

Changes in Cognition and Dementia Risk Over 24 Months in the BetterBrains Trial to Prevent Cognitive Decline

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Background

Large multidomain lifestyle intervention trials, e.g., FINGER, U.S. POINTER, and Maintain Your Brain, show that targeting multiple modifiable dementia risk factors (MDRFs) can slow or prevent cognitive decline.

However, sustained engagement in these interventions remains challenging. Person-centred approaches that tailor interventions to individuals' specific dementia risk profiles, preferences, resources, and capabilities may improve adherence to, and the effectiveness of, these interventions.

The **BetterBrains Trial** is an online, multidomain, person-centred dementia prevention intervention designed to address this challenge by providing personalised, telehealth-enabled coaching targeting each participant's MDRFs.

The aim of this study is to characterise 24-month changes in cognition and dementia risk (secondary outcomes) following participation in the BetterBrains Trial.

Methods

Participants completed assessments of cognition, lifestyle, health and medical characteristics, and self-reported surveys via the BetterBrains online platform (www.betterbrains.org.au) at baseline, 12 & 24 months.

Risk Factor Assessment: At study entry, assessment of 19 self-reported MDRFs across 4 domains ('**hearts**', '**mind**', '**mood**', '**sleep**') was conducted and participants with at least 1 MDRF were enrolled.

Randomisation & Masking: Computer-generated random allocation via permuted blocks of variable sizes (undisclosed) to the BetterBrains program or psychoeducation only (control) in a 1:1 ratio, after baseline assessment completion and identity verification. Randomisation stratified by (a) age (<55 vs. ≥55 years), and (b) rurality (metropolitan vs. regional, rural, remote). All outcomes assessor and investigator blinded.

Intervention: Intervention group received online (telehealth with allied health coach) person-centred goal setting, motivational interviewing, follow-up support, healthcare provider communication and linkage to local healthcare supports for management of MDRFs over 12 months.

Cognitive Outcomes: Continuous change from baseline to 24 months on each individual test (a-e) and a primary cognitive composite (a-d): (a) Cogstate Detection, (b) Cogstate One Card Learning, (c) Cogstate One Back, (d) Cognitive Function Instrument, and (e) International Digit Symbol Substitution Test – Medicines.

Dementia Risk: Continuous change from baseline to 24 months on the Cardiovascular Risk Factors, Aging & Dementia (CAIDE) risk score (no APOE) and modified Australian National University AD Risk Index (ANU-ADRI).

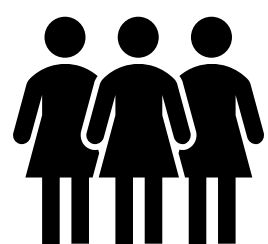
Results & Conclusions

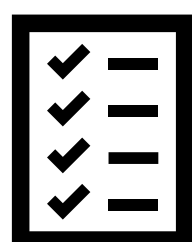
Baseline Demographic / Risk Characteristics & Adherence:

- Intervention and control groups were well-balanced on baseline demographic and risk characteristics (Table 1)
- Adherence to the pre-specified criterion of completion of ≥6 telehealth coaching sessions was very high (85%)

Table 1. Baseline demographic/risk characteristics of the primary population.

Characteristic	Intervention	Control
Number	517	520
Age, yr, median (IQR)	61 (10)	61 (11)
Sex, n (%)		
Male	89 (17%)	93 (18%)
Female	428 (83%)	427 (82%)
Edu, yrs, M/SD	15.4 (3.9)	15.4 (3.9)
Location, n (%)		
Metro	374 (72%)	375 (72%)
RRR	143 (28%)	145 (28%)
CAIDE no APOE, M/SD	5.83 (2.3)	5.84 (2.2)
Mod. ANU-ADRI, M/SD	-2.79 (2.3)	-2.44 (4.4)


1,037
participants randomised & analysed
(517 intervention, 520 control)


85% adherence
intervention adherence

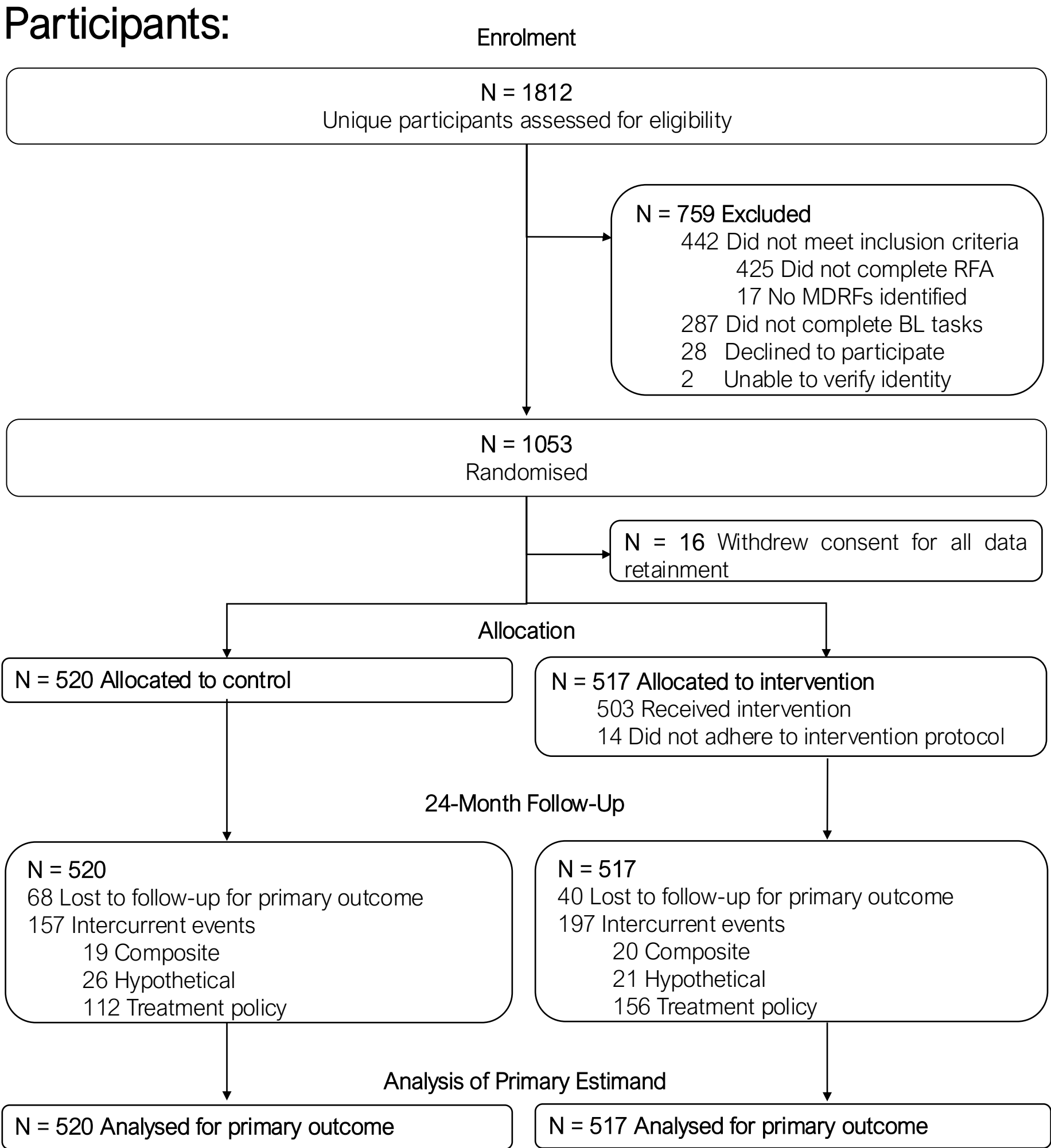
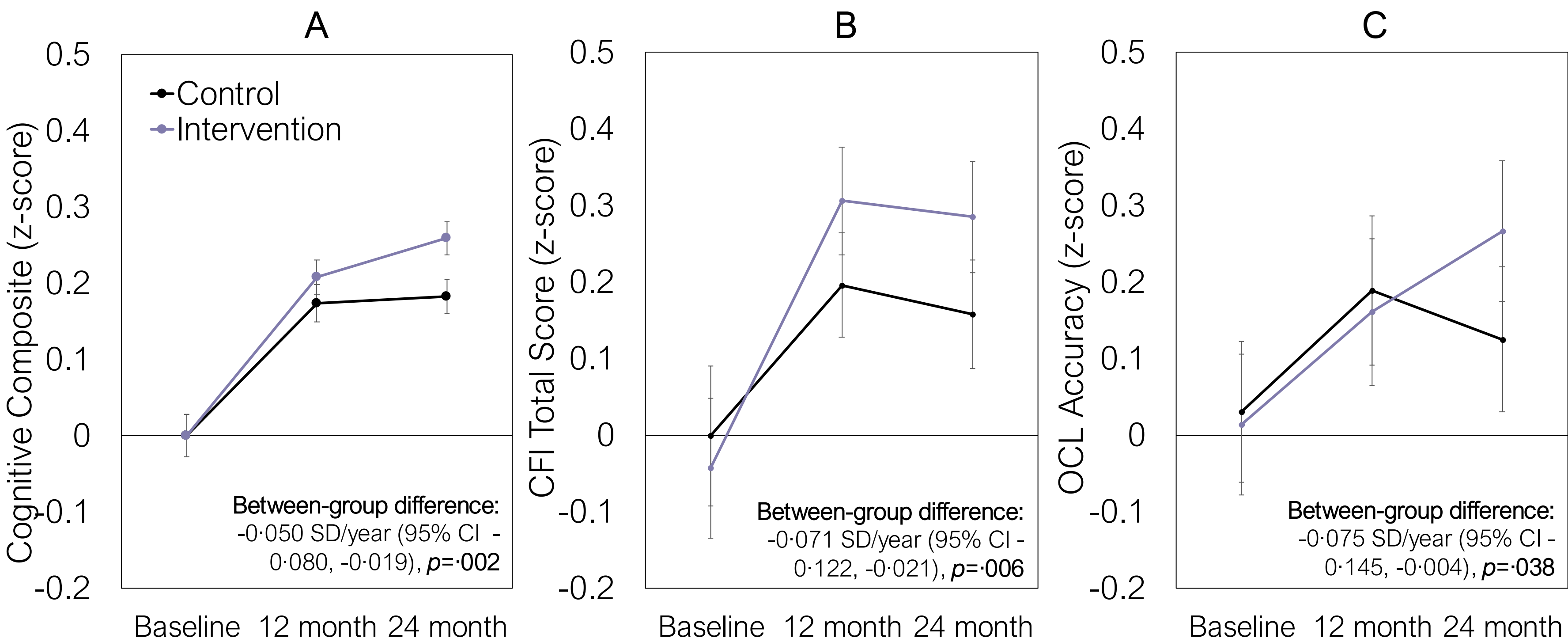


Fig 1. CONSORT diagram for the BetterBrains RCT.

Change in Cognition & Dementia Risk over 24 Months

The BetterBrains intervention group demonstrated greater annual mean rate of improvement on the cognitive composite score, CFI total score, and Cogstate One Card Learning test over 24 months compared to the control group (Fig 2A-C).



No between-group differences for Detection ($p=.060$), One Back ($p=.060$), or International Digit Symbol Substitution Test – Medicines ($p=.911$).

No significant between-group differences were observed for change in dementia risk at 24 months as measured by the CAIDE (-0.049 SD/year (95% CI -0.155, 0.057), $p=.362$) or the modified ANU-ADRI (0.109 SD/year (95% CI -0.133, 0.352), $p=.377$).

Conclusion: A decentralised, person-centered, multidomain lifestyle intervention program targeting personalised MDRFs was effective in preserving cognitive function over 24 months compared with psychoeducation (control).