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Association of polypharmacy and inappropriate medications with physical function in older patients with cancer

Secondary analysis from: URCC 13059 (PI: Mohile)

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Conflict of Interest Disclosure

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Has no real or apparent conflicts of interest to report.

Background

- Polypharmacy (means concurrent use of multiple medications) is a significant health problem in the geriatric population
- Older adults with cancer are at a higher risk of polypharmacy (PP) due to multiple comorbidities and complexity of treatment regimens
- Previous data showed a prevalence of PP as high as 92% in this population[1]

[1]Maggiore RJ, et al: *Oncologist* 2010; 15(5): 507-22.

Background

- No consensus on the optimal cut-off number of medications to define PP in older adults

  - Common definition : ≥ 5 medications

- **Potentially inappropriate medications (PIM):** drugs that have high risk to benefit ratio

Background

- Functional and physical impairments are predictive of chemotherapy toxicities and lower survival [1,2]
- Therefore, maintenance of a good physical and functional status is important for older patients with cancer
- The relationship of PP/PIM with physical function is understudied in this population

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[1]Extermann et al: *Cancer*; 118(13):3377-86, 2012; [2]Maione et al; *JCO*; 23(28):6865-72, 2012

Objectives

- To determine the optimal cut-off value of number of medications in relation to validated physical functional measures
- To examine the association of PP and PIM with physical function impairments in older adults with advanced cancer
- **Hypothesis:** PP and PIM are associated with physical function impairment in older adults with advanced cancer

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Methods: Study Design

- Cross-sectional analysis of baseline data from a national geriatric assessment study (Geriatric Assessment for Patients (GAP) study; URCC13059, University of Rochester NCI Community Oncology Research Program (NCORP), PI: Dr. Mohile)

Methods: Study Participants

- Aged ≥70 years
- Had a diagnosis of incurable stage III/IV solid tumor or lymphoma
- Had ≥1 impaired domain on geriatric assessment
- Were planning to start a new cancer treatment regimen (chemotherapy or other agents with similar prevalence of toxicity) within four weeks from the time of enrollment

Methods: Medication Screening

- Polypharmacy log including all **regular** medications (both prescription and over the counter (OTC) medications) received within two weeks of study enrollment.
- Antineoplastic and supportive care medications were excluded from the medication count

PIM were captured using the most updated version of ***2015 AGS Beers criteria***

2015 AGS Beers criteria

- A list of medications that may be potentially harmful for older adults
- Potential drug-disease interactions
- Combinations of medications known to cause harmful drug-drug interactions
- A list of potentially problematic medications to avoid or adjusted depending on an older person's kidney function

Methods: Analysis plan

Step 1

- The optimal cut-off value for number of medications was determined using the **Youden Index**

The value that is most associated with impairment among the examined physical function measures

Step 2

Separate multivariate stepwise logistic regression models to examine the associations each of the medication variables with physical function outcomes

Methods: Independent Variables

- **PP (≧ 5 medications)**

  the commonly used cut-off

- **PP- optimal**

  the cut-off value resulted from Youden Index

- **PIM**

  ≧ 1 medications according to Beers criteria

Methods: Outcome Variables (binary)

Activity of daily living (ADL)

- Six items scale assess difficulty basic daily activities as bathing, dressing, and eating
- Impairment: unable to perform one or more activities

Instrumental activity of daily living (IADL)

- Seven items scale assesses instrumental activities such as difficulty using telephone, shopping, and preparing a meal
- Impairment: unable to perform one or more activities

OARS Physical Health (PH)

- Survey assesses difficulty in10 items including physical activity, climbing stairs, and walking for long distances
- Impairment : one or more responses for “my health limits me a lot”

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Methods: Covariates

Demographics

- ❑ Age
- ❑ Gender
- ❑ Race
- ❑ Education
- ❑ Income
- ❑ Retirement

Baseline Clinical

- ❑ Cancer type
- ❑ Cancer stage
- ❑ Performance status (KPS)
- ❑ Comorbidities
- ❑ Nutritional status

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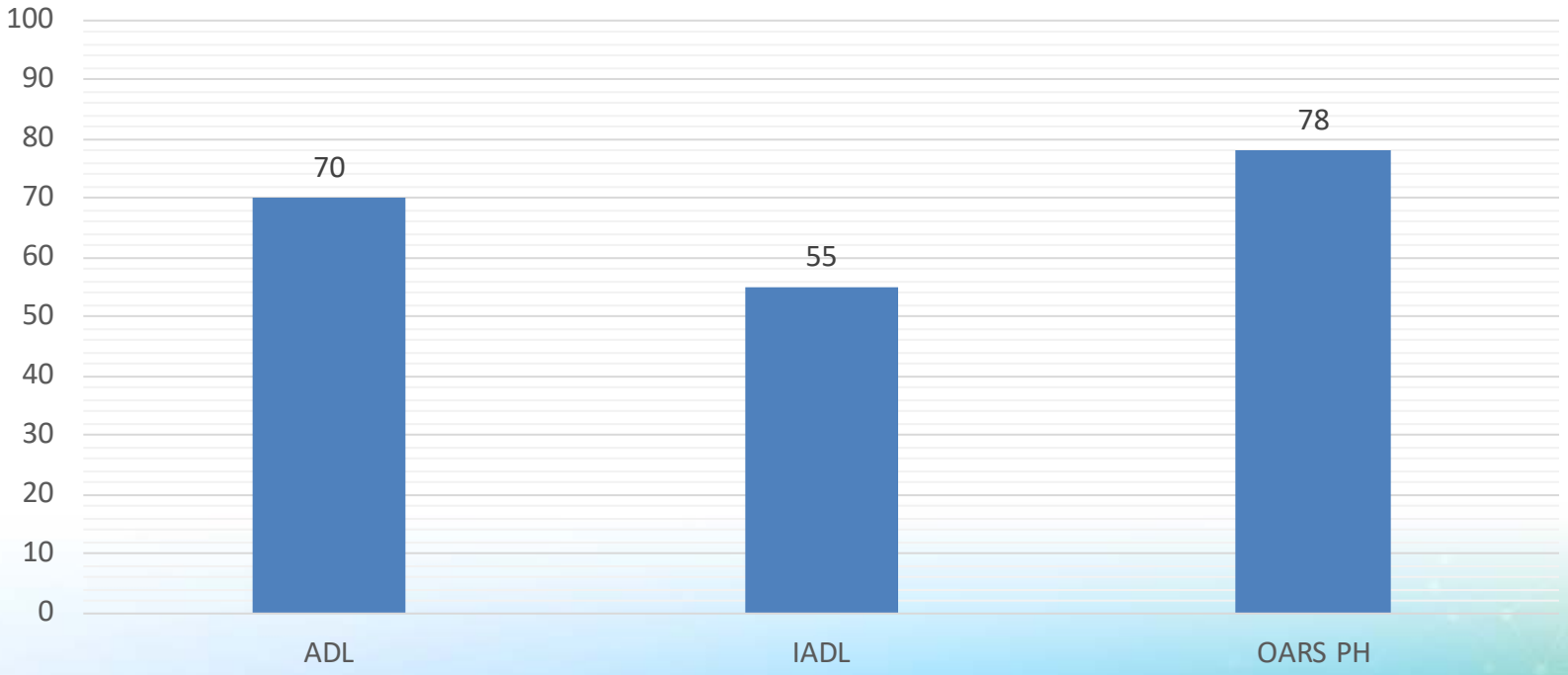
Results: Sample Characteristics (N=439)

Variables		All patients
Age, mean (SD)		76.9(5.4)
Gender	Female	195 (44.6)
Race	White	375 (86.0)
Education	Some college or above	272 (51.9)
Income	≤$50,000	257 (49.2)
Cancer type	Gastrointestinal	147 (34.4)
	Lung	125 (29.1)
	Others	157 (36.6)
Comorbidities	Impaired	295 (67.7)

Results: Physical Function Impairments



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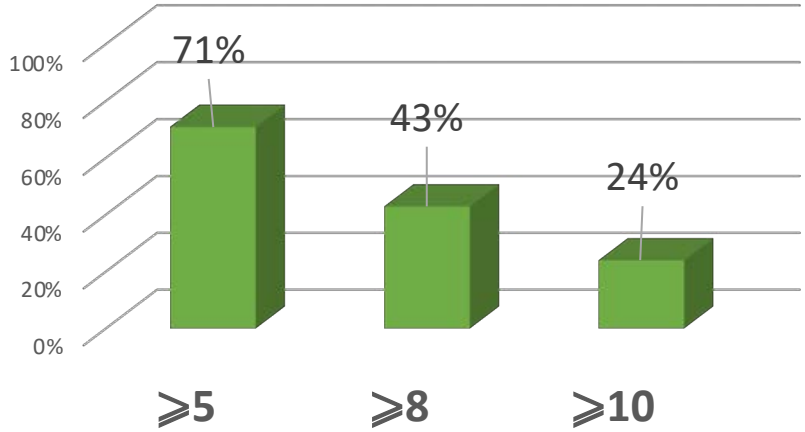
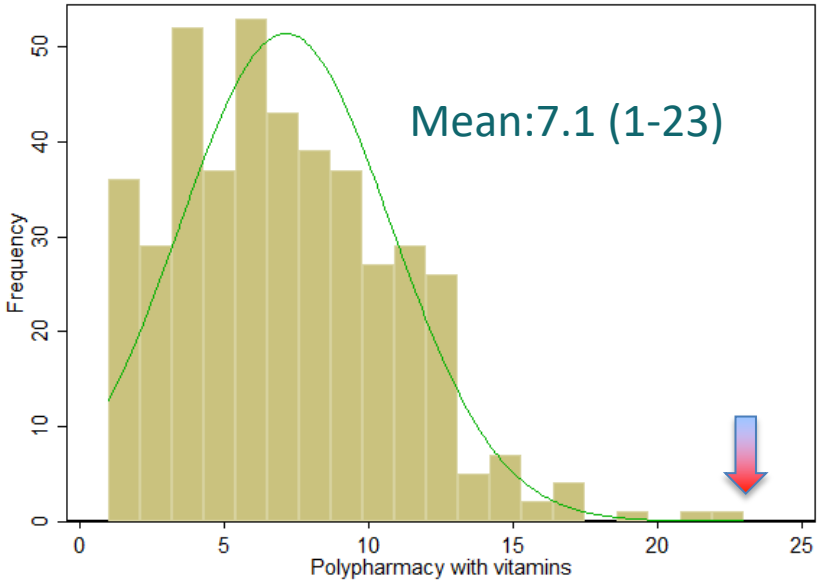
Results: Prevalence of Polypharmacy





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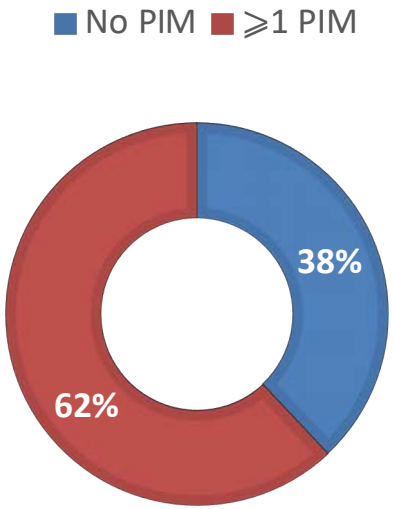
Results: Prevalence of PIM



Most commonly used Beers criteria medications (N=273)

Medication Class	Percent
Proton Pump Inhibitors	36%
Benzodiazepines	24%
NSAIDs	18%
1st generation Antihistamines	15%

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Results: Optimal cut-off value for PP

Outcome	Cut-off for PP	AUC	Sensitivity	Specificity
ADL	8	0.590	0.523	0.626
IADL	8	0.582	0.479	0.654
PH	8	0.591	0.459	0.723

Results: Multivariate Analysis

Variable	ADL AOR (95% CI)	IADL AOR (95% CI)	OARS PH AOR (95% CI)
PP- 5 (ref. <5 meds)	1.05 (0.99-1.12)	1.15 (0.68- 1.77)	1.23 (0.71-2.12)
PP- optimal (ref. <8 meds)	1.61 (1.01-2.58)*	1.26 (0.81- 1.97)	1.73 (1.01-2.98)*
PIM (ref. No)	1.42 (0.87-2.32)	1.72 (1.09-2.73)*	1.97 (1.15-3.37)*

*All models included age, gender, race, and cancer type as covariates. In addition, we implemented stepwise procedure to select additional covariates with P < 0.157

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Strengths

- A large sample of older adults with cancer receiving cancer treatment in the community oncology practices
- To our knowledge, this is the first study demonstrating that PIM is associated with physical functional impairment in older adults with cancer

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Limitations

- Medications were only captured at one time point
- We were unable to demonstrate causality
- Medications were captured from the medication logs which do not take account into medication adherence

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Conclusion

- Receiving ≥ 8 medications was a better cut-off than ≥ 5 medications to identify physical functional impairments
- PP (≥ 8) and PIM were independently associated with physical function impairment among older adults with advanced cancer
- Optimizing medication use may reduce the risk of functional decline, thereby improving quality of life and survival
- Future studies should evaluate the effect of PP and PIM on the risk of physical and functional decline in older adults with cancer in a longitudinal fashion

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-NCI

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Questions?

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