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Original Research Article

Co-morbidity pattern in elderly patients presenting to the geriatric outpatient department at a district hospital in the Himalayan foothills

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ABSTRACT

Background: The elderly is a group of people who require more medical attention than others due to the start of the decline of the body functions. Ageing is rapidly progressing in India consequent to the highest number of young people here. The aim of the present study was to find the pattern of comorbidities in patients visiting the geriatric OPD of a District hospital in Himachal Pradesh.
Methods: In this study, we have hypothesized that many of the geriatric patients presenting to the OPD will have other comorbidities in addition to the presenting complaint, as a virtue of their old age.
Results: The data was collected over a span of 3 months with 1016 patients enrolled for the study. Off this number 510 male and 506 females. 67.2% of patients had some form of comorbidity. 121 patients (11.90%) had one comorbidity, 192 patients (18.9%) had two comorbidities, 168 patients (16.55%) had three comorbidities, 132 patients (13.0%) had four comorbidities, 61 (6.0%) had 5 comorbidities and 13 patients (1.28%) had 6 comorbidities. The most common comorbidity found was hypertension in 380 (37.4%) of the patients followed by some form of mental disorder in 366 (36.02%) patients, followed by dyslipidemia in 327 (32.19%) patients and then Diabetes Mellitus in 256 patients (25.2%) of the patients.
Conclusions: Majority of the patients presenting to the geriatric department were multimorbid and had some other comorbidity in addition to their presenting complaint. Hence, the emphasis for specialized care for the geriatric patients. With increase in the life expectancy in India, these need to be addressed early on to provide good and healthy quality of life to the geriatric population and to decrease the burden on our already strained healthcare infrastructure.

Keywords: Comorbidity pattern, District hospital, Elderly

INTRODUCTION

Longer and healthier lives have automatically led to an increased population of the elderly. The elderly are a group of people who require a lot of medical attention, but geriatrics is a new field in India, which is why I tried to make a study about comorbidity patterns in the elderly to help them out. The current decade (2021–2030), which has been adopted as the decade of healthy aging by the World Health Organization which envisages longer, healthier and more fulfilling lives globally.[1] India, a developing nation and the world's most populous country, has over 153 million older people, comprising 10.1% of the national population and some experts project that by 2051, the elderly will constitute 22.5% of the total population.[1,2,5] This increase in life span along with multiple co morbidities add to the complexity of medical care in old age especially in a developing country like ours. As per reports, there are 153 million people aged 60 and above and this number is expected to reach a staggering 347 million by 2050.[1] As per a report the elderly comprise 10.5% of the Indian population.[2] The total population of Himachal Pradesh (our state) is

estimated to be 77.56 lakhs.[3] Elderly population aged 60 years and above constitute 13% of the entire population of the state.[4] In the present study we hypothesized that many of the geriatric patients presenting to the OPD will have other comorbidities in addition to the presenting complaint, as a virtue of their old age. The set up for the study was a district hospital of Himachal Pradesh where the first exclusive geriatric OPD of the state has been made functional. The patients will then be categorized as per their age and sex. The most common causes of comorbidity were then found. As per our hypothesis, the patients were categorized, comorbidities were then recorded and studied to find out the common comorbidities present.

This study will help us find out the common causes of comorbidity in the elderly which can further be helpful in planning and implementation of health programs focusing on the elderly.

METHODS

Study type

This was an observational cross-sectional study.

Study place

Geriatric OPD at the Deen Dayal Upadhyay hospital, Himachal Pradesh.

Study duration

The study period was from 16 August 2025 to 15 November 2025, India.

Selection criteria

All patients whose data was complete in the OPD register during the period of study were included in the study.

Procedure

Data records of 1016 patients was taken from the register during the period of study. This included patient information like patient's name, age, sex, presenting complaint and comorbidities. Patients attending the Geriatric OPD were all above 60 years of age as per the United Nations definition.

All patients from the register were recorded, with the exclusion criteria being patients having incomplete records in the register. It was a hospital based cross sectional study with a total of 1016 patients were recorded from the register. The diagnosis of the patients attending the outpatient geriatric department of a district hospital was recorded and analyzed from the OPD register.

Ethical approval

As it was an observational study which involved collecting data from registers in terms of their age, sex, chief presenting complaint and the comorbidity present, during the period of study with no direct interaction with patients, it was exempted from formal approval of the Institutional Ethical Committee.

Statistical analysis

The data was taken from the register and recorded on an excel sheet. Then it was analyzed using the SPSS version 23 of the excel sheet.

RESULTS

A record of 1016 patients was compiled in the spreadsheet. There were 510 (50.2%) males and 506 (49.8%) females, as shown in Table 1. The male to female ratio was thus seen to be 1.007:1. Hence, there we found no statistical difference in the number of males as compared to the number of females. Maximum (634 or 62.40%) patients were found to be in the age group of 60-69 years, followed by the age group of 70-79 years (305 or 30.01%) followed by 80-89 age group (68 or 6.69%) and the least (9 or 0.86%) were in the >90 age group as has been shown in Table 2.

The mean age of the patients was seen to be 67.92 and the median age was 66. There appeared to be more than one mode/peak, thus making the data multimodal and hence, it appeared did not follow a bell-shaped curve. This has been depicted in Figure 1.

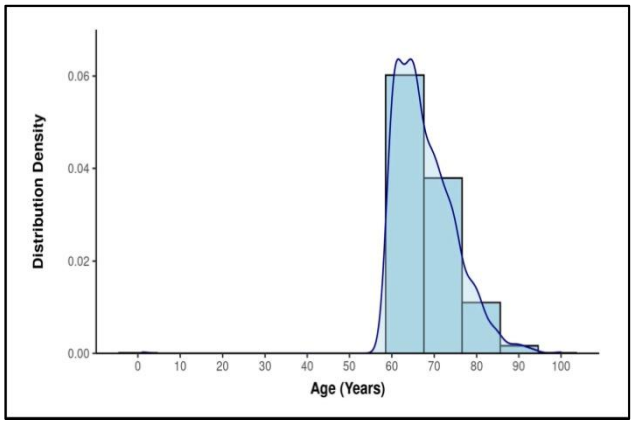

Figure 1: Age groups in the form of a histogram with more than one peak, thus making it multimodal and therefore it did not follow a bell curve.

The mean (SD) of number of comorbidities was 1.89 (1.68). The median (IQR) of number of comorbidities was 2.00 (0-3). The number of comorbidities ranged from 0-6. This is depicted in Table 3. 67.62% or 687 patients who presented to the OPD had some comorbidity in addition to their presenting complaint. 121 patients

(11.90%) had one comorbidity, 192 patients (18.9%) had two comorbidities, 168 patients (16.55%) had three comorbidities, 132 patients (13.0%) had four comorbidities, 61 (6.0%) had 5 comorbidities and 13 patients (1.28%) had 6 comorbidities, as shown in Table 4. The most common comorbidity found was hypertension in 380 (37.4%) of the patients followed by some form of mental disorder in 366 (36.02%) patients, followed by dyslipidemia in 327 (32.19%) patients and then Diabetes Mellitus in 256 patients (25.2%) of the patients. Cardiovascular disorders were present in 145 (14.27%), 138 (13.58%) patients had musculoskeletal disorder, 104 (10.24%) had respiratory disorder, anemia in 103(10.14%), excretory system was involved in 63 (6.20%) patients, hypothyroidism in 57 (5.61%), central nervous system disorders in 39 (3.84%) and carcinoma was detected in 17 (1.70%) patients. This is tabulated in Table 5.

In addition, some form of vitamin deficiency was found in 167 (16.44%) patients. The mean (SD) of number of comorbidities in the age group: 60-69 Years group was 1.89 (1.66), 1.91 (1.75) in the 70-79 years ager group, in the age group,1.90 (1.70) in 80-89 years age group and in the age group: ≥90 years group was 1.22 (1.30). The Number of Comorbidities in the age group of 60-69 years ranged from nil to a maximum of 6, in the age group 70-79 years ranged from 0 – 6, in the age group: 80-89 years ranged from 0-5 and in the age group: ≥90 years ranged from 0-3. The $\chi 2$ value was 1.329 and the p value=0.722. Hence there was no statistically significant difference was found between the groups as regards to the number of Comorbidities This has been depicted in Table 6 And Table 7.

Table 1: Sex distribution of patients.

Sr. no.	Sex	Number	%
1	Male	510	50.2
2	Female	506	49.8

Table 2: Age distribution of patients.

Sr. no.	Age group	Number of patients	%
1	60-69	634	62.4
2	70-79	305	30.01
3	80-89	68	6.99
4	≥90	9	0.86

Table 3: Mean number of comorbidities.

Number of comorbidities	
Mean	1.89
Median	2
Range	0-6

Table 4: Number of comorbidities.

Sr. no.	Number of comorbidities	Number of patients	%
1	0	329	32.28
2	1	121	11.9
3	2	192	18.9
4	3	168	16.55
5	4	132	13
6	5	61	6
7	6	13	1.28

Table 5: Different comorbidities.

Sr. no.	Comorbidity	Number of patients	%
1	Hypertension	380	37.4
2	Mental disorders	366	36.02
3	Dyslipidemia	327	32.19
4	Diabetes mellitus	256	25.2

Continued.

Sr. no.	Comorbidity	Number of patients	%
5	Cardiovascular	145	14.27
6	Musculoskeletal	138	13.58
7	Respiratory	104	10.24
8	Anemia	103	10.14
9	Excretory	63	6.2
10	Hypothyroidism	57	5.6
11	Cns disorder	39	3.84
12	Carcinoma	17	1.7

Table 6: Association between the age groups and the number of comorbidities.

Number of comorbidities	Age group				Kruskal wallis test	
	60-69 years	70-79 years	80-89 years	>=90 years	χ^2	P value
Mean	1.89	1.91	1.90	1.22	1.329	0.722
Median	2	2	2	1		
Min-max	0-6	0-6	0-5	0-3		

Table 7: Pairwise comparison of subcategories of age groups.

Pairwise comparison of subcategories of age group (in years)	Adjusted P value
≥90-60-69	0.830
≥90-70-79	0.824
60-69-70-79	1.000
≥90-80-89	0.849
60-69-80-89	1.000
70-79-80-89	1.000

DISCUSSION

This study was undertaken to study the comorbidity patterns in the elderly presenting to the Geriatric Outpatient Department at a district hospital of Northern India. Comorbidity is the presence of one or more additional diseases or medical conditions that occurs in addition to a primary disease or disorder in the same person. We found a multimorbidity in 687 (67.2%) of the patients. The main comorbidities found in this study were, in descending order, hypertension, mental disorders, dyslipidemia and diabetes mellitus. First, it is important to have a brief overview of what these comorbidities are.

Hypertension (high blood pressure) occurs when the blood pressure of a person is 140/90 mmHg or higher on two consecutive readings. The non-modifiable risk factors include family history, advancing age and co-existing disease such as diabetes or kidney disease. However, the modifiable risk factors are unhealthy diet, physical inactivity, consumption of tobacco or alcohol and obesity.[6] Dyslipidemia refers to a disorder with abnormal levels of various lipids (fats) in the bloodstream, which pose a significant risk factor for various diseases like cardiovascular diseases, stroke and atherosclerosis. Lipids are fatty compounds that perform a variety of functions in your body.[7] Causes for dyslipidemia may be primary or secondary. Primary causes are mainly genetic and secondary dyslipidemias are caused by lifestyle and other factors. A sedentary lifestyle with excessive dietary intake of excessive calories, saturated fat and cholesterol.[8]

Diabetes is a chronic metabolic disease which is characterized by elevated levels of blood glucose (or blood sugar) in the body due to improper regulation, which lover long time leads to serious damage to various organs like the heart, blood vessels, eyes, kidneys and nerves.[9] The most common symptoms of diabetes are polydipsia (excessive thirst), polyphagia (excessive hunger), polyuria (increased frequency of urination), blurred vision, fatigue, sores that do not heal and frequent infections.[10] Long term complications include cardiovascular disease, peripheral neuropathy (burning sensation in feet), nephropathy (kidney damage), hearing impairment, etc. Diagnosis is by measuring plasma glucose.[11]

Anemia is a disease where there is a deficiency of healthy red blood cells or hemoglobin to carry oxygen to all other body's tissues from the heart.[12] Cardiovascular diseases are the diseases which affect the heart and blood vessels.[13] Musculoskeletal disorders are the disorders affecting either the bones, the joints, the muscles or the connective tissues.[14] Respiratory disease is a disease that affects either the lungs or any other parts of the respiratory system starting from the nose to the bronchi. Respiratory diseases may be caused either by infection or by smoking or tobacco or by breathing secondhand

tobacco smoke, radon, asbestos or any other forms of air pollutants.[15] Hypothyroidism is a disorder when the thyroid gland of our body doesn't make enough thyroid hormones to meet the needs of our body.[16] Carcinoma is defined as cancer arising from the epithelial cells that line an organ or tissue.[17] With this brief understanding of the comorbidities, it is further important to compare the present study with other similar studies. A similar cross-sectional study had been conducted by Godbole et al at in the Western part of India at a tertiary care center on 300 geriatric patients attending geriatric clinic in the year 2018.[18] They found multimorbidity in 198 (66%) patients which is very similar to our study. The most frequent chronic diseases in decreasing order of prevalence were hypertension, mental diseases, diabetes mellitus, chronic obstructive pulmonary disease and coronary artery disease.

A study was conducted by Mini et al on 9852 older adults in 2011 under the United Nations Population Fund in seven states of India that had been selected for the study. The study showed multimorbidity in 30.7%. It was seen that those in the highest wealth group, aged >70 years, alcohol users, women and tobacco users were more likely to be multimorbid.[19] The multimorbidity percentage in this study could be low as compared to our study as it was household-based study and our study was on patients presenting to the hospital.

Another cross-sectional observational study conducted by Mishra et al, on 295 elderlies admitted to a tertiary care center In Odisha, India.[20] The study showed that majority of the cases admitted were having a single morbidity with 117 (39.66%), 106 (39.53%) had two concurrent morbidities, 63 (21.35%) had three morbidities, 7 (2.3%) had four morbidities and 2 (0.67%) had as many as five morbidities.[20] However, this was a study on patients admitted to the hospital while our study was on outdoor patients.

There were 510 (50.2%) males and 506 (49.8%) females of the total 1016 patients. Thus, we can conclude there was no sexual disparity in the patients presenting to the Geriatric OPD. In the study which was conducted by Godbole et al, however there were 61.6% males as compared to 38.4% females of the total 185 patients and in the study conducted by Mini et al there were 47% men and 53% females and in the study by Mishra et al there were 140 (47.5%) males and 155 (52.545) females. In the present study we found that the maximum (634 or 62.40%) number of patients were in the age group of 60-69, followed by 70-79 age group (305 or 30.01%) followed by 80-89 age group (68 or 6.69%) and the least (9 or 0.86%) were in the >90 age group.

However, in the study conducted by Godbole et al most of the patients with multimorbidity belonged to 65-74 years age group. This can be attributed to the fact that previously geriatric patients were taken as greater to or equal to 65 years as opposed to today when they are taken as greater than or equal to 60 years. It was seen that 67.62% patients had some comorbidity in addition to their presenting complaint. 121 patients (11.90%) had one comorbidity, 225 patients (22.1%) had two comorbidities, 168 patients (16.55%) had three comorbidities, 132 patients (13.0%) had four comorbidities, 61 (6.0%) had 5 comorbidities and 13 patients (1.28%) had 6 comorbidities. In the study conducted by Godbole et al 102 (34%) had single morbidity, whereas 198 (66%) suffered from multimorbidity.[18] The most common comorbidity found was hypertension in 380 (37.4%) of the patients followed by some form of mental disorder in 366 (36.02%) patients, followed by dyslipidemia in 327 (32.19%) patients and then diabetes mellitus in 256 patients (25.2%) of the patients.

Cardiovascular disorders were present in 145 (14.27%), 138 (13.58%) patients had musculoskeletal disorder, 104 (10.24%) had respiratory disorder, anemia in 103 (10.14%), excretory system was involved in 63 (6.20%) patients, hypothyroidism in 57 (5.61%), central nervous system disorders in 39 (3.84%) and carcinoma was detected in 17 (1.70%) patients. In addition, some form of Vitamin deficiency was found in 167 (16.44%) patients. Godbole et al however, showed that the most frequent chronic diseases in all patients were hypertension (63.33%), mental diseases (35.66%), diabetes mellitus (25.66%), chronic obstructive pulmonary disease (COPD) (18.66%) and coronary artery disease (CAD) (18.33%).[18]

Mini et al found arthritis to be the most common morbidity (i30.6%), followed by hypertension (21.0%), cataract (12.9%), diabetes (10.15%), lung disease (9.1%) and heart disease (5.8%). Among the elderly with multimorbidity, the most common combinations were arthritis and high-blood pressure (7.5%), followed by arthritis and cataract (5.3%) and then diabetes and high-blood pressure (4.7%).[19] In the study by Mishra et al most of the comorbidities for elderly patients were hypertension in 145 (48.3%), diabetes mellitus in 160 (53.3%) dyslipidemia in 82 (27.7%), neurological diseases in 75 (25.4%), cardiovascular diseases in 45 (15.2%), lung diseases in 33 (11%), renal in 22 (7.3%), rheumatic diseases in 18 (6%) and cancer in 5 (1.7%) patients.[20]

From all the studies including the present study, whether done on outdoor patients or a community-based survey or on indoor patients we can conclude that the major three causes of comorbidity in the elderly are the so-called lifestyle diseases namely hypertension, diabetes mellitus or dyslipidemia. Mental disorders were another disease commonly found.

Thus, authors suggest that the future health related strategies targeting the elderly be focused on the lifestyle diseases and mental disorders. Targeting the lifestyle diseases requires lifestyle modification. Activities focusing on healthy lifestyle should be encouraged early on in life because it's our eating habits and our physical

exertion right from the beginning which determines whether one will suffer from these diseases later on life. Genes of course have their own role.

Limitation

It was an observational study on patients presenting to OPD so the results may not be generalizable to the whole population. More data needs to be collected from general geriatric population in the future.

CONCLUSION

The authors suggest that the future health related strategies targeting the elderly be focused on the lifestyle diseases and mental disorders. Targeting the lifestyle diseases requires lifestyle modification. Activities focusing on healthy lifestyle should be encouraged early on in life because it's our eating habits and our physical exertion right from the beginning which determines whether one will suffer from these diseases later on life. Genes of course have their own role.

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