HKU Med LKS Faculty of Medicine
School of Nursing
香港大學護理學院

Promoting brain health among people with suboptimal cognitive functioning in Hong Kong: A Brain Vitality Enhancement (BRAVE) programme

BRAVE

Health Research Symposium

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Project number: 01170728

Introduction

– **Prevalence** of dementia

55 million in 2020

78 million in 2030

139 million in 2050

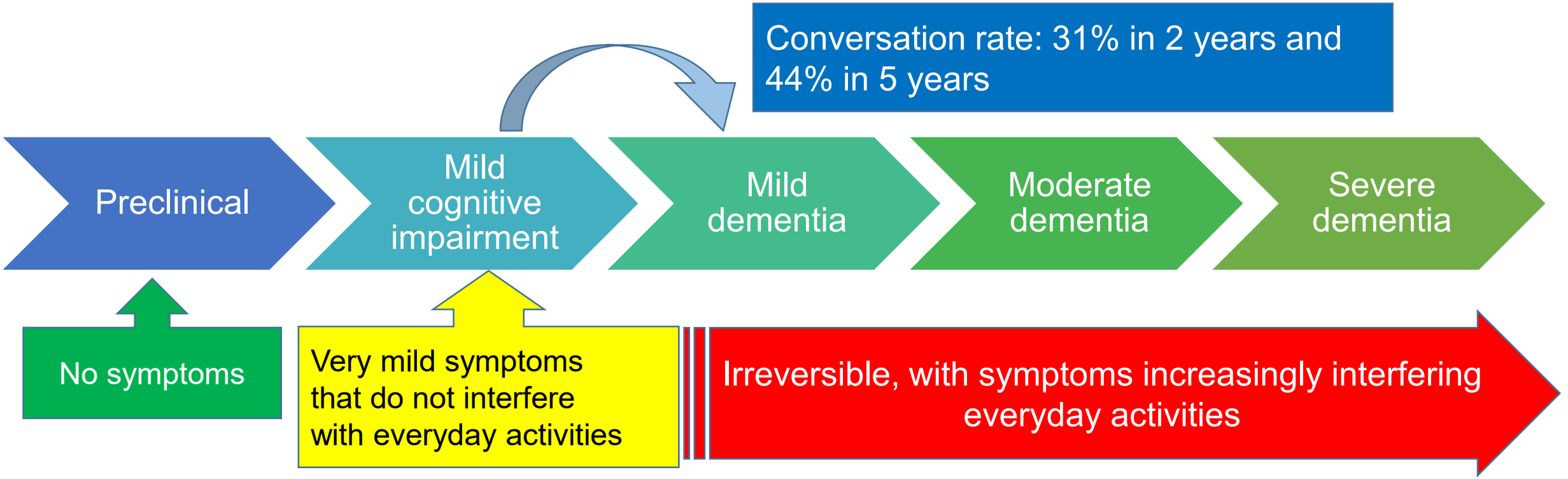
– **Incidence** of dementia
  – Over **10 million** new cases of dementia each year worldwide, implying <u>one new case every 3.2 seconds</u>

GBD 2019 Dementia Forecasting Collaborators. Lancet Public Health 2022;7: e105–25

Burden of dementia

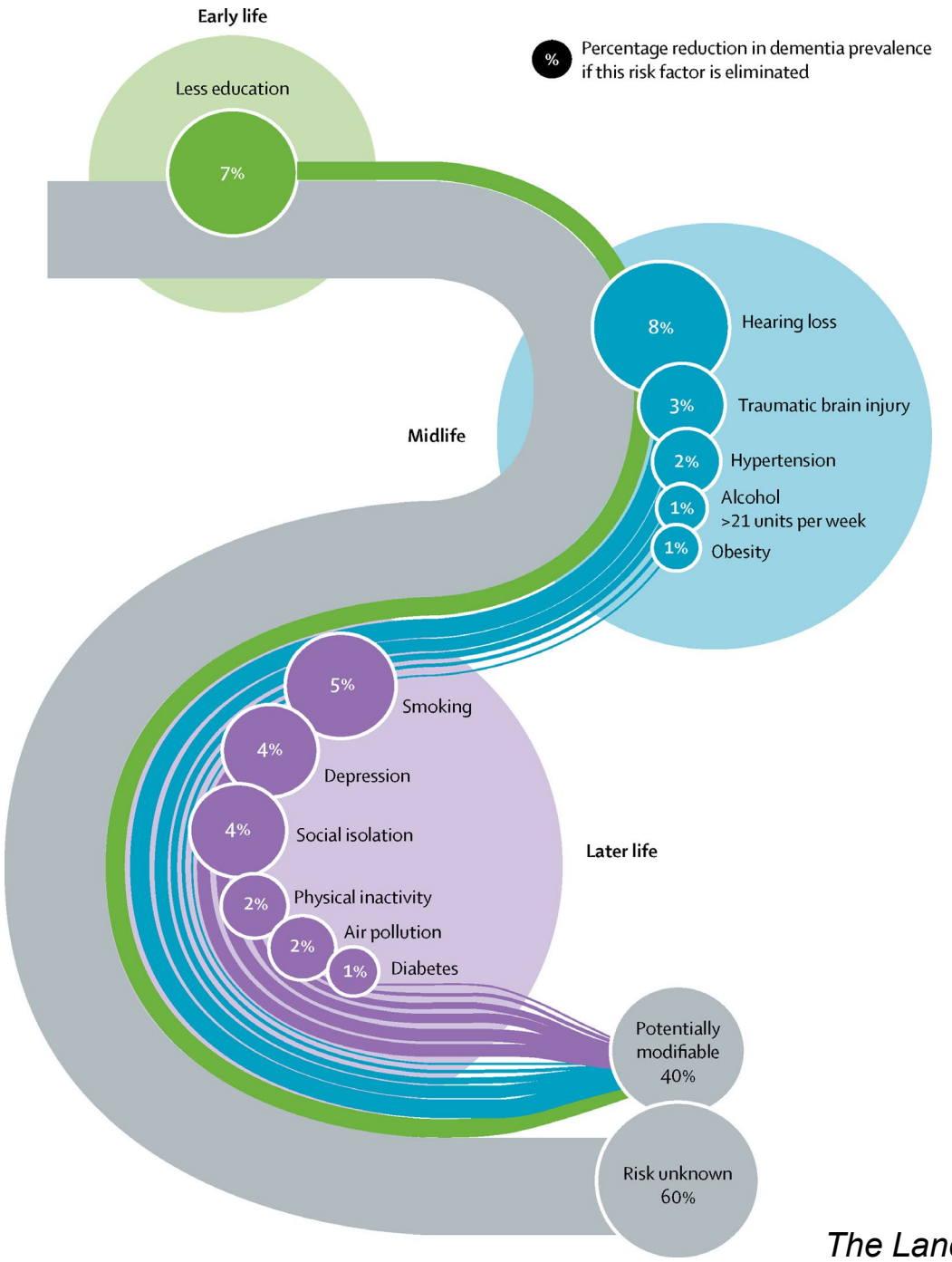
World Health Organization (2021). Global status report on the public health response to dementia

Cognitive impairment continuum



Prevalence of MCI:
6.7% for ages 60–64, 8.4% for 65–69, 10.1% for 70–74, 14.8% for 75–79, and 25.2% for 80–84

Nin et al. (2016). Alzheimer's & Dementia: The Journal of the Alzheimer's Association. 12(7): 1064-1065

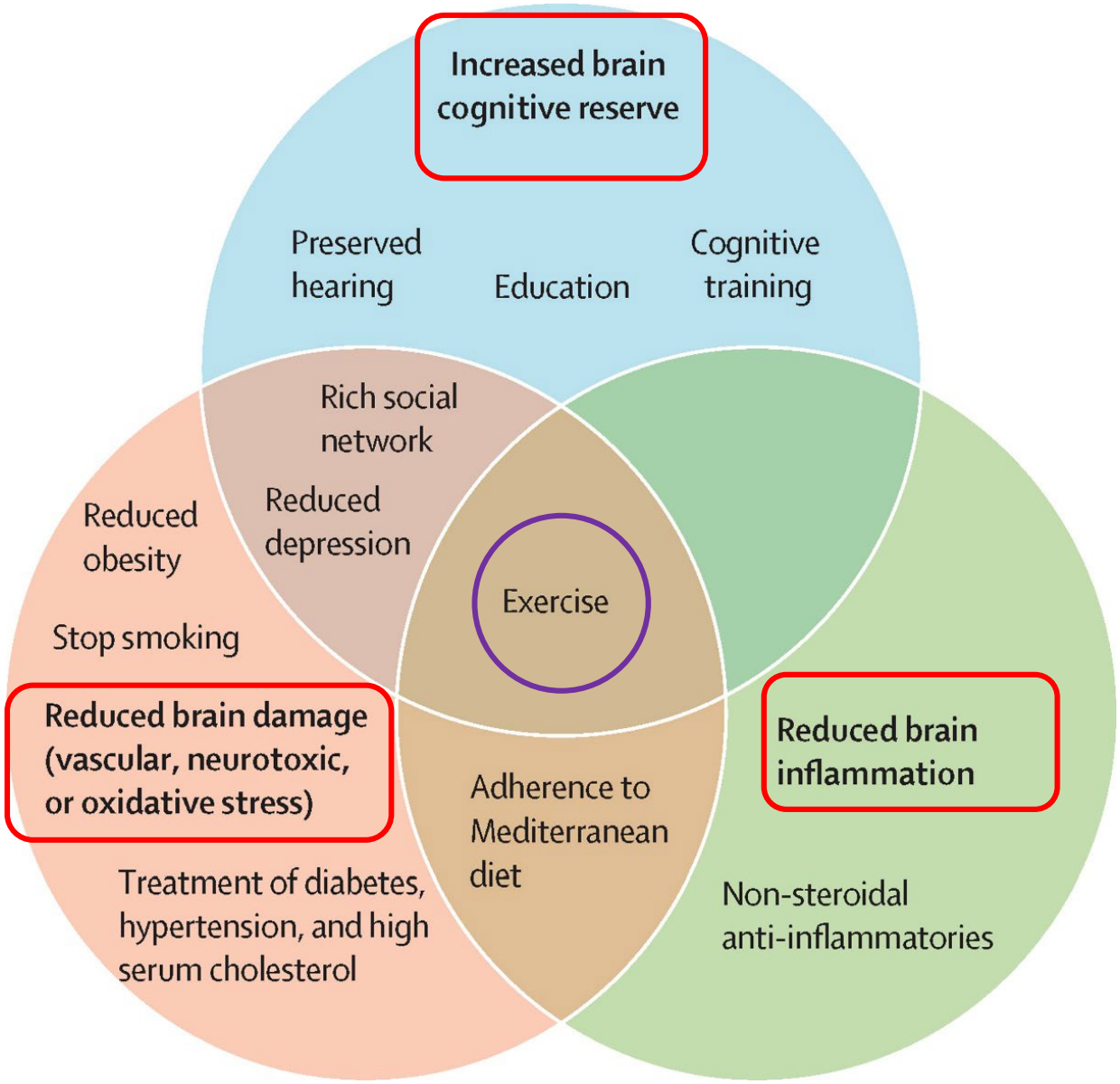


Modifiable risk factors for dementia

- Physical inactivity
- Smoking
- Excessive alcohol consumption
- Air pollution
- Head injury
- Infrequent social contact
- Less education
- Obesity
- Hypertension
- Diabetes
- Depression
- Hearing impairment

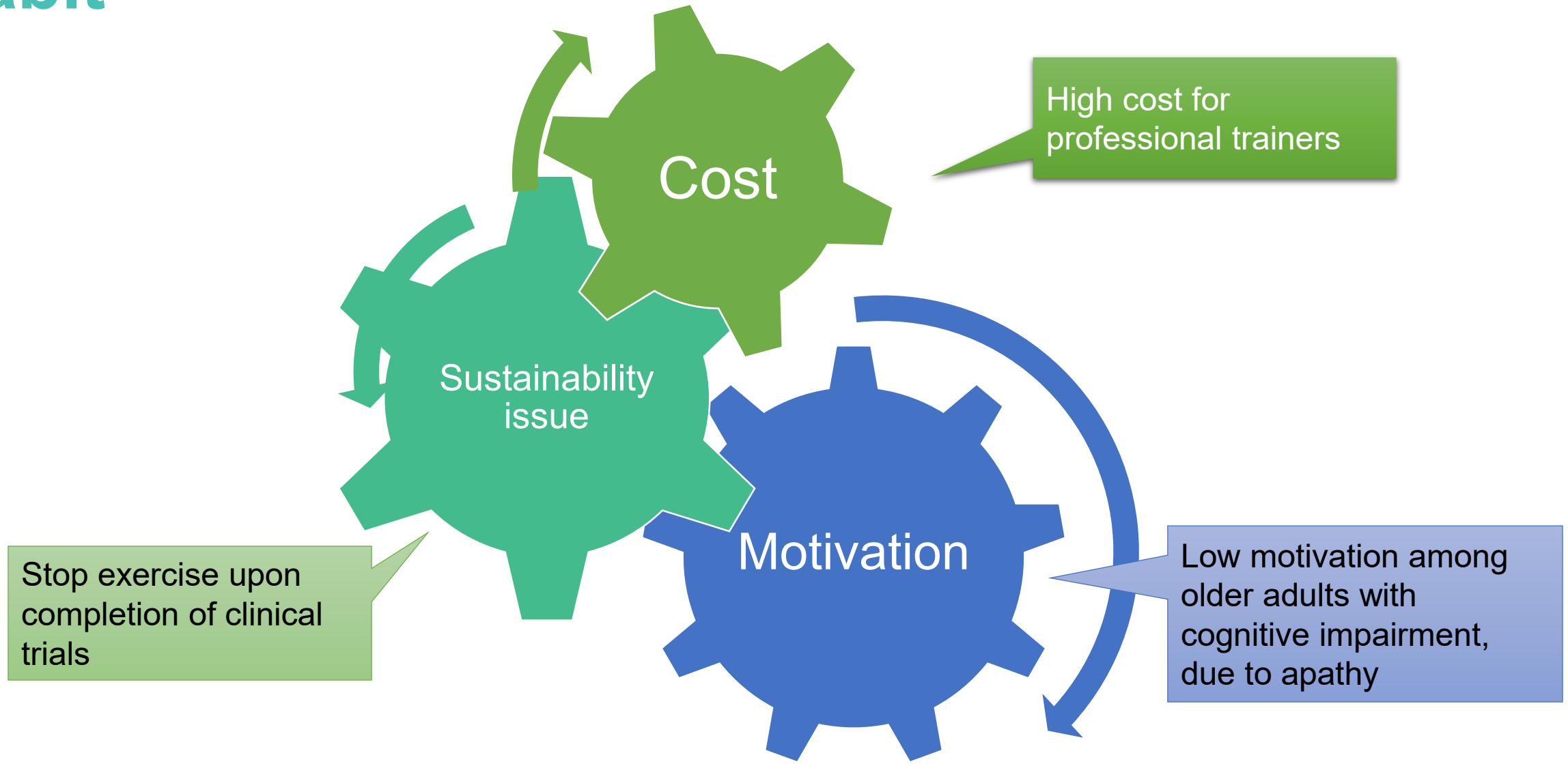
The Lancet 2020 (10248) 413 - 446. DOI: (10.1016/S0140-6736(20)30367-6)

Mechanisms linking potentially modifiable risk factors in dementia



The Lancet 2020 (10248) 413 - 446. DOI: (10.1016/S0140-6736(20)30367-6)

Challenges to maintain the exercise habit



Peer mentoring in exercise interventions

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– Two systematic reviews → peer mentors as effective agents
  - Motivating older adults to participate in exercise interventions
  - As effective as professionally-delivered interventions

(Burton et al., 2017; Ginis et al., 2013)

– Maintain similar or greater level of intervention fidelity than professional trainers (Castro et al., 2011)

– Using elderly volunteers in assisting professional trainers to lead exercise for people with subjective memory complaints
  - Improved memory, attention and executive function (Buman et al., 2011)

Study Aims & Design

– Study aims

- To examine the effects of a volunteer-supported brain health enhancement intervention, titled “Brain Vitality Enhancement (BRAVE)” programme on cognitive function and health-related quality of life in persons with MCI
- To explore participants’ satisfaction and engagement experience, and the feasibility of the senior volunteering model for promoting active and healthy aging

– Study design

- Mixed-methods design
  - Two-arm randomized controlled trial with waitlist control
  - Qualitative study

Eligibility criteria

Peer volunteers

- Inclusion criteria
  - Voluntary work experience
  - Cognitively intact
  - Physically active (at least moderately active)
  - Aged ≥50 years old
  - Own a smartphone

Mentees

- Inclusion criteria
  - **MCI** as defined according to the National Institute on Ageing-Alzheimer's Association's criteria:
    - Self-reported subjective cognitive complaints
      - Memory Inventory for Chinese ≥3
    - Presence of objective cognitive decline
      - MoCA <1.5SD from age and education matched normal persons
    - Independence in daily living
  - Aged ≥50 years old
  - Own a smartphone
- Exclusion criteria
  - Dementia
  - Impaired mobility and communication
  - Received structured exercise training in the previous 6 months

BRAVE programme

Training workshop for peer volunteers

Empowerment Workshop for Peer Volunteers (10 participants/group)

Pre-exercise Educational Module
(1 session/week x 2 sessions; 90 minutes/session)

- Structured education on MCI
- Communication skills with MCI
- Techniques of exercise coaching
- Introduction of the app

Exercise Training Module
(3 sessions/week x 3 weeks; 60 minutes/session)

- Familiarize with the exercise protocol
- Acquire the knowledge and skills in mentoring exercise sessions

Booster Session
(Once; 120 minutes)

- Consolidate knowledge and skills of peer volunteers
- Competency evaluation
- Awarding “Exercise Ambassadors”

Mobile app

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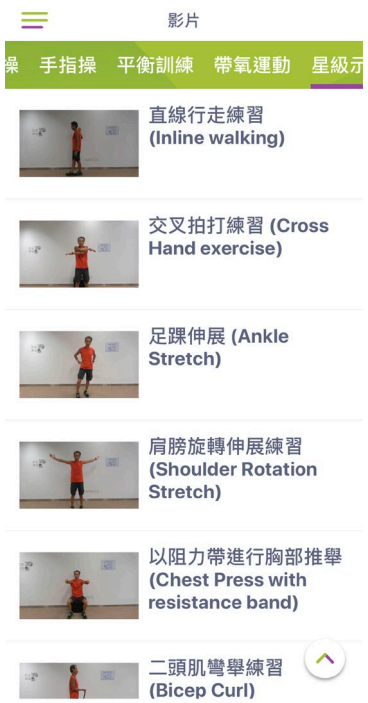
- Target users
  - General Public
  - BRAVE programme participants
- Function
  - Provide updated information on brain health, benefits of exercise and an exhaustive list of exercise videos
  - Activity scheduler, tracker and social networking for the participants, volunteers and the coach



Volunteer-supported exercise programme for persons with MCI

Exercise Training Module for persons with MCI (10 participants + 2 mentors/ group)

Orientation

- Mentor-mentee matching
- Ice-breaking activities
- Introduce the awarding system for enhancing motivation and team spirit

Supervised Exercise Module (3 sessions/week x 8 weeks; 60 minutes/ session)

- Implement exercise protocol
- Provide exercise instructions
- Address exercise barriers

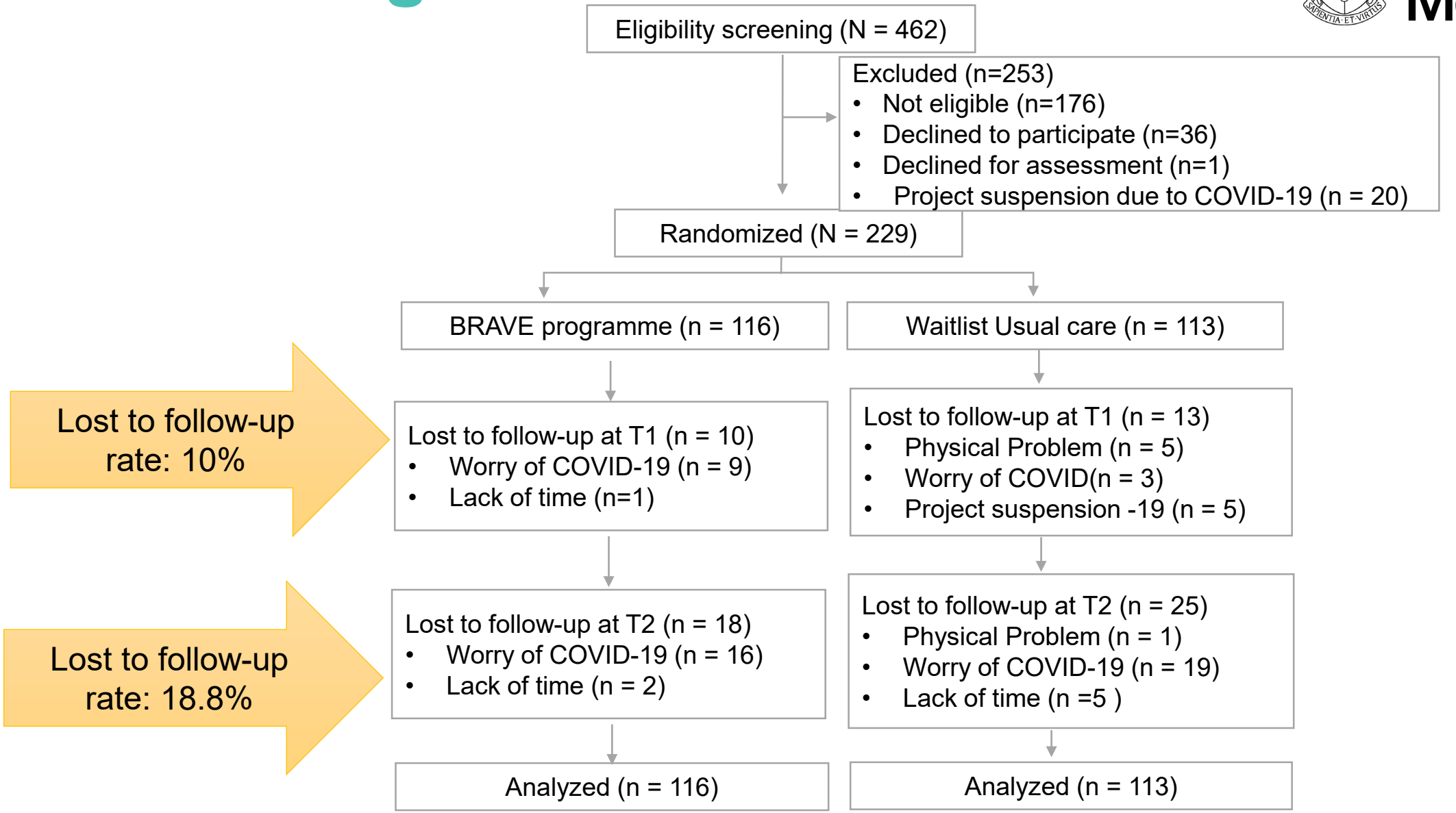
Counselling Session

- Integrate mentor-directed exercise training as lifestyle activities
- Goal setting for maintaining physical activity
- Establish action plan with concrete schedule, logistic arrangement, contingency plan

Peer mentor-directed exercise sessions in the community

Follow-up Support
(Via the mobile application and onsite visits weekly x2; biweekly x1)

CONSORT diagram

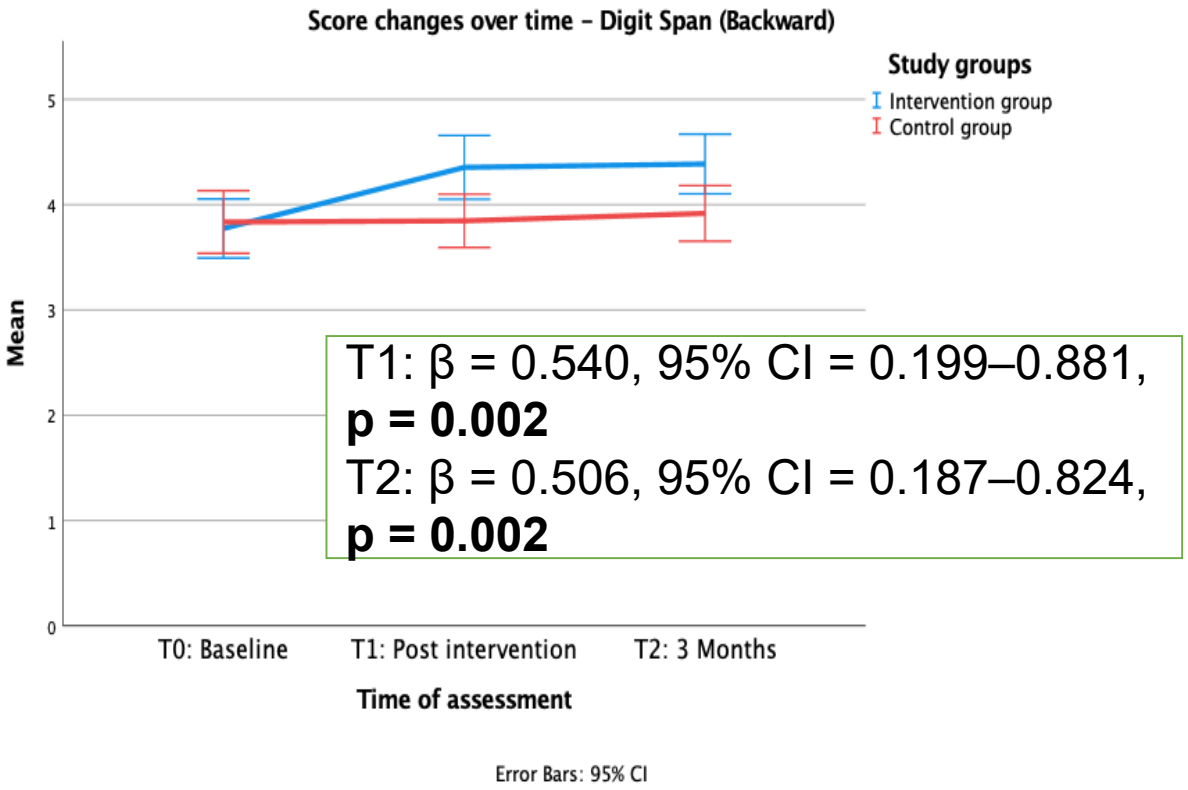


Sample characteristics at baseline

Characteristics	Total sample Mean (SD) or frequency (%)	BRAVE group Mean (SD) or frequency (%)	Control group Mean (SD) or frequency (%)	p-value
Age	74.38 (7.48)	73.93 (7.40)	74.83 (7.57)	0.363
Sex				0.852
Male	33 (14.4)	16 (13.8)	17 (15.0)	
Female	196 (85.6)	100 (86.2)	96 (85.0)	
Education				0.745
Nil/primary	143 (62.4)	74 (63.8)	69 (61.1)	
Secondary 1-3	43 (18.8)	23 (19.8)	20 (17.7)	
Secondary 4-7	32 (14.0)	15 (12.9)	17 (15.0)	
≥ Tertiary	11 (4.8)	4 (3.4)	7 (6.2)	
Occupation				0.683
Retired/Housewife	223 (97.4)	112 (96.6)	111 (98.2)	
Employed	6 (2.6)	4 (3.4)	2 (1.8)	
Monthly income				0.517
<$5000	160 (69.9)	76 (65.5)	84 (74.3)	
$5000-$10000	34 (14.8)	20 (17.2)	14 (12.4)	
$10001-$20000	22 (9.6)	12 (10.3)	10 (8.8)	
>$20001	13 (5.7)	8 (6.9)	5 (4.4)	
Smoking status				0.783
Current smoker	6 (2.6)	2 (1.7)	4 (3.5)	
Ex-smoker	18 (7.9)	9 (7.8)	9 (8.0)	
Non-smoker	205 (89.5)	105 (90.5)	100 (88.5)	
MoCA	22.91 (2.51)	22.61 (2.59)	23.21 (2.40)	0.070
Memory Inventory for Chinese	10.70 (4.63)	10.74 (4.48)	10.66 (4.80)	0.902
ADAS-Cog	11.01 (4.33)	11.04 (4.42)	10.97 (4.25)	0.905
Color Trails Test (CTT)				
CTT 1 (standard score)	84.39 (18.78)	84.66 (18.92)	84.11 (18.71)	0.824
CTT 2 (standard score)	87.66 (17.21)	89.48 (16.98)	85.82 (17.33)	0.109
Digit Span Test				
Digit Span Forward test	8.01 (1.56)	8.11 (1.50)	7.91 (1.63)	0.333
Digit Span Backward test	3.85 (1.35)	3.76 (1.31)	3.95 (1.39)	0.293
Total score	11.86 (2.38)	11.87 (2.19)	11.86 (2.56)	0.969
Short Form-36				
Physical component score	39.44 (11.70)	39.72 (11.14)	39.16 (12.30)	0.719
Mental component score	51.05 (11.47)	50.56 (11.86)	51.56 (11.08)	0.510

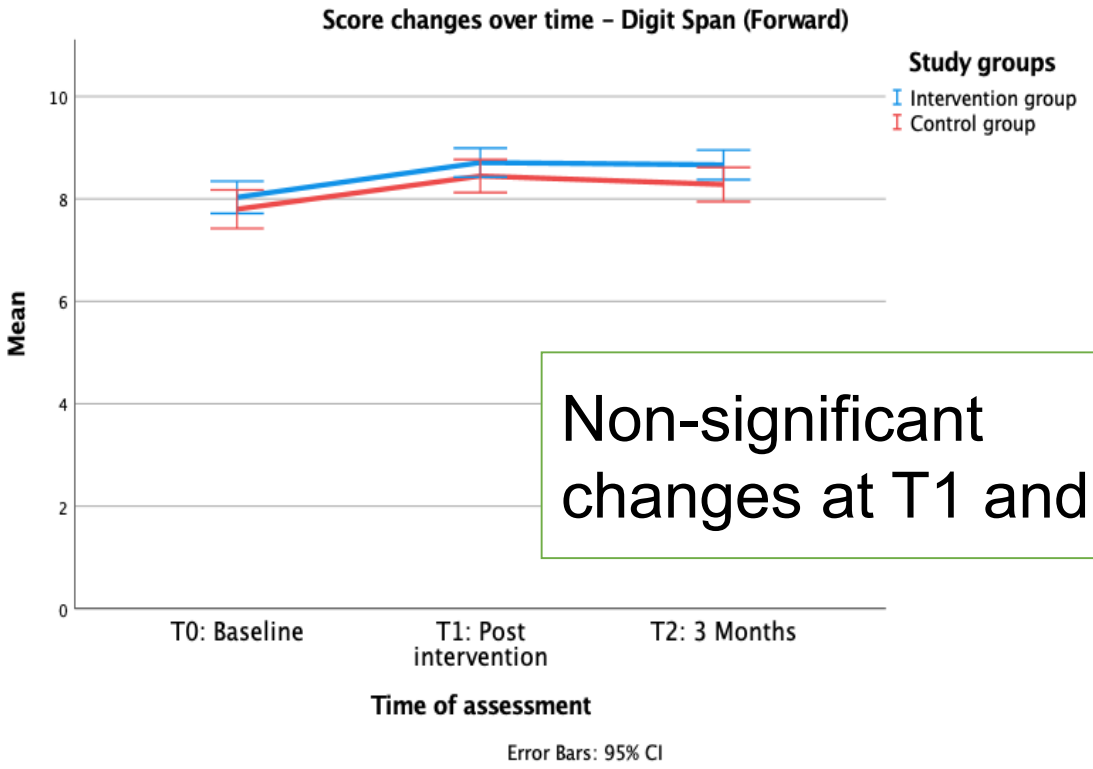
Effects of BRAVE programme

Working memory



T1: β = 0.540, 95% CI = 0.199–0.881, **p = 0.002**
T2: β = 0.506, 95% CI = 0.187–0.824, **p = 0.002**

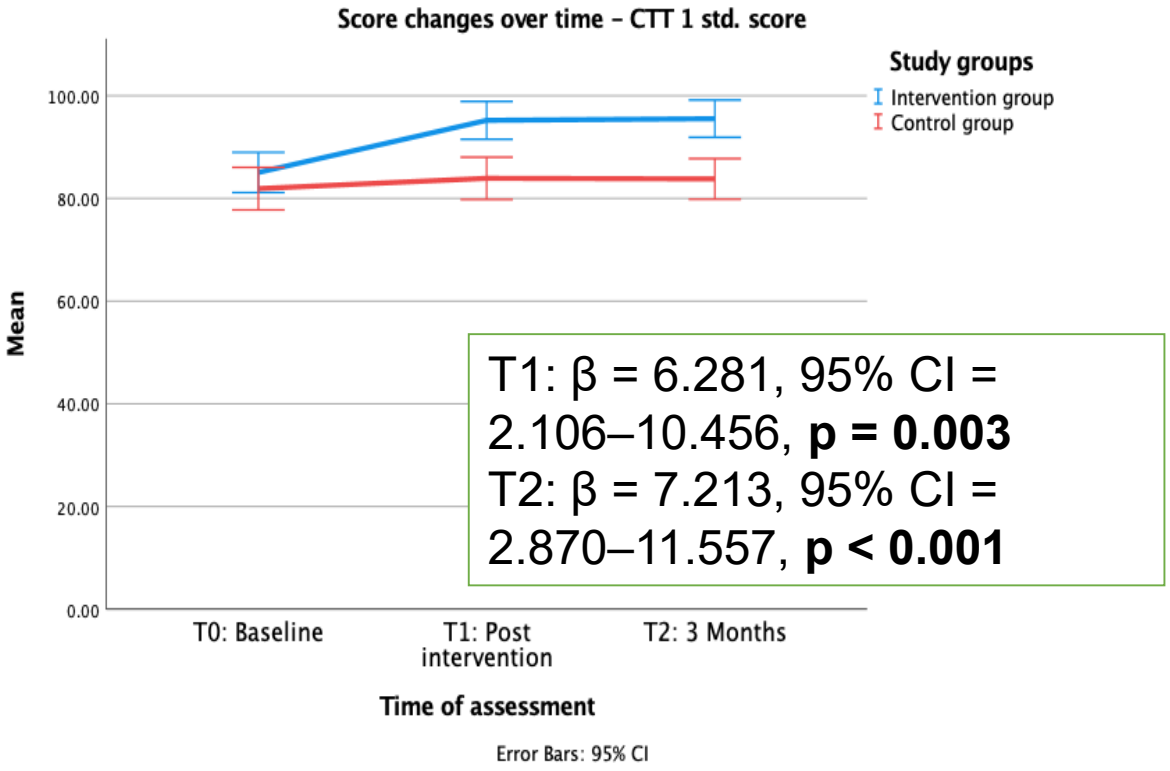
Short-term memory



Non-significant changes at T1 and T2

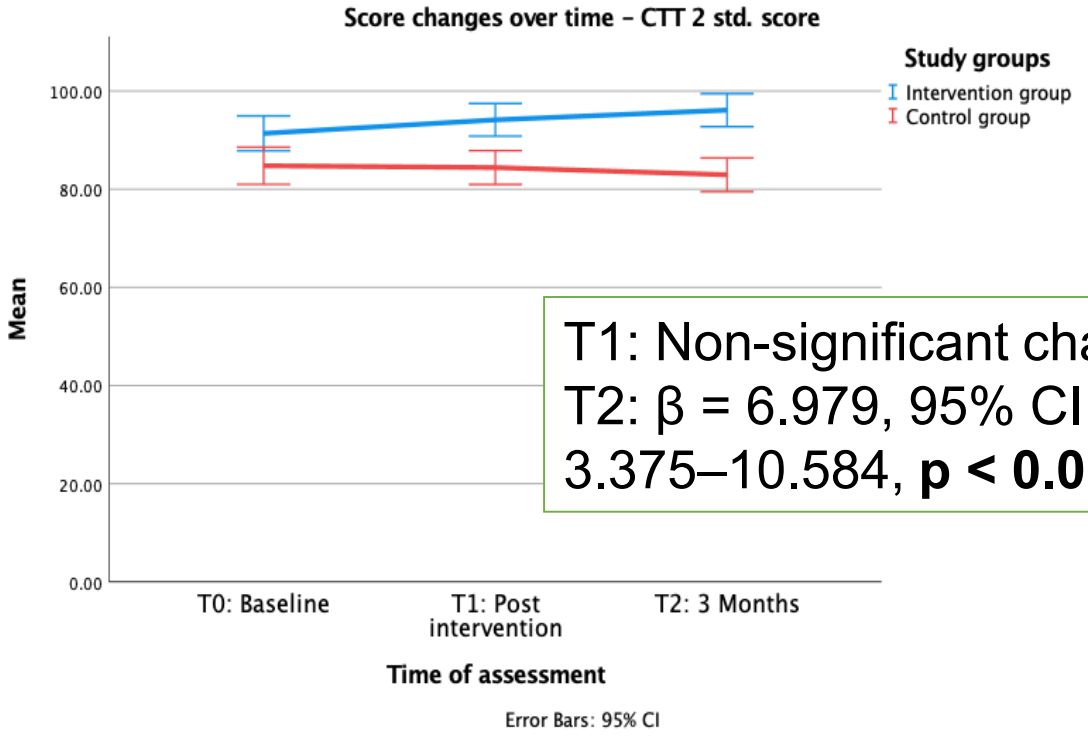
Effects of BRAVE programme

Executive function processing speed & attention



T1: β = 6.281, 95% CI = 2.106–10.456, **p = 0.003**
T2: β = 7.213, 95% CI = 2.870–11.557, **p < 0.001**

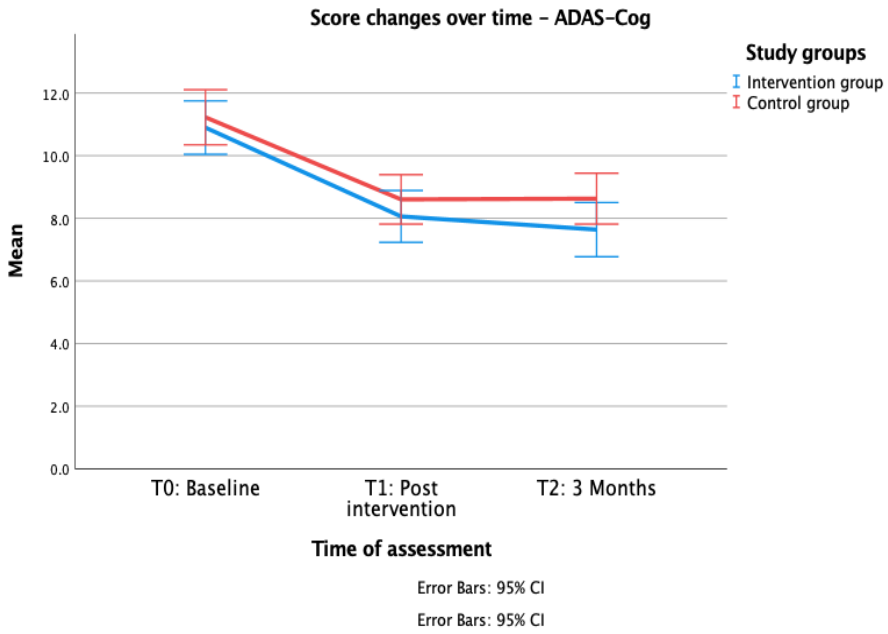
Executive function sequencing & mental flexibility



T1: Non-significant change
T2: β = 6.979, 95% CI = 3.375–10.584, **p < 0.001**

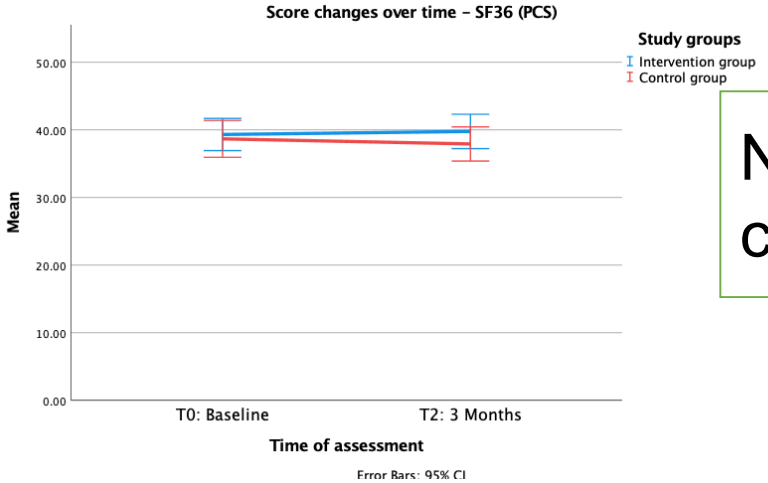
Effects of BRAVE programme

Global cognition

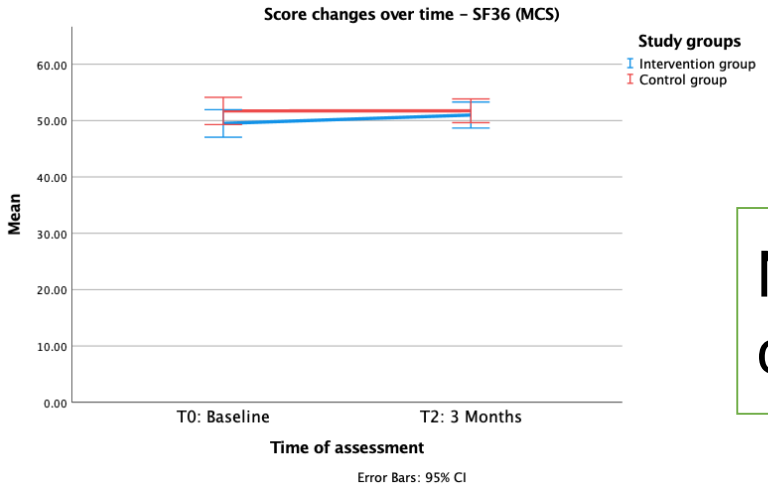


Non-significant changes at T1 and T2

Health-related quality of life



Non-significant changes at T1 and T2



Non-significant changes at T1 and T2

Programme engagement

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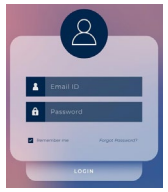
General public + participants

2,195 app downloads

23,957 app logins 

42,519 views to videos

Participants in the BRAVE group

- Overall programme adherence rate: 81.0%
- Attended at least 75% of the sessions: 92%
- Number of logins to the app: 48.24±11.03
- Actively responding to coach' messages: 68%, with 1,664 hits for the videos
- 289 exercise-motivating interactions between volunteers and MCI participants captured from the textual data

Programme recognition

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動腦共行

旨在提高和喚醒公眾對輕度認知障礙的認識和注意；並附以相關研究、資訊及建議，讓大眾進一步瞭解輕度認知障礙的預防和治療方法。

下載：
App Store: https://qrgo.page.link/ZyxuD
Google Play: https://qrgo.page.link/L5B46

動腦共行

Office for Film, Newspaper and Article Administration
The Government of the Hong Kong Special Administrative Region
of the People's Republic of China

Meritorious Website Contest
Healthy Mobile Phone/Tablet Apps Contest

其他入圍應用程式 (按名稱排列)
Other shortlisted apps (Names in alphabetical order)

Lifesum - Diet Plan, Macro Calculator & Food Diary
MyMapHK
news.gov.hk 香港政府新聞網
Plant Nanny² 植物保姆² - 喝水養成 app
Snappy - 香港街景相片資料庫
Sololearn: Learn to Code for Free
Stellarium Mobile - 星圖
WaterMinder - 水追蹤和飲水提醒應用程式
WordUp Vocabulary
動腦共行
友里蹤跡 - 協助尋找走失的腦退化症人士

Satisfaction survey

Item	Mean (SD)
1. I understand the purpose of this programme.	4.55 (0.60)
2. I understand the content of this programme.	4.57 (0.58)
3. After completion of this programme, I can better understand how this topic relates to me.	4.59 (0.57)
4. The content in the programme provides me with tangible information which can be integrated into my daily life.	4.60 (0.56)
5. After completion of this programme, I will implement the suggestions and incorporate them into my daily life.	4.54 (0.73)
6. The interactive method of this programme encouraged my participation.	4.66 (0.56)
7. Instructors/speakers are happy to answer my queries.	4.72 (0.53)
8. The programme length is commensurate to the content.	4.46 (0.63)
9. Overall, I am very satisfied with the programme.	4.77 (0.54)
10. I am willing to recommend this programme to my friends.	4.66 (0.56)
Total	46.16 (4.49)

Qualitative findings: Volunteers

- Perception of the programme
  - Highly practical exercise protocol in the community setting
  - Mobile app served as an important virtual platform to maintain mentor-mentee relationship
- Self-fulfilling volunteering experience
  - Meaningful programme that valued their capability contributing to the society
  - Peer mentoring fosters mutual growth, support and create a sense of accomplishment
- Perceived needs on increasing autonomy and individualization
  - Higher autonomy for volunteers to lead but not assist in the sessions
  - Arrange group exercise according to the ability of persons with MCI

Qualitative findings: MCI Participants

- Positive changes brought about by the programme
  - Improved understanding about MCI
  - Realizing the importance of maintaining physical activity
  - Getting to know mentors of similar age within the neighborhood
- Perception of the programme
  - Perceived importance and relevance of the programme
  - Perceived user-friendliness of the app and its content
  - Perceived needs on increasing the accessibility of the programme
- Contextual factors hindering active engagement
  - Unprecedented influence of COVID-19
  - Less flexible schedule

Research translation to health services

– Project deliverables are adopted in several ongoing large-scale research implementation projects to address the global advocacy on healthy aging promotion

賽馬會康齡「伴」旅計劃
Jockey Club Pathway to Healthy Ageing Project

01 Health Screening

TheWHO's Integrated care for older people (ICOPE) guideline was used to assess if the older adults with risks of accelerated ageing including frailityfraility,sarcopenia, malnutrition, social loneliness, mood disturbance and other geriatric symptoms.

02 Health Coach Training

A series of trainings were provided to the health coaches by nurses and social workers in the project so that they understand the common health problems among the older people.

They attended small class discussion and trainings with the team nurses and social

03 Health Ageing Workshop

The project consists of nine cohorts (Three months as one cohorts) and implement in two phases.

Phase 1: The nurse team, social workers and health coaches helps the elderly clients to tailor made health plans accordingly to their personal needs and health

04 Community Elderly Health Services

To provide trainings to the staff at the collaborating NGOs, develop the clinical practice guidelin guideline and set upregular conferencewith the network.

Jockey Club Elders Get Active Fitness Campaign

Photos

Conclusion

- The BRAVE programme is well received and effective at sustaining improvements in various cognitive domains of PwMCI
- The programme also demonstrates an effective model to support senior volunteers in developing self-fulfilling experience and to promote active aging in our society

Funding support

The work described in this presentation was fully supported by a Health and Medical Research Fund from the Health Bureau (project number: 01170728)

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