

DAPA
Dementia and Physical Activity

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Lessons from the
Dementia and Physical Activity trial –
A randomised controlled trial of exercise in
people with mild to moderate dementia

Professor Sallie Lamb, Oxford Clinical Trials
Research Unit
University of Oxford

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Introduction

- Dementia facts
- Description of the DAPA trial
- Barriers and facilitators to participating in structured exercise for people with dementia
- Examples from practice

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Prevalence and cost of dementia in the UK

Prevalence

- 850,000 people with dementia by 2015
- Projected increase of 40% over next 12 years

Cost to society

- £26.3 billion, unpaid care £11.6 billion
- Social and psychological costs to individual, family, and community

[Alzheimer's Society, 2014]

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Current treatments for dementia

- Main treatments for cognition are pharmacological (medications) – small benefits
- Many patients are ineligible
- Side effects

Exercise may be a viable option for treatment, but

- The effectiveness of exercise on cognition in people living with dementia remains uncertain [NICE, 2012]
- Limited evidence at the outset of the trial

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State of the evidence

Study or Subgroup	Exercise		Control		Weight	Std. Mean Difference IV, Random, 95% CI		
	Mean	SD	Mean	SD				
Aguilar 2014	21	4.7	17	21.1	4.6	17	4.9%	-0.02 [-0.69, 0.65]
Alcoverde 2014	72.9	10.9	10	63.9	12.9	10	3.8%	0.77 [-0.15, 1.68]
Bossers 2015	14.62	5.61	36	13.88	5.73	36	5.9%	0.13 [-0.33, 0.59]
Cheng 2014	6.48	5.5	39	7.45	5.88	35	5.9%	-0.17 [-0.63, 0.29]
Hothoff 2015	22.11	0.57	13	20.72	0.55	14	3.4%	2.41 [1.28, 3.43]
Hemous 2010	30.38	7.66	16	23.23	8.37	15	4.6%	0.97 [0.13, 1.61]
Lam 2015	-6.4	3.3	114	-8.4	3.3	101	6.7%	0.00 [-0.27, 0.27]
Law 2014	61.91	7.67	43	58.03	7.72	40	6.0%	0.50 [0.06, 0.94]
Lopez 2015	15.17	1.92	24	13.06	1.16	36	5.3%	1.38 [0.80, 1.96]
Miu 2009	17.17	6.66	36	18.07	4.53	49	6.0%	-0.16 [-0.59, 0.27]
Nakatsuka 2015	24.2	2.2	24	25.4	2.5	39	5.6%	-0.50 [-1.01, 0.02]
Pikula 2013	15.29	6.29	49	14.54	5.8	46	6.2%	0.12 [-0.28, 0.53]
Suzuki 2013	27.09	2.57	47	26.18	3	45	6.1%	0.32 [-0.09, 0.74]
Underwood 2013	12.57	6.3	53	11.73	6.54	51	6.2%	0.13 [-0.25, 0.51]
Vanila 2012	20.73	4.92	16	19.4	6.12	15	4.7%	0.26 [-0.45, 0.97]
Vreugdenhil 2011	12	2	11	6	2	10	2.6%	-2.88 [-3.59, -1.17]
Vreugdenhil 2012	-18.5	9.8	20	-30.6	17.9	20	5.0%	0.82 [0.17, 1.47]
Wei 2014	25.53	0.82	30	24.67	1.42	30	5.6%	0.73 [0.21, 1.26]
Yang 2015	22.8	2.8	25	19.5	3.4	25	5.3%	1.04 [0.45, 1.64]
Total (95% CI)	623		634		100.0%			0.47 [0.21, 0.74]

Heterogeneity: Tau² = 0.25, Chi² = 85.52, df = 18 (P < 0.00001), I² = 79%
Test for overall effect: Z = 3.55 (P = 0.0004)

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The Dementia and Physical Activity (DAPA) trial

- Funded by National Institute of Health Research/Health Technology Assessment

Could an increase in physical activity have a positive effect on cognition, function and quality of life in individuals with dementia?

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Design

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- Pragmatic randomised controlled trial
- 2 arms (best practice usual care vs BPUC + exercise)
- 12 month follow up
- Primary outcome ADAS cog
- Other very important secondary outcomes
- Parallel economic and qualitative study
- Sample size **468** 80% power $p < 0.05$ 2: 1 alloc

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Trial participants

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- Broad inclusion criteria (pragmatic trial)
- Probable dementia of mild to moderate severity (DSM IV) – any type
- Community-dwelling
- Able to walk 10 feet unaided
- Medically stable

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Outcome Measures in DAPA

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Collected at baseline, 6 and 12 months

Cognition

1. **ADAS-cog**
Alzheimer's Disease Assessment Scale-cognition –plus additional items for executive function = maze and number cancellation tests

Function

2. **BADL**
Bristol Activities of Daily Living

Quality of Life

3. **QOL-AD**
Quality of Life – Alzheimer's Disease - participant and carer as proxy
4. **EQ-5D** participant, carer as proxy

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Outcome measures in DAPA continued

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Carer Burden

5. **ZRI**
Zarit Burden Interview

Behavioural symptoms

6. **NPI**
Neuropsychiatric Inventory

Health Economics

7. **CSRI**
Client Services Receipt Inventory

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Design features

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- Computer generated random allocation sequence
- Allocation concealment
- Masked assessment
- Training and QA for outcome measures
- Intervention according to MRC complex intervention guidance

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The DAPA intervention design:

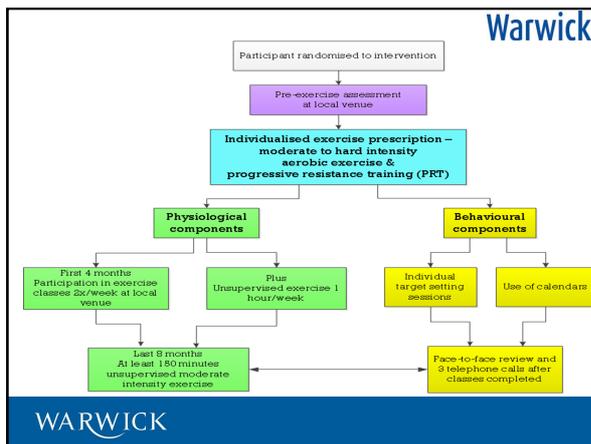
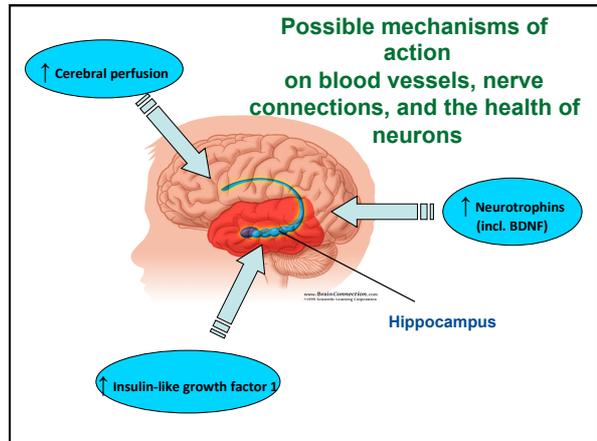
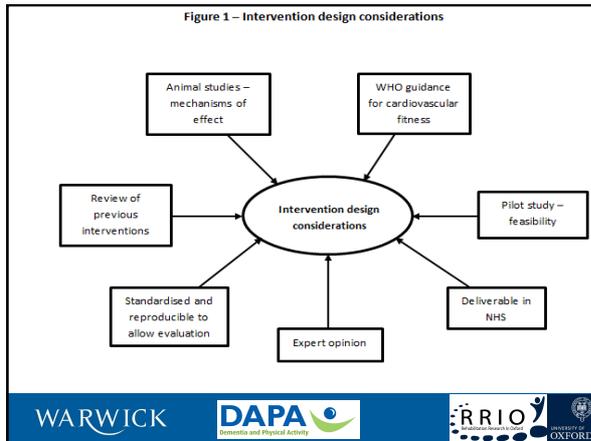
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Aim

to develop a programme which can provide an adequate exercise challenge which is:

- achievable for all potential participants
- accounts for
 - wide range of age and physical abilities
 - multiple co-morbidities
 - dementia-related disabilities
- acceptable, enjoyable and safe for all
- considers impact on carer burden

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DAPA exercise class prescription

- 25 mins aerobic exercise
- 25 minutes progressive resistance exercise

at moderate to hard intensity (12 – 16 on Borg Scale)

- 1 hour supervised exercise in a group format
- 2x/week for 16 weeks (4 months)
- + 1 hour at home

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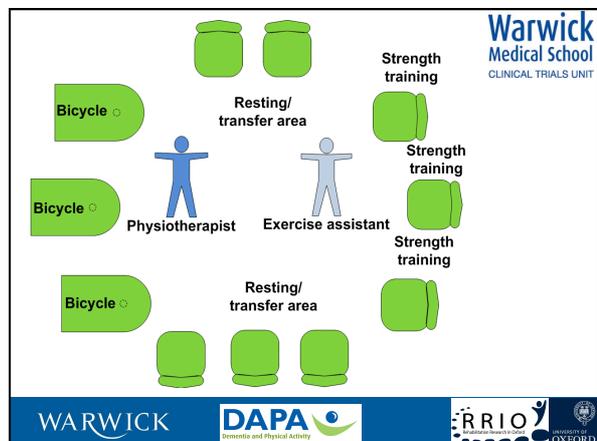
DAPA exercise class activities

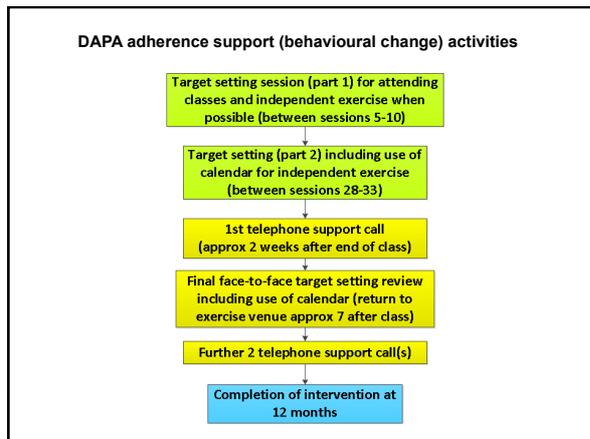
Aerobic - exercising on a static bicycle

Resistance - lifting dumbbells and weighted vests

weighted belts

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Person-centred approach

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Elements include:

- Developing a relationship with the person so they feel they can trust you
- Knowing the person as an individual, getting to know their personality, life story, interests and skills
- Treating the person in a way that respects their values, preferences and needs
- Giving the person choice in decision-making
- Involving carers when appropriate in supporting the person in their decision making
- Promoting emotional and physical comfort

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Overall approach for person centred care

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✓ unconditional positive regard

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Memory losses

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Supporting memory

- ✓ limited changes to activities, repeat (exs, structure)
- ✓ one step instructions
- ✓ limit questions
- ✓ be prepared!

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Communication challenges

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Supporting communication

- ✓ give time
- ✓ short, simple sentences
- ✓ non-verbal – gesture
- ✓ eye contact

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Supporting communication continued

- ✓ avoid instructions via questions
- ✓ positive instructions

Praxis (the ability to plan and then execute)

Dyspraxia - examples

- getting on and off a bicycle, using a treadmill
- copying a movement
- putting on a jacket

“The impairment of the ability to perform certain voluntary, especially purposive or skilled, movements in a person with normal muscular strength and sensation”

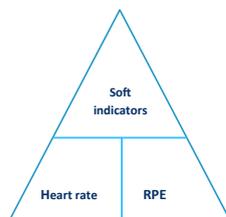
Supporting praxis

- ✓ awareness, understanding
- ✓ functional approach
- ✓ cues – visual, verbal, tactile (facilitation)
- ✓ simplify, accept/develop modifications

Other significant challenges

- Visual perception
 - Perceiving shapes, colours, backgrounds
- Executive function
 - Internal business manager – planning, solving problems, deciding what to do, and what not to do
- Attention
- Self esteem
- Behavioural and psychological symptoms
 - Anxiety and distress, apathy, depression

Monitoring prescription



What have I learnt?

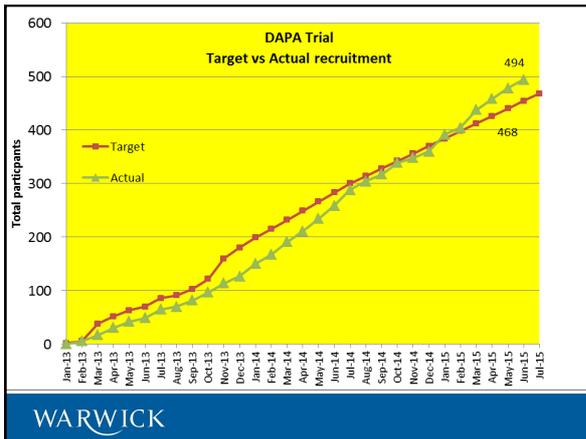
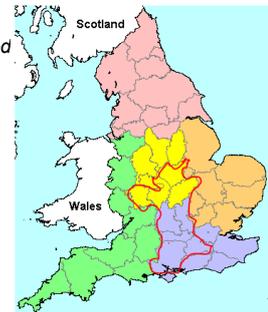
- Giving time & being patient
- Close observations & monitoring HR

What have I learnt? continued

- Regular positive reinforcement – building confidence
- Clear, short & simple instructions
- Physical Demonstrations, verbal instruction, & tactile cues
- Eye contact & Body Positioning

DAPA Trial: Current status

- Closed recruitment
- Final follows up being completed
- Coventry, Stratford, Worcestershire, Hereford, Buckinghamshire, Berkshire, Northamptonshire, North London, Exeter, Black Country, Leicestershire, Solent, Gloucester, Swindon



Demographics

- Average age 77 years (50.4 to 95.6 years)
- Slightly more men than women (60:40)
- Average MMSE at entry 21.8 (11 to 30)
- ADAS cog (8.3)
- Follow up 90% at 6 months including deaths and withdrawals
- General background decline in cognition over time

Attendance at the group sessions

Compliance range ^a	Number of participants ^a
0% <= Compliance <= 25% ^a	35 (10.9%) ^a
25% < Compliance <= 50% ^a	21 (6.6%) ^a
50% < Compliance <= 75% ^a	50 (15.6%) ^a
75% < Compliance <= 100% ^a	214 (66.9%) ^a

Safety and adverse events

- 2 serious falls resulting in hospital care (follow up period)
- 1 angina attack immediately after session (already medicated)
- 1 bout of severe hip pain
- 1 funny turn
- Remarkably safe given 1504 episodes of group care delivered (0.003%)

Qualitative study

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Interviewed participants, carers, therapists
During the exercise class intervention
During the follow up period

- Positive
- Purposeful
- Community
- PwD surprised themselves, carers and therapists

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Qualitative study

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I think it's partly that it's actually being able to do something that feels positive whereas a lot of things have been maybe taken away you know that they feel quite down because they've had to give up driving recently and I think the groups are a nice, positive, generally in a centre where other people are exercising it's a good normal thing isn't it. You're taking part in exercise; it's something you can do.

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Multiple perspectives

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I'm enjoying it. I'm very tired when I come out because I do 25 minutes on the bike, about two miles on the bike.

I think it's been excellent and she's... she's getting a sense of achievement, she's achieving something you know, she tells me how long she's ridden on the bike.

I'm not saying it's been the easiest thing for me to do, it's been very hard sometimes for me to do because I've had a lot of pain in my legs...in one way I would say I haven't enjoyed it I find I'm getting very tired in an afternoon, I don't like the bikes. They are very, very uncomfortable.

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Summary

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Difficult trial to run, a lot of set up and grit and determination
Will be nearly as large as the total number who have ever been randomised
Well designed intervention and trial
People with moderate and severe dementia can exercise
Generally enjoy it and stick to it

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NHS National Institute for Health Research

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