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Comparing medication regimen complexity & polypharmacy in people with Intellectual Disability

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An Intellectual Disability Supplement to the Irish Longitudinal Study on Ageing

Intellectual Disability Supplement -TILDA







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IDS-TILDA - Observational cohort Wave 1: 753 participants, random sample, 10% representative of ≥40yrs people with ID, Questionnaire followed up with Interview, Medicines classified -Anatomical Therapeutic Chemical system Wave 2: 95% retention rate

MRCI: Medication Regimen Complexity

- Tool to quantify the complexity of prescribed medication regimens (*Mansur et al, 2012*)
- Three aspects;

Section A	Section B	Section C			
No. of dosage forms	Dosing frequency	Additional directions			

- Weighted averages of the number of drugs, dosage forms, dosing frequencies, and additional instructions eg. Crushing/ breaking tablets – explicit guidelines with examples of regimens aid users
- Validated
- 3-10 min per regimen
- Data was collected from 276 patients in **Residential Care** settings across the country as part of the IDS TILDA **Wave 2** Study
- A total MRCI for each participant was calculated: (*George et al, 2004*) Total (A) + Total (B) + Total (C)

Research Questions



- How complex are these regimens compared top others?
- What factors appear to influence that complexity? –
 Wave 1 = Age, Level of ID, Residential setting
- Does the MRCI tell us more than counting the number of medicines?



Previous MRCI Studies

Ambulatory Care Patients at the Department of Veterans Affairs, USA '16

- <u>MRCI</u> Median = 25
- <u>Med Count</u> Median = 8

Acute Geriatric Ward (65+ years and Hospitalized), Israel '12

- <u>MRCI</u> Mean (@ discharge) = 30.3
- <u>Med Count</u> Mean = 6

Swedish National Study of Aging and Care (60+ years), Sweden '15

- <u>MRCI</u> Median = 9
- <u>Med Count</u> Median = 3

University of Colorado Study (65+ years), USA

- <u>MRCI</u> Mean= 19.36
- <u>Med Count</u> Mean= 8

University of San Diego Study (65+ years), USA

- <u>MRCI</u> Mean= 17.62
- <u>Med Count</u> Mean= 7.1

- MRCI Mean= 22.5, Median = 19
- Med Count Median= 6
- Med + Supplement Count Median = 7

*MRCI Calculation techniques and weightings may differ between studies

Type of Residence vs. MRCI



Type of Residence	Mean MRCI (±SD)	Significant Difference (p<0.05)			
Independent/Family	9.75 ± 10.8	All			
Community Group Home	21.9 ± 17.3	All			
Residential Home	27.8 ± 16.5	All			

- Participants with Intellectual Disabilities have significantly more complex medication regimens when living in Residential Care than Community Group Homes or with family, and those living in Group Homes have significantly more complex regimens than those living at home.
- Confounding factors may contribute to differences
- e.g. Residential Care tends to have residents with more severe levels of ID
 - 44.5% have severe/profound ID in Residential vs. only 8.2% of severe/profound ID participants living independently/with family

The Vertical lines mark the median MRCI for each setting

MRCI scores compared across Settings



Note: The Histogram for Residential Provides the most normally distributed MRCI frequencies





MRCI vs. Age

MRCI and Level of ID



Estimated Marginal Means of MRCI Looking at Age and Level of ID, Controlled for Morbidity





Estimated Marginal Means of MRCI

Descriptive Statistics

Dependent variable: MRCI									
Age_range_w2	ID	Mean	Std. Deviation	N					
44 - 49 years	Mild	8.1429	9.18170	21					
	Moderate	20.2143	17.02600	63					
	Severe\Profound	26.1875	17.57647	48					
	Total	20.4659	17.24168	132					
50 - 64 years	Mild	18.5071	14.91364	70					
	Moderate	22.3964	16.75575	111					
	Severe\Profound	28.4815	15.68368	81					
	Total	23.2385	16.35107	262					
65+ years	Mild	30.2778	19.47640	18					
	Moderate	27.1579	17.68301	57					
	Severe\Profound	30.4800	10.52525	25					
	Total	28.5500	16.47626	100					
Total	Mild	18.4541	16.16775	109					
	Moderate	22.9762	17.17950	231					
	Severe\Profound	28.0909	15.58987	154					
	Total	23.5729	16.81418	494					

MRCI and,



(a) Number of Medications + Supplements(b) Number of Routes of Administration



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Relationship between MRCI & Total Medications & Setting



Type_of_residence Indep/Family Community group home Residential Care

- Data controlled for morbidity
- Colour identifies the residential setting matching the MRCI-Total Med Predicted Value
- Residential Care is at the higher end of the spectrum, while Independent/Family is low



Correlations/Regressions





Strong, Positive correlation between MRCI and Total Number of Medications

- r= 0.997
- p= 0.000

Predicted Values recorded from multiple regression of each <u>dependent variable</u> (Total Meds and MRCI) with the same <u>independent values</u> (Age, Level of ID, Type of Residence, Gender, FCI Score)

Comparison



Table 1 Predictors of MRCI and Number of Medications

MRCI						Number of Medications							
			95.0% C onfidence Interval for B							95.0% C (Interva	nfidence 1 for B		
В	S.E.	Beta	Sig	Lower Bound	Upper Bound	Part	В	S.E.	Beta	Sig	Lower Bound	Upper Bound	Part
0.217	1.391	0.006	0.876	-2.517	2.951	0.006	-0.085	0.375	-0.009	0.818	-0.823	0.650	-0.009
4.369	1.030	0.186	0.000	2.346	6.393	0.170	1.094	0.277	0.170	0.000	0.549	1.639	0.155
3.107	1.013	0.126	0.002	1.116	5.098	0.123	0.843	0.273	0.125	0.002	0.307	1.380	0.121
5.625	1.069	0.230	0.000	3.525	7.726	0.210	1.625	0.288	0.243	0.000	1.059	2 191	0.222
3.177	0.474	0.280	0.000	2.246	4.108	0.268	0.994	0.128	0.320	0.000	0.743	1.245	0.306
	B 0.217 4.369 3.107 5.625 3.177	B S.E. 0.217 1.391 4.369 1.030 3.107 1.013 5.625 1.069 3.177 0.474	B S.E. Beta 0.217 1.391 0.006 4.369 1.030 0.186 3.107 1.013 0.126 5.625 1.069 0.230 3.177 0.474 0.280	B S.E. Beta Sig 0.217 1.391 0.006 0.876 4.369 1.030 0.186 0.000 3.107 1.013 0.126 0.002 5.625 1.069 0.230 0.000 3.177 0.474 0.280 0.000	B S.E. Beta Sig Lower Bound 0.217 1.391 0.006 0.876 -2.517 4.369 1.030 0.186 0.000 2.346 3.107 1.013 0.126 0.002 1.116 5.625 1.069 0.230 0.000 3.525 3.177 0.474 0.280 0.000 2.246	B S.E. Beta Sig Lower Bound Upper Bound 0.217 1.391 0.006 0.876 -2.517 2.951 4.369 1.030 0.186 0.000 2.346 6.393 3.107 1.013 0.126 0.002 1.116 5.098 5.625 1.069 0.230 0.000 3.525 7.726 3.177 0.474 0.280 0.000 2.246 4.108	B S.E. Beta Sig Lower Bound Upper Bound Part 0.217 1.391 0.006 0.876 -2.517 2.951 0.006 4.369 1.030 0.186 0.000 2.346 6.393 0.170 3.107 1.013 0.126 0.000 3.525 7.726 0.210 3.177 0.474 0.280 0.000 2.246 4.108 0.268	Nixer 95.0% Confidence Interval for B B S.E. Beta Sig Lower Bound Upper Bound Part B 0.217 1.391 0.006 0.876 -2.517 2.951 0.006 -0.086 4.369 1.030 0.186 0.000 2.346 6.393 0.170 1.094 3.107 1.013 0.126 0.002 1.116 5.098 0.123 0.843 5.625 1.069 0.230 0.000 3.525 7.726 0.210 1.625 3.177 0.474 0.280 0.000 2.246 4.108 0.268 0.994	B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. 0.217 1.391 0.006 0.876 -2.517 2.951 0.006 -0.086 0.375 4.369 1.030 0.186 0.000 2.346 6.393 0.170 1.094 0.277 3.107 1.013 0.126 0.002 1.116 5.098 0.123 0.843 0.273 5.625 1.069 0.230 0.000 3.525 7.726 0.210 1.625 0.288 3.177 0.474 0.280 0.000 2.246 4.108 0.268 0.994 0.128	B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Sig Outper Bound Part B S.E. Beta Beta 0.217 1.391 0.006 0.876 -2.517 2.951 0.006 -0.086 0.375 -0.009 4.369 1.030 0.186 0.000 2.346 6.393 0.170 1.094 0.277 0.170 3.107 1.013 0.126 0.002 1.116 5.098 0.123 0.843 0.273 0.125 5.625 1.069 0.230 0.000 3.525 7.726 0.210 1.625 0.288 0.243 3.177 0.474 0.280 0.000 2.246 4.108 0.268 0.994 0.128 0.320	B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig 0.217 1.391 0.006 0.876 -2.517 2.951 0.006 -0.086 0.375 -0.009 0.818 4.369 1.030 0.186 0.000 2.346 6.393 0.170 1.094 0.277 0.170 0.000 3.107 1.013 0.126 0.002 1.116 5.098 0.123 0.843 0.273 0.125 0.002 5.625 1.069 0.230 0.000 3.525 7.726 0.210 1.625 0.288 0.243 0.000 3.177 0.474 0.280 0.000 2.246 4.108 0.268 0.994 0.128 0.320 0.000	Number of Medications PS.0% Confidence Interval for B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Outper Bound Outper Bo	NRCI Number of Medications B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Outper Bound Part B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Upper Bound Part B S.E. Beta Sig Lower Bound Upper Bound Outper Bound <thoutper bound<="" th=""> Outper Bound</thoutper>

Significance level: p<0.05

MRCI R2 = 0.223

Number of Medications $R^2 = 0.248$

Conclusions



- MRCI is a feasible & useful tool for quantifying complexity of medicines use and administration
- Burden is related to number of medicines & routes of administration
- MRCI could be used to highlight circumstances in which additional training of carers is required
- MRCI does not tell us more than the number of medicines
- Additional measures of burden needed time taken, perceived difficulty, mistakes

The components of complexity of medicines use

- Number of medicines
- Number of High Risk medicines
- Number of doses
- Number of dose forms
- Additional administration instructions
- Clinical state-dependent variation of regimen

- Risks ADRs, DDIs, DDSIs, Administration
- Burden Patient, Carer
- System
 - Limited access to pharmacists
 - Insufficient numbers of nurses
 - Inadequate training in medicines use for carers



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thank you





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