throughout the research process.

Consent for publication

All authors have approved the manuscript and agree with its submission.

Availability of data and materials:

The original data are not available for public sharing in order to protect participant confidentiality.

Declaration of competing interest

The authors declare no competing interests.

Funding:

This research did not receive funding.

Authors' contributions

L.H., H.HH, C.T. wrote the study protocol; L.H., Y.Y. done transcription and translation; L.H., Y.Y, H.HH., C.T. completed data analysis; L.H. wrote original draft; L.H., H.HH., C.T. wrote reviewing and editing.

Acknowledgements

The authors would like to thank all older adults and researchers who generously contributed their time and perspectives to this study. We also thank the Chinese Health Information Centre for supporting participant recruitment and facilitating community engagement. We would also like to acknowledge the Great Britain-China Educational Trust (GBCET) for their support.

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Figures

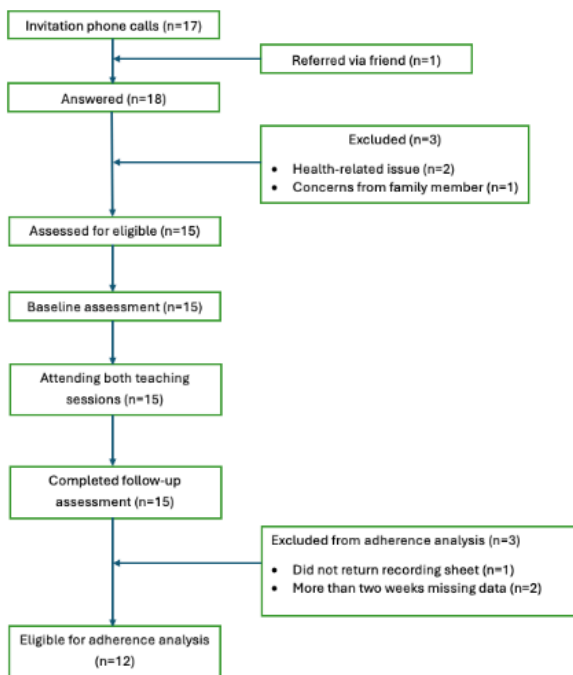


Figure 1

Participant Recruitment and Eligibility Flow

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