Falls Associated with High Medication Regimen Complexity in People with HIV

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BACKGROUND

- Polypharmacy is associated with falls in older persons.
- People with HIV (PWH) have high polypharmacy prevalence due to greater comorbidity burden.
- We examined whether polypharmacy was associated with past year fall risk in PWH and non-PWH.
- We used both simple medication counts (≥5 non-ART meds) to define polypharmacy and a novel measure that includes both polypharmacy and regimen complexity, the medication regimen complexity index (MRCI).[1]

METHODS

- Data were retrospectively abstracted from randomly selected PWH from Boston Medical Center (BMC) Infectious Disease and non-PWH from Geriatrics.
- **Inclusion:** Age ≥40, ≥2 ID/geriatric visits post-3/1/22, and HIV diagnosis for ≥1 year (PWH only)
- MRCI and polypharmacy were calculated using UC Boulder's MRCI tool. Falls were manually abstracted.
- Multivariable logistic regression models predicting fall occurrence by MRCI and polypharmacy were stepwise and forward selected (entry and stay p=0.15). Chi-square (X^2) tests related MRCI and polypharmacy to fall category (0/1/>1 fall). SAS 9.4 (Cary, NC) was used, with all tests conducted at α=0.05.

RESULTS

Table 1: Baseline characteristics [cont. – mean (SD, n); cat. – freq (%)]

	PWH (N =300)	Non-PWH (N = 300)
Age	59.01 (9.52, 300)	80.46 (8.13, 300)
Male Sex assigned at birth	171 (57.00)	97 (32.33)
Race	[Missing = 15]	[Missing = 4]
American Indian/Alaskan Native	1 (0.35)	1 (0.34)
Asian	4 (1.40)	15 (5.07)
Black or African American	213 (74.74)	159 (53.72)
Black or African American/White	0 (0)	1 (0.34)
Native Hawaiian/Pacific Islander	1 (0.35)	0 (0)
Other	24 (8.42)	44 (14.86)
White	42 (14.74)	76 (25.68)
Current psychotropic prescription	93 (31.00)	122 (40.67)
Substance use in past year	[Missing = 11] 47 (16.26)	[Missing = 14] 11 (3.85)
Medication Regimen Complexity Index (MRCI) Score	32.12 (19.91, 300)	39.55 (20.37, 300)
Medication count	11.46 (6.66, 300)	14.11 (6.50, 300)
Medication count ≥5 non-ART	270 (90.00)	286 (95.33)
Fall occurred in past year	36 (12.00)	115 (38.33)
>1 Fall in past year	14 (4.67)	52 (17.33)
Fall category in past year		
0 (no fall)	264 (88.00)	185 (61.67)
1 fall	22 (7.33)	63 (21.00)
>1 falls	14 (4.67)	52 (17.33)

PWH with high medication regimen complexity (MRCI) scores have higher risk for fall occurrence and multiple falls

Table 2: Regression of MRCI with fall occurrence (PWH N = 289)

Predictor and selected covariates	Fall occurrence OR (95% CI)	p-Value
MRCI	1.026 (1.007, 1.046)	0.0086
Age	1.049 (1.005, 1.094)	0.028
Substance use in past year	2.924 (1.241, 6.885)	0.014
Current psychotropic prescription	2.342 (1.032, 5.315)	0.042

Note: Current opioid prescription covariate does not show an association (p>0.05)

Table 3: Regression of MRCI with fall occurrence (Non-PWH N = 281)

Predictor and selected covariates	Fall occurrence OR (95% CI)	p-Value
MRCI	1.005 (0.991, 1.019)	0.46
Visits (natural log)	1.815 (1.228, 2.682)	0.0028
BMI	0.948 (0.905, 0.992)	0.022
Current psychotropic prescription	1.777 (1.029, 3.068)	0.039

Note: Age, race, ethnicity, and English-speaking covariates do not show associations (p>0.05)

- MRCI associated with fall occurrence in PWH but not in non-PWH
- Polypharmacy defined by med counts (>5 non-ART meds) not associated with falls in either cohort
- Current psychotropic prescription strongly associated with falls in PWH and non-PWH

Table 4: Regression of polypharmacy (≥5 non-ART) with fall occurrence (PWH N = 192)

Predictor and selected covariates	Fall occurrence OR (95% CI)	p-Value
Medication count ≥5 non-ART	>999.999 (<0.001, >999.999)	0.96
Age	1.071 (1.015, 1.130)	0.013
Visits	1.132 (1.032, 1.242)	0.0087
Substance use in past year	3.614 (1.212, 10.778)	0.021
Alcohol use		
None (reference)	-	-
Light	1.013 (0.279, 3.677)	0.98
Moderate	20.606 (1.057, 401.882)	0.046
Heavy	5.360 (0.267, 107.795)	0.27
Have psychotropic prescription	4.020 (1.456, 11.098)	0.0072

Note: Race and current opioid prescription covariates do not show associations (p>0.05)

Table 5: Regression of polypharmacy (≥5 non-ART) with fall occurrence (Non-PWH N = 297)

Predictor and selected covariates	Fall occurrence OR (95% CI)	p-Value
Medication count ≥5 non-ART	0.300 (0.089, 1.014)	0.053
Have psychotropic prescription	2.042 (1.212, 3.440)	0.0073

Note: Age, English-speaking, ethnicity, medication count and current opioid prescription covariates do not show associations (p>0.05)

Table 6: X^2 association tests for exposures and fall category

Predictor and *population*	X^2 (df)	p-Value (Fisher's exact)
MRCI (dichotomized)[#]		
PWH (N = 300)	15.00 (2)	0.0006 (0.0004)
Non-PWH (N = 300)	5.37 (2)	0.068 (0.063)
Medication count ≥5 non-ART		
PWH (N = 300)	4.55 (2)	0.10 (0.13)*
Non-PWH (N = 300)	3.50 (2)	0.17 (0.22)*

***Less than 80% of cells have expected frequency of ≥5**
[#]At highest cutoff for high regimen complexity (25.1, Ferreira et al 2015)

- MRCI significantly associated with worse fall category in PWH

CONCLUSIONS

- PWH with high MRCI -> higher risk for fall occurrence and multiple falls
  - Necessitate monitoring for fall risk and to find intervention targets
- MRCI associated with falls while polypharmacy by med count did not
  - Possibly due to high overall polypharmacy prevalence
  - MRCI may be a more sensitive and suitable screener
- Psychotropics and recent substance use may justify more fall monitoring
- Non-PWH – more documented falls due to average older age and screening differences
- Need better and more focused geriatric care approaches to screen for and manage polypharmacy and fall risk.

ADDITIONAL KEY INFORMATION

[1]Polypharmacy by med counts is defined as ≥5 non-ART medications. MRCI factors in dosage forms, frequency and special instructions (e.g. dietary instructions) to quantify how difficult a medication regimen is to take in totality.

Additional information on the MRCI tool can be found at https://pharmacy.cuanschutz.edu/research/MRCTool.

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