

## ORIGINAL ARTICLE

**Factors Associated with the Morbidity Pattern among the Geriatric Population of Jammu District, Jammu and Kashmir: A Cross-Sectional Study***Himani Nanda<sup>1\*</sup>, V. K. Shivgotra<sup>1</sup>, Manjeet Kumar<sup>1</sup>**<sup>1</sup>Department of Statistics, University of Jammu, Jammu-180006 (J&K) India***Abstract:**

*Background:* The geriatric population is increasing in India as well as in the world. Multimorbidity prevailing among the geriatric population is an important health challenge for most of the developing countries. *Aim and Objectives:* To assess the prevalence of morbidities prevailing among the geriatric population of Jammu district, J&K and to determine association of these morbidities with several socio-demographic variables. *Material and Methods:* A cross-sectional study was conducted among the geriatric population of Jammu district, J&K by using simple random and systematic sampling. Logistic regression model software IBM SPSS version 24.0 was used to study the effect of various socio-demographic variables on the prevalence of multimorbidity. *Results:* A total of 750 geriatric persons were included in our study in which the majority were suffering from vision problems (51.5%), followed by arthritis (40.7%), hypertension (39.3%), and so on. Adjusted Odds Ratio (AOR) and Crude Odds Ratio (COR) were calculated. It was found that increasing age, high socio-economic status, etc were main predictors of prevalence of multimorbidity. *Conclusion:* The present study highlighted major health problems faced by the geriatric population. So, there is an urgent need to improve geriatric health services to improve their quality of life.

**Keywords:** Ageing, Geriatric Population, Morbidity, Multimorbidity, Prevalence

**Introduction**

Ageing has been an inescapable part of human life. It is a complicated, complex and unavoidable

process that begins before birth and continues throughout all the stages of life [1]. It is described as a natural and biological phenomenon that has a profound connection not only with the individuals but also with the society [2].

WHO defines healthy ageing as the process of developing and maintaining the functional ability that enables the well being in older age [3]. This population ageing can be seen as a success story for government, health policies and socio-economic growth but it also challenges the society to maximize the health and functional ability of geriatric population for their social participation and safety [4].

Due to downward trends in fertility and mortality rates, the population around the world is growing old at higher rates with enhanced life expectancy [5]. The world's geriatric population is growing at faster rates. Elderly or old age people are individuals who exceed the average human beings' life span. The Government of India has implemented a "National Policy on Older Persons in January, 1999" which defines persons having age 60 years and above as elder [6]. The current statistics show that India's geriatric population constitutes 8%-9% of its total population i.e. there are 106 million geriatric persons across the nation making India the second largest worldwide population of geriatric citizens [7]. This share of

the population is anticipated to rise from 8% to almost 12.6% in 2025 and to 19% in the year 2050. This growing healthy population is a source of both happiness and anxiety. Happiness because these people are living longer and healthier lives. Anxiety is about how to respond to future with larger geriatric population with their rightful demands and needs [8]. The health of the geriatric population has sometimes been treated as less important than that of the younger population either because older people are considered less productive or because ill health has seemed as an inevitable consequence of later life [9].

From the morbidity point of view, chronic morbidities occur in at least 50% of the Indian geriatric population. This implies that ageing population suffers from chronic medical conditions and there is an increase in incidence of the prevalence of multiple chronic conditions. Multimorbidity is defined as the simultaneous occurrence of several adverse conditions to the same person. Old age is not a disease in itself but the geriatric persons are exposed to several long-term diseases such as diabetes, hypertension, cardiovascular diseases, arthritis, asthma, cancer, kidney diseases, vision problem, etc. Many studies have been conducted on the prevalence of multimorbidity in Europe, Bangladesh and Canada. But in developing countries like India, limited studies have been carried out on the prevalence of multimorbidity [10]. Hence, the present study was conducted to study the morbidity pattern among the geriatric population and to determine the association of these morbidities prevailing among the geriatric population of Jammu district, J&K with several socio-demographic variables.

#### **Materials and Methods:**

##### **Ethical Consideration:**

The study was approved by Department of Statistics, University of Jammu and the Institutional Ethics Committee of Government Medical College, Jammu.

##### **Study Design and Participants:**

With the objectives of determining the morbidity pattern among the geriatric population, a cross-sectional study was conducted in Jammu district, J&K during the period 1<sup>st</sup> October, 2017 to 30<sup>th</sup> November, 2019. All those persons having age 60 years and above were explained the objectives and the purpose of the study. Those who were willing to participate and have given their consent were included in the study.

##### **Sample Size Determination:**

The required sample size was determined by single proportion formula

$$n = \frac{Z^2 pq}{d^2}$$

by considering 95% confidence interval, the z-value at 5% level of significance for the two-tailed test is 1.96, 39.0% is the prevalence of diabetes among the geriatric population taken from the study carried out in Kalaburgi, Karnataka in 2016 by Reshmi *et al.* [11] with absolute precision margin of error 3.5% and with usual statistical constant (Type-I error = 0.05) and (Type-II error = 0.2) which gave us an approximate sample size of 746. Hence, we included a sample of 750 geriatric persons in our study.

##### **Sampling Methods:**

Data were collected from the geriatric population residing in various tehsils of Jammu district, J&K by visiting their homes, district and sub-district

hospitals, primary health centres, community health centres, old age homes, etc. Simple random sampling technique was used to select the urban and rural geriatric households residing there and systematic sampling technique was used for surveying old aged people in hospitals; the sampling fraction used varies from time to time.

#### Data Collection:

A pre-designed and pre-tested questionnaire was used for data collection. Data regarding the socio-demographic profile and the various morbidities prevailing among the geriatric population were collected. Modified Kuppaswamy scale and Udai Parekh scale were used for measuring the socio-economic status of urban and rural old aged people respectively [12]. A geriatric depression scale designed by Yesavage and Sherry [13] was used for computing the depression level among this population.

#### Data Analysis:

Data were entered by using excel spreadsheets and then compiled, tabulated and analyzed by using software IBM SPSS software (version 24.0 for windows; SPSS Inc., Chicago, USA). Descriptive statistics were calculated for all variables. Binary logistic regression was performed to identify significant risk factors for no morbidity and multimorbidity among the geriatric population of Jammu district, J&K. Adjusted Odds Ratio (AOR) and 95% confidence intervals were calculated for all the variables in the model. The significance level of  $p < 0.05$  was assumed for all the statistical analysis in the study.

This paper is based on logistic regression analysis to estimate the dependent variable multimorbidity which was recorded in binary form (i.e. an elderly with one morbidity or no morbidity was taken as 0

whereas an elderly with two or more morbidities was taken as 1 based on various independent variables). This regression model was used to determine the percentage variation in the dependent variable based on independent variables, to understand the effect of covariates and to estimate the probability of whether certain event occurred or not. The multiple regression model noted was put in the form:

$$Y(x) = \ln \left\{ \frac{\Pr(Y=1|x)}{\Pr(Y=0|x)} \right\} = \beta_0 + (\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p) + e$$

where  $\beta_0, \beta_1, \beta_2, \dots, \beta_p$  were regression coefficients  $x_1, x_2, \dots, x_p$  were independent variables and  $e$  was the error term.

#### Results:

In the present study, 750 study subjects were included, out of which 392 (52.3%) were males and 358 (47.7%) were females. Majority of the respondents 268 (35.7%) were in the age group of 60-64 years, 211 (28.1%) were having age 65-69 years, followed by 124 (16.5%) respondents in the age group of 70-74 years, 65 (8.7%) in the age group of 75-79 years, 53 (7.1%) respondents in the age group of 80-84 years and only 29 (3.9%) respondents were having age 85 years and above. Table 1 showed the socio-demographic profile of the geriatric population of Jammu district, J&K. Among total geriatric population included in the study, 383 (51.1%) and 367 (48.9%) respondents belonged to urban and rural areas respectively. Most of the geriatric population i.e. 584 (77.9%) belonged to the Hindu religion followed by 89 (11.9%) respondents belonging to the Sikh religion whereas the remaining 77 (10.3%) respondents belonged to the Muslim religion. 497 (66.3%) geriatric persons were from nuclear families

whereas the remaining 253 (33.7%) respondents were from joint families.

Nearly two-third i.e. 539 (71.9%) of the geriatric population studied was married, followed by 204 (27.2%) widow/widowers, 5 (0.7%) respondents were single and only 2 (0.3%) old aged people were divorced. Economically, 387 (51.6%) respondents were living independently, followed by 221 (29.5%) respondents who were completely dependent on their spouse or others and 142 (18.9%) respondents who were partially dependent on others.

Out of the total 750 respondents, 284 (37.9%) belonged to lower-middle class, 214 (28.5%) respondents belonging to upper-middle class, followed by 150 (20.0%) respondents in upper-

lower category, 98 (13.1%) respondents belonging to upper class whereas the remaining 4 (0.5%) respondents belonged to lower class category. Majority of the geriatric population i.e. 670 (89.5%) were living with their children and spouse, 39 (5.2%) respondents were living with their spouse only, 22 (2.9%) were living alone whereas the other 17 (2.3%) respondents were living with their relatives respectively. At least half of the geriatric population 372 (49.6%) were suffering from one morbidity, 258 (34.4%) respondents were having two morbidities, whereas the other 90 (12.0%) respondents were suffering from three morbidities, 26 (3.5%) were having more than three morbidities and the remaining 4 (0.5%) respondents were having no morbidity at all.

**Table 1: Distribution of Study Subjects According to Socio-Demographic Profile**

| Variables                    | Males<br>N (%) | Females<br>N (%) | Total<br>N (%) |
|------------------------------|----------------|------------------|----------------|
| <b>Gender</b>                | 392 (52.3)     | 358 (47.7)       | 750 (100.0)    |
| <b>Age-groups (in years)</b> |                |                  |                |
| 60-64                        | 106 (27.0)     | 162 (45.3)       | 268 (35.7)     |
| 65-69                        | 123 (31.4)     | 88 (28.6)        | 211 (28.1)     |
| 70-74                        | 70 (17.9)      | 54 (15.1)        | 124 (16.5)     |
| 75-79                        | 42 (10.7)      | 23 (6.4)         | 65 (8.7)       |
| 80-84                        | 33 (8.4)       | 20 (5.6)         | 53 (7.1)       |
| 85 and above                 | 18 (4.6)       | 11 (3.1)         | 29 (3.9)       |
| <b>Area</b>                  |                |                  |                |
| Urban                        | 214 (54.6)     | 169 (47.2)       | 383 (51.1)     |
| Rural                        | 178 (45.4)     | 189 (52.8)       | 367 (48.9)     |
| <b>Religion</b>              |                |                  |                |
| Hindu                        | 299 (76.3)     | 285 (79.6)       | 584 (77.9)     |
| Muslim                       | 49 (12.5)      | 28 (7.8)         | 77 (10.3)      |
| Sikh                         | 44 (11.2)      | 45 (12.6)        | 89 (11.9)      |

*Continued...*

| <b>Variables</b>                | <b>Males<br/>N (%)</b> | <b>Females<br/>N (%)</b> | <b>Total<br/>N (%)</b> |
|---------------------------------|------------------------|--------------------------|------------------------|
| <b>Family type</b>              |                        |                          |                        |
| Nuclear                         | 255 (65.1)             | 242 (67.6)               | 497 (66.3)             |
| Joint                           | 137 (34.9)             | 116 (32.4)               | 253 (33.7)             |
| <b>Marital status</b>           |                        |                          |                        |
| Single                          | 5 (1.3)                | 0 (0.0)                  | 5 (0.7)                |
| Married                         | 332 (84.7)             | 207 (57.8)               | 539 (71.9)             |
| Widow/Widower                   | 54 (13.8)              | 150 (41.9)               | 204 (27.2)             |
| Divorced                        | 1 (0.3)                | 1 (0.3)                  | 2 (0.3)                |
| <b>Dependency status</b>        |                        |                          |                        |
| Living independent              | 363 (92.6)             | 24 (6.7)                 | 387 (51.6)             |
| Partially dependent on others   | 19 (4.8)               | 123 (34.4)               | 142 (18.9)             |
| Totally dependent               | 10 (2.6)               | 211 (58.9)               | 221 (29.5)             |
| <b>Pension receiving status</b> |                        |                          |                        |
| No                              | 140 (35.7)             | 204 (57.0)               | 344 (45.9)             |
| Yes                             | 252 (64.2)             | 154 (43.0)               | 406 (54.1)             |
| <b>Socio-Economic Status</b>    |                        |                          |                        |
| Lower                           | 0 (0.0)                | 4 (1.1)                  | 4 (0.5)                |
| Upper lower                     | 69 (17.6)              | 81 (22.6)                | 150 (20.0)             |
| Lower middle                    | 150 (38.3)             | 134 (37.4)               | 284 (37.9)             |
| Upper middle                    | 105 (26.8)             | 109 (30.4)               | 214 (28.5)             |
| Upper                           | 68 (17.3)              | 30 (8.4)                 | 98 (13.1)              |
| <b>Living status</b>            |                        |                          |                        |
| Living alone                    | 10 (2.6)               | 12 (3.4)                 | 22 (2.9)               |
| Living with spouse              | 19 (4.9)               | 20 (5.6)                 | 39 (5.2)               |
| Living with children and spouse | 352 (90.0)             | 318 (88.8)               | 670 (89.5)             |
| Living with relatives           | 9 (2.3)                | 8 (2.2)                  | 17 (2.3)               |
| Others                          | 1 (0.3)                | 0 (0.0)                  | 1 (0.1)                |
| <b>Number of morbidities</b>    |                        |                          |                        |
| No morbidity                    | 4 (1.0)                | 0 (0.0)                  | 4 (0.5)                |
| One morbidity                   | 210 (53.6)             | 162 (45.3)               | 372 (49.6)             |
| Two morbidities                 | 128 (32.7)             | 130 (36.3)               | 258 (34.4)             |
| Three morbidities               | 40 (10.2)              | 50 (14.0)                | 90 (12.0)              |
| More than three morbidities     | 10 (2.6)               | 16 (4.5)                 | 26 (3.5)               |

BMI was calculated for all study subjects. Distribution of the study population according to BMI was given in Table 2. More than half of the geriatric population 506 (67.5%) was having normal weight, whereas 215 (28.7%) respondents were overweight and only 25 (3.3%) respondents were obese.

Table 3 depicted the gender-wise prevalence of morbidity pattern among the geriatric population of

Jammu district, J&K. The most common morbidity was depression (74.8%) followed by vision problem (51.5%), arthritis (40.7%), hypertension (39.3%), gastrointestinal disorders (38.1%), cataract (30.0%), diabetes (26.5%), body ache (25.9%), asthma (17.6%), cardiovascular diseases (14.7%), insomnia (14.3%), cancer (10.9%), hearing impairment (10.9%), anemia (10.3%) and so on.

**Table 2: Distribution of Study Subjects According to BMI (kg/m<sup>2</sup>)**

| Variables        | Males<br>N (%) | Females<br>N (%) | Total<br>N (%) |
|------------------|----------------|------------------|----------------|
| <b>BMI</b>       |                |                  |                |
| Under weight     | 1 (0.3)        | 1 (0.3)          | 2 (0.3)        |
| Normal weight    | 304 (77.6)     | 202 (56.4)       | 506 (67.5)     |
| Overweight       | 75 (19.1)      | 140 (39.1)       | 215 (28.7)     |
| Class I obesity  | 12 (3.1)       | 13 (3.6)         | 25 (3.3)       |
| Class II obesity | 0 (0.0)        | 2 (0.6)          | 2 (0.3)        |

**Table 3: Prevalence of Morbidity Pattern among the Geriatric Population**

| Morbidities                    | Males<br>(n=392) |            | Females<br>(n=358) |            | Total<br>(n=750) |            |
|--------------------------------|------------------|------------|--------------------|------------|------------------|------------|
|                                | Yes (%)          | No (%)     | Yes (%)            | No (%)     | Yes (%)          | No (%)     |
| <b>Diabetes</b>                | 98 (25.0)        | 294 (75.0) | 101 (28.2)         | 257 (71.8) | 199 (26.5)       | 551 (73.5) |
| <b>Hypertension</b>            | 151 (38.5)       | 241 (61.5) | 144 (40.2)         | 214 (59.8) | 295 (39.3)       | 455 (60.7) |
| <b>Cardiovascular diseases</b> | 64 (16.3)        | 328 (83.7) | 46 (12.8)          | 312 (87.2) | 110 (14.7)       | 640 (85.3) |
| <b>Arthritis</b>               | 133 (33.9)       | 259 (66.1) | 172 (48.0)         | 186 (52.0) | 305 (40.7)       | 445 (59.3) |
| <b>Asthma</b>                  | 75 (19.1)        | 317 (80.9) | 57 (15.9)          | 301 (84.1) | 132 (17.6)       | 618 (82.4) |
| <b>Cancer</b>                  | 41 (10.5)        | 351 (89.5) | 41 (11.5)          | 317 (88.5) | 82 (10.9)        | 668 (89.1) |
| <b>Kidney diseases</b>         | 23 (5.9)         | 369 (94.1) | 23 (6.4)           | 335 (93.6) | 46 (6.1)         | 704 (93.9) |

Continued...

| Morbidities                | Males (n=392) |            | Females (n=358) |            | Total (n=750) |            |
|----------------------------|---------------|------------|-----------------|------------|---------------|------------|
|                            | Yes (%)       | No (%)     | Yes (%)         | No (%)     | Yes (%)       | No (%)     |
| Anaemia                    | 30 (7.7)      | 362 (92.3) | 46 (12.8)       | 312 (87.2) | 76 (10.1)     | 674 (89.9) |
| Depression                 | 286 (73.0)    | 106 (27.0) | 275 (76.8)      | 83 (23.2)  | 561 (74.8)    | 189 (25.2) |
| Vision                     | 218 (55.6)    | 174 (44.4) | 168 (46.9)      | 190 (53.1) | 386 (51.5)    | 364 (48.5) |
| Cataract                   | 115 (29.3)    | 277 (70.7) | 110 (30.7)      | 248 (69.3) | 225 (30.0)    | 525 (70.0) |
| Hearing impairment         | 51 (13.0)     | 341 (87.0) | 31 (8.7)        | 327 (91.3) | 82 (10.9)     | 668 (89.1) |
| Gastrointestinal disorders | 126 (32.1)    | 266 (67.9) | 160 (44.7)      | 198 (55.3) | 286 (38.1)    | 464 (61.9) |
| Insomnia                   | 47 (12.0)     | 345 (88.0) | 60 (16.8)       | 268 (83.2) | 107 (14.3)    | 643 (85.7) |
| Dementia                   | 34 (8.7)      | 358 (91.3) | 30 (8.4)        | 328 (91.6) | 64 (8.5)      | 686 (91.5) |
| Body ache                  | 93 (23.7)     | 299 (76.3) | 101 (28.2)      | 257 (71.8) | 194 (25.9)    | 556 (74.1) |
| Psychological disorders    | 22 (5.6)      | 370 (94.4) | 24 (6.7)        | 334 (93.3) | 46 (6.1)      | 704 (93.9) |
| COPD                       | 27 (6.9)      | 365 (93.1) | 5 (1.4)         | 353 (98.6) | 32 (4.3)      | 718 (95.7) |
| Others                     | 96 (24.5)     | 296 (75.5) | 118 (33.0)      | 240 (67.0) | 214 (28.5)    | 536 (71.5) |

The pseudo R Square table was used to compute the strength of logistic regression. In the logistic regression, the indication of the amount of variation in the dependent variable given by Cox and Snell R Square and Nagelkerke R Square was also known as Pseudo R Square. The values in the given table were 0.088 and 0.117 respectively indicating that between 8.8% and 11.7%, the variation in the independent variable multimorbidity was explained by set of independent variables used in the model (Table 4).

Hosmer and Lemeshow test was used for model adequacy test in the binary logistic regression model. For this fit, a model is said to be poor if the p-value is less than 0.05. Hence for the prevalence of multimorbidity among the geriatric population, chi-square=8.510 with 8 d.f. and p-value 0.385 indicated that there was no significant difference between the observed and predicted values which implies that the model fit the data at an acceptable level (Table 5).

**Table 4: Pseudo R Square Table for Multimorbidity**

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-------------------|----------------------|---------------------|
| 1    | 970.873           | 0.088                | 0.117               |

**Table 5: Contingency Table for Hosmer and Lemeshow Test**

| Multimorbidity = No |          | Multimorbidity = Yes |          | Total | <sup>2</sup> | d.f. | P     |
|---------------------|----------|----------------------|----------|-------|--------------|------|-------|
| Observed            | Expected | Observed             | Expected |       |              |      |       |
| 52                  | 53.180   | 21                   | 19.820   | 73    | 8.51         | 8    | 0.385 |
| 46                  | 49.368   | 29                   | 25.632   | 75    |              |      |       |
| 46                  | 46.538   | 30                   | 29.462   | 76    |              |      |       |
| 42                  | 42.223   | 32                   | 31.777   | 74    |              |      |       |
| 41                  | 40.404   | 35                   | 35.596   | 76    |              |      |       |
| 40                  | 37.450   | 35                   | 37.550   | 75    |              |      |       |
| 39                  | 34.274   | 36                   | 40.726   | 75    |              |      |       |
| 30                  | 30.216   | 45                   | 44.784   | 75    |              |      |       |
| 30                  | 24.613   | 45                   | 50.387   | 75    |              |      |       |
| 10                  | 17.734   | 66                   | 58.266   | 76    |              |      |       |

Table 6 showed the factors associated with the multimorbidity pattern among the geriatric population of Jammu district, J&K. The prevalence of multimorbidity among the geriatric population was found to be 49.9%. It was found to be more prevalent among men (54.7%) as compared to that of women (45.4%). Also, the prevalence of multimorbidity increases with the increase in age from (41.4%) in the age group of 60-64 years to (72.4%) in the age group of 85 years and above. Similarly, the prevalence of multimorbidity among geriatric population decreased with the increase in socio-economic status i.e. the people having low socio-economic status were more prevalent to multimorbidity (75.0%) than that of people with high socio-economic status (49.9%). The results of logistic regression revealed that gender, the age group of 65-69 years and 70-74 years and the people who were living independently were significantly associated with the patterns of multimorbidity. The crude odds ratio of multimorbidity

prevalence was about 1.187 times higher for people living in urban areas (95% CI: 0.891-1.580) compared to those of people living in rural areas, 1.045 times higher for people living in joint families (95% CI: 0.772-1.414) to that of people living in nuclear families. The crude odds ratio of prevalence of multimorbidity decreased with an increase in socio-economic status. Geriatric people having upper-lower socio-economic status were 3.533 times more likely prone to multimorbidity (95% CI: 0.355-35.164) to those having lower socio-economic status.

The association of socio-demographic variables concerning multimorbidity revealed that increasing socio-economic status (upper-lower AOR=3.835; lower-middle AOR=1.199 and upper class AOR=1.202); totally dependent AOR=1.305; people living in joint families AOR=1.057, people living in urban areas having AOR=1.255 were mainly the predictors of multimorbidity among the geriatric population of Jammu district, J&K.



**Table 6: Factors Associated with the Prevalence of Multimorbidity among the Geriatric Population**

| Variables                     | Multimorbidity present (%) | COR (95% CI)        | P (COR) | AOR (95% CI)        | P (AOR) |
|-------------------------------|----------------------------|---------------------|---------|---------------------|---------|
| <b>Gender</b>                 |                            |                     |         |                     |         |
| Males                         | 196 (54.7%)                | 0.687 (0.516-0.917) | 0.011   | 0.830 (0.444-1.551) | 0.560   |
| Females                       | 178 (45.4%)                | <b>Reference</b>    | -       | <b>Reference</b>    | -       |
| <b>Age-groups (in years)</b>  |                            |                     |         |                     |         |
| 60-64                         | 111 (41.4%)                | <b>Reference</b>    | 0.000   | <b>Reference</b>    | 0.002   |
| 65-69                         | 100 (47.4%)                | 0.269 (0.115-0.630) | 0.002   | 0.271 (0.109-0.674) | 0.005   |
| 70-74                         | 71 (57.3%)                 | 0.343 (0.146-0.809) | 0.015   | 0.361 (0.146-0.895) | 0.028   |
| 75-79                         | 36 (55.4%)                 | 0.510 (0.210-1.241) | 0.138   | 0.530 (0.209-1.344) | 0.181   |
| 80-84                         | 35 (66.0%)                 | 0.473 (0.183-1.223) | 0.122   | 0.498 (0.184-1.345) | 0.169   |
| 85 and above                  | 21 (72.4%)                 | 0.741 (0.274-2.000) | 0.554   | 0.799 (0.286-2.234) | 0.669   |
| <b>Area</b>                   |                            |                     |         |                     |         |
| Urban                         | 175 (47.7%)                | 1.187 (0.891-1.580) | 0.242   | 1.255 (0.748-2.103) | 0.390   |
| Rural                         | 199 (52.0%)                | <b>Reference</b>    | -       | <b>Reference</b>    | -       |
| <b>Religion</b>               |                            |                     |         |                     |         |
| Hindu                         | 280 (47.9%)                | <b>Reference</b>    | 0.054   | <b>Reference</b>    | 0.029   |
| Muslim                        | 39 (50.6%)                 | 0.569 (0.360-0.900) | 0.016   | 0.521 (0.315-0.863) | 0.011   |
| Sikh                          | 55 (61.8%)                 | 0.634 (0.342-1.178) | 0.149   | 0.692 (0.341-1.405) | 0.308   |
| <b>Family type</b>            |                            |                     |         |                     |         |
| Nuclear                       | 246 (49.5%)                | <b>Reference</b>    | -       | <b>Reference</b>    | -       |
| Joint                         | 128 (50.6%)                | 1.045 (0.772-1.414) | 0.777   | 1.057 (0.733-1.523) | 0.768   |
| <b>Dependency status</b>      |                            |                     |         |                     |         |
| Living independent            | 176 (45.5%)                | <b>Reference</b>    | 0.018   | <b>Reference</b>    | -       |
| Partially dependent on others | 84 (59.2%)                 | 0.783 (0.562-1.090) | 0.147   | 0.950 (0.499-1.809) | 0.875   |
| Totally dependent             | 114 (51.6%)                | 1.359 (0.888-2.082) | 0.158   | 1.305 (0.816-2.088) | 0.266   |
| <b>Socio-Economic status</b>  |                            |                     |         |                     |         |
| Lower                         | 3 (75.0%)                  | <b>Reference</b>    | -       | <b>Reference</b>    | -       |
| Upper lower                   | 75 (50.0%)                 | 3.533 (0.355-5.164) | 0.282   | 3.835 (0.337-4.698) | 0.279   |
| Lower middle                  | 132 (46.5%)                | 1.178 (0.707-1.962) | 0.530   | 1.199 (0.585-2.459) | 0.620   |
| Upper middle                  | 119 (55.6%)                | 1.023 (0.645-1.621) | 0.924   | 0.999 (0.520-1.918) | 0.997   |
| Upper                         | 45 (49.9%)                 | 1.475 (0.913-2.385) | 0.112   | 1.202 (0.720-2.008) | 0.481   |

**Discussion:**

The trend of decreasing percentage of geriatric population with an increase in age was observed in the study [14-16]. The proportion of male subjects outnumbered female subjects in our study which is similar to the pattern observed in Aligarh [17]. While in some other studies, the number of females was more as compared to the number of males [10, 18]. Our study reported that most of the geriatric persons were Hindus (77.9%) followed by Sikhs (11.9%). In another study conducted in Ghaziabad district, it was observed that majority of the respondents (85.5%) were Hindus [19]. In our study, 65.1% of the people were from nuclear families whereas 34.9% were from joint families. Around 48.9% of the geriatric population belonged to nuclear families in Mysore, Karnataka [20]. Here, 71.9% of the total geriatric population was married followed by 27.2% widow/widowers who were similar to the studies conducted in Odisha and Uttar Pradesh [10, 21]. Our study reported that according to Kuppaswamy's socio-economic status scale classification, 37.9% of the total population belonged to lower-middle class, followed by upper-middle class (28.5%), upper-lower class (20.0%) and upper class (13.1%). This is contrary to the study conducted in Karnataka which reported that majority of the population belonged to the lower class (70%) followed by upper-lower class (29%) respectively [11].

Our study revealed that majority of the study population (51.6%) was living independently, followed by geriatric persons who were totally dependent on others (29.5%). Similar trends were observed in Bargarh district, Odisha where 42.3% of the geriatric population was living independent [10]. In our study, 67.5% of the total

geriatric population was having normal weight, followed by overweight (28.7%), obesity 3.3%. In another study conducted in the geriatric population in an urban area of North India, it was found that 41.0% were having normal weight whereas about 16.1% of the total geriatric population was overweight [22].

The morbidity pattern observed in our study depicted that the most common prevailing morbidity among the geriatric population of Jammu district was depression (74.8%) followed by vision (51.5%), arthritis (40.7%), hypertension (39.9%), gastrointestinal disorders (38.1%), cataract (30.0%) and diabetes (26.5%) and so on. In an urban area of North India, the same morbidity pattern was observed where eye problems were observed in 68.1% subjects followed by hypertension (44.0%), gastrointestinal disorders (38.6%) and so on [22]. It was seen in our study that morbidities like diabetes, hypertension, arthritis, cataract, gastrointestinal disorders, cancer and kidney problems, etc. were found to be more prevalent among females than in males whereas cardiovascular diseases, asthma, dementia, etc were prevailing more among the male subjects than in females. Similar findings were observed in studies conducted in Varanasi and Chandigarh respectively [23-24].

The results of logistic regression revealed that gender, age, dependency status and the low socio-economic status were the main predictors of multimorbidity among geriatric population of Jammu district, J&K. This was in accordance with the study conducted in Bargarh district of Odisha where gender, life style factors and dependency status were the main predictors of multimorbidity

[10]. The strengths of the study were that very few studies were conducted on the geriatric population in J&K. It provided an update on the prevalence of several morbidities among the geriatric population and the various risk factors associated with the prevalence of multimorbidity.

### Conclusions

Our study highlighted the major health problems suffered by the geriatric population of Jammu district, J&K. So, there is an urgent need to improve the health care facilities for the geriatric population. Awareness among geriatric population

should be created for regular medical checkups to ensure prevention and early detection of morbidities. It is also important to have geriatric units with specialized professionals along with supporting health care services to deal with geriatric morbidities adequately.

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