Impact of free later life formal university education on longitudinal modifiable risk factors, cognition and plasma phosphorylated tau 181

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1. Background

- We know up to 40% of dementia cases could be prevented through addressing modifiable risk factors[1]
- Early life education is a significant contributor, with 7% reduction in dementia prevalence if this was eliminated
- However, there is a lack of research into continuing education, where there is great potential for enhancing cognitive reserve through mid- to later-life educational interventions
- Recent evidence has shown how lower level of education was associated with higher perceived barriers to positive lifestyle change toward dementia risk reduction[2]
- Here we sought to investigate the impact of a fee-free mid- to later-life university educational intervention on:
  - Modifiable risk factors for dementia
  - Cognitive function
  - Plasma phosphorylated tau 181 (p-tau 181)

2. Methods

- Participants recruited from the ISLAND Study Linking Ageing and Neurodegenerative Disease (ISLAND) [3]
- ISLAND is a prospective public health initiative in Tasmania, Australia's southernmost island state[3]
- ISLAND Campus intervention was available to all ISLAND participants across the state of Tasmania
- Participants were eligible to enrol in a variety of degrees, diplomas
- Modifiable risk factors for dementia were measured by the Dementia Risk Profile (DRP), a custom traffic-light based tool reflecting individual risk factor adherence
- Cognitive function administered online via the Cambridge Neuropsychological Test Automated Battery (CANTAB); Paired Associates Learning (PAL) and Spatial Working Memory (SWM)
- At four clinics across the state, participants also provided blood samples for measurement of plasma p-tau 181 and apolipoprotein E epsilon 4 allele (APOE ε4)

3. Results

- Total of 984 (intervention = 492, control = 492) ISLAND participants took part in the study.
- Intervention participants were propensity score matched with controls, with optimal logistic regression matching on age & gender
- Groups were similar on socioeconomic status, geographic location, APOE ε4 presence, however intervention participants had significantly higher prevalence of prior university study completion (Table 1)
- Intervention participants enrolled in an array of in-person/online degrees and courses at the University of Tasmania

	Intervention (Campus)	Control (Not Campus)	p-value
N (%)	**492 (50%)**	**492 (50%)**	
Age at baseline (mean [SD])	61.2 (7.31)	61.1 (7.41)	0.859
Gender: N female (%)	351 (71.3%)	369 (75.0%)	0.329
Total years of education (mean [SD])	11.7 (1.34)	11.6 (1.58)	0.177
Prior completion of tertiary education	117 (23.8%)	192 (39.0%)	**<0.001**
APOE ε4 presence: N yes (%)	57 (24.1%)	38 (26.6%)	0.669

Table 1: Demographic statistics for included ISLAND participants (n = 984)

	N	%
Diploma of Family History	103	20.9
Diploma of Arts	74	15.0
Diploma of Fine Arts	52	10.5
Diploma of General Studies	38	7.7
Diploma of Sustainable Living	37	7.5
Diploma of Languages	29	5.9
Bachelor of Psychological Science	19	3.9
Diploma of Creative Arts and Health	18	3.7
Bachelor of Dementia Care	17	3.4
Bachelor of Science	11	2.2

Table 2: ISLAND Campus course/degree enrolment

- Participation in ISLAND Campus had a significantly positive impact on total DRP change, with those in the intervention group displaying greater positive improvements on risk factors over time (Figure 1)
- Over time, intervention participants significantly improved their SWM as measured via CANTAB
- No changes were observed in longitudinal CANTAB PAL or cross-sectional differences in p-tau 181 (pg/mL) between intervention and control participants

4. Results II

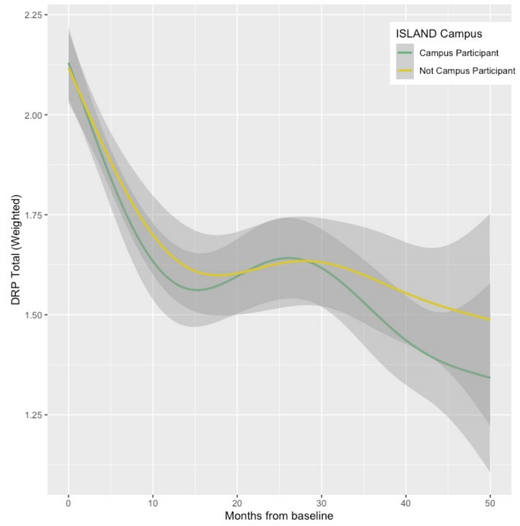

Figure 1: Longitudinal total DRP score trajectories between intervention (Campus) and control (Not Campus) participants in the ISLAND Campus study. Trajectories are generalized additive models with thin plate regression splines, accounting for PSW. We saw significant improves in DRP reduction for ISLAND Campus participants.

5. Conclusions

- ISLAND Campus, a mid- to later-life fee-free university level education significantly improved dementia risk factors and cognition in a cognitive healthy cohort of Tasmanian Australians
- Uptake was similar in both groups, indicating our intervention removed geographic and socioeconomic barriers to participation
- Future interventions should target individuals without prior university education, where the greatest gains may be seen

References

1: Livingston G, Huntley J, Sommerlad A, et al. Dementia prevention, intervention, and care: 2020 report of the lancet commission. The Lancet. 2: Siette J, Dodds L, Deckers K, Köhler S, Armitage CJ. Cross-sectional survey of attitudes and beliefs towards dementia risk reduction among Australian older adults. *BMC Public Health*. 2023/05/30 2023;23(1):1021. doi:10.1186/s12889-023-15843-0 3 Bartlett L, Doherty K, Farrow M, et al. Island study linking aging and neurodegenerative disease (ISLAND) targeting dementia risk reduction: protocol for a prospective web-based cohort study. *JMIR Research Protocols*. 2022;11(3):e34688.

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