

A study of older patients who fall in hospital: Do the sedative and anticholinergic medications get reviewed after a fall?

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INTRODUCTION

This study looks at the change in the anticholinergic and sedative medication burden for patients that had a fall during their admission under Older Persons Health (OPH). This study took place at Burwood hospital, where every fall has a quality incident event review and a post fall medical review known as "the falls pathway."

The patients on the OPH wards are older, medically complex and frail. Fallers are a particularly high risk population. They are often our frailest patients and there is a high prevalence of cognitive impairment and delirium. As our inpatient fallers have had a post fall review, ie a trigger to review the medications that cause falls, we hypothesized that the medication burden will have reduced more than those who had not fallen.

HYPOTHESIS

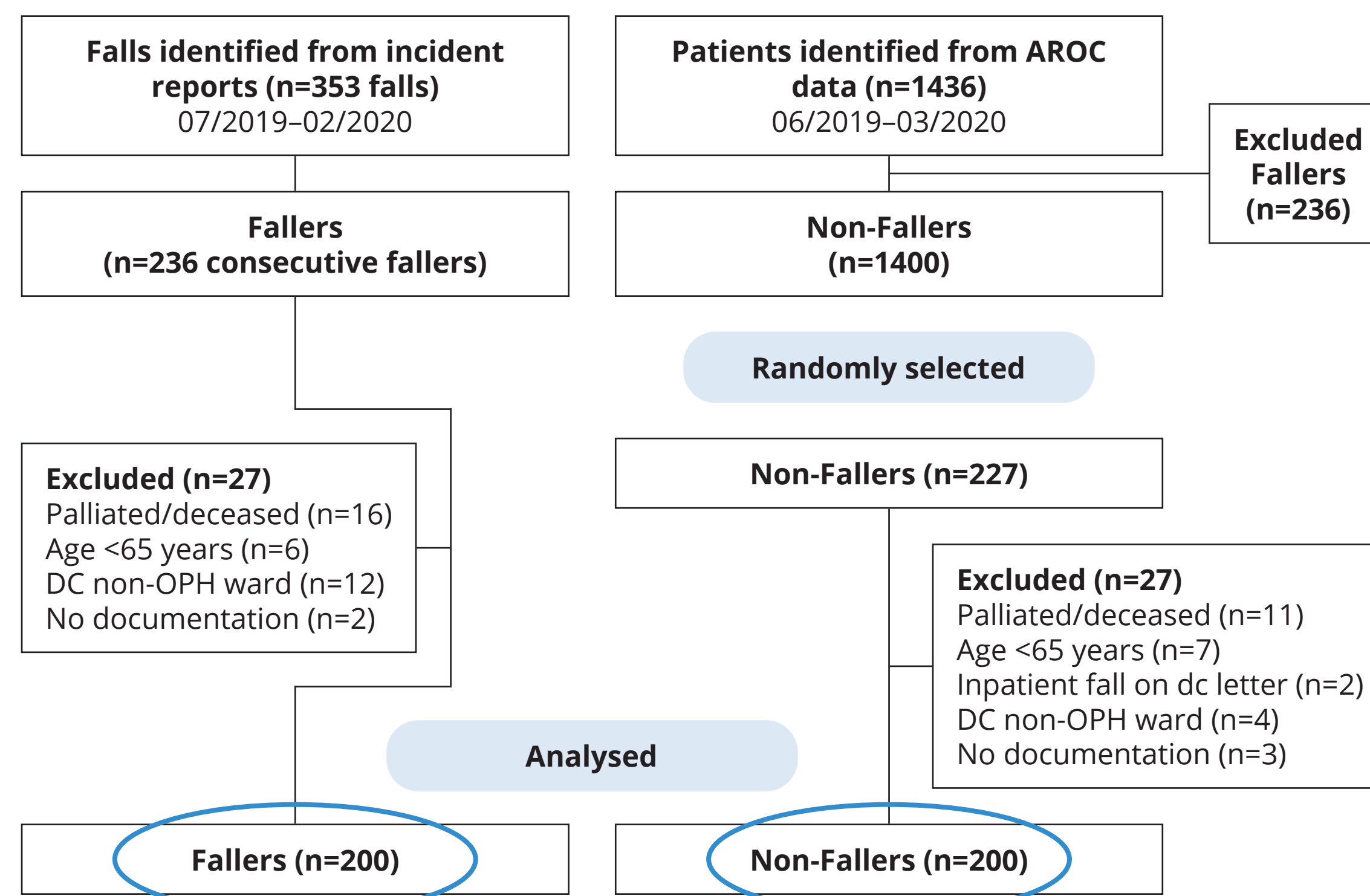
The anticholinergic and sedative medication burden will reduce more in fallers than non-fallers.

AIMS

1. Did inpatient fallers have a change in their anticholinergic and sedative medication burden during an OPH admission (and was this different to non-fallers)?
2. If faller status was not associated with the change in the anticholinergic and sedative medication burden, then what was?

STUDY DESIGN

This is a retrospective observational, controlled study. To represent the real life patient journey, patients who had been transferred out of another specialty were included provided that the final discharge into the community was from OPH.



THE DRUG BURDEN INDEX

The anticholinergic and sedative medication burden was measured using a validated tool called the Drug Burden Index.

$$DBI = \sum D / (\delta + D)^{1,2}$$

A DBI of 0.5 was chosen to be a clinically meaningful reduction as it represents stopping one medication at its minimum effective daily dose.

RESULTS

The fallers and non-fallers had similar age, sex, ethnicity and mortality.

Table: Key significant differences between fallers and non-fallers

Population Characteristic	Fallers	Non-Fallers	P-value*
Cognitive impairment, n (%)	143 (72)	116 (58)	<0.001 ¹
No cognitive impairment, n (%)	40 (20)	71 (36)	<0.001 ¹
FIM on admission, (mean)	62	73	<0.001 ²
FIM on discharge, (mean)	82	91	<0.001 ²
FIM change, (mean)	20	18	0.09 ²
Length of stay: OPH, (mean days)	28	17	<0.001 ²
Length of stay: Index, (mean days)	38	26	<0.001 ²
Readmitted in 6 months, (mean days)	11	6	0.003 ²

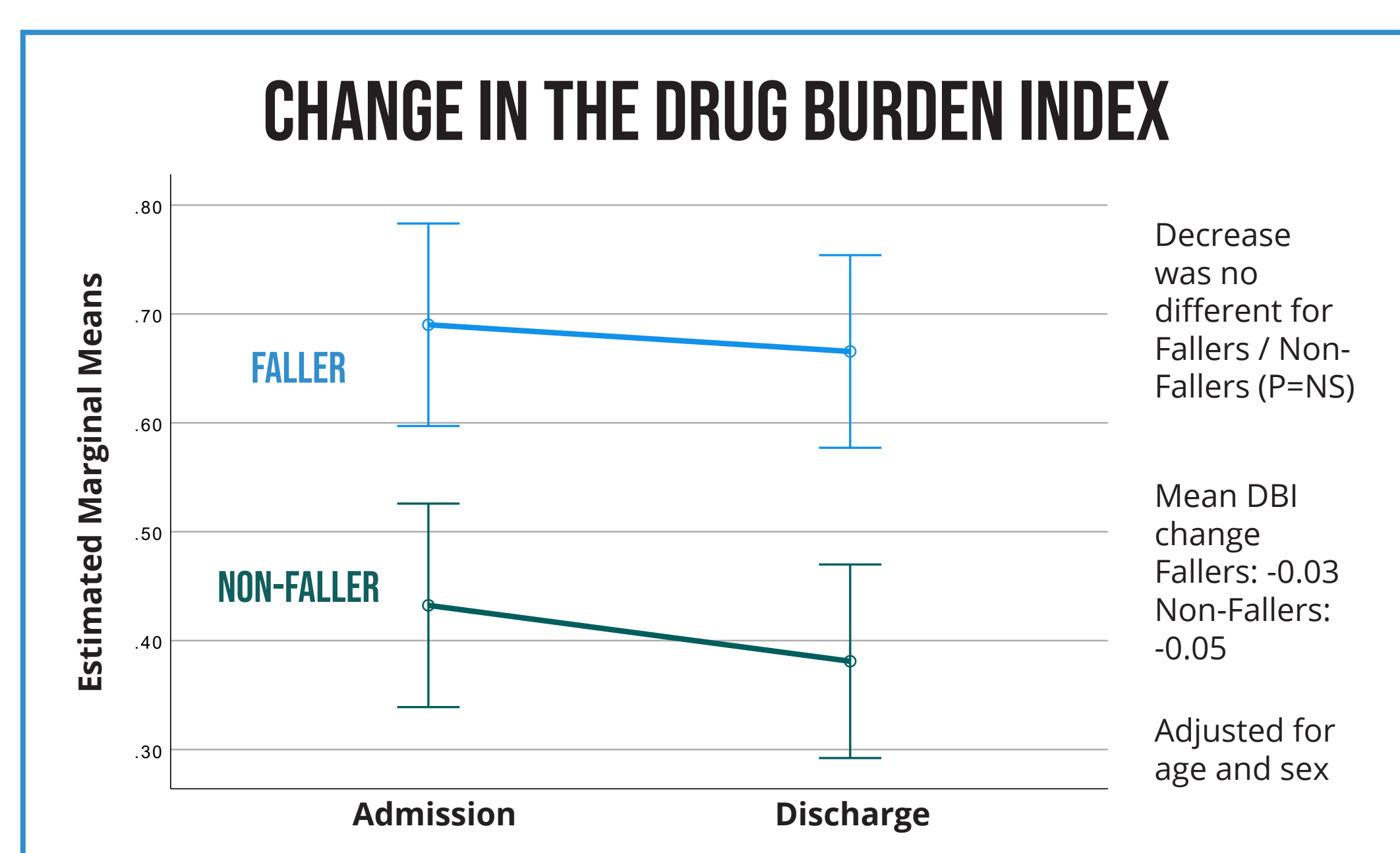
*P-value is the difference between cohorts. 1. Chi-square test and 2. T-test

Primary outcome

Fallers had a significantly higher DBI than the non-fallers (p<0.001) at both admission and discharge

- On admission to OPH: Mean DBI in Fallers 0.69 and non-fallers 0.43 (p<0.001)
- On discharge from OPH: Mean DBI in Fallers 0.66 and non-fallers 0.38 (p<0.001)

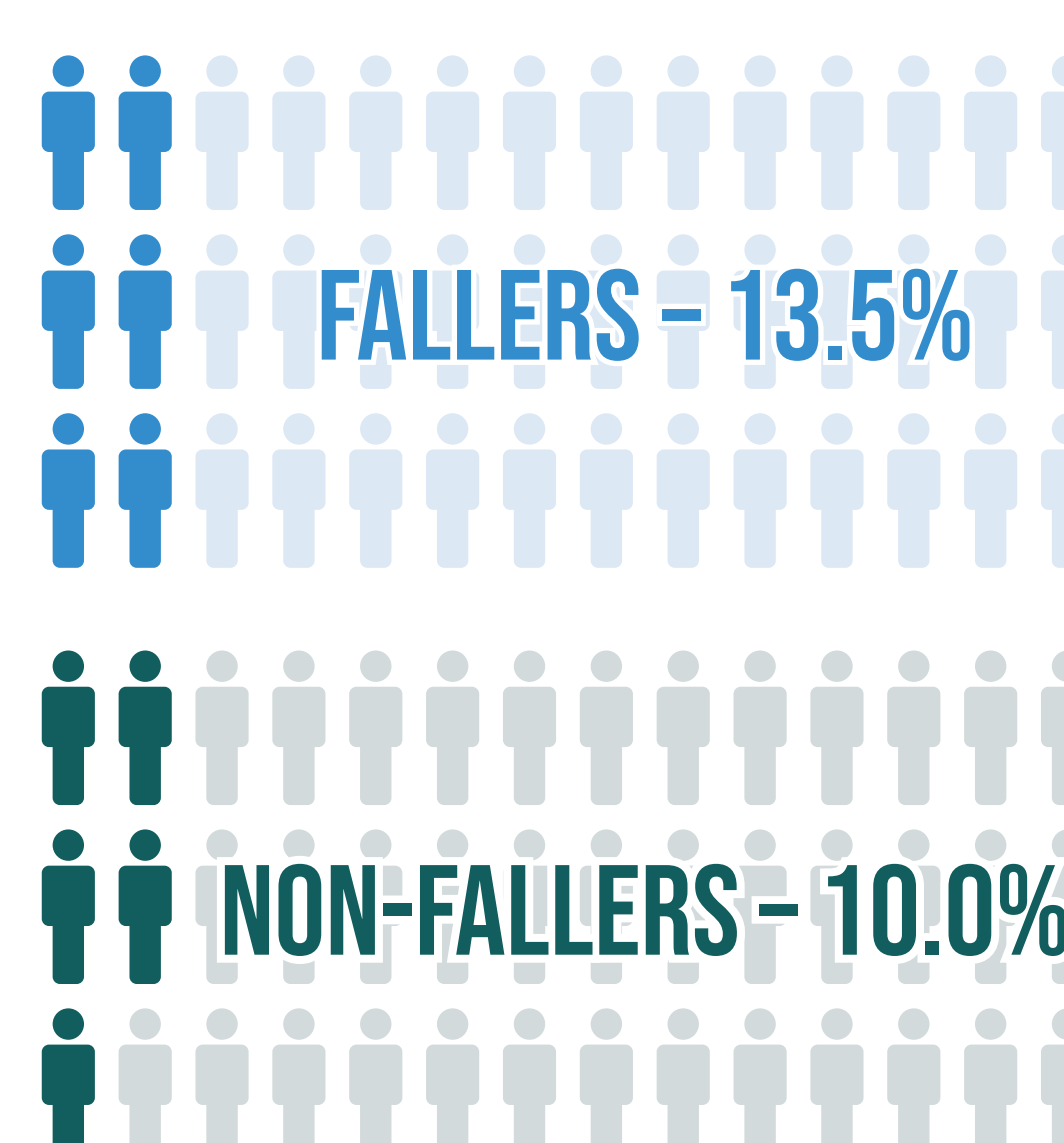
For both cohorts, the anti-cholinergic and sedative medication burden decreased significantly between admission and discharge. However, this decrease was no greater for fallers than non-fallers.



13.5% of fallers vs 10% of non-fallers had a clinically meaningful reduction of the anticholinergic and sedative medication burden (shown below):

PROPORTION WITH A REDUCTION IN DBI OF AT LEAST 0.5

No difference between fallers/non-fallers (p=NS)



DBI of 0.5 was chosen to be clinically meaningful

Secondary analysis:

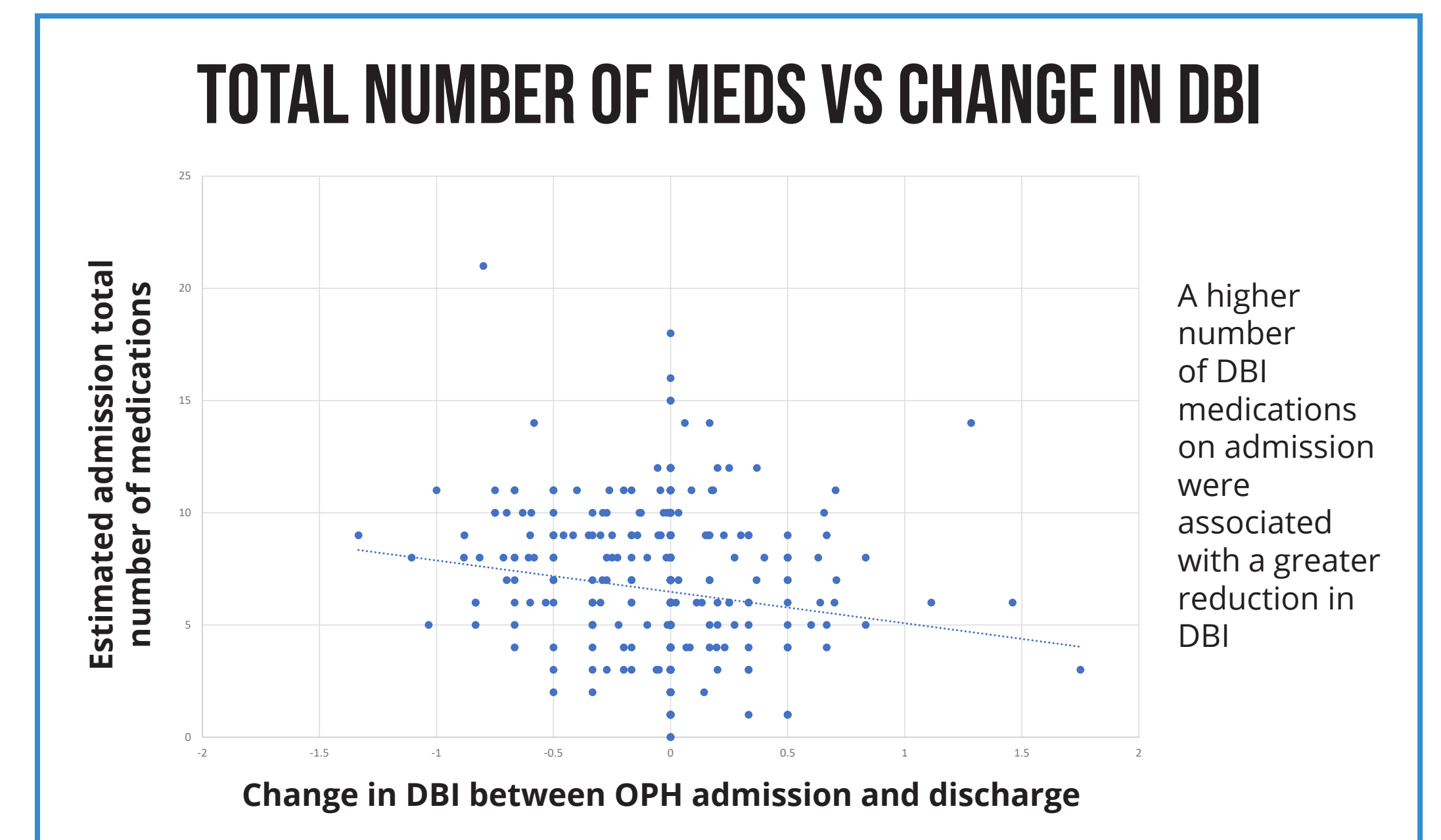
If faller status was not associated with the change in the DBI, then what was?

The total number of medications

Fallers were on more medications on admission than the non-fallers (Fallers 6.9 vs 6.2 in non-fallers) but did not have a greater decrease in the total number of medications (change of +0.3 vs +0.4 respectively), p=NS.

The total number of medications vs change in DBI

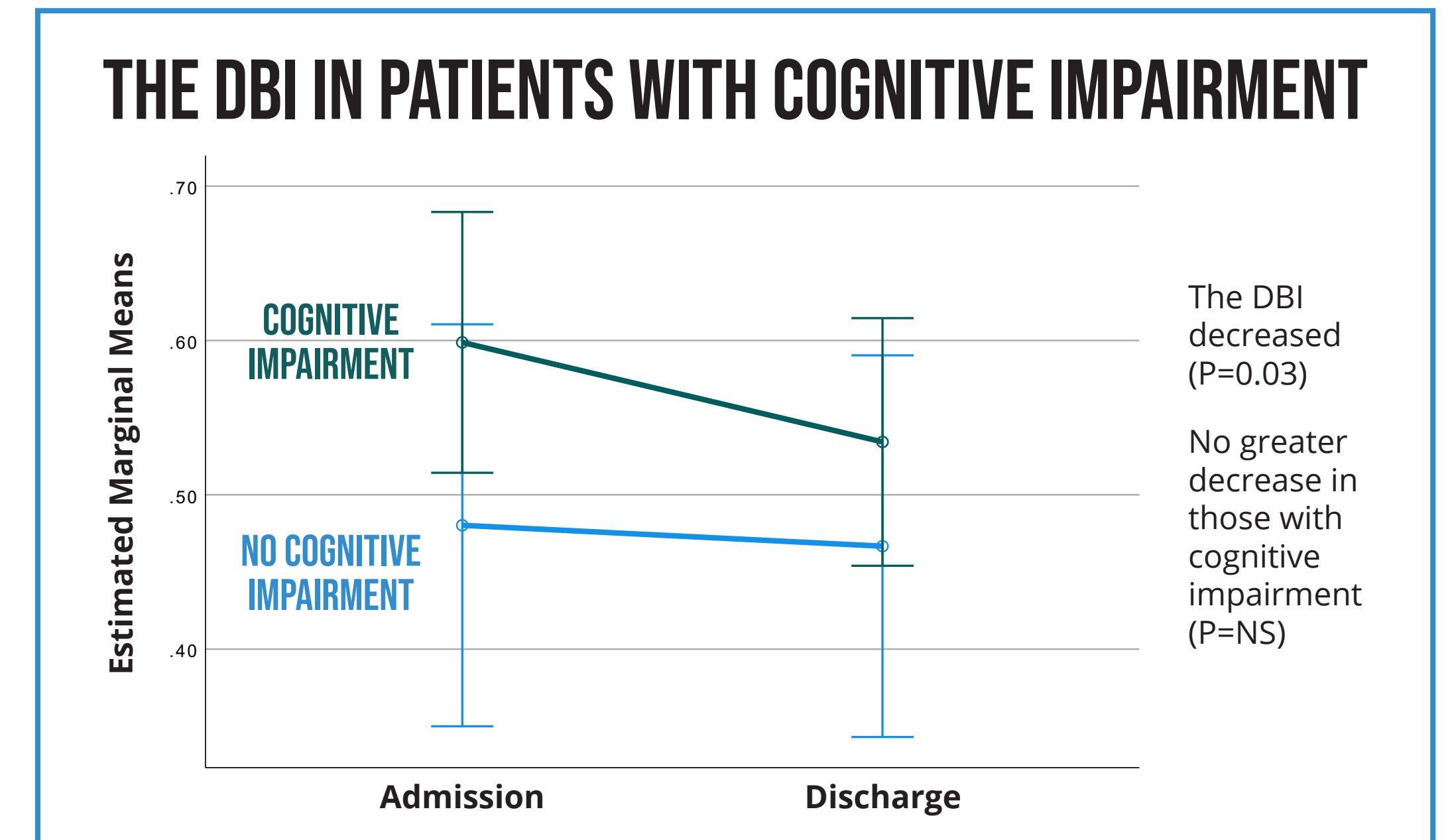
Those with more medications on admission had a greater decrease in the DBI. These patients likely had more medications that needed reducing. Additionally, it is promising that those patients with an already high drug burden did not have it added to further.



The DBI and cognitive impairment

Those with cognitive impairment are more susceptible to the effects of anticholinergic and sedative medications. The DBI on admission to OPH was 0.6 for those with cognitive impairment and 0.5 for those without.

There was no greater decrease in the anticholinergic and sedative medication burden for those with cognitive impairment. For our cognitively impaired patients we have not reduced or recognized the medications causing worsening cognitive impairment. It may also mean that this specific cohort of patients require anticholinergic and sedative medications that we are reluctant to stop.



The DBI, dependency and frailty

The clinical frailty scale was only available for 39% of patients. For those that had the data available, there was no association between the change in the anticholinergic and sedative medication burden and frailty. There was also no association between the Functional Independence Measure (FIM) and change in DBI or DBI on discharge. There was a trend for patients who identified as frail on discharge, to have a higher anticholinergic and sedative medication burden on discharge.

The DBI and single versus multiple falls

The faller cohort was further analysed by single versus multiple inpatient falls. Multiple falls provide additional opportunities for a medication review. There was no association between the number of inpatient falls and the change in the DBI. The change in DBI for single falls was -0.38 and multiple falls +0.19.

CONCLUSION

In conclusion, the anticholinergic and sedative medication burden reduced by a statistically significant amount but this reduction was not clinically meaningful. Fallers had a higher initial anticholinergic and sedative medication burden, however the change in DBI was no greater than for the non-fallers. It is discouraging that despite the faller cohort's frailer state, the medications were not pruned significantly. Since this study has been completed, the falls pathway incident report form has been revised to include prompts to review the medications that cause falls. Additionally, there has been the implementation of a weekly combined pharmacist and clinician medication review meeting on each ward.

References

1. Hilmer SN et al. A Drug Burden Index to define the functional burden of medications in older people. Archives of Internal Medicine. April 23 2007.
2. Byrne CJ et al. Anticholinergic and sedative drug burden in community-dwelling older people: A national database study. BMJ Open. 2018 Jul 1;8(7).