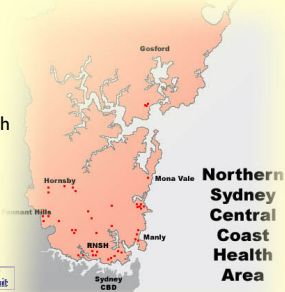


PHYSICAL FUNCTIONING MEASURES, MEDICATION AND FALLS IN RESIDENTIAL AGED CARE FACILITIES

Nicholas Wilson
 PhD Student
 MSc (University of Otago, NZ)
 Kolling Institute of Medical Research
 University of Sydney

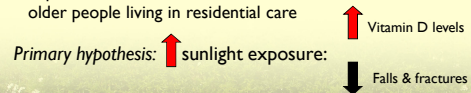


Geoff and Elaine Perry
 Ageing Research Unit



FREEDOM Study: Falls Risk Epidemiology: Effect of Vitamin D on Skeletal Outcomes and Other Measures

Randomised controlled multi-centre trial to determine the role of sunlight exposure and increased calcium intake to reduce falls and fractures in older people living in residential care



FREEDOM Study Physical function testing



FREEDOM Study Physical function testing



FREEDOM Study Cohort (n=602)

Characteristic	Value ± Standard deviation
Age (years ± Standard deviation, SD)	85.7 ± 6.4
Sex (Female %)	70.9
Individuals with cognitive impairment (%)	40.9
Individuals with depression (%)	29.1
Mean number of comorbidities*	0.95 ± 0.91
Mean grip strength (kg)	19.9 ± 8.1
Mean balance (scale 1-5)	3.79 ± 1.2
Mean reaction time (ms)	394 ± 201
Mean walking speed (ms ⁻¹)	0.56 ± 0.52

* Comorbidities include: Stroke, Arthritis, Osteoporosis, Parkinson's disease and Diabetes

Drug Burden Index (DBI)

- DBI is a measure of exposure to medicines with anticholinergic and sedative effects

$$DBI = \sum \frac{D}{D + \delta}$$

D = daily dose of sedative or anticholinergic drug taken by participant
 δ = minimum registered dose of sedative or anticholinergic drug

- In studies of community dwelling older people from USA (Health ABC) and Australia (CHAMP):
 - mean DBI 0.18
 - increasing DBI associated with impaired physical function

Hilmer et al. Archives of Internal Medicine 2007
 Hilmer et al. American Journal of Medicine 2009
 Gnjidic et al. British Journal of Clinical Pharmacology 2008

Drug Exposure in the FREEDOM Study



Characteristic	Baseline	12 month
Exposure to medication (%)	97.9	98.3
Mean number of medications (\pm SD)	6.0 \pm 3.0	6.6 \pm 3.3
Exposure to anticholinergic medications (%)	36.1	34.8
Exposure to sedative medications (%)	42.8	41.1
Mean drug burden of anticholinergic drugs (\pm SD)	0.27 \pm 0.43	0.26 \pm 0.43
Mean drug burden of sedative drugs (\pm SD)	0.34 \pm 0.48	0.36 \pm 0.53
Mean Drug Burden Index (\pmSD)	0.60 \pm 0.67	0.62 \pm 0.74

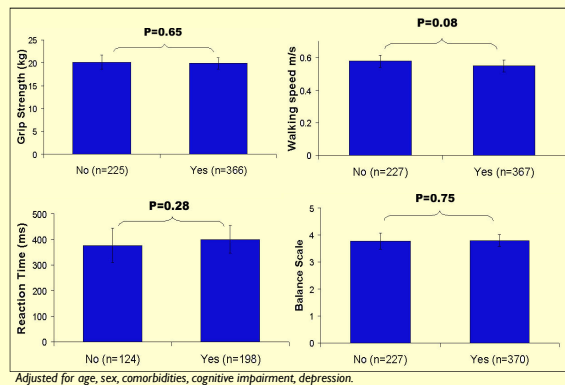
Commonly Prescribed DBI Medications in FREEDOM Cohort

Anticholinergic	Exposure
Antidepressants (excl SSRIs)	17.4%
Antipsychotics	9.6%
Antiemetics	3.8%
Antispasmodics	3.5%
Sedative	
Anxiolytics	18.1%
SSRIs	14.5%
Opioids	6.0%
Antidiarrhoeals	1.7%



SSRIs: Selective serotonin reuptake inhibitors

Baseline Functional Outcome Measures



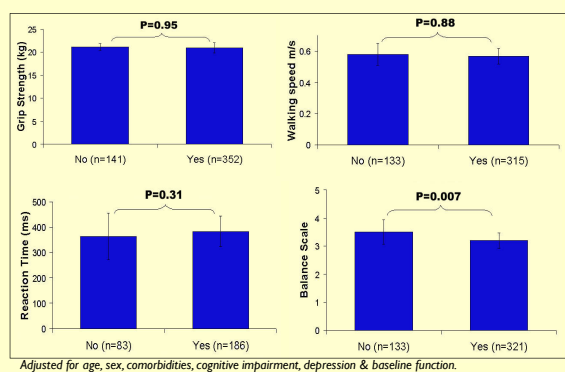
Baseline DBI and Physical Function

Functional outcome	DBI b	p	Anticholinergic	p	Sedative	p
Grip Strength (kg) n=591	-0.83	0.44	-0.31	0.59	-0.32	0.52
Reaction Time (ms) n= 322	5	0.77	6	0.84	7	0.74
Walking speed (ms ⁻¹) n= 595	-0.01	0.23	-0.007	0.69	-0.02	0.18
Balance (scale 1-5) n= 597	1.13	[0.90,1.42]	0.97	[0.67,1.39]	1.27	[0.92,1.73]

Adjusted for age, sex, comorbidities, cognitive impairment, depression (and aid for walking speed)

Wilson et al. Age and Ageing. 2010 39(4)

12 Month Functional Outcome Measures



DBI Exposure Over One Year and 12 Month Physical Function

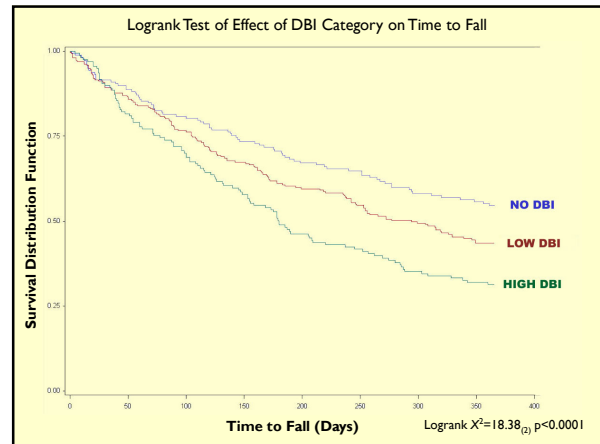
Functional outcome	DBI b	p	Anticholinergic	p	Sedative	p
Grip Strength (kg) n=493	0.14	0.54	-0.28	0.51	0.49	0.16
Reaction Time (ms) n= 269	-0.3	0.99	80	0.09	-39	0.22
Walking speed (ms ⁻¹) n= 448	-0.01	0.31	0.02	0.35	-0.001	0.53
Balance (scale 1-5) n= 454	1.39	[1.08, 1.80]	1.35	[0.87,2.10]	1.57	[1.08, 2.27]

Adjusted for age, sex, comorbidities, cognitive impairment, depression & baseline function (and aid for walking speed)

Wilson et al. Age and Ageing. 2010 39(4)

Falls in FREEDOM

- 998 falls from 330 individuals (55%)
 - 135 individuals fell once (41%)
 - 195 individuals fell more than once (59%)



Categorical DBI and Falls

Negative binomial regression model

DBI Category	Incidence Rate Ratio {95% CI}
None (0)	1.00
Low (0.05-0.99)	1.62 {1.18 – 2.21}
High (≥ 1)	1.90 {1.34 – 2.70}

Final multivariate model adjusted for sex, history of falls, cognitive impairment, incontinence & use of walking aid

Wilson et al. JAGS. 2010

Drug classes and falling

Drug Class	Multivariate IRR (95% CI)	P Value
SSRI (n=87)	1.60 (1.16, 2.21)	<0.01
Opioid (n=36)	1.16 (0.72, 1.89)	0.53
Other antidepressant (n=105)	1.32 (0.98, 1.77)	0.07
Antipsychotic (n=59)	1.22 (0.80, 1.86)	0.35

Adjusted for sex, history of falls, cognitive impairment, use of walking aid and incontinence.

Wilson et al. JAGS. 2010

Summary

- Higher DBI in this cohort of people from low-level RACFs compared to those in community dwelling settings
- No association cross-sectionally
- Only balance associated longitudinally
 - Sedative exposure
- Increasing DBI is an independent predictor of falls in this population
- SSRIs associated with 1.6 times increased rate of falling

Discussion

- Different population
 - High frailty and variability in this cohort
- Medication reviews- cessation not always feasible
 - Review for indications eg SSRIs
- Inclusion criteria limit this being a true representation of RACF population
- Limitations to DBI calculations

Associations observed were not what we expected

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