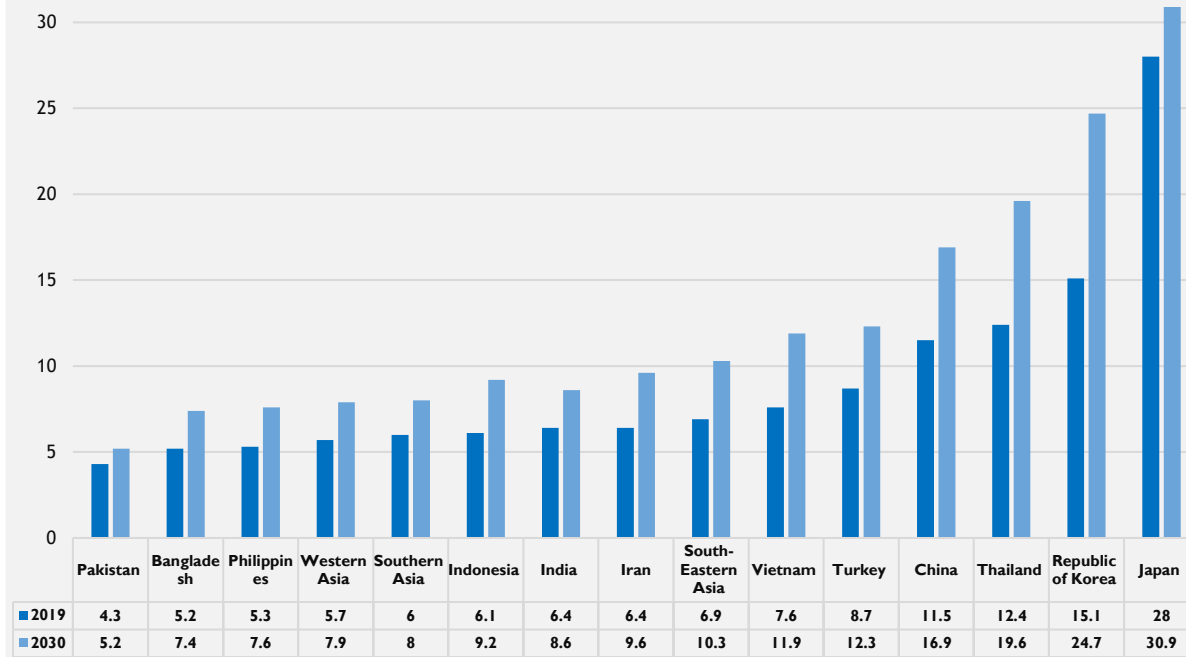


AGEING IN DEVELOPING COUNTRIES AND APPROPRIATENESS OF GERIATRIC PRESCRIBING: PHYSICIANS' KNOWLEDGE OF THE EXPLICIT CRITERIA OF POTENTIALLY INAPPROPRIATE MEDICATIONS

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Ageing in developing countries is at a **faster growth**, about **three times more rapid** than in developed countries. Currently, **1 in 10** people is **>60 years** in a developing world but estimated to be **1 in 5 by 2050**. Current older population in India is **60 million** that is projected to exceed **227 million by 2050**, with an increase of **280%** from today. This **demographic change** in the proportion of older adults in developing world is already at great interest of the World Health Organization (WHO), United Nations (UN) and other international and national health and social organizations. **Figure 1**. Distribution (%) of population over 5 million aged ≥ 65 years on different countries in **2019 and 2030**.



PIM prescribing leads to worsening of self-performance, Adverse Drug Events, Mortality, Morbidity and increased risk of drug-drug interactions, drug-disease interactions and other drug-therapy problems. **Polypharmacy (≥ 5 drugs) – 13.5%** and **excessive polypharmacy (≥ 10 drugs) – 23.3%** in India. Range of PIM prescribing in India - **12% to 94%**. Prescribing patterns are strongly influenced by physicians' knowledge and expertise in geriatric prescribing. We aimed to assess the knowledge and use of different geriatric explicit criteria of PIMs by prescribing physicians, use of information sources on appropriateness of drug prescribing, and to determine the factors contributing to better scoring in appropriate selection of drug treatment for geriatric patients.

METHODOLOGY

Study Design: Cross-sectional descriptive Study

Questionnaire: 20-item questionnaire consisting of **Section 1**- Physician's characteristics (9 questions). **Section 2**- Usage of additional sources to obtain more relevant information when prescribing to older patients. **Section 3**- Usage of clinical guidelines for prescribing in older patients. **Section 4** - Knowledge about medications to be avoided in older patients, assessed via six clinical vignettes. **Section 5** - Potential barriers to appropriate prescribing in elderly, assessed using a 5-point Likert scale. **Statistical analysis:** Descriptive statistics were used to summarize the results of individual sections. Chi-square tests were performed to compare categorical variables, and t-tests to compare continuous variables. p-value <0.05 was considered statistically significant. All analyses were performed using statistical software package IBM SPSS version 24.0.

RESULTS

Of 256 invited participants, 201 (78.5%) full responses were received. Majority of respondents were males (63.2 %) with mean age of 34.2 ± 7.3 years. Mean age of females was lower (31.6 ± 3.4 years). Around **three-fourths (74.1%)** of the respondents **received training in geriatric medicine**, 39.8 % were also currently providing **more than once a week care** for older adults in long-term care facilities and almost **one third (32.3 %)** were providing **acute care** to geriatric patients at clinics of internal medicine. However, **only 31.8% of physicians felt confident** in appropriate prescribing in older patients (Table 1).

Table 1: Physician's characteristics and their usage of different explicit criteria

Characteristics	Total (n=201)	Stratified by knowledge		P-value
		0-3 (n=96)	4-5 (n=105)	
Gender: Female	74 (36.8%)	25 (26.0%)	49 (46.7%)	0.002
Age: 20-29	63 (31.3%)	47 (49.0%)	16 (15.2%)	
Age: 30-39	117 (58.2%)	30 (31.3%)	87 (82.9%)	<0.001
Age: 40-65	21 (10.4%)	19 (19.8%)	2 (1.9%)	
Received a training: Yes	149 (74.1%)	60 (62.5%)	89 (84.8%)	<0.001
Frequency of geriatric care: No longer do	36 (17.9%)	26 (27.1%)	10 (9.5%)	
Frequency of geriatric care: Less than once weekly	85 (42.3%)	19 (19.8%)	66 (62.9%)	<0.001
Frequency of geriatric care: Once weekly or more	80 (39.8%)	51 (53.1%)	29 (27.6%)	
Years of practice: < 10 years	133 (66.2%)	67 (69.8%)	66 (62.9%)	
Years of practice: 10-20 years	53 (26.4%)	15 (15.6%)	38 (36.2%)	<0.001
Years of practice: > 20 years	15 (7.5%)	14 (14.6%)	1 (1.0%)	
Confidence: Yes	64 (31.8%)	36 (37.5%)	28 (26.7%)	0.100

Clinical vignettes - Assessment of geriatric knowledge

6 simple cases/vignettes on Hypertension, Diabetes Mellitus, Fall risks, Depression, Osteoarthritis, and Stable angina, were used. Mean score for clinical vignettes was 3.5 ± 0.9 . (Median = 4). No physician reached maximum number of points (min: 0, max: 5). Majority of main characteristics were significantly different between physicians reaching clinical vignette scores of 0-3 points and those having 4-5 points. Besides this, physicians **who scored 4-5 points used geriatric explicit criteria of PIMs significantly more often** than those who scored 0-3 points ($p < 0.001$). Multiple Logistic Regression results are discussed below:

Characteristics	n	Odds ratio	95% CI	p-value
Gender: Male	127	1.000		
Gender: Female	74	2.250	1.007 5.209	0.052
Age in Years 22-29	63	1.000		
Age in Years 30-39	117	4.587	2.038 10.752	<0.001
Age in Years 40-65	21	0.342	0.044 1.719	0.232
Frequency of long-term care: No longer do	85	1.000		
Frequency of long-term care: < once weekly	36	4.758	1.610 14.917	0.006
Frequency of long-term care: once or more weekly	80	0.979	0.342 2.862	0.968
Speciality: Internal Medicine	65	1.000		
Speciality: Others	136	2.716	1.199 6.332	0.018

Figure 2: Use of general information sources and specific explicit criteria of potentially inappropriate prescribing in older patients

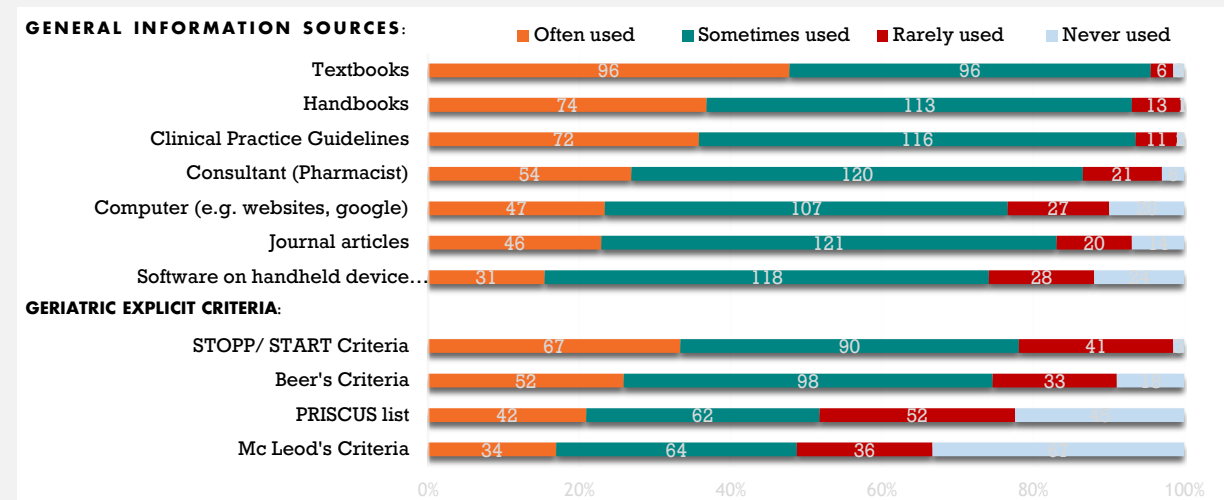
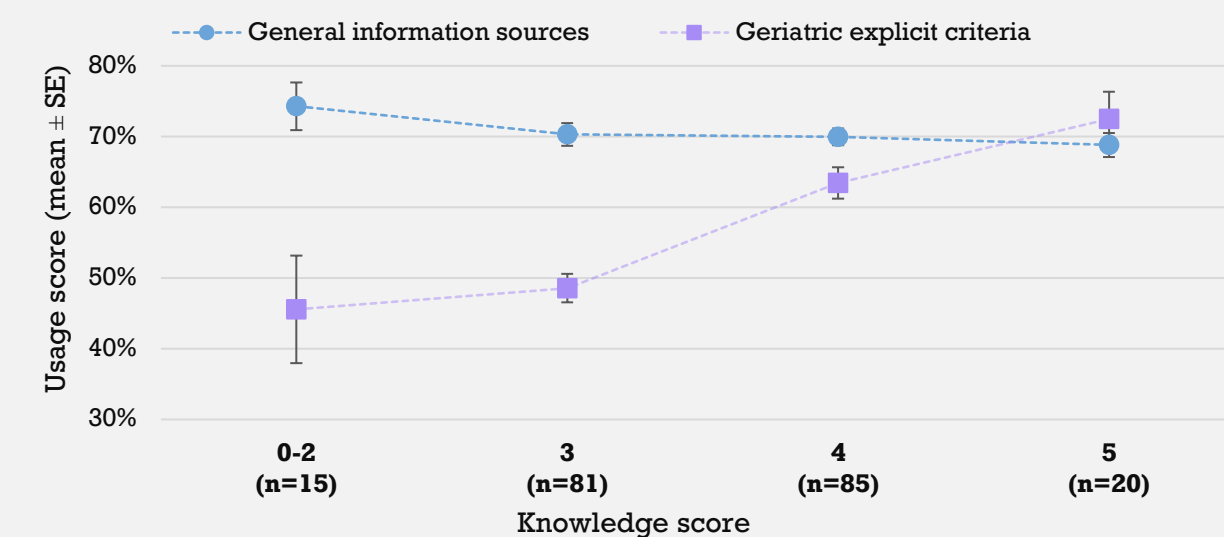


Figure 3: Usage score of general information sources and specific explicit criteria in older patients related to knowledge of appropriate geriatric prescribing



CONCLUSION

Our study showed **inadequate knowledge** of basic principles of geriatric prescribing and **low confidence of physicians'** towards appropriate prescribing in complex older patients. **Limited options in current drug formularies, inadequate use of modern computerized support systems and insufficient knowledge of specific geriatric tools** to identify and reduce inappropriate prescribing of PIMs in complex older adults were frequently reported problems. **Educational interventions** focusing on integrative training of physicians of different specialties and specialist helping to individualized drug schemes (clinical pharmacists) is necessary to better individualize drug prescribing.

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