Introduction

Aging is a biological reality associated with declining health status. In India, the geriatric population is defined as those over 60 years although the World Health Organization recommends using the cutoff at 65 years.1-3 In India, according to projections, the population in the age group of 60 years and above is expected to increase from 71 million in 2001 to 179 million in 2031 and further to 301 million in 2051; the numbers of those who are 70 years and older are projected to increase from 27 million in 2001 to 132 million in 2051. Among the elderly persons aged 80 and above, the numbers will increase from 5.4 million in 2021 to 32 million in 2051. The increasing number and proportion of elderly will have a direct impact on the demand for health and pension services.10

Increasing problems of health, psychosocial, personal, and socioeconomic factors associated with the process of aging further compound the picture. One of the problems associated with the aging of the population is the absence of facilities for medical treatment and of providing economic and social support. Information on morbidity profile of this population is essential for planning its health-care facilities.

A cross-sectional study with a convenient sample of 100 participants was conducted with an aim to describe the profile,
social well-being, and economic activity of the elderly who attended a family practice unit in South India.

### Methodology

A descriptive cross-sectional survey was carried out in the outpatient clinic of a family practice unit in South India following the Institutional Review Board approval. This unit is a part of a large tertiary teaching hospital that caters predominantly to the people living in the surrounding slum areas.

The study was undertaken with the objectives of determining the morbidity profile, screening for depression, and to determine the commonly involved organ systems in the elderly patients presenting to our outpatient clinic.

The first three to four elderly participants who were aged 60 years or older presenting to the outpatient clinic on 30 working days were enrolled in the study between June 2008 and May 2010. A total of 100 participants were enrolled in the study. The study excluded severely debilitated participants and those unwilling to participate. Participants were questioned in privacy after taking a formal consent in the presence of a witness in their own language.

Demographic characteristics of participants such as age, gender, and address were noted along with their level of education, social support, and financial status. Use of tobacco and alcohol was documented. Presenting complaints and duration pertaining to one or more of the organ systems, including respiratory, cardiovascular, central nervous system (CNS), genitourinary, and musculoskeletal systems, were noted. Based on the duration of the symptoms, illnesses were categorized as acute, subacute, and chronic, where acute and subacute were those presenting for <4 weeks. Relevant history was documented. A complete physical and systemic examination was performed. Geriatric depression scale (GDS) was used to document depression. Hemoglobin was assessed for all participants.

The data were analyzed using SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, Illinois, SPSS Inc. Chi-square test was done where applicable to test the significance of the findings.

### Results and Discussion

#### Age

In this study, the mean age was 67 years (standard deviation [SD] ±4.44; range 60–80 years) with 41 male participants (41%) and 59 female participants (59%). Female participants were likely to live longer than male participants ($P = 0.001$ and $P \sim 0$, respectively). This proportion of men to women is similar to the average outpatient attendance at this center across all age groups and it is possible because women are more likely to report to a clinic after completing household duties while men are likely to be outworking. A large multicenter study of 10,035 individuals conducted in India showed that nearly 71.3% of elderly were in the age group of 60–69 years. As per the census (2011), the elderly constitute 8% of Indian population. Srivastava et al. in their study reported 87 males for every 100 females while some studies have reported the ratio to be almost 1:1. Even at the national level, male-to-female ratio approaches unity, while worldwide also, this ratio is 1.01.

#### Literacy

Sixty-two participants were illiterate, 23 participants had literacy level below 5th grade, while 15 participants were educated higher than 5th grade. In this study, female participants were less educated than male participants. As per the census (2011), the literacy rate of the elderly in the state of Tamil Nadu was 49.8%. This is higher than the national figure of 43.5%. The literacy rate of the elderly in the district of Vellore is comparable at 44.6%. The lower literacy rate of the elderly (38%) in the current study may be due to the fact that the family practice unit caters specifically to the urban lower socioeconomic population [Table 1].

#### Work and finance

Seventeen percent of participants continued to work while the remainder were unemployed. Financially, 46 were independent, 20 were partially independent, and the remaining 34 participants were entirely dependent on others. Two percent of participants possessed a phone. Males were more independent financially as compared to females. In Tamil Nadu, for the means of living, 60% of elderly were dependents (similar to our findings), 21% were involved in household work, 11% were pensioners, and interestingly 1% were classified as students. Other means of living accounted for 7% while there were <1% beggars and vagrants.

#### Marital status

In this study, of the 100 participants, 49 were still married while 49 participants were widowed and 2% participants were separated. Seventeen participants were still living with their spouse, 45 were living with their children, and 27 were living with spouse and children. One participant was living with a
close relative while ten lived alone [Table 1]. Female participants were more likely to be widowed than a male participant being a widower. In addition, female participants were more likely to be living with children as compared to men who were more likely to be living with their spouses or with spouses and children. In India, 76.6%–89% of the elderly are likely to live with their spouses and/or children. For Tamil Nadu, 62% of the elderly were living with their spouses while 35% were widowed, similar to the national figures. Two percent never married. One percent of elderly persons from Tamil Nadu were divorced or separated.

In one multicenter study, the incidence of married elderly was 56.3% for the urban population in Vellore. In our study, majority had some family or social support and 10% were still living alone. It is important to develop facilities for health and social support, especially for this vulnerable group.

Tobacco and alcohol use
In this survey, 62% of the participants were nonsmokers, 11% were smokers, and 16% participants were ex-smokers while 16% participants used tobacco snuff or betel leaf. According to studies conducted in this area, the incidence of tobacco use (the past and current) among the elderly is between 21.1% and 37%. Prevalence of tobacco consumption is lower in females (11.6%) as compared to males (37%). The current smokers account for 15.6%–32.2% while the percentage of ex-smokers is 5.5%–13.9%. Our findings are similar to these findings. Regular consumption of alcohol was seen in 3 participants whereas 18 participants consumed occasionally [Table 2].

Morbidity profile
Eighty-five participants had chronic conditions, with multiple comorbidities. Three participants presented with acute-on-chronic illness while 12 presented with acute symptoms. In those who presented with acute or subacute symptoms, 15% were due to exacerbation of chronic obstructive pulmonary disease (COPD) or fever. Eighty percent of the participants had more than one chronic condition and 50% had three or more conditions [Figures 1 and 2].

Hypertension
In this study, among the 71 patients who were previously diagnosed to have hypertension, 9 presented with cardiovascular and 4 with CNS disease symptoms. On clinical evaluation, 71 participants were hypertensive and 13 had coronary artery disease. The incidence of hypertension in the Indian elderly population has been reported between 10% and 63%. This incidence is twice in the urban areas as compared to the rural areas, possibly because of sedentary and modern lifestyle and stress in urban areas. Our data are consistent with these findings.

Nutritional status
Data on the prevalence of malnutrition among the elderly in India are scarce. The mean body mass index (BMI) in the study
The mean hemoglobin level in this study was 11.8 g/dL (SD - 1.5; range - 5.7–16.9). Fifty-three female participants (89.8%) were anemic as compared to 68.3% of the male participants (P = 0.022). The reported incidence of anemia (based on clinical impression) by Joshi et al. among the elderly is 66.5%. More objectively, Srivastava et al. have reported hemoglobin level ≤10 g/dL in 13.8% of the urban elderly population at the national level. In contrast, Alwar et al. found the prevalence of anemia to be 37.88% in the elderly patients. The high prevalence of anemia in our study, especially among women, may be because of poverty and poor nutrition. It is, therefore, important to screen for anemia in this population and take corrective measures.

**Respiratory and cardiovascular diseases**

In this study, abnormal respiratory and cardiovascular findings were seen in 19 and 12 participants, respectively. Thirteen male participants presented with respiratory complaints as compared to six female participants (P = 0.005). Clinically, 11 males and 8 females had COPD. In this study, both respiratory complaints and abnormal respiratory system examination findings were more common in participants who continued to smoke or had been smoking in the past. Srivastava et al. in their study found that COPD affected 4.8% of the elderly which is much lower than our study. This is probably because this study is a hospital-based study; the male predominance is similar to our study. Diabetes mellitus

The prevalence of diabetes mellitus in the elderly ranges from 12.1% to 13.3%, according to some studies. This is higher than that of 7% in general population. The prevalence is higher among urban elderly (16.9%) than among rural elderly (9.8%). The prevalence is higher in males (14.0%) than females (12.7%). In our study, which is a hospital-based study, there were 44 patients with diabetes. Diabetes occurs across all ranges of BMI but has an increased incidence with high BMI. Srivastava et al. found that 16.7% of the elderly participants had BMI <18.5 while 28.0% had BMI >25.0. In this study, there was an association between high BMI and diabetes mellitus [P = 0.008, Table 4].

**Musculoskeletal diseases**

Forty-four female participants (74.6%) presented with musculoskeletal complaints as compared to 26.8% of the male participants (P ~ 0). Thirty-nine female and nine male participants had musculoskeletal system involvement clinically, the majority of which had knee osteoarthritis. Musculoskeletal complaints have been reported between 37% and 51% of the geriatric population. Incidence of arthritis among the elderly in India has been variable reported between 12.5% and 34%. A high prevalence of arthritis/joint pain, particularly among females, has been reported in studies conducted in India. People with arthritis have also been found to have a high BMI. In this study, BMI of female participants was higher than that of male participants. This may possibly be due to a vicious cycle of musculoskeletal complaints and arthritis in elderly women secondary to high BMI that, in turn, contributes to limited activity, eventually leading to an increased BMI. This is further worsened due to hard, untiring life faced by women who never retire from household work until they are totally disabled. In this study, there was a significant association between a high BMI and musculoskeletal complaints, predominantly arthritis, in women [P = 0.026, Table 4]. A study from the USA highlighted a strong independent relationship between excess body weight and self-reported arthritis. The risk of arthritis was 50% higher among women.

**Falls**

It has been observed that among the elderly, history of falls is as high as 30%. Higher number of females (9.2%) report falls than males (8.3%). The incidence of falls resulting in fractures is 2.7%–6%. These figures are much higher than the findings in this study as only four people gave a history of fall, all women but none of the falls resulted in a complication.

**Genitourinary diseases**

In this study, 40 people (28 female and 12 males) gave a history of complaints attributable to the genitourinary system. Studies have shown that the incidence of urinary problems has been between 1.5% and 14.4%. One study recognized incontinence being a common, and disruptive condition that many elderly participants underreport. There is a significant association of urinary incontinence in women with increasing age (P < 0.01), with 57% having stress incontinence, 23% having urge incontinence, and 20% having mixed incontinence, the former having the severest perceived impact on the quality of life. In this study, we found the prevalence of urge incontinence in 22% women while 6.8% had stress incontinence and 18.6% had mixed incontinence. This is a socially isolating condition that is often underreported due to stigma and sensitivity. Geriatric services must take special care to address this issue.

**Mental health**

The mental health care of the elderly is another neglected area. The GDS is a tool used to screen the depression. A study of 1000 elderly from rural South India showed a prevalence of

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**Table 4: Association between body mass index and musculoskeletal complaints and diabetes mellitus**

| BMI       | <18.4 | 18.5-24.9 | 25-29.9 | >30  |
|-----------|-------|-----------|---------|------|
| Musculoskeletal complaints | Absent | 3 | 33 | 8 | 1 | 0.026 |
| Present | 1 | 30 | 14 | 10 |  |
| Diabetes mellitus | Absent | 4 | 40 | 10 | 2 | 0.008 |
| Present | - | 23 | 12 | 9 |  |

BMI: Body mass index
geriatric depression of 12.7\%\textsuperscript{[30]}. However, a community-based study of 196 participants conducted in an urban slum of Mumbai showed that depressed elderly (using GDS) constituted 45.9\% of the study population and the prevalence was more in females (57.8\%, \textit{P} < 0.05)\textsuperscript{[31]} In our study, 44% of the population had a GDS score between 5 and 10 (female - 28, male - 16) which requires intervention such as counseling and follow-up and 10\% (female - 8, male - 2) had a GDS score of more than 10 warranting therapy. Mental health is usually neglected and underdiagnosed among the elderly and needs to be addressed actively.

**Medication**

The elderly are likely to be on multiple medications. A large global longitudinal study of 3618 elderly (60 years and more) reported a high prevalence of use of four or more than four medications concurrently. Polypharmacy among the elderly with an increased prevalence among those diagnosed with diabetes (21.4\%) and hypertension (11.1\%) has been reported.\textsuperscript{[32]} In this study, 85\% were suffering from chronic illnesses, and regular medications were being taken by 81 participants for their chronic illnesses. This high degree of compliance probably reflects the nature of care in this unit where low-cost subsidized care is provided. However, this study did not look into the number of medications taken by each patient. It is likely that most participants may have been taking multiple medications. Establishment of good patient–doctor relationship is important for a long-term follow-up of chronic illness in the elderly. Good family practice units are appropriate setups where this service could be delivered.

**Implications and recommendations**

The reality of an increasing population of elderly and changing trends in morbidity profile with large numbers living with chronic illnesses warrant urgent action from the policy makers and the health system. Action should be taken at several levels within the public and private sectors. Health personnel at primary care level should be trained to address these problems with a specific emphasis on the development of communication skills. Communication can be particularly challenging in the elderly due to their hearing and vision difficulties along with aging-related amnesia. Therefore, communication skills could play a vital role in achieving a good patient compliance with their regular medications and medical follow-ups. Multicompetent general practitioners or family medicine specialists are another way to address this growing need. Family medicine training centers and the academia need to develop a relevant training program for the health professionals focusing on elderly services. Policy makers should not only be aware of these problems but also help to put into practical action policies that will enable better access to health care and social service for the elderly.

**Limitations**

This was a hospital-based, descriptive, cross-sectional study of 100 elderly participants with its attendant design limitations. The findings may be reflective but may not represent the elderly population in general.

**Conclusion**

In this study of 100 elderly participants presenting to an urban family practice outpatient department, only one patient was clinically normal. A majority of participants were illiterate and unemployed. The most common clinical diagnoses were hypertension, musculoskeletal disorders, diabetes mellitus, COPD, coronary artery disease, and genitourinary complaints. The majority of participants took medicines regularly, suggestive of a good follow-up and health-seeking behavior. These findings do underscore the importance of good communication skills by the health-care workers in ensuring a good patient compliance with medications and follow-up. These findings suggest the need for policies and strategies to frame more comprehensive and holistic guidelines, especially in the field of communication skills to address the issues pertaining to urinary system and mental health which are sensitive areas that need to be discussed with the elderly in such a way that they are comfortable to speak about them. Treating physicians should be aware and alert to look for more than the presenting complaints of the elderly, not only in the physical domain but also in the social, economic, and psychological domains as well. This study underscores that a family practice unit may be a good setup to provide the first-contact care for the diagnosis and management of common problems in the elderly and help to improve their quality of life, through the primary care physicians armed with basic skills of medical history, physical examination, and office-based procedures. Policy decisions should focus on all the elderly in the area of health, but especially target those who live alone or are poor with subsidized services. For the elderly who live alone and are poor, it may be important to provide subsidized care.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Chaubey PC, Vij A. Planning consideration of comprehensive geriatric care in India. J Acad Hosp Adm 1999;11:7-12.
2. Srivastava RK, Mathur A, Ananthanarayanan PH, Kaur J, Varghese C, Haldia KR, et al. Multicentric study to establish epidemiological data on health problems in elderly. New Delhi: Directorate General of Health Services; 2007.
3. Epidemiology and prevention of cardiovascular diseases in elderly people. Report of a WHO Study Group. World Health Organ Tech Rep Ser 1995;853:1-67.
4. Rajan SI, Sarma PS, Mishra US. Demography of Indian aging, 2001-2051. J Aging Soc Policy 2003;15:11-30.
5. Registrar General and Census Commissioner, India. Census 2001. New Delhi: Registrar General and Census Commissioner, India; 2010.
6. Kant S, Mishra P, Goswami A. Morbidity among elderly persons residing in a resettlement colony of Delhi. Indian J Prev Soc Med 2004;35:1-9.
7. The World Factbook 2014-15. Washington, DC: Central Intelligence Agency, 2015. Available from: https://www.cia.gov/library/publications/the-world-factbook/index. [Last accessed on 2015 Dec 12].

8. Prakash R, Choudhary SK, Singh US. A study of morbidity pattern among geriatric population in an urban area of Udaipur Rajasthan. Indian J Community Med 2004;29:35-40.

9. Khokhar A, Mehra M. Life style and morbidity profile of geriatric population in an urbans community of Delhi. Indian J Med Sci 2001;55:609-15.

10. Hypertension control. Report of a WHO Expert Committee. World Health Organ Tech Rep Ser 1996;862:1-83.

11. Chadha SL, Radhakrishnan S, Ramachandran K, Gopinath N. Epidemiological study of coronary heart disease (CHD) in rural population of gurgaon district (Haryana State). Indian J Community Med 1989;14:141-7.

12. Jones JS. Life in the 21st century – A vision for all. S Afr Med J 1998;88:674.

13. Niranjan GV, Vasundhra MK. A study of the health status of aged persons in slums of urban field practice area, Bangalore. Indian J Community Med 1996;21:1-4.

14. Parray SH, Ahmed D, Ahmed M, Gaash B. Morbidity profile of geriatric population in Kashmir (India). Indian J Pract Doct 2008;4:1-2.

15. Hazarika NC, Biswas D, Mahanta J. Hypertension in the elderly population of Assam. J Assoc Physicians India 2003;51:567-73.

16. Shankar R, Tondon J, Gambhir IS, Tripathi CB. Health status of elderly population in rural area of Varanasi district. Indian J Public Health 2007;51:56-8.

17. Joshi K, Kumar R, Avasthi A. Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. Int J Epidemiol 2003;32:978-87.

18. Alwar V, Reethi K, Rameshkumar K. Geriatric anemia: An Indian perspective. Indian J Hematol Blood Transfus 2013;29:126-7.

19. Kumar V, Acanfora M, Henessy CH, Kalache A. Health status of the rural elderly. Indian J Med Sci 2001;17:328-31.

20. Bays HE, Chapman RH, Grandy S; SHIELD Investigators’ Group. The relationship of body mass index to diabetes mellitus, hypertension and dyslipidaemia: Comparison of data from two national surveys. Int J Clin Pract 2007;61:737-47.

21. Sunder L, Chadha SL, Bhatia PC. A study on senior citizens in rural areas. Health Millions 1999;25:18-20.

22. Garg BS, Gupta SC, Mishra VN, Singh RB. A medico-social study of aged in urban area. Indian Med Gaz 1982;16:90-5.

23. Chacko A, Joseph A. Health problems of the elderly in rural South India. Indian J Community Med 1990;15:70-3.

24. Zakkak JM, Wilson DB, Lanier JO. The association between body mass index and arthritis among US adults: CDC’s surveillance case definition. Prev Chronic Dis 2009;6:A56.

25. Campbell AJ, Reinenk J, Allan BC, Martinez GS. Falls in old age: A study of frequency and related clinical factors. Age Ageing 1981;10:264-70.

26. Gryfe CI, Amies A, Ashley MJ. A longitudinal study of falls in an elderly population: I. Incidence and morbidity. Age Ageing 1977;6:201-10.

27. Gupta HL, Yadav M, Sundarka MK, Talwar V, Saini M, Garg P. A study of prevalence of health problems in asymptomatic elderly individuals in Delhi. J Assoc Physicians India 2002;50:792-5.

28. Singh AK, Singh M, Singh DS. Health problems in rural elderly at Varanasi, Uttar Pradesh. J Assoc Physicians India 1996;44:540-3.

29. Bodhare TN, Valsangkar S, Bele SD. An epidemiological study of urinary incontinence and its impact on quality of life among women aged 35 years and above in a rural area. Indian J Urol 2010;26:353-8.

30. Rajkumar AP, Thangadurai P, Senthilkumar P, Gayathri K, Prince M, Jacob KS. Nature, prevalence and factors associated with depression among the elderly in a rural South Indian community. Int Psychogeriatr 2009;21:372-8.

31. Jain RK, Aras RY. Depression in geriatric population in urban slums of Mumbai. Indian J Public Health 2007;51:122-3.

32. Dutta M, Prashad L. Prevalence and risk factors of polypharmacy among elderly in India: Evidence from SAGE Data. Int J Public Ment Health Neurosci 2015;2:11-4.