



EFFECTS OF POLYPHARMACY AND PIMS (POTENTIALLY INAPPROPRIATE MEDICATIONS) ON CHARLSON COMORBIDITY INDEX AND KATZ INDEX IN ELDERLY PATIENTS: A PROSPECTIVE STUDY

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INTRODUCTION



By 2050, the world's aging population is projected to increase from 900 million to 2 billion people (1).



As individuals age, they become increasingly vulnerable to polypharmacy compared to younger people. In the US, with over 2 billion patient visits during 2009-2016, overall polypharmacy was common (2)



PIM often leads to sub-optimal or poor health outcomes in older adult and has been linked to a number of factors include advancing age, female gender, polypharmacy, reliance on instrumental activities of daily living, frailty, and cognitive impairments (3).



High prevalence of PIM prescription has been shown in several countries like Sweden, Ireland, and the United States (4).

OBJECTIVE

This study investigated the effects of polypharmacy and PIMS on the Charlson Comorbidity Index and Katz Activity of Daily Living in elderly patients during January and February 2023.

METHODOLOGY

This was a prospective study that included 100 geriatric inpatients who were ≥ 60 years old. Comorbidity was determined using the Charlson Comorbidity Index, and dependency on daily living was assessed with Katz Activity of Daily Living in elderly patients.

We conducted Student's t-test to compare the Katz ADL, CCI, and the number of drugs taken by participants, with or without PIM. A correlation analysis has been done between PIM, Katz ADL, and the number of drugs in patients with and without PIM, using the Spearman Rank method.

RESULTS/FINDINGS

1. Prevalence of Polypharmacy among Elderly Hospitalized Patients from January to February 2023.

Polypharmacy Prescription		
Number of Drugs	N	%
<5	20	20
≥ 5	80	80
Total	100	100

2. Respondents Demographics

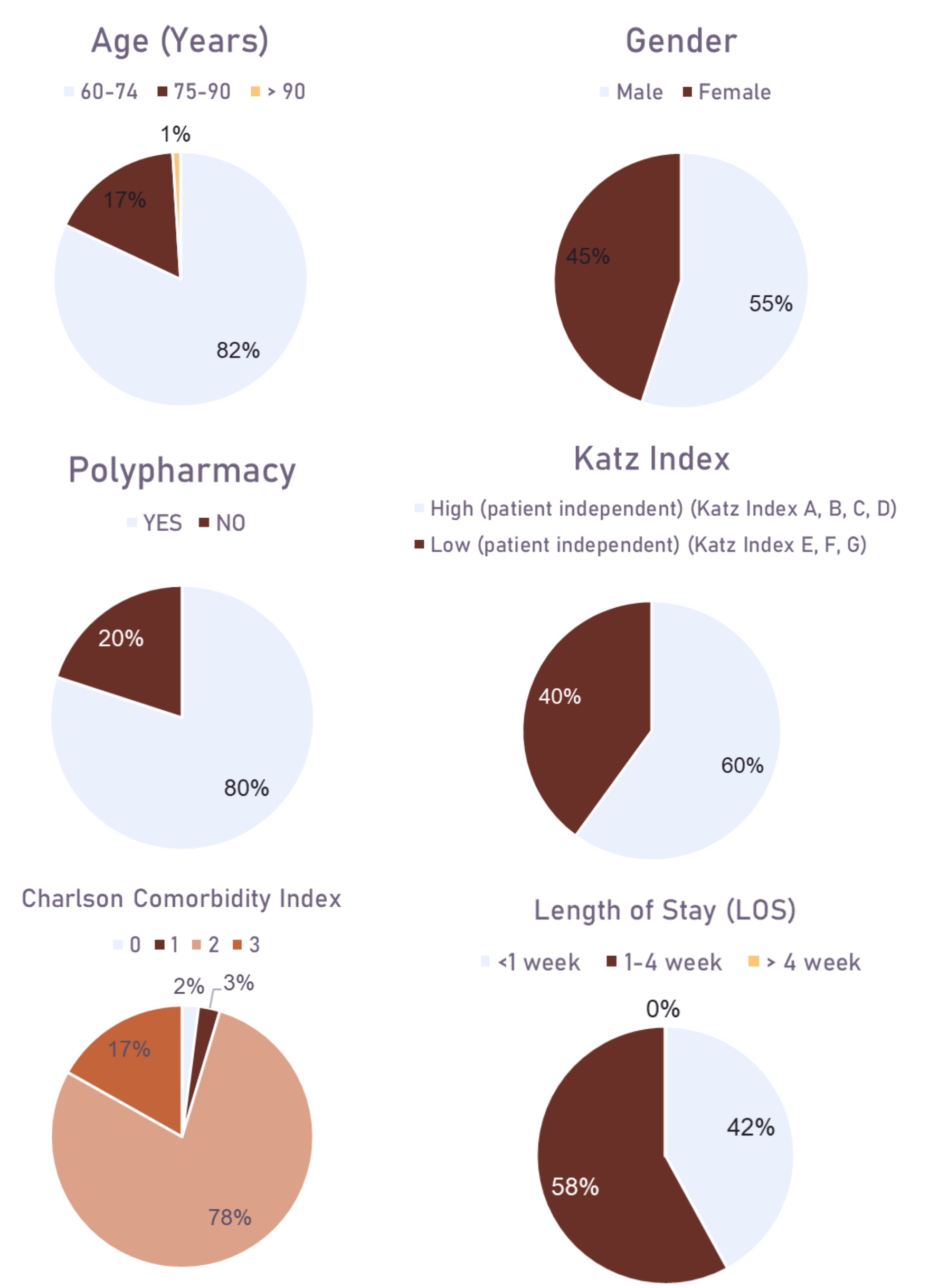
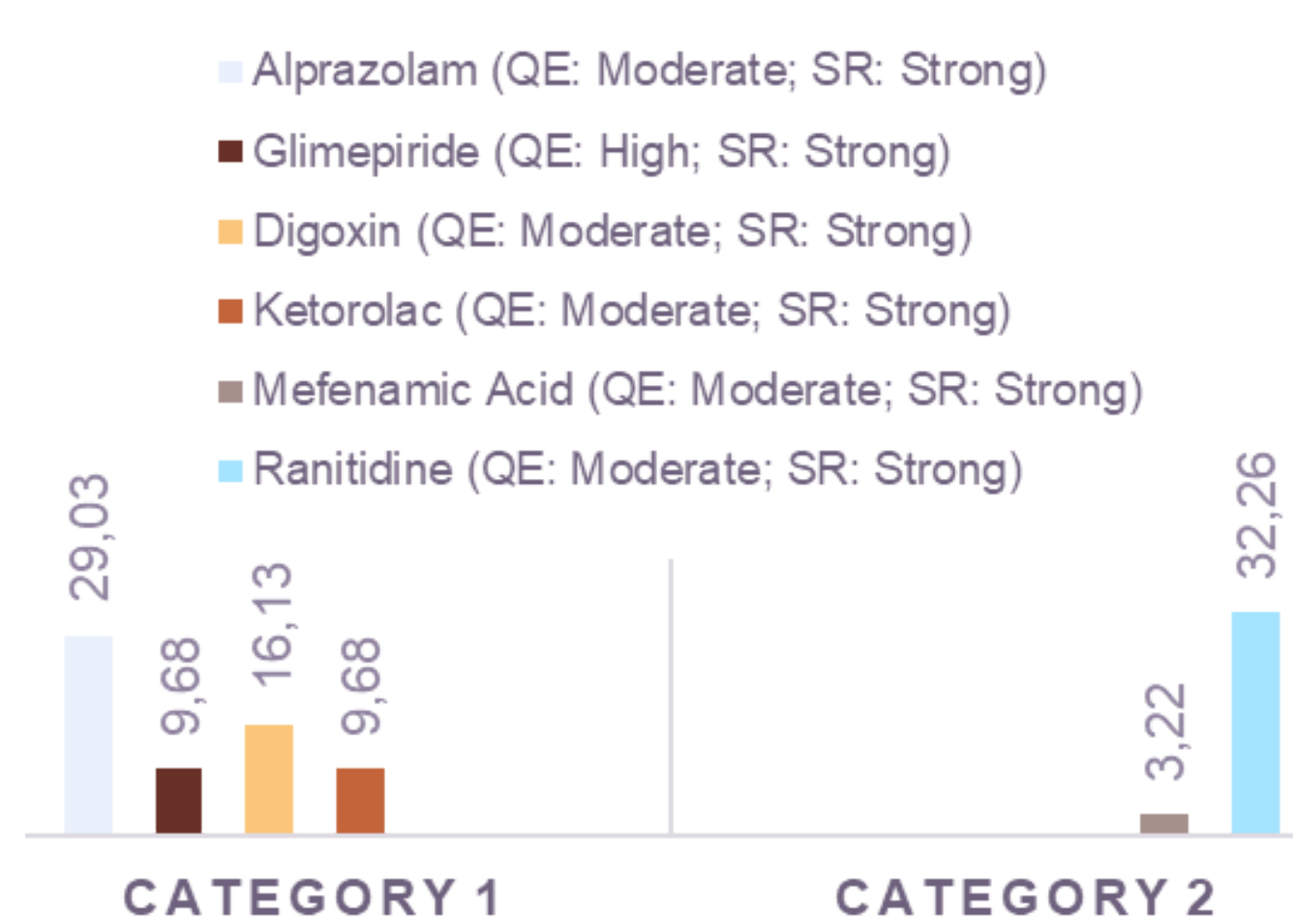


Figure 1. shows the interview process regarding the Katz Activity of Daily Living Questionnaire between researcher and elderly patient in Hospital

3. Distribution of PIM classes by 2019 Beers criteria among 100 elderly hospitalized patients



Studies have found that benzodiazepines increase the risk of cognitive impairment, delirium, falls, and bone fractures in older people, and Ranitidine may cause or exacerbate delirium in older people.

ANALYSIS

- Comparing the PIMs group with non-PIMs subjects regarding the Katz ADL, CCI, and the number of drugs that the participants took showed that Katz Activity of Daily Living was significantly higher in the non-PIMs group, and the number of drugs was significantly higher in the PIMs group ($P = 0.01$ for both).
- CCI did not differ between the groups ($P = .349$). A strong positive correlation between Polypharmacy and PIMs ($n = 100, r = 1.00, P = .020$).
- Katz ADL negatively correlated with PIMs and the number of medications used ($n = 100, r = -0.252, P = .011; n = 100, r = -0.010, P = .923$).

4. Comparison of Katz ADL, CCI, and Number of Medications Taken by The Elderly Between Group

n = 100	PIMs		Without PIMs		P-value
	Mean \pm SD	Med. (Min-Max)	Mean \pm SD	Med. (Min-Max)	
Katz ADL	3,35 \pm 1,936	5 (1-6)	4,36 \pm 2,013	4 (1-6)	0,012
CCI	1,76 \pm 0,769	2 (0-3)	1,91 \pm 0,793	2 (0-3)	0,349
Number of Medications	5,36 \pm 3,027	5 (3-13)	4,00 \pm 2,365	4 (3-11)	0,015

5. Correlation Analysis Between Katz ADL, CCI, and Number of Medications Taken by Elderly Patients in All Groups

		Katz ADL			PIMs			Number of Medications		
		R	P		R	P		R	P	
Katz ADL	R	1	-0,252*	-0,010						
	P	-	0,011	0,923						
PIMs	R	-0,252*	1	0,232*						
	P	0,011	-	0,020						
Number of Medications	R	-0,010	0,232*	1						
	P	0,923	0,020	-						

CONCLUSION

The number of medications consumed by elderly patients with PIMs has been observed to have a significant impact on the Katz Index score. The Katz Index is widely considered an appropriate tool for assessing functional status, which in turn measures the ability of the elderly to perform activities of daily living independently. Polypharmacy can potentially serve as a rapid prognostic factor in this patient population. However, additional comprehensive studies are necessary to validate this observation.

References

- Erdal, G. S., Kocoglu, H., Karandere, F., Kasapoglu, P., Isiksacan, N., & Hursitoglu, M. (2021). The effect of polypharmacy on the charlson comorbidity index and katz index in aging people with and without diabetes mellitus. *Eurasian Journal of Medicine*, 53(2), 85-89. <https://doi.org/10.5152/eurasianjmed.2021.20070>
- Ahmed, B., Nanji, K., Mujeeb, R., & Patel, M. J. (2014). Effects of polypharmacy on adverse drug reactions among geriatric outpatients at a tertiary care hospital in Karachi: a prospective cohort study. *PLoS One*, 9(11), e112133. <https://doi.org/10.1371/journal.pone.0112133>
- Muhlack, D. C., Hoppe, L. K., Stock, C., Haefeli, W. E., Brenner, H., & Schöttker, B. (2018). The associations of geriatric syndromes and other patient characteristics with the current and future use of potentially inappropriate medications in a large cohort study. *European Journal of Clinical Pharmacology*, 74(12), 1633-1644. <https://doi.org/10.1007/s00228-018-2534-1>
- Sönnerstam, E., Sjölander, M., & Gustafsson, M. (2017). An evaluation of the prevalence of potentially inappropriate medications in older people with cognitive impairment living in Northern Sweden using the EU(7)-PIM list. *European Journal of Clinical Pharmacology*, 73(6), 735-742. <https://doi.org/10.1007/s00228-017-2218-2>