Abstract
A cross sectional study was conducted in the Medical wards of Services Hospital Lahore from 17th May 2017 to 12th June 2017 to study the morbidity profile of chronic diseases in geriatric patients. Semi-structured questionnaires were used which were translated into the local language. In all 601 morbidities were documented by 171 subjects, with mean number of morbidities per person as 3.51±1.69. The most prevalent disease observed was Hypertension 105(61.4%), 42(50.6%) in males and 63(71.6%) in females. The 2nd most common was anaemia 80(46.8%), 20(24.1%) in males and 60(68.2%) in females. The 3rd most common morbidity was diabetes mellitus 59(34.5%), 20(24.1%) males and 39(44.3%) females.

This study has assisted in understanding the patterns of health problems among the elderly, which will help to address the prevailing geriatric morbidity conditions and application of appropriate interventions thereafter. Thus, it will help active ageing to be maximally functional in our society.

Keywords: Geriatric, Morbidity, Chronic diseases.

Introduction
Ageing, a universal process is regarded as a normal, inevitable biological phenomenon. Morbidity refers to departure from a state of physical or psychological well-being resulting from disease, illness, injury or sickness especially where the affected individual is aware of his or her condition. According to the World Health Organization (WHO) morbidity could be measured in terms of number of persons who were ill, illnesses these persons experienced and the duration of these illnesses.¹ The geriatric population is defined as population aged 60 years and above. By the year 2025, the world will host 1.2 billion people aged 60 and over and rising to 1.9 billion in 2050.² A chronic disease, as defined by the U.S National Center for Health Statistics, is a disease lasting 3 months or longer.³ Majority of the geriatric group has one or more chronic diseases like diabetes mellitus, hypertension and heart diseases.

International and regional studies have been conducted to bring some common chronic diseases in geriatric patients into limelight. A study conducted in Civil Hospital Karachi showed that most prevalent morbidities were cerebrovascular accidents (13.6%), chronic liver diseases (7.7%) and hernias (7.7%).⁴ A similar study in India revealed that the most common disorders reported among elderly were eye diseases (51.7%) followed by endocrine, nutritional and metabolic diseases (38.4%). Diseases of circulatory system (33.1%), disorders of oral cavity (32.3%), musculoskeletal disorders (30.2%) and diseases of respiratory and digestive system were reported in about 10% of the geriatric people.⁵

According to a previous conducted study in Saudi Arabia, the most prevalent of these is hypertension (59.1%) followed by diabetes mellitus (57.3%), stroke (34.9%), dementia (28.5%), osteoarthritis (24.2%), Alzheimer (21.4%), osteoporosis (17.2%) and ischaemic heart diseases (16.7%).⁶

Objectives of this study were to enumerate the common chronic diseases in the geriatric population. We intended to compare the prevalence of various morbidities amongst males and females and to assess the morbidities encountered by them along the lines of other variables like marital status, literacy and age.

Such assessment of the morbidity profile amongst elderly will highlight some very common geriatric diseases in Pakistan. It will help to modify our lifestyles according to the need of time to prevent the development of these diseases in the future and implement interventions in early life. As the incidence of geriatric population is rising, this study will help us adopt a holistic approach. This means not only catering to their health problems but also uplifting their psychological and social wellbeing and providing them with a good nutritional support.

Methods and Materials
This cross-sectional study was conducted from 17th May 2017 to 12th June 2017 with prior approval from the ethical committee and the institutional review board of the Services Hospital Lahore, a renowned tertiary care teaching hospital. Sample was estimated using WHO sample size software⁷ by

Morbidity profile of chronic diseases in geriatric patients
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formula of estimation of population proportion at confidence level 95% and anticipated population proportion 50% with relative precision 15%. Using non-probability convenience sampling technique, 171 subjects were enrolled in this study. Patients of 60 years and above were included whereas patients who were not well oriented or unable to comprehend our questions were excluded.

A semi structured questionnaire was designed with open ended and close ended questions of multiple choices to collect data. It was assessed by the Community Medicine’s physicians and pre-tested before its approval. It covered patients’ socio demographic variables, presenting complaints, complete general and systemic examination and the associated laboratory investigations. Written informed consent was obtained from all the respondents. Personal interview of the patient was undertaken by translating the questionnaire into the local language. Patients files were meticulously examined as definitive diagnosis and history of chronic conditions given therein were taken as morbid conditions.

SPSS computer software version 23.0 was used for the entry, compilation and analysis of data. For qualitative variables, frequency and percentage distribution tables were generated. Statistical test such as chi-square test was applied at 5% level of significance for qualitative data.

Results

Of the 171 study subjects, 88 (51%) were females and 83 (49%) were males. Out of 83 males, 21 were labourers, 8 were businessmen, 9 were government servants, 6 were farmers and others belonged to miscellaneous professions. Out of 88 females, 85 were housewives and 3 were working women. A total of 601 morbidities were reported by 171 subjects in this study, 349 (58.1%) in females and 252 (41.9%) in males.

Table-1 reflects mean number of morbidities according to socio-demographic variables. Mean number of morbidities per person is 3.51±1.69. Higher mean was noticed in females 3.97±1.82 than in males 3.02±1.39. Whereas, highest mean was observed in the age group >80years i.e. 4.17±1.65, and the least in the age group 60-64 i.e. 3.28±1.53. Moreover, greater mean was seen in literate 3.53±1.75 compared to illiterate i.e. 3.49±1.62. Marital status based diverse means were also recorded for e.g. 4.40±2.01 in widowed and 3.14±1.07 in singles.

Table-2 displays the morbidities in decreasing order of magnitude observed in the geriatric population stratified by gender. Hypertension had the highest prevalence in 105 (61.4%) which was statistically significant p<0.005, comprising of higher number of females 63 (71.6%) than

<table>
<thead>
<tr>
<th>Socio-demographic Variables</th>
<th>Number of patients</th>
<th>Total number of morbidities</th>
<th>Mean number of morbidities per person ±S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-64</td>
<td>78</td>
<td>265</td>
<td>3.28±1.53</td>
</tr>
<tr>
<td>65-70</td>
<td>32</td>
<td>117</td>
<td>3.12±1.39</td>
</tr>
<tr>
<td>70-74</td>
<td>23</td>
<td>88</td>
<td>3.78±1.98</td>
</tr>
<tr>
<td>75-80</td>
<td>20</td>
<td>60</td>
<td>4.15±2.10</td>
</tr>
<tr>
<td>&gt;80</td>
<td>18</td>
<td>71</td>
<td>4.17±1.65</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>83</td>
<td>252</td>
<td>3.02±1.39</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>349</td>
<td>3.97±1.82</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>93</td>
<td>327</td>
<td>3.49±1.62</td>
</tr>
<tr>
<td>Literate</td>
<td>78</td>
<td>274</td>
<td>3.53±1.75</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>7</td>
<td>22</td>
<td>3.14±1.07</td>
</tr>
<tr>
<td>Married</td>
<td>154</td>
<td>537</td>
<td>3.47±1.68</td>
</tr>
<tr>
<td>Widowed</td>
<td>10</td>
<td>42</td>
<td>4.40±2.01</td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td>601</td>
<td>3.51±1.69</td>
</tr>
</tbody>
</table>

Table-2: Frequency of morbidities according to socio-demographic characteristics and their mean with standard deviation.

<table>
<thead>
<tr>
<th>Morbidities</th>
<th>Male n=83 (%)</th>
<th>Female n=88 (%)</th>
<th>Total n=171 (%)</th>
<th>P value of chi square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>42(50.6)</td>
<td>63(71.6)</td>
<td>105(61.4)</td>
<td>0.005*</td>
</tr>
<tr>
<td>Anaemia</td>
<td>20(24.1)</td>
<td>60(68.2)</td>
<td>80(46.8)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Diabetes</td>
<td>20(24.1)</td>
<td>39(44.3)</td>
<td>59(34.5)</td>
<td>0.005*</td>
</tr>
<tr>
<td>Arthritis</td>
<td>19(22.9)</td>
<td>27(30.7)</td>
<td>46(26.9)</td>
<td>0.328</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>24(28.9)</td>
<td>19(21.6)</td>
<td>43(25.1)</td>
<td>0.294</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>23(27.7)</td>
<td>18(20.5)</td>
<td>41(24.0)</td>
<td>0.267</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>3(3.6)</td>
<td>25(28.4)</td>
<td>28(16.4)</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>14(16.9)</td>
<td>11(12.5)</td>
<td>25(14.6)</td>
<td>0.419</td>
</tr>
<tr>
<td>Chronic liver disease</td>
<td>5(6.0)</td>
<td>17(19.3)</td>
<td>22(12.9)</td>
<td>0.01*</td>
</tr>
<tr>
<td>Depression</td>
<td>8(9.6)</td>
<td>10(11.4)</td>
<td>18(10.5)</td>
<td>0.713</td>
</tr>
<tr>
<td>Stroke</td>
<td>6(7.2)</td>
<td>10(11.4)</td>
<td>16(9.4)</td>
<td>0.353</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
<td>14(16.9)</td>
<td>0(0)</td>
<td>14(8.2)</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>5(6.0)</td>
<td>9(10.2)</td>
<td>14(8.2)</td>
<td>0.316</td>
</tr>
<tr>
<td>Asthma</td>
<td>8(9.6)</td>
<td>4(4.5)</td>
<td>12(7.0)</td>
<td>0.193</td>
</tr>
<tr>
<td>Parkinson</td>
<td>9(10.8)</td>
<td>3(3.4)</td>
<td>12(7.0)</td>
<td>0.05*</td>
</tr>
<tr>
<td>Cancer</td>
<td>3(3.6)</td>
<td>8(9.1)</td>
<td>11(6.4)</td>
<td>0.145</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>6(7.2)</td>
<td>4(4.5)</td>
<td>10(5.8)</td>
<td>0.455</td>
</tr>
<tr>
<td>Haemorrhoids</td>
<td>5(6.0)</td>
<td>5(5.7)</td>
<td>10(5.8)</td>
<td>0.924</td>
</tr>
<tr>
<td>Peptic ulcer disease</td>
<td>4(4.8)</td>
<td>5(5.7)</td>
<td>9(5.3)</td>
<td>0.80</td>
</tr>
<tr>
<td>Dementia</td>
<td>1(1.2)</td>
<td>8(9.1)</td>
<td>9(5.3)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>5(6.0)</td>
<td>3(3.4)</td>
<td>8(4.7)</td>
<td>0.522</td>
</tr>
<tr>
<td>Alzheimer</td>
<td>3(3.6)</td>
<td>0(0)</td>
<td>3(1.8)</td>
<td>0.07</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>1(1.2)</td>
<td>22(23.3)</td>
<td>23(13.5)</td>
<td>0.59</td>
</tr>
<tr>
<td>Heart failure</td>
<td>2(2.4)</td>
<td>1(1.1)</td>
<td>3(1.8)</td>
<td>0.526</td>
</tr>
</tbody>
</table>

*P value <0.05 is taken as significant.
QUESTIONNAIRE

Interview No: ________________

Socio-demographic data:
Age: ________________
Sex: □ Male □ Female
Educational Status: □ Literate □ Iliterate
Marital status: □ Unmarried □ Married □ Divorced □ Widow
Occupation: __________________________
Address: __________________________

Date of Admission: __________________________

Clinical Examination:
Presenting Complaints:
1) __________________________
2) __________________________
3) __________________________
1) Are you being treated for any medical condition(s) at present? □ Yes □ No
2) If yes, then for what?

Past history:
Medical history:
3) Did you have any medical illness before? □ Yes □ No
4) If yes, what problem(s) did you have? __________________________

Surgical History:
5) Have you ever been hospitalized for any illnesses or operations? If yes, please explain __________________________
6) Did you have any accident/Trauma before? □ Yes □ No __________________________

Patient Blood Profile:
1. Blood glucose level: __________________________
2. Cholesterol level: __________________________
3. Urea level: __________________________
4. Creatinine level: __________________________

General Physical Examination:
Built: □ Good □ Poor
General mental status: □ Normal □ Abnormal
Weight: □ Underweight □ Normal □ Overweight
Pallor: □ Present □ Absent
Pedal edema: □ Present □ Absent
Pulse rate: ________________ Respiratory rate: ________________
Blood Pressure: __________________________

Systemic review:
CVS:
1) Have you ever been diagnosed with hypertension? □ Yes □ No

Respiratory:
4) Do you have any breathing problems? □ Yes □ No
5) Have you been diagnosed with any of these? (See file records/past records)
□ Asthma □ Chronic obstructive pulmonary disease
□ Tuberculosis □ Pneumonia

CNS:
6) Has anyone ever told you that you are facing memory loss? □ Yes □ No
7) If yes, then mode of documentation?
□ Documents □ Self □ Provisional diagnosis
8) Have you been diagnosed for tremors? □ Yes □ No
9) If yes, are they?
□ Resting tremors □ Intentional tremors
10) Have you been diagnosed with any of the following? (See file records/past records)
□ Alzheimer □ Parkinson □ Depression □ Dementia

GIT:
11) Do you experience GI upsets?
□ Diarrhoea □ Constipation
12) Have you been diagnosed with any of the following?
□ Peptic ulcer disease □ Haemorrhoids □ Chronic hepatitis
□ Hepatic encephalopathy □ Diabetes Mellitus

Urogenital:
13) Has a doctor ever told you that you have any kidney stones? □ Yes □ No
14) Has a doctor ever told you that you have chronic kidney disease? □ Yes □ No
15) Have you ever undergone dialysis? □ Yes □ No
16) Have you undergone prostate surgery in case of males? □ Yes □ No
17) Have you undergone hysterectomy in case of females? □ Yes □ No
18) Have you ever been diagnosed with benign prostatic hyperplasia? □ Yes □ No

Musculoskeletal:
19) Do you have history of falls and fractures? □ Yes □ No
20) If yes, have you been diagnosed with osteoporosis? □ Yes □ No
21) Has a doctor diagnosed you any arthritis? □ Yes □ No
22) If yes, then which one?
□ Osteoarthritis □ Rheumatoid arthritis
males 42 (50.6%). This was followed by anaemia which was 80(46.8%) p<0.001 [Females: 60(68.2%) vs. males: 20(24.1%)] and Diabetes mellitus with 59(34.5%) [Females: 39(44.3%) vs. males: 20(24.1%)] p<0.005. A significantly higher proportion of geriatric women suffered from osteoporosis [females: 25(28.4%) vs. males: 3(3.6%)], chronic liver disease [Females: 17(19.3%) vs. males: 5(6.02%)], dementia (females: 8(9.1%) vs. males: 1(1.2%)). On the other hand, the disease more frequently encountered in males than females was Parkinson’s disease [males: 9(10.8%) vs. females: 3(3.4%)]. Whereas, benign prostatic hyperplasia in males accounted for 14 cases (16.9 %).

Discussions
Among 171 subjects, a total of 601 illnesses were registered. This study highlights that the most common morbidity was hypertension, more in females than in males. The results are consistent with the studies conducted in Karachi,4 India,6,9 and South Korea.10

Anaemia was found to be the 2nd most common morbidity. Age related anaemia, a common morbidity is due to declining ratio of bone marrow cells to fat cells and a reduced marrow response on stimulation from erythropoietin.9,11 Higher ratio in geriatric women than men is related to multiple pregnancies, nutritional challenges and other gynaecological problems. Third in the list is diabetes mellitus, also highlighted by other studies.8,10 Elderly are threatened for harbouring type 2 diabetes mellitus due to the combination of rising insulin resistance and falling pancreatic islet function.

Interestingly, gender based diversity was observed in our study. For example, coronary heart disease was 2nd most common in males and 6th most common in females (Table-2). Aging comes with compromised elasticity and increased atherosclerotic thickening of the major arteries.

Musculoskeletal ailments like osteoporosis and arthritis stand as 4th and 5th most prevalent diseases in females, being much lower amongst males. Hormonal withdrawal in elderly females leads to such osteoporotic and degenerative changes.

These findings complemented those observed in other studies.6,10 Highest mean in widowed was reflected suggesting their financial dependence on others for catering their medical needs in our setup. This has also been documented by another study.6 Interestingly, larger number of diseased subjects were illiterate and had low awareness about the preventive measures for these morbidities.

Limitation
The subjects enrolled are heterogeneous with regard to their ethnicity, locality and time of presentation, thereby limiting the generalization of their findings. Furthermore, morbidities were recorded using patients' files so any undiagnosed disease was not included.

Conclusion
The three most commonly encountered diseases in the geriatric population are hypertension, anaemia and diabetes mellitus. This data will enhance understanding of a dire need to create awareness among people regarding active ageing. Active aging is the process of optimizing health opportunities in early life, so that the risk of developing diseases in later life is substantially reduced.

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Conflict of Interest: None to declare.

Funding Disclosure: None to declare.

References