

# Clinical effectiveness of the multicomponent frailty management program developed by an OT in Singapore: A study finding from a cluster-randomized clinical trial\*

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\*SIT Non-STEM Ignition grant



# Acknowledgement

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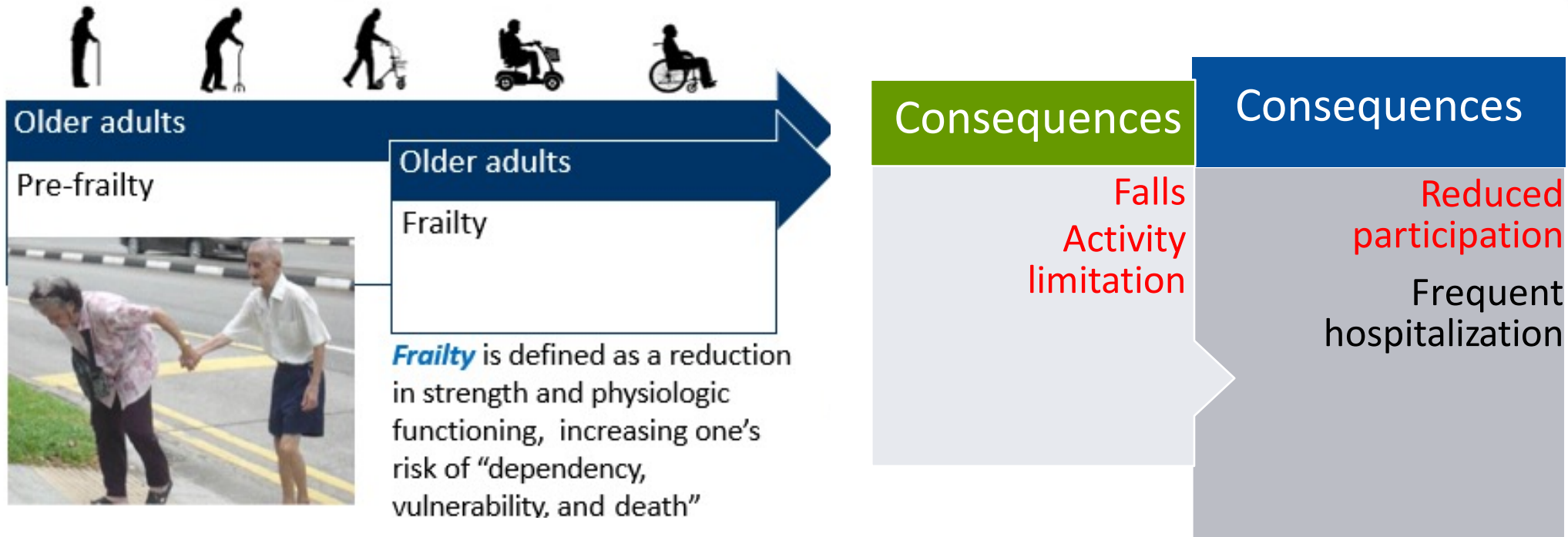
## ❑ Research Team Members

- ❑ Dr Shawn Soh, Asst Prof, SIT
- ❑ Dr Pearpilai Jutasompakorn, A/Prof, SIT
- ❑ Dr Eric Chua, A/Prof, SIT
- ❑ Dr Wee Shiou Liang, A/Prof, SUSS
- ❑ Honours students from PT/OT degree programs, SIT

## ❑ Participating organizations and centres



# Background



- The prevalence of frailty in community-living older adults
  - approximately 3.5%-27% in the Asia-Pacific region
  - > 50% in the underdeveloped countries
  - In Singapore, the prevalence of frailty and pre-frailty is 6.2% and 37%, respectively.

(Fried et al., 2002; Dent et al., 2017)

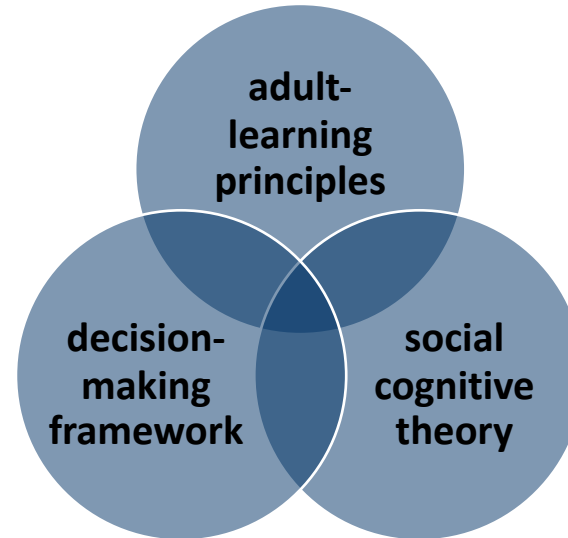
# Background

## Development of the Say No To Frailty Program

Say No To Frailty

A Multi-Component Frailty Management Program for Community-living Older Adults

Session No. 课程	Topics 课程内容	
Session 1 第一节	Introduction, personal sharing & goal setting 课程简介, 个人分享与目标设定	Balance & strength exercises 平衡与肌力训练
Session 2 第二节	Common chronic disease and management 常见慢性病与管理	Balance & strength exercises 平衡与肌力训练
Session 3 第三节	Medication management 药物管理	Balance & strength exercises 平衡与肌力训练
Session 4 第四节	Fall prevention (I) 预防跌倒 (一)	Balance & strength exercises 平衡与肌力训练
Session 5 第五节	Community independent living (I) 独立社区生活 (一)	Balance & strength exercises 平衡与肌力训练
Session 6 第六节	Mid-point review 中期复习	Balance & strength exercises 平衡与肌力训练
Session 7 第七节	Healthy diet 健康饮食	Balance & strength exercises 平衡与肌力训练
Session 8 第八节	Fall prevention (II) 预防跌倒 (二)	Balance & strength exercises 平衡与肌力训练
Session 9 第九节	Energy conservation 节能消耗管理	Balance & strength exercises 平衡与肌力训练
Session 10 第十节	Community independent living (II) 独立社区生活 (二)	Balance & strength exercises 平衡与肌力训练
Session 11 第十一节	Active lifestyle 活跃生活方式	Balance & strength exercises 平衡与肌力训练
Session 12 第十二节	Review and plan 复习与计划	Graduation ceremony 毕业典礼
1-mth Follow up	Booster session 强化课	
3-mth Follow up	Phone call 电话跟进	



(Bandura, 1997)

### Program objectives

- ✓ Improve physical functions
- ✓ Increase self-confidence
- ✓ Increase community participation
- ✓ Improve quality of life
- ✓ **Reduce falls**

OT  
Approach



Facilitate  
Lifestyle  
Changes

# Background

Journal of Aging and Physical Activity, (Ahead of Print)  
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Human Kinetics  
ORIGINAL RESEARCH

## Testing the Effects of a Multicomponent Frailty Management Program for Community-Dwelling Older Adults in Singapore: A Feasibility Study

Tianma Xu,<sup>1</sup> Ting-Ting Yeh,<sup>2</sup> Kidman Yi Jer Ng,<sup>1</sup> Nicole Wen Ru Wong,<sup>1</sup> and Verna Sock Juen Koh<sup>1</sup>  
<sup>1</sup>Health & Social Sciences Cluster, Singapore Institute of Technology, Singapore; <sup>2</sup>Master Degree Program in Healthcare Industry, College of Medicine, Chang Gung University, Taoyuan, Taiwan

Frailty in later life is often associated with functional declines and reduced quality of life. A multicomponent frailty management program (mFMP) is lacking in Singapore. This study aimed to determine the feasibility and effects of an mFMP in reducing frailty and increasing participation among frail community-living older adults. Pre- and postassessments at three time points were conducted to compare the differences in body functions between the mFMP (experimental group [EG]) and a fitness program (control group [CG]). Recruitment, dropouts, and fall data were collected. Weekly field notes and semistructured interviews postintervention were thematically analyzed. Sixteen out of 23 participants (EG: eight; CG: eight) completed the 12-week interventions with reduced frailty immediately postintervention. At 3-month postintervention, 10 participants (EG: five; CG: five) being followed up had a sustained level of frailty ( $p < .05$ ). The EG and CG reported zero and two falls, respectively. The mFMP demonstrated its feasibility and exhibited a trend to facilitate personal behavioral changes postintervention.

**Keywords:** falls, active aging, physical function, group intervention

The population aged 65 years and older is growing faster than all other age groups worldwide, and the prevalence of frailty is likely to rise. The prevalence of frailty in community-dwelling older adults is approximately 3.5%–27% in the Asia-Pacific region and above 50% in underdeveloped countries (Dent et al., 2017). In Singapore, the prevalence of prefrailty and frailty among community-dwelling older adults was 37% and 6.2%, respectively (Merchant et al., 2017).

The definition of frailty is still inconsistent in the literature due to the lack of consensus on assessment and diagnosis. According to the International Association of Gerontology and Geriatrics Frailty Consensus, frailty is defined as a reduction in strength and physiologic functioning, increasing one's risk of "dependency, vulnerability, and death" (Dent et al., 2017). The frailty phenotype, the most commonly used diagnostic tool, diagnoses a person as frail if he/she presents three or more clinical symptoms: weight loss, exhaustion, weak grip strength, slow walking speed, and low physical activity (Fried et al., 2001). Another widely used frailty assessment tool is the Clinical Frailty Scale (CFS), where scoring is based on clinical judgment without the need for a physician for administration (Rockwood et al., 2005). Alternatively, the frailty index measures cognition, mood, and psychosocial components to define frailty (Rockwood et al., 2005). This multidimensional nature of frailty is an accumulation of multiple deficits (Rockwood & Mitnitski, 2007) that result in a complexity of healthcare needs. As a result, frailty places individuals at a higher risk of many adverse health-related outcomes, such as falls, frequent hospitalization, institutionalization, disability, and mortality (Merchant et al., 2017). A recent systematic review showed that frail individuals are more likely to develop or face worsening disabilities compared to nonfrail individuals (Kojima, 2017). Disability is a multidimensional progressive

condition that results in problems at any of three different levels—the body's physiological functions and anatomical structure, limitation in activities of daily living, and restriction of community participation (World Health Organization, 2001). Disability, particularly in mobility, has been shown to be predictive of limitations in performing self-care activities (Fried et al., 2004), which further restrict people's participation in the community (Fairhall, Sherrington, et al., 2011). The presence of disability in frail older adults complicates frailty status, which places a greater burden on frail individuals, their family members, healthcare professionals, and the health system.

Effective interventions are needed to reverse frailty status since frailty is potentially reversible, with studies reporting reversion rates of 13%–32% among prefrail and mildly frail older adults (Lim et al., 2019). Many practice guidelines in frailty management (Dent et al., 2017; Fairhall, Langron, et al., 2011) have suggested some common recommendations that include (a) identification of frailty using a validated assessment tool; (b) targeting the modifiable factors (e.g., malnutrition and polypharmacy); (c) encouraging active participation in physical activities; and (d) exercise prescription with a resistance training component. Furthermore, the Asia-Pacific Clinical Practice Guideline for the Management of Frailty specifically suggests targeting the modifiable factors through lifestyle modification and including family members and caregivers during the intervention phase (Dent et al., 2017).

Many other frailty management programs focused on different individual components, such as nutrition (Kim & Lee, 2013; Smoliner et al., 2008) and physical functions (Fiatarone et al., 1994; Ng et al., 2015). Most of the local programs in Singapore mainly target the physical dimension of frailty as the literature suggested the effectiveness of physical exercises in frailty management (Theou et al., 2011). For instance, Gym Tonic, a strength training program, has demonstrated its effectiveness in reversing frailty status in one out of four community-dwelling older adults (Lien Foundation, 2017). There are also a growing number of

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## 2019 Feasibility study

### Key findings

- It's **feasible** to run the SNTF program in community settings
- The program had positive effects in facilitating **behavioural changes** in older adults with frailty and pre-frailty.
- Positive outcome in **fall reduction**

(Xu et al., 2023)

# Methodology - Study Design



Clinical effectiveness and cost-effectiveness of a multicomponent frailty management program “Say No To Frailty” in Singapore: A cluster-randomized controlled trial protocol

Tianma Xu\*, Shawn Leng Hsien Soh, Chern-Pin Chua, Jutasompakorn Pearpilai, Shiou Liang Wee

Health and Social Sciences Cluster, Singapore Institute of Technology, Singapore

Package	2022				2023				2024				2025								
	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Ctr 1 - A	Intervention A			3-mth follow up			6-month follow up														
Ctr 2 - B	Intervention B			3-mth follow up			6-month follow up														
Ctr 3 - A	Intervention A			3-mth follow up			6-month follow up														
Ctr 4 - A							Intervention A				3-mth follow up			6-month follow up							
Ctr 5 - B							Intervention B				3-mth follow up			6-month follow up							
Ctr 6 - C							Control				3-mth follow up			6-month follow up							
Ctr 7 - B											Intervention A			3-mth follow up							
Ctr 8 - C											Control			3-mth follow up							
Ctr 9 - C											Control			3-mth follow up							
Ctr 10 - A														Intervention B							
Ctr 11 - B														Intervention B							
Ctr 12 - C														Control							

(One-year study period per centre)

## (2022-2025) Cluster-RCT study design

T. Xu et al.

Contemporary Clinical Trials 142 (2024) 107546

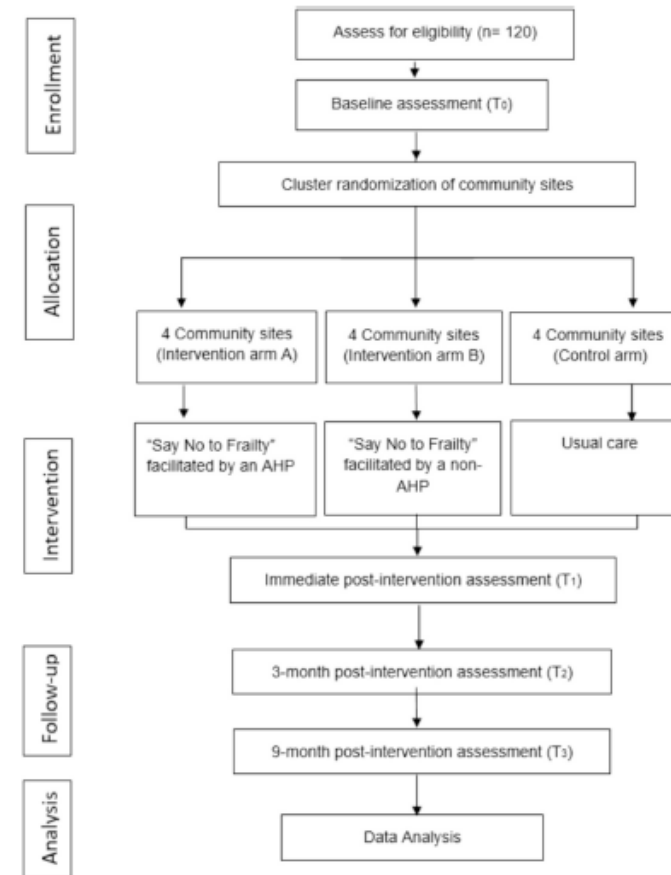


Fig. 2. Study Flow Diagram.

(Xu et al., 2024)

# Methodology - Participants

## Inclusion criteria

- Age 65 years old or above
- Clinical Frailty Scale (CFS) scored between 4 and 6
- Able to communicate verbally and understand instructions
- Able to walk with/without a walking aid for a short distance independently
- No severe cognitive impairment - Abbreviated Mental Test (AMT) > 5\*



**4 Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.



**5 Mildly Frail** – These people often have more evident slowing, and need help in high order iADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



**6 Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

*\*Accompanied by a caregiver/family member*

# Methodology – Data Collection

## Primary outcome measure

- The Clinical Frailty Scale will be used to assess the frailty status.

## Secondary outcome measures include the following:

- Hand dynamometer to assess handgrip strength;
- Short Physical Performance Battery (SPPB) to evaluate the changes in physical functions;
- Falls-Efficacy Scale International (FES- I) to assess the level of self-efficacy or fear of falling in performing self-care activities;
- Life-space Assessment (LSA) to assess the extent of mobility;
- Goal Attainment Scale (GAS) to evaluate the degree of goal achievements in community participation;
- EQ-5D-5L to detect any changes in self-perceived quality of life.

Monthly  
fall data



# Results

Total number of participating centres: 11

- Total number of participants: 116



Enrolled	<b>37</b>	<b>38</b>	<b>41</b>
Followed-up	30	29	36

	AHP (n=37)	Non-AHP (n=38)	Control (n=41)	P-value
Age, mean (SD)	76.4 (6.5)	76.2 (6.4)	78.3 (7.5)	0.248
Gender - Female, n (%)	32 (84)	30 (79)	32 (78)	0.19
Gender - Male, n (%)	6 (16)	8 (21)	9 (22)	
Ethnicity - Chinese, n (%)	37 (97.37)	32 (84.2)	36 (87.80)	0.19
Ethnicity - Malay, n (%)	0(0)	1 (2.6)	3 (7.317)	
Ethnicity - Indian, n (%)	1 (2.63)	3 (7.9)	2 (4.88)	
Ethnicity - Others, n (%)	0(0)	2 (5.2)	0(0)	
No. of current health issues, mean (SD)	3.05 (1.47)	3.08 (1.62)	2.44 (0.98)	0.067
Polypharmacy, n (%)	7 (18.9)	7 (18.4)	11 (26.8)	0.59
Living alone, n (%)	8 (21.1)	9 (23.7)	10 (24.4)	<0.001
Living with family, n (%)	30 (79)	29 (76.3)	18 (43.9)	
Living with others, n (%)	0	0	13 (31.7)	
History of falls (past 6 months), n (%)	10 (27.0)	9 (23.7)	5 (12.5)	0.236
Able to walk >10 m, n (%)	37 (100)	38 (100)	40 (97.6)	0.390
Clinical Frailty Scale, mean (SD)	4.4 (0.55)	4.4 (0.55)	4.6 (0.59)	0.352
Abbreviated Mental Test, mean (SD)	9.2 (1.2)	9.5 (0.8)	9.3 (1.0)	0.986
Modified Barthel Index, mean (SD)	98.7 (2.4)	99.0 (2.8)	98.2 (4.2)	0.648

# Results - Phase I study findings

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Long-term effectiveness of a multicomponent frailty management program in Singapore: One-year preliminary findings of a cluster-randomised controlled trial

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ARTICLE INFO

**Keywords:**  
Frailty management  
Older adults  
Singapore  
Community  
Cluster randomised controlled trial

**ABSTRACT**

The prevalence of frailty is increasing with the rapidly ageing population in Singapore. A 12-week multicomponent frailty management program, "Say No to Frailty" (SNTF) showed its feasibility and demonstrated positive outcomes. This study aimed to evaluate the long-term clinical effectiveness of the SNTF program on various health outcomes in community-dwelling older adults with pre-frailty and frailty in Singapore. As part of the larger cluster-randomised controlled trial (c-RCT), participants from three intervention groups were included. Two groups were led by Allied Healthcare Professionals (AHPs) (n = 19) and one group was led by a non-AHP (n = 8). Assessments on frailty status (Clinical Frailty Scale), physical functions (Short Physical Performance Battery and hand grip strength), self-efficacy (Falls Efficacy Scale - International), participation (Life-Space Assessment and Goal Attainment Scale), and quality of life (EQ-5D-5L) were conducted at baseline, 3 months, 6 months and 12 months. Data were analysed using mixed ANOVA to compare the changes between and within groups. Monthly fall data were collected and analysed. Statistically significant improvements in all health outcomes at 12-month follow-up were observed in all intervention groups. There was no significant difference found in most outcome measures between groups across all time points. Fall reduction post-intervention was observed. SNTF demonstrated potential long-term effectiveness in improving frailty status, physical functions, self-efficacy, community participation, quality of life and fall reduction in the community-dwelling older adults with pre-frailty and frailty in Singapore, regardless of the training background of the program facilitators.

The SNTF program had positive effects in improving physical functions, self-efficacy, community participation, and quality of life.

Statistical analysis: **mixed ANOVA**

- Functional changes within and between groups

**Table 2**  
Outcome measures at four timepoints across AHP-led and non-AHP-led

	AHP-led intervention group (n = 19)	Non-AHP-led intervention group (n = 7)	M	SD	Group	Time	Group x Time
Clinical Frailty Scale (CFS) <sup>a</sup>					.775	<.001*	.579
Baseline	4.5 (0.70)	4.5 (0.76)	4.5	0.70			
3-month	3.8 (0.85)	4.0 (0.93)	3.9	0.86			
6-month	3.7 (0.89)	4.0 (0.93)	3.8	0.89			
12-month	3.3 (1.37)	3.6 (0.92)	3.4	1.24			
Handgrip strength, right (kg)					.744	<.001*	.501
Baseline	16.82 (4.60)	18.10 (4.25)	17.20	4.46			
3-month	18.29 (4.64)	20.21 (4.70)	18.86	4.66			
6-month	18.19 (4.26)	19.29 (4.02)	18.51	4.15			
12-month	18.95 (4.81)	19.58 (4.23)	19.14	4.58			
Handgrip strength, left (kg)					.764	.110	.544
Baseline	15.26 (4.08)	16.07 (4.43)	15.50	4.11			
3-month	16.12 (4.07)	16.43 (3.73)	16.21	3.91			
6-month	15.54 (4.20)	17.42 (3.14)	16.10	3.95			
12-month	16.26 (4.91)	17.33 (3.34)	16.58	4.47			
Fall Efficacy Scale - International (FES-I) <sup>a</sup>					.479	.001*	.079
Baseline	37.21 (9.86)	29.12 (6.03)	34.81	9.56			
3-month	26.68 (8.69)	27.13 (12.03)	26.81	9.55			
6-month	26.42 (9.32)	29.75 (14.05)	27.41	10.76			
12-month	26.37 (11.43)	23.25 (7.69)	25.44	10.42			
Short Physical Performance Battery (SPPB)					.817	<.001*	.004*
Baseline	7.47 (2.34)	9.38 (1.85)	8.04	2.34			
3-month	9.42 (2.29)	9.25 (2.60)	9.37	2.34			
6-month	9.58 (2.36)	9.13 (2.85)	9.44	2.47			
12-month	10.47 (2.25)	9.25 (2.25)	10.11	2.28			
Life-Space Assessment (LSA)					.656	<.001*	.470
Baseline	64.74 (20.82)	54.63 (25.68)	61.74	22.35			
3-month	80.45 (22.47)	67.94 (28.72)	76.74	24.61			
6-month	81.74 (24.33)	71.44 (34.21)	78.69	27.35			
12-month	74.05 (25.46)	74.94 (19.42)	74.31	23.46			
Goal Attainment Scale (GAS)					.577	<.001*	.128
Baseline	34.12 (5.14)	37.63 (0.79)	35.16	4.60			
3-month	55.13 (12.69)	50.73 (11.32)	53.82	12.26			
6-month	56.80 (14.22)	50.87 (14.83)	55.04	14.38			
12-month	59.74 (12.75)	54.28 (12.38)	58.12	12.66			
EQ-5D-5L Index Score					.650	<.001*	.705
Baseline	.80 (.15)	.79 (.19)	.80	.16			
3-month	.92 (.09)	.85 (.25)	.90	.16			
6-month	.93 (.09)	.86 (.26)	.91	.16			
12-month	.93 (.09)	.88 (.17)	.92	.12			
EQ-5D-5L Health Score					.558	.009*	.355
Baseline	73.79 (17.18)	71.88 (20.69)	73.22	17.90			
3-month	85.32 (9.53)	73.75 (24.31)	81.89	15.84			
6-month	79.74 (10.20)	73.75 (26.02)	77.96	16.19			
12-month	80.53 (10.66)	80 (24.34)	80.37	15.44			

Note. Data presented in mean (SD)

<sup>a</sup> Inverted scoring scales where a lower score indicates a better outcomes

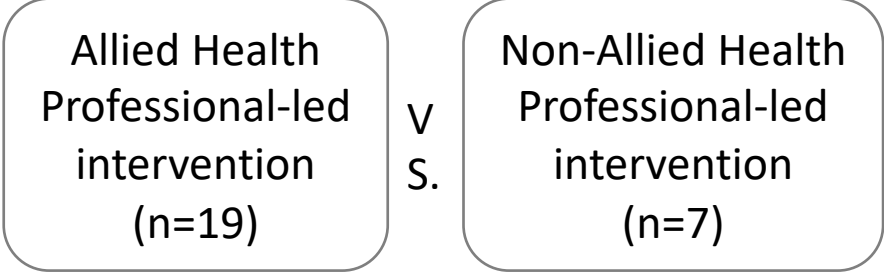
\* p < .05

# Results - Phase I study findings

**Table 2**  
Outcome measures at four timepoints across AHP-led and non-AHP-led

	AHP-led intervention group (n = 19)	Non-AHP-led intervention group (n = 7)	M	SD	Group	Time	Group x Time
Clinical Frailty Scale (CFS) <sup>a</sup>					.775	<.001*	.679
Baseline	4.5 (0.70)	4.5 (0.76)	4.5	0.70			
3-month	3.8 (0.85)	4.0 (0.93)	3.9	0.86			
6-month	3.7 (0.89)	4.0 (0.93)	3.8	0.89			
12-month	3.3 (1.37)	3.6 (0.92)	3.4	1.24			
Handgrip strength, right (kg)					.744	<.001*	.501
Baseline	16.82 (4.60)	18.10 (4.25)	17.20	4.46			
3-month	18.29 (4.64)	20.21 (4.70)	18.86	4.66			
6-month	18.19 (4.26)	19.29 (4.02)	18.51	4.15			
12-month	18.95 (4.81)	19.58 (4.23)	19.14	4.58			
Handgrip strength, left (kg)					.764	.110	.544
Baseline	15.26 (4.08)	16.07 (4.43)	15.50	4.11			
3-month	16.12 (4.07)	16.43 (3.73)	16.21	3.91			
6-month	15.54 (4.20)	17.42 (3.14)	16.10	3.95			
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Baseline	37.21 (9.86)	29.12 (6.03)	34.81	9.56			
3-month	26.68 (8.69)	27.13 (12.03)	26.81	9.55			
6-month	26.42 (9.32)	29.75 (14.05)	27.41	10.76			
12-month	26.37 (11.43)	23.25 (7.69)	25.44	10.42			
Short Physical Performance Battery (SPPB)					.817	<.001*	.004*
Baseline	7.47 (2.34)	9.38 (1.85)	8.04	2.34			
3-month	9.42 (2.29)	9.25 (2.60)	9.37	2.34			
6-month	9.58 (2.36)	9.13 (2.85)	9.44	2.47			
12-month	10.47 (2.25)	9.25 (2.25)	10.11	2.28			
Life-Space Assessment (LSA)					.656	<.001*	.470
Baseline	64.74 (20.82)	54.63 (25.68)	61.74	22.35			
3-month	80.45 (22.47)	67.94 (28.72)	76.74	24.61			
6-month	81.74 (24.33)	71.44 (34.21)	78.69	27.35			
12-month	74.05 (25.46)	74.94 (19.42)	74.31	23.46			
Goal Attainment Scale (GAS)					.577	<.001*	.128
Baseline	34.12 (5.14)	37.63 (0.79)	35.16	4.60			
3-month	55.13 (12.69)	50.73 (11.32)	53.82	12.26			
6-month	56.80 (14.22)	50.87 (14.83)	55.04	14.38			
12-month	59.74 (12.75)	54.28 (12.38)	58.12	12.66			
EQ-5D-5L Index Score					.650	<.001*	.705
Baseline	.80 (.15)	.79 (.19)	.80	.16			
3-month	.92 (.09)	.85 (.25)	.90	.16			
6-month	.93 (.09)	.86 (.26)	.91	.16			
12-month	.93 (.09)	.88 (.17)	.92	.12			
EQ-5D-5L Health Score					.558	.009*	.355
Baseline	73.79 (17.18)	71.88 (20.69)	73.22	17.90			
3-month	85.32 (9.53)	73.75 (24.31)	81.89	15.84			
6-month	79.74 (10.20)	73.75 (26.02)	77.96	16.19			
12-month	80.53 (10.66)	80 (24.34)	80.37	15.44			

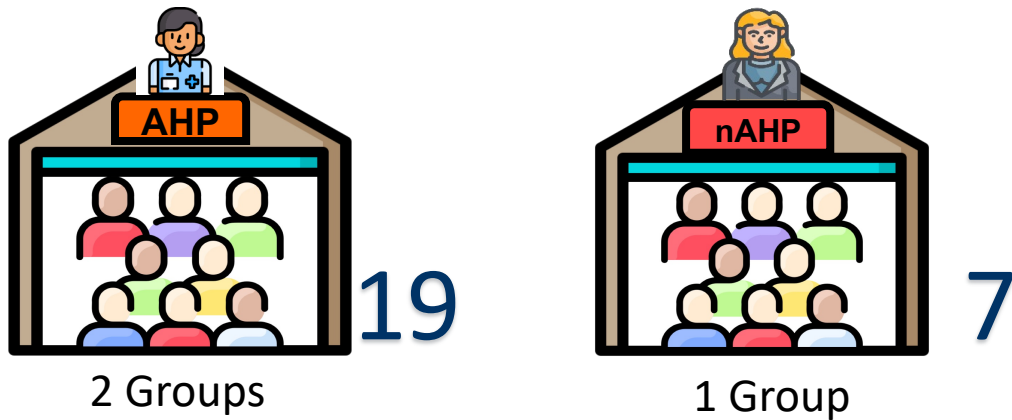
Note. Data presented in mean (SD)  
<sup>a</sup> Inverted scoring scales where a lower score indicates a better outcomes  
 \*  $p < .05$



Both interventions had no significant difference in clinical effectiveness regardless of the program facilitator's training background (AHP or non-AHP).

Statistical analysis: **mixed ANOVA**  
 - Functional changes within and between groups

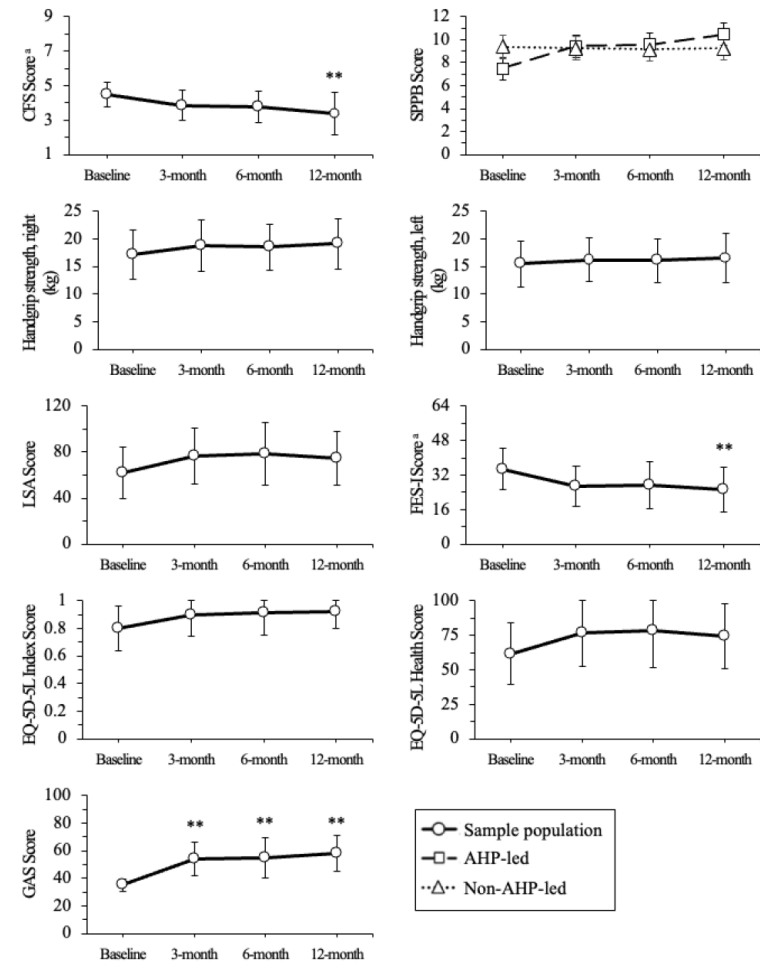
# Results - Phase I study findings



## First 3 intervention groups:

- Clinical outcomes remained positive at the end of the one-year study period.

Figure 1  
Outcome measures across four timepoints



# Results - Phases I-III study findings

**Table 2.** Means of Outcome Measures at Different Time Points, Between-group and Within-group Changes at 3-months, 6-months, and 12-months Post-intervention Follow-up.

	Timeline				Within-group changes (p-value)			Between-group changes (p-value)								
	Baseline (T0)	3 months (T1)	6 months (T2)	12 months (T3)	T0 vs T1	T0 vs T2	T0 vs T3	3-months			6-months			12-months		
								Control vs AHP	Control vs Non- AHP	AHP vs Non- AHP	Control vs AHP	Control vs Non- AHP	AHP vs Non- AHP	Control vs AHP	Control vs Non- AHP	AHP vs Non- AHP
<b>Clinical frailty Scale (CFS)<sup>1</sup></b>								0.072	0.088	0.998	0.330	0.064	0.684	0.001*	0.011*	0.787
AHP	4.5±0.58	3.36±0.81	3.48±0.71	3.04±1.19	0.000*	0.00*	0.00*									
Non-AHP	4.45±0.57	3.38±0.97	3.26±0.96	3.23±0.81	0.00*	0.00*	0.00*									
Control	4.56±0.59	3.89±0.98	3.82±1.00	3.97±0.81	0.004*	0.002*	0.016*									
<b>Right Handgrip Strength (kg)</b>								0.511	0.522	1.00	0.999	0.359	0.429	0.681	0.048*	0.328
AHP	17.74±4.53	19.45±4.42	18.26±3.94	18.55±4.30	0.479	0.972	0.910									
Non-AHP	19.18±5.50	19.45±5.35	20.20±5.41	20.77±4.78	0.969	0.770	0.541									
Control	18.95±5.08	17.89±6.08	18.21±6.20	17.39±5.90	0.853	0.947	0.647									
<b>Left Handgrip Strength (kg)</b>								0.938	1.00	0.956	0.814	0.708	0.400	0.920	0.370	0.653
AHP	16.55±4.17	17.93±3.75	17.55±3.69	18.14±3.95	0.574	0.785	0.469									
Non-AHP	18.03±5.53	17.50±4.06	19.41±3.76	19.5±3.56	0.996	0.543	0.510									
Control	18.55±6.19	17.47±6.47	18.35±6.29	17.61±6.46	0.877	0.999	0.918									
<b>Short Physical Performance Battery (SPPB)</b>								0.003*	0.058	0.591	0.034*	0.077	0.964	0.002*	0.076	0.477
AHP	8±2.55	10±2.02	10.04±1.95	10.65±1.58	0.004*	0.003*	0.000*									
Non-AHP	8.86±2.90	9.21±2.30	9.83±2.42	9.73±2.33	0.914	0.432	0.527									
Control	7.71±2.94	7.5±3.49	8.12±3.62	8.14±3.30	0.993	0.951	0.942									
<b>Fall Efficacy Scale – International (FES-I)<sup>1</sup></b>								0.194	0.570	0.793	0.052*	0.165	0.897	0.018*	0.060	0.918
AHP	36±10.14	24.08±6.92	24.36±7.13	24.57±9.55	0.00*	0.00*	0.00*									
Non-AHP	31.83±11.72	25.71±8.35	25.65±11.02	25.59±8.17	0.132	0.133	0.135									
Control	27.95±9.18	28.03±10.00	30.65±11.18	31.06±8.54	1.00	0.632	0.504									
<b>Life Space Assessment (LSA)</b>								0.000*	0.019*	0.172	0.00*	0.007	0.291	0.001*	0.004*	0.885
AHP	61.46±20.16	79.06±18.55	79.38±22.17	76.63±23.32	0.016*	0.014*	0.057									
Non-AHP	55.36±26.45	68.33±22.89	70.17±21.24	73.45±26.55	0.140	0.082	0.026*									
Control	48.22±16.34	53.45±20.63	52.40±20.10	53.46±19.25	0.617	0.781	0.626									
<b>EQ-5D-5L Mobility</b>								0.363	1.00	0.452	0.408	0.921	0.281	0.023*	0.235	0.622
AHP	1.71±0.81	1.2±0.50	1.12±0.33	1.17±0.49	0.008*	0.002*	0.006*									
Non-AHP	1.45±0.63	1.42±0.72	1.35±0.57	1.36±0.58	0.993	0.913	0.944									
Control	1.66±0.62	1.42±0.64	1.29±0.58	1.67±0.83	0.400	0.095	1.00									
<b>EQ-5D-5L Health Score</b>								0.019*	0.895	0.013	0.140	0.133	0.998	0.813	0.888	0.597
AHP	72.93±18.30	84.76±10.74	78.20±11.26	79.35±10.59	0.009*	0.482	0.326									
Non-AHP	68.62±17.37	72.63±17.29	78.49±13.60	75±17.53	0.776	0.133	0.482									
Control	69.63±17.08	74.34±15.08	70.88±16.90	76.89±15.74	0.572	0.987	0.209									

Note: <sup>1</sup> Inverted scoring scales, where a lower score indicates a better outcome, \* denotes significance difference using ANOVA and Tukey's post-hoc test.

**SNTF Participants** had significant improvement in physical functions, self-efficacy, community participation, and quality of life.

✓ AHP-led groups > non-AHP-led groups

**Control groups:**  
Had a significant improvement in CFS ONLY

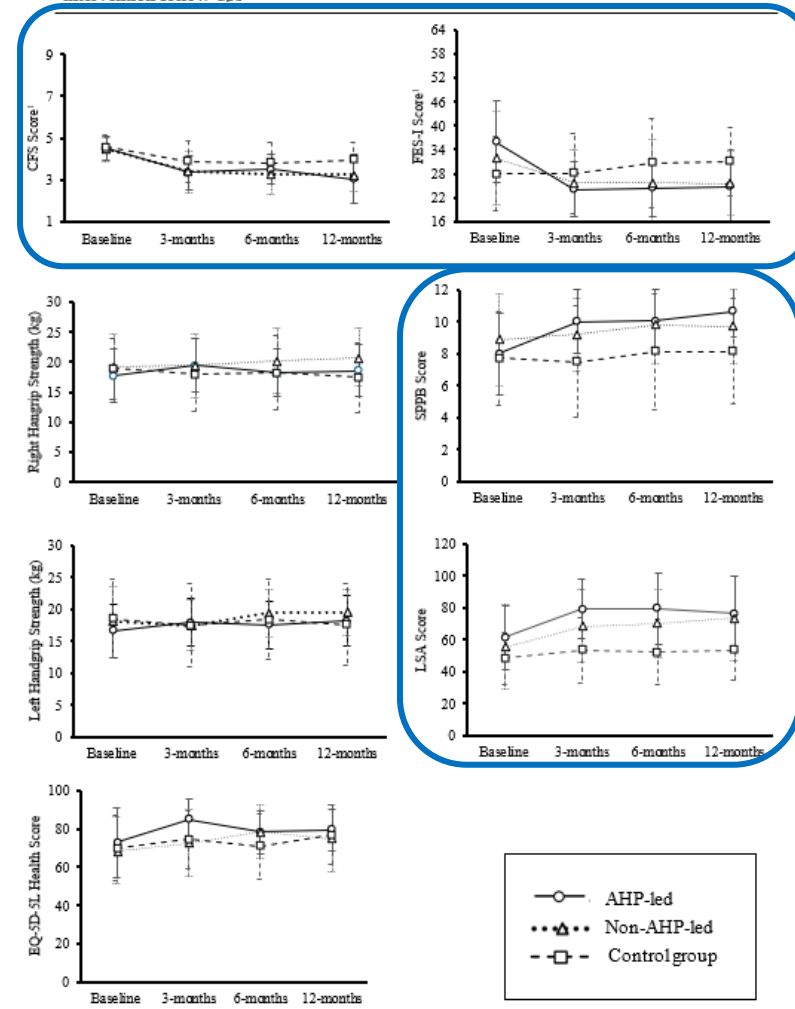
# Results - Phases I-III study findings



**Clinical effects of the SNTF program sustained for at least 9 months**

- CFS
- FES-I
- SPPB
- LSA

Figure 2. Outcome Measures at Baseline, 3-months, 6-months, and 12-months post-intervention follow-ups



Note: Data is presented in Mean±SD  
 - CFS = Clinical Frailty Scale, FES-I = Falls Efficacy Scale-International, SPPB = Short Physical Performance Battery,  
 LSA = Life Space Assessment  
<sup>1</sup> Inverted scoring scales, where a lower score indicates a better outcome

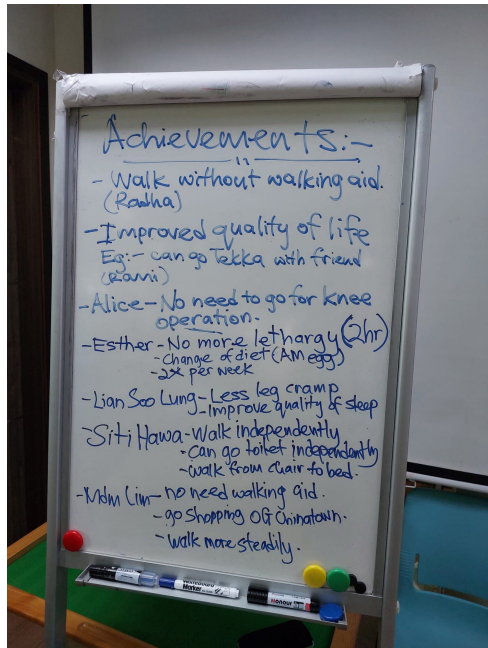
# Results – Other findings

Better physical functions + Greater confidence + Reduced knee pain



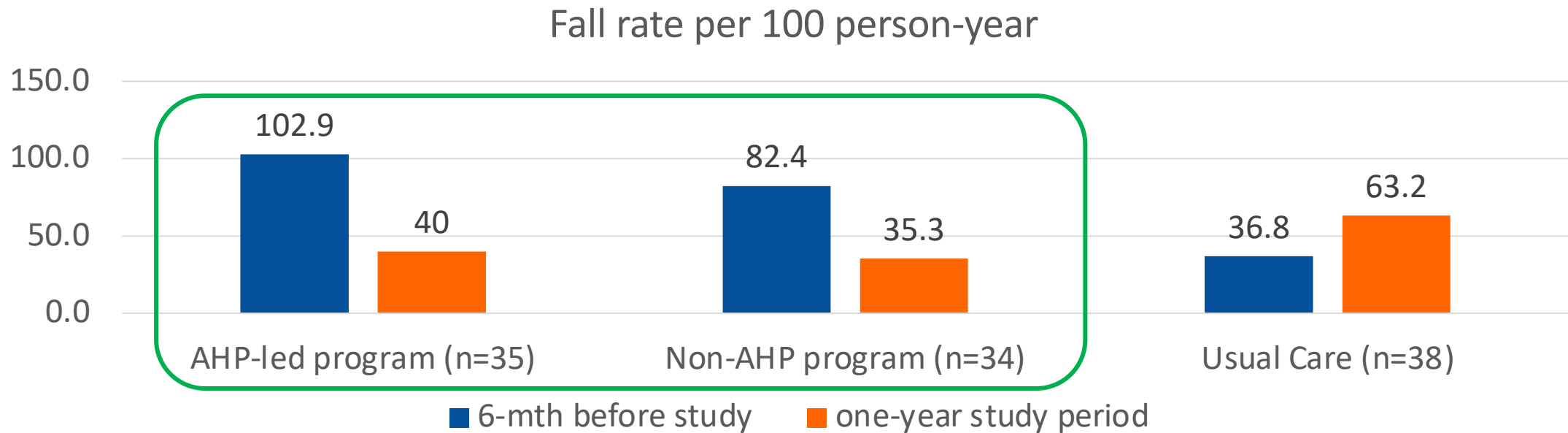
## Personal goal achievements

30%  
Community volunteers



# Results - Fall Rate (All 4 Phases)

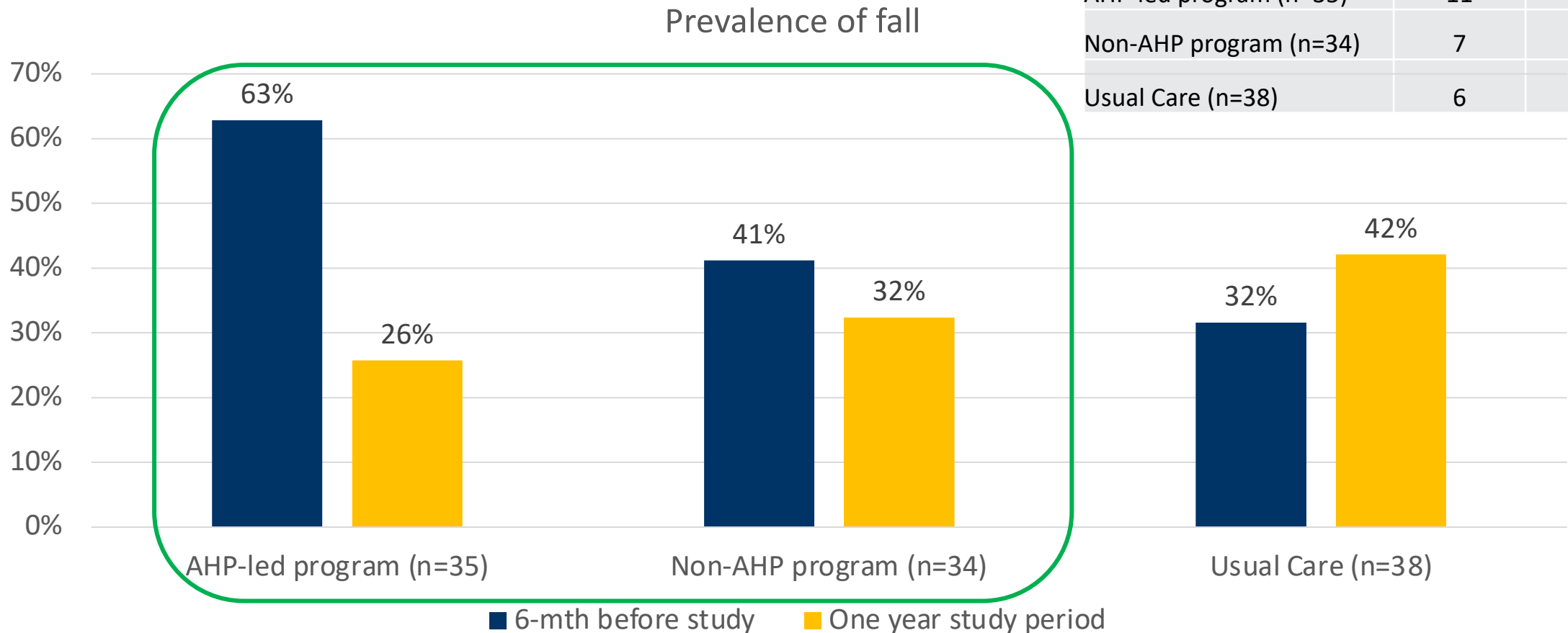
Study arms	6-mth before study	0-3 month	4-6 month	7-9 month	10-12 month
AHP-led program (n=35)	18	5	6	2	1
Non-AHP program (n=34)	14	1	5	5	2
Usual Care (n=38)	7	5	12	5	2



# Results - Prevalence of falls (4 phases)

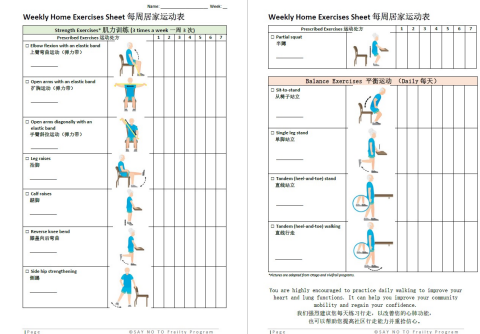
Number of fallers

Study Arms	6-mth before study	One year study period
AHP-led program (n=35)	11	9
Non-AHP program (n=34)	7	11
Usual Care (n=38)	6	16



# Discussion

- Say No To Frailty – addresses **frailty** and **falls**.
- **Self-efficacy** was addressed in the SNTF program to encourage active participation in the community (Clemson et al, 2004; Clark et al, 2012)
- **Personal life goal setting and reviews**
- Competency skills of program facilitators are essential in **facilitating participants' behavioural changes** for long-lasting effects
  - **Group discussion**
  - **Weekly homework reviews, etc**



**Weekly Home Exercises Sheet 每周居家运动表**

**Strength Exercises 肌力训练 (1 item/week - 隔1天)**

	1	2	3	4	5	6	7	8	9	10
□ Perform Exercises with one hand 单手做运动 (隔1天)										
□ Open arms with one hand 开臂运动 (隔1天)										
□ Open arms diagonally with one hand 开臂斜运动 (隔1天)										
□ Leg raises 抬腿										
□ Calf raises 踮脚										
□ Reverse knee bend 屈膝运动										
□ Side hip strengthening 侧抬腿										

**Postural Control Exercises 姿势控制训练**

	1	2	3	4	5	6	7	8	9	10
□ Forward heel 前脚跟										

**Balance Exercises 平衡训练 (Only 每天)**

	1	2	3	4	5	6	7	8	9	10
□ Sit on floor 坐地运动										
□ Stand on heel 脚跟站立										
□ Heel Stand and heel stand 脚跟站立										
□ Heel Stand and heel walking 脚跟站立										

You are highly encouraged to practice daily routine to improve your heart and lung function. It can help you improve your community mobility and enrich your confidence.  
我们鼓励您每天坚持练习，以改善您的心肺功能，提高您的社区活动能力和自信心。

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# Discussion



Empowerment

OT



Enablement

Say 'No' To Frailty  
与衰弱说'不'



Help community-living older adults with frailty and pre-frailty increase **community participation** & reduce **falls**.

# Conclusion

## Say 'No' To Frailty 与衰弱说'不'

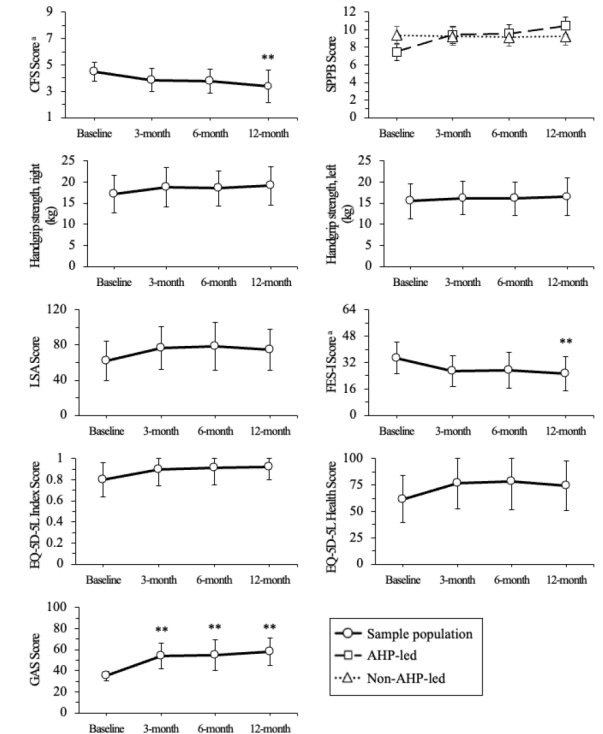
“Professional-led & Layperson-led”

Main health outcomes of the cluster-RCT study



Figure 1

Outcome measures across four timepoints



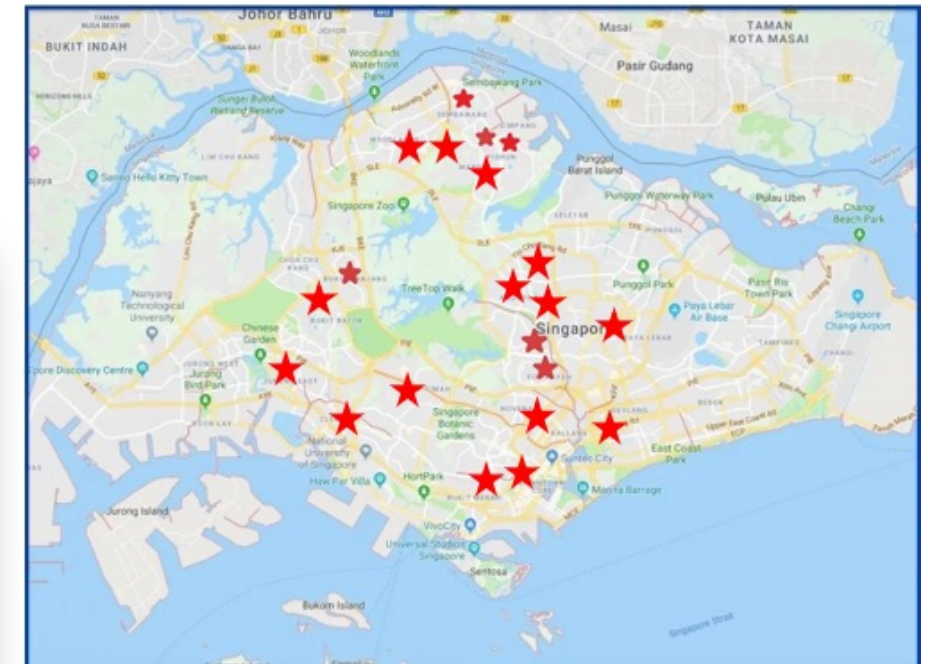
Note. Outcome measures at baseline, 3-month, 6-month and 12-month follow-ups  
Data presented in mean ± SD  
CFS = Clinical Frailty Scale, SPPB = Short Physical Performance Battery, LSA = Life-Space Assessment, FES-I = Fall Efficacy Scale-International, GAS = Goal Attainment Scale  
<sup>a</sup> Inverted scoring scales where a lower score indicates a better outcome  
\*\*  $p < .0083$  in accordance with Bonferroni correction

# Conclusion

A MANAGEMENT				
Frailty Group	Robust	Frail	Severely Frail	Terminally ill
CFS	1-3	4-6	7-8	9
Anchor Setting(s)	Community & Primary Care	Community, Home, Primary Care & Acute Care	Home, Intermediate and Long-Term Care	
Broad Recommended Interventions	<ul style="list-style-type: none"> <li>Exercises consisting of strength, balance, and flexibility aspects<sup>19</sup></li> <li>Nutritional support</li> <li>Falls prevention</li> <li>Chronic disease management</li> <li>Social networking activities</li> <li>Psychosocial support</li> <li>Medication review</li> </ul>	<ul style="list-style-type: none"> <li>Exercises consisting of strength, balance, and flexibility aspects<sup>19</sup></li> <li>Nutritional support</li> <li>Falls prevention</li> <li>Chronic disease management</li> <li>Social networking activities</li> <li>Psychosocial support</li> <li>Medication review</li> <li>Rehabilitation</li> <li>Specialist care</li> <li>Caregiving support</li> </ul>	<ul style="list-style-type: none"> <li>Psychosocial support</li> <li>Medication review</li> <li>Specialist care</li> <li>Caregiving support</li> <li>End-of-life care</li> </ul>	
Desired Outcomes	<ul style="list-style-type: none"> <li>Prevent / reverse frailty and keep seniors healthy by building resilience through population-based strategies</li> <li>Maintain and enhance intrinsic capacity (IC) and functional ability (FA)</li> </ul>	<ul style="list-style-type: none"> <li>Manage frailty through population-based strategies, CGAs and specialised care</li> <li>Manage declined IC</li> <li>Enhance FA to compensate for losses in IC</li> </ul>	<ul style="list-style-type: none"> <li>Manage frailty through specialised care and support dignified end-of-life</li> <li>Manage declined IC and impaired FA</li> </ul>	
Examples of Programmes	<ul style="list-style-type: none"> <li>Live Well, Age Well Programme by Health Promotion Board (HPB) and People's Association (PA)<sup>20</sup></li> <li>Tsao Foundation Community Geriatric Services Centre at Whampoa (ComSA)</li> <li>Gym Tonic</li> <li>Combat Age Related Loss of Muscle (CALM) package by SportSG</li> <li>AIC Wellness Programme, Partnering Agencies' Resources</li> <li>Community Health Posts (CHP)</li> </ul>	<ul style="list-style-type: none"> <li>Live Well, Age Well Programme by HPB and PA<sup>20</sup></li> <li>Say No to Frailty Programme</li> <li>Geriatric Services Hubs (GSHs)                             <ul style="list-style-type: none"> <li>Alexandra Hospital (AH)</li> <li>Changi General Hospital (CGH)</li> <li>Ng Teng Fong General Hospital (NTFGH)</li> <li>Sengkang General Hospital (SKH)</li> <li>Singapore General Hospital (SGH)</li> </ul> </li> <li>Tsao Foundation ComSA</li> <li>Gym Tonic</li> <li>CALM package</li> <li>AIC Wellness Programme, Partnering Agencies' Resources</li> <li>CHP</li> <li>Project SilverCare</li> </ul>	<ul style="list-style-type: none"> <li>AIC Wellness Programme, Partnering Agencies' Resources</li> </ul>	



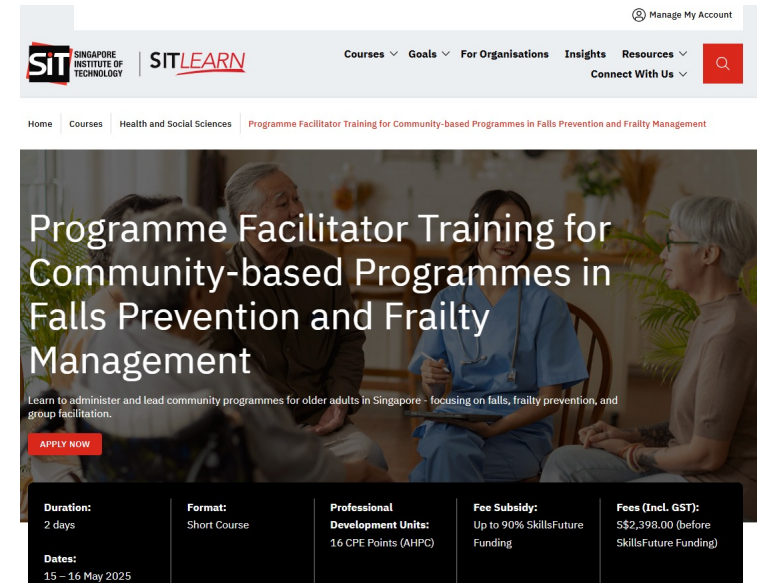
## Wider implementation of “Say No To Frailty” in AACs in Singapore (2025 – 2028)



# Program facilitator training

Master trainer: Dr Tim Xu

Fees: Heavily subsidized by Skills Future Funding

Home Courses Health and Social Sciences Programme Facilitator Training for Community-based Programmes in Falls Prevention and Frailty Management

## Programme Facilitator Training for Community-based Programmes in Falls Prevention and Frailty Management

Learn to administer and lead community programmes for older adults in Singapore - focusing on falls, frailty prevention, and group facilitation.

[APPLY NOW](#)

<b>Duration:</b> 2 days	<b>Format:</b> Short Course	<b>Professional Development Units:</b> 16 CPE Points (AHPC)	<b>Fee Subsidy:</b> Up to 90% SkillsFuture Funding	<b>Fees (Incl. GST):</b> S\$2,398.00 (before SkillsFuture Funding)
<b>Dates:</b> 15 - 16 May 2025				



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# SAY NO TO FRAILITY

A Multicomponent Frailty Management Program for Community-Living Older Adults in Singapore

*Program developed by Dr Tim Xu, Associate Professor, Singapore Institute of Technology.*



## About the "SAY NO TO FRAILITY" program

Session No. 课节	Topics 课程内容	Balance & strength exercises 平衡与力量训练
Session 1 第一节	Introduction, personal sharing & goal setting 自我介绍、个人生活经验分享	平衡与力量训练
Session 2 第二节	Common chronic disease and management 常见慢性病的管理	平衡 & strength exercises 平衡与力量训练
Session 3 第三节	Medication management 药物管理	Balance & strength exercises 平衡与力量训练
Session 4 第四节	Fall prevention (I) 预防跌倒 (一)	Balance & strength exercises 平衡与力量训练
Session 5 第五节	Energy conservation 能量守恒	Balance & strength exercises 平衡与力量训练
Session 6 第六节	Independent living 独立生活	Balance & strength exercises 平衡与力量训练
Session 7 第七节	Healthy diet 健康饮食	Balance & strength exercises 平衡与力量训练
Session 8 第八节	Fall prevention (II) 预防跌倒 (二)	Balance & strength exercises 平衡与力量训练
Session 9 第九节	Community independent living (I) 社区独立生活 (一)	Balance & strength exercises 平衡与力量训练
Session 10 第十节	Community independent living (II) 社区独立生活 (二)	Balance & strength exercises 平衡与力量训练
Session 11 第十一节	Active lifestyle 积极的生活方式	Balance & strength exercises 平衡与力量训练
Session 12 第十二节	Review and plan 复习计划	Certification ceremony 结业典礼
E-mail 电邮	Feedback	
Follow up 跟进		



• Facilitated by a trained program facilitator



**Thank you!**

**Associate Professor Tim Xu**

Health and Social Sciences Cluster

Singapore Institute of Technology

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