

## Current issues in geriatric pharmacotherapy: Clinical implications and the Indian perspective

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### Abstract

The present review explores the recent advances and challenges surrounding geriatric pharmacotherapy in the Indian context which especially assumes greater significance during the time of the raging global SARS-Cov2 (n-Cov19) viral pandemic outbreak that has impacted or killed millions of persons worldwide. In the backdrop, this systematic review aims to underscore the factors and challenges encountered in routine geriatric care in India and its widespread clinical implications for the society at large. For the purpose of collating this review, a comprehensive compendial search of abstracting and indexed databases was performed in the month of August, 2020 using the keywords such as: “Geriatric care”, “Acute Care for Elders”, “Ageing care” and “Geriatric Pharmacology”. The electronic database searched included PubMed and Cochrane and the period was delineated from 2000-2019 to arrive initially at 30 research and review articles. Subsequently, post-screening 25 articles were brought forward for the review. The review findings are unanimous and self-explanatory and reiterate the well-known fact that geriatric care should be among our top national health priority at this moment as it has a tremendous cascading impact considering the family structure and socio-demographic dynamics and is indeed crucial for maintaining standards of the population health in an enormously populated nation like ours.

**Keywords:** Geriatric care, acute care for elders, ageing, geriatric pharmacology.

### Introduction

In the current scenario, India is in demographic transition phase. The increasing aging population is a source of joys and worries. Joy because people are living longer lives and worries about how to respond with older population in near future with their rightful needs and demands [1]. There has been an enormous increase in the count of elderly persons in between 1991 and 2001. It has been projected that the count of elderly people would increase to about 324 million by the year 2050. Thus, India has obtained the label of “an ageing nation” [2]. With a view to focus on the needs of older people, the year 1999 was declared national year of older persons [3]. Since the older people carry a greater burden of disability and disease, they account for great proportion of health care spending.

Various researches have shown that the groups of older people are at risk of several diseases and that diseases among older people are a global problem [4]. Aged people are a growing group in the world [5]. Recent studies have brought out some of health problems of the aged people in India. This present study explored the health problems of the elderly people [6]. In older people, chronic disease adds another dimension. It affects the lives of older people over all domains of health. This study attempted to examine the co-morbidities that had been documented as being of concern to older Indians to learn

whether the types of chronic disease widespread in this population and modifiable lifestyle factors [7].

### Normal changes in ageing

Although changes can be explained in every organ system, this review will address the changes with public health as well as clinical decision-making implications [8].

### Sensory changes in the elderly

**Hearing loss** - Loss of hearing (presbycusis) and increased production of cerumen with ageing contribute to difficulty hearing [9]. In older people the use of hearing aids could reverse adverse effects on their quality of life [10].

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**Table 1:** Physiologic changes in the immune system that occurs with age [23].

Immune system	Age related changes
Innate immune system	Anatomical and biochemical barriers: Sweat production, barrier function of skin and mucus.
	Hematopoietic tissue: Total number of hematopoietic stem cells in the bone marrow.
	Macrophages: Bone marrow precursors, phagocytic capacity and oxidative killing activity of macrophages.
	Neutrophils: Chemotactic responses, migration capacity, phagocytic capacity and superoxide generation.
Adaptive immune system	Involution of the thymus gland, number of thymic precursors, number of native T cells, functional activity of regulatory T cells.
B cells	B cells precursors in the bone marrow, number of B cells, Plasma cell differentiation, Specific antibody production.

**Visual acuity**-Visual acuity normally decreases with age (presbyopia). Older people will often have problems with glare and making night driving riskier.

**Vestibular function** - Vestibular function declines with age. There can be an effective treatment for this which is vestibular rehabilitation.

**Somatic disease and various chronic diseases**

**Cardiovascular disease** -The principal cause of death of older people is cardiovascular disease. This category includes congestive heart failure, ischemic heart disease, arrhythmia and angina pectoris.

**Hypertension** -It is the typical chronic disease of older people and is a major contributor to atherosclerosis [11]. Aggressive treatment should be done and continued as much as it is consistent with patient’s goal and well-tolerated [12].

**Diabetes Mellitus** -The rates of diabetes have been increasing day by day. Diabetes mellitus remains a dangerous risk factor for cardiovascular disease at geriatric age [13]. Diabetes is associated with peripheral neuropathy and peripheral arterial disease which is forwarding to amputations and diabetic foot ulcers.

**Osteoarthritis** -The second most common chronic disease is osteoarthritis. The manifestation of osteoarthritis seems to be

**Table 2:** Characteristics of major infections in geriatric patients [23].

Type of infection	Predisposing factors for specific infections in elder people	Preventive and therapeutic measures in elder people
Respiratory infections	Decreased Lung elasticity Mucociliary clearance Cough and other protective reflexes	Annual influenza vaccination Pneumococcal vaccination Drug-dosage adjustments according to accompanying co-morbidities
Urinary tract infections	Reduced bladder capacity Decreased urine flow Involuntary contractions	Avoid unnecessary urinary catheterization Avoid treatment of asymptomatic bacteriuria.
Skin and soft tissue infections	Malnutrition and increased catabolism Collagen and subcutaneous tissue loss Decreased size of blood-vessels in dermis Decreased water bringing capacity of stratum corneum Decreased derma-epidermal adhesion.	Minimize prolonged pressure Keep skin dry and clean
Bacteremia and sepsis	Immunosuppression due to immunosenescence. Frequent use of iv lines in critically ill elder people.	Avoid unnecessary iv catheter insertion and prompt removal as indicated by the type of bacteremia or fungemia.

higher among women than men. Obesity is another one risk factor for osteoarthritis.

**Osteoporosis** -There is normal loss of bone density with ageing which is called Osteopenia. Many geriatric patients have osteoporosis, a more severe weakening of bone density.

### Physical function in the elderly

Normal changes (age-related) and collected pathology contribute to functional changes which is seen with ageing.

**Walking speed** - Walking speed decreases with normal ageing but will decrease additionally because of disease. Measurements of walking speed can be used to explain disability, community ambulation, falls and risk of mortality [14].

**Mobility disability** - Mobility disability is associated with depression, falls and social isolation. Maximum older people with a disability live alone [15].

**Activity disability of daily living** - Disability rates are relatively high among older people. Rates of disability in activities like bathing and dressing and disability in serviceable activities of everyday basis such as cooking that all rises with growing age. Older people with disabilities also struggle with depression, chronic pain and complex medication regimens [16]. One of the major cause of disability and morbidity among older people are falls. There are some fall prevention programmes like physical activity, balance exercise, vitamin D supplementation and home safety assessment to reduce the incident of falls [17]. Frailty is a common problem in the elderly and is defined as a special vulnerability to stressors and is suggested by slowness, weakness, exhaustion and weight loss [18].

### Psychological and Cognitive Diseases

Cognitive aging- short-term memory loss, difficulty in word-finding and processing speed becomes slower with geriatric age. Ageing can affect the safety during driving cars and often increase the risk for financial exploitation. These types of changes reduce the capacity of understanding the information about complicated medication [19]. But not all the brain functions decline with age. Wisdom, knowledge, empathy, and altruism increase with age [20].

**Dementia** - This disease increases with age. Dementia screenings have limited public health benefit as medications are marginally effective. Geriatric patients with dementia have unsatisfied needs and their livings are very unsafe [21].

**Depression** - It is not a normal outcome of aging. Depression is very frequent among institutionalized older adults and disabled adults [22]. Physiological changes affect the immune system that occur with aging are summarized in Table 1 and Table 2 synthesizes the characteristics of major infections in geriatric patients [23].

### The Way Forward [24, 25]

Thus to summarise, most disease occurs in older people, particularly geriatric patients and the frail elderly. These older patients have the greatest potential to benefit from medications; however, observational studies indicate an increased prevalence of adverse drug reactions (ADR) and some clinical trials have failed to establish therapeutic benefits seen in younger adult

subjects. Thus the purpose of prescribing medications to geriatric patients requires individual analysis of benefit and harm rather than wide-ranging application of prescribing guidelines. To do this the therapist must have an intensive knowledge of the magnitude of the reported benefits and risks of the medications. Abundant geriatric medicine is concerned with the identification and management of adverse drug reactions (ADR) and frequently the major intervention is withdrawal of medications rather than the prescription of new medications.

### Cases of application of Principles of Geriatric Pharmacology [26, 27]

1. Treatment of cardiac failure with beta blockers
2. Use of Paracetamol for chronic pain
3. Warfarin for stroke prevention in atrial fibrillation
4. Avoidance of irrational and indiscriminate practice of Polypharmacy
5. Improving patient adherence at home and healthcare facilities.

### Conclusion

Age-related deleterious changes in elderly occurs mainly due to gradual immunological, neurological and hemodynamic changes and also in drug pharmacokinetics and pharmacodynamics, practice of polypharmacy, lack of adherence to therapy given the fact that older people are the major recipients of pharmacotherapy, increased research to customise according to individual patient needs remains the need of the hour especially in the Indian context during the current COVID-19 outbreak, feared to be worst in the last century.

Monitoring, aggressive interventions and routine evaluation of the elderly population at various levels has shown to add to the quality of life (QoL) of the patient and at the same time a better treatment guidelines based on rigorous evidence base (Indian database for the elderly issues) is much-awaited and imperative step to guide clinicians and healthcare providers who manage geriatric patients.

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### References

1. G.K. Ingle, A. Nath, Concerns and solutions for problems in geriatric health in India, *Indian J Comm Med.* 33 (2008) 214-218.
2. T.F. Wetle, The oldest old: missed public health, *American J Public Health.* 98 (2008) 1159.
3. R. Visvanathan, Under-nutrition in older people: a serious and growing global problem! *J Postgrad Med.* 49 (2003) 352-360.
4. R.P. Thakur, A. Banerjee, V.B. Nikumb, Health problems among the elderly : A cross sectional study, *Annals of Medical and Health Sciences Research.* 3 (2013) 19-25.
5. J. Footit, D. Anderson, Associations between perception of wellness and health-related quality of life, comorbidities,

- modifiable lifestyle factors and demographics in older Australians, *Australasian Journal on Ageing*. 31 (2012) 22-27.
6. E. Jaul, J. Barron, Age-related diseases and clinical and public health implications for the 85 years old and over population, *Frontiers in public health*. 5 (2017) 335.
  7. A. Davis, C.M. McMahon, et al, Aging and hearing health: the life-course approach, *Gerontologist*. 56 (2016) S256-67.
  8. H. Amieva, et al, Self-reported hearing loss, hearing aids and cognitive decline in elderly adults: a 25 year study, *J Am Geriatr Soc*. 63 (2015) 2099-104.
  9. C.K. Zalewski, Aging of the human vestibular system, *Semin Hear*. 36 (2015) 175-96.
  10. J. Collerton, et al, Health and disease in 85 year olds: baseline findings from the Newcastle 85+ cohort study, *BMJ*. 339 (2009) b4904.
  11. M.C. Odden, et al, Risk factors for cardiovascular disease across the spectrum of older age: the cardiovascular health study, *Atherosclerosis*. 237 (2014) 336-42.
  12. J.M. Guralnik, Lower extremity function and subsequent disability: consistency across studies, predictive models and value of gait speed alone compared with the short physical performance battery, *J gerontol a Bio Sci med sci*. 55 (2000) M221-31.
  13. A. Middleton, S.L. Fritz, M. Lusardi, Walking speed: the functional vital sign, *J Aging Phys Act*. 23 (2015) 314-22.
  14. D. Connolly, J. Garvey, G. McKee, Factors associated with ADL/IADL disability in community dwelling older adults in the Irish Lonitudinal study on ageing (TILDA), *Disabil Rehabil*. 39 (2017) 809-16.
  15. Panel on prevention of falls in older persons, American geriatrics society and british geriatrics society, Summary of the updated American geriatrics society/ british geriatrics society clinical practice guideline for prevention of falls in older persons, *J Am Geriatr Soc*. 59 (2011) 148-57.
  16. L.P. Fried, et al, Frailty in older adults: evidence for a phenotype, *J Am Geriatr Soc*. 56 (2011) M146-56.
  17. J.D. Spence, Preventing dementia by treating hypertension and preventing stroke, *Hypertension*. 44 (2004) 20–21.
  18. O. Anson, E. Paran, Hypertension and cognitive functioning among the elderly: an overview, *Am. J. Ther*. 12 (2005) 359–365.
  19. D.G. Blazer, K. Yaffe, J. Karlawish, Cognitive aging: a report from the Institute of Medicine, *JAMA*. 313 (2015) 2121-2.
  20. J.B. Rosen, M. Brand, E. Kalbe, Empathy mediates the effects of age and sex on altruistic moral decision making, *Front Behav Neurosci*. 10 (2016) 67.
  21. H. Amjad, D.L. Roth, Q.M. Samus, S. Yasar, J.L. Wolff, Potentially unsafe activities and living conditions of older adults with dementia, *J Am Geriatr Soc*. 64 (2016) 1223-32.
  22. M.L. Stek, et al, Natural history of depression in the oldest old: population-based prospective study, *Br J Psychiatry*. 188 (2006) 65-9.
  23. M. Esme, A. Topeli, B.B. Yavuz, M. Akova, Infections in the Elderly Critically-ill Patients, *Frontiers in Medicine*. 6 (2019) 118.
  24. D.G. Le Couteur, L. Bailey, V. Naganathan, Beta-blockers and heart failure in older people, *Eur. Heart J*. 27 (2006) 887–888.
  25. M.D. Flather, S. Yusuf, L. Kober, M. Pfeffer, A. Hall, G. Murray, et al, Long-term ACE-inhibitor therapy in patients with heart failure or left-ventricular dysfunction: a systematic overview of data from individual patients, ACE-Inhibitor Myocardial Infarction Collaborative Group, *Lancet*, 355 (2000) 1575– 1581.
  26. M.R. McClung, P. Geusens, P.D. Miller, H. Zippel, W.G. Bensen, C. Roux, et al, Effect of risedronate on the risk of hip fracture in elderly women, *Hip Intervention Program Study Group, N. Engl. J. Med*. 344 (2001) 333–340.
  27. B.R. Nair, Evidence based medicine for older people: available, accessible, acceptable, adaptable? *Aust. J. Ageing*. 21 (2002) 58–60.