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ORIGINAL ARTICLE

Prevalence and Associated Factors of Low Back Pain Among Elderly Persons in an Urban Resettlement Colony of Delhi

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Abstract
Background: Low back pain (LBP) is a prevalent musculoskeletal problem globally and a leading cause of disability-adjusted life years (DALY) among all age groups. Elderly persons aged 60 years and over are particularly vulnerable, and the proportion of the ageing population is increasing in India. Prevalence of LBP among elderly persons in urban areas of India range from 17.5 to 20.7%. **Methods:** This is a cross-sectional study conducted in an urban resettlement colony of Delhi to determine the one-year prevalence of LBP among elderly persons. Simple random sampling was applied to select participants. LBP was defined as pain lasting more than a day in the area between the lower costal margin and the gluteal folds. LBP due to injuries or organic causes were excluded. The study also assessed association of LBP with various socio-demographic, behavioural and clinical characteristics of the participants. Statistical analysis was performed with multiple logistic regression. A p-value <0.05 was considered statistically significant. **Results:** The study included 526 participants. The one-year prevalence of LBP was 21.5% with men and women being 27.4% and 12.2%, respectively. It was found that poverty, depression, bad self-reported health, occurrence of two or more self-reported chronic conditions, and being overweight were independently associated with LBP in the multivariable logistic regression. **Conclusion:** Health system should integrate screening, management of LBP and rehabilitation in routine elderly care. Addressing poverty, chronic diseases, and mental health is also essential to reduce the burden of LBP.

Key words: Low back pain, prevalence, cross-sectional study, associated-factors

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Graphical Abstract

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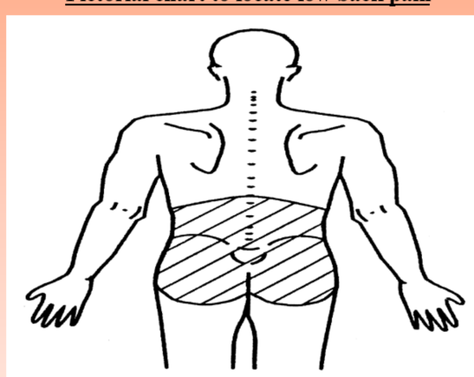
Pictorial chart to locate low back pain



Conclusions Health system should integrate screening, management of LBP and rehabilitation in routine elderly care. Addressing poverty, chronic diseases, and mental health is also essential to reduce the burden of LBP

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Introduction

Low back pain is defined as pain lasting more than a day in an area between the lower costal margin and the gluteal folds with or without radiation into leg [1]. Low back pain (LBP) was the most common musculoskeletal problem globally [2]. It was the leading cause of activity limitation and absenteeism from work [3]. The number of LBP patients increased from 377.5 million in 1990 to 577 million in 2017. Global YLD (years lost due to disability) due to LBP increased by 52.7% from 1990 to 2017 [4]. It resulted in a huge medical burden and economic cost, globally [5]. LBP remained in the top 10 causes of disability-adjusted life years (DALY) among all age-groups for the last three decades (1990-2019). In the 50-74 years age-group, LBP was the eighth leading cause of DALY in 1990; it became the sixth cause in 2019 [6].

As per Global Burden of Disease, in 2017, the global prevalence of LBP increased with age, and peaked around the age of 80 to 89 years [4]. In 60-64 years, the prevalence of LBP in men was around 13% and in women it was around 17%. In 80-89 years, the prevalence of LBP in men was around 18% and in women it was around 23%.

Elderly persons were the persons who were aged 60 years or more [7,8]. The proportion of ageing population was increasing in India. According to census 2001, the population share of elderly persons was 7.4% [7]. In census 2011, this increased to 8.4% [9]. Based on Sample Registration System (SRS)-2018, elderly persons comprised 6.5% of the total population of urban Delhi. This proportion among men and women was 6.2% and 6.8%, respectively [10].

Prevalence of LBP among elderly persons in an urban area of Coimbatore, Tamilnadu was 17.5% and an urban area of Hisar, Haryana was 20.7% [1,11]. Several studies investigated the risk factors associated with LBP. LBP was found to be associated with smoking, obesity,

overweight, low physical activity, long sitting time, increasing age, comorbidities, and depression [5,12–15]. Individuals with LBP who were smokers were less likely to seek treatment [16].

Depression was associated with higher risk (frequency) and more severity of LBP [17,18]. People experiencing depression were approximately 60% more likely to develop back pain in their lifetime versus non-depressed people [18].

LBP was a common musculoskeletal disorder in elderly population. LBP was responsible for a large percentage of functional limitations resulting in difficulty in performing daily life activities, which deteriorated the quality of life [19]. Moreover, pain threatened the safety, autonomy and independence of elderly persons [20]. Globally, many studies have been conducted to estimate the prevalence of LBP and its associated factors among elderly persons. In India, it has been studied among groups like young adults, students, housewives, handloom workers, menopausal women, etc. However, there is scant published literature on factors associated with LBP among elderly persons in India. There is limited evidence on the prevalence of LBP among elderly persons in urban communities of northern India.

Estimation of prevalence and associated factors of LBP will help in designing appropriate intervention in the target population. Hence, our aim was to estimate the prevalence and associated factors of LBP, among elderly persons (aged 60 years and above) in an urban resettlement colony of Delhi.

Materials and Methods

This community-based cross-sectional study was conducted in the Urban Field Practice Area (UFPA) of Centre for Community Medicine, All India Institute of Medical Sciences (AIIMS), New Delhi. It is a resettlement colony with about 5,600 houses with a population of about 38,000.

Elderly persons residing in this area for at least six months were included. LBP due to injuries or organic causes (with history and/or documentary proof) and elderly persons who were unable to comprehend were excluded.

Sample size was calculated using the formula ($n=Z^2pq/d^2$). The anticipated prevalence of LBP was based on an earlier study by Kulandaivelan et al., because of similar study setting [1]. This study had reported prevalence of LBP among elderly as 20.7%. The absolute precision was assumed to be 3.5%. The calculated sample size was 536. Further, assuming an overall non-response rate of 10% and death and migration of 25%, a total of 738 elderly persons were required to estimate the prevalence of LBP with a level of significance of 5%. Hence, 800 elderly persons were recruited in this study, after rounding off.

A list of elderly persons (≥ 60 years) was generated from the Health Management and Information System (HMIS), of the UFPA. The list was the sampling-frame for this study. Using this sampling frame, a simple random sample of 800 elderly persons was drawn. Data collection was done from June 2021 to August 2021.

LBP was defined as pain lasting more than a day in an area between the lower costal margin and the gluteal folds with or without radiation into leg during past one-year [1]. A pictorial chart (Figure 1) was shown to the participant and they were asked to locate their pain. If they located their pain within the shaded area, it

was considered as LBP. LBP due to injury and organic causes were excluded. Severity of LBP was classified as mild, moderate and severe as claimed by the participants.

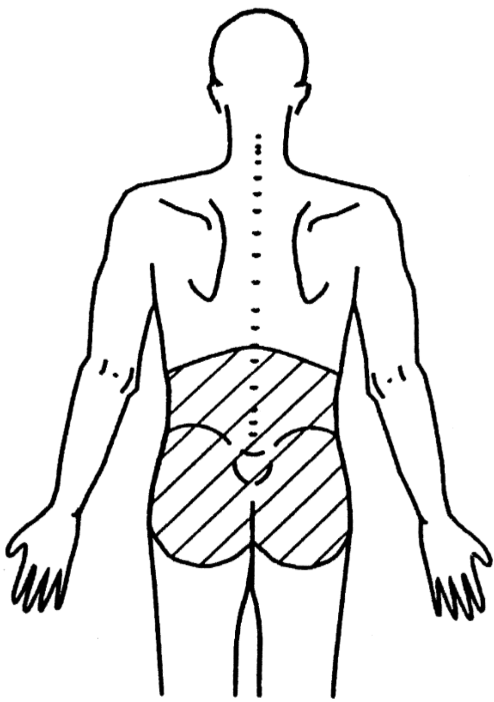

Figure 1. Pictorial chart to locate low back pain

Elderly persons were persons who were aged 60 years or above [7,8]. Poverty was assessed by the possession of Below Poverty Line (BPL) card provided by the Government of India. Others were categorised as Above Poverty Line (APL).

Physical activity was assessed by Global Physical Activity Questionnaire (GPAQ) in Hindi [21]. MET-minutes of 600 or more was considered to be physically active. Sitting time was the total number of hours a participant had been sitting per week. Total bed time was the total number of hours a participant had been spending lying down on bed per week. Participants were classified based on smoking habits into former smokers, current smokers and never smoker. Participants were classified based on alcohol use into former alcohol user, current alcohol user and never used alcohol.

Self-reported health was obtained by asking the participants to rate their perceived health from very good to very bad. Depression was assessed by Patient Health Questionnaire (PHQ-9) in Hindi [22]. Total score of five or more was considered as presence of depression. Self-reported chronic condition was defined as having documentary proof or taking medicines for any of the chronic conditions (e.g. diabetes, hypertension, asthma, chronic obstructive pulmonary disease, etc).

Digital weighing machine (Rossmax, model: WB100) was used to record the weights of the participants in kilograms. Non-elastic measuring tape was used to measure the arm span of the participants in centimetre. Arm-span was used instead of height. In elderly persons, because of change in curvature of spine,

height may vary [23]. Body Mass Index (BMI) was classified based on WHO Asia-Pacific criteria [24].

Statistical Analysis

Data entry was done in Microsoft Excel and analysis was carried out using Stata version 16.0 (StataCorp LLC, Texas, USA). Prevalence of LBP with 95% Confidence Interval (CI) was calculated. Chi-square test / Fisher's exact test was done to determine the relation between two categorical variables. Bivariable logistic regression analysis was done to find crude odds ratio for LBP with associated factors. Those variables with a p-value <0.2 in the bivariable model were included in the multivariable model. A p-value less than 0.05 was considered statistically significant.

Results

Based on the HMIS (with 2018 census data), UFPA of Centre for Community Medicine, AIIMS, New Delhi had a population of 38000 including 2176 elderly persons. A simple random sample of 800 elderly persons was drawn from HMIS. During the survey, it was found that 100 participants had died, and 109 had migrated. Ten participants were ineligible. Out of the 10 participants, four were less than 60 years of age, three had LBP due to injury, and three had organic causes of LBP, namely, tuberculosis of the spine, spondylolisthesis and scoliosis. Out of the remaining 580 participants, 526 participated in the study with a response rate of 90.7% (Table 1).

Table 1. Response rate of participants

	Number of participants approached	Number of participants responded	Response rate %
Total	580	526	90.7
Men	238	205	86.1
Women	342	321	93.9

Women constituted about 61% of the participants. Out of the 526 participants 30%, 30.6%, and 39.4% were in the age-group 60-64, 65-69, and ≥ 70 years, respectively. Of all participants, 63.3% were illiterate, and 90.7% were currently not working. Based on the previous occupation, 34% were homemakers with almost all of them being women, 37.1% were skilled and semiskilled workers and 16.2% being unskilled workers. Remaining participants (categorised as others for the analysis) were service class workers, professionals and unemployed. Among the 526 participants 57.8% were currently married, 41.6% were widow or widower, one participant was unmarried and two were separated. Out of the total participants 52.7% were living with spouse and children and 41.1% were living with their children only. About 83.8% were above poverty line (Table 2).

Table 2. Distribution of participants by sociodemographic variables

Variables	Men n = 205 (%)	Women n = 321 (%)	Total n = 526 (%)
Age-group (years)			
60-64	46 (22.4)	112 (34.9)	158 (30.0)
65-69	67 (32.7)	94 (29.3)	161 (30.6)
70 and above	92 (44.9)	115 (35.8)	207 (39.4)
Education			
Literate	131 (63.9)	62 (19.3)	193 (36.7)
Illiterate	74 (36.1)	259 (80.7)	333 (63.3)
Previous occupation			
Homemakers	2 (1.0)	177 (55.1)	179 (34.0)
Skilled workers	95 (46.3)	100 (31.2)	195 (37.1)
Unskilled workers	53 (25.9)	32 (10.0)	85 (16.2)
Others	55 (26.8)	12 (3.7)	67 (12.7)
Previous occupation that needed weight lifting			
No	118 (57.8)	273 (74.4)	391 (74.5)
Yes	86 (42.2)	48 (15.0)	134 (25.5)
Previous occupation that needed long sitting time			
No	130 (63.7)	300 (93.5)	430 (81.9)
Yes	74 (36.3)	21 (6.5)	95 (18.1)
Current occupation			
Working	20 (9.8)	29 (9.0)	49 (9.3)
Not working	185 (90.2)	292 (91.0)	477 (90.7)
Current occupation that needs weight lifting			
No	15 (75.0)	28 (96.6)	43 (87.8)
Yes	5 (25.0)	1 (3.45)	6 (12.2)
Current occupation that needs long sitting time			
No	10 (50.0)	24 (82.8)	34 (69.4)
Yes	10 (50.0)	5 (17.2)	15 (30.6)
Marital status			
Unmarried	0 (0)	1 (0.3)	1 (0.2)
Married	159 (77.6)	145 (45.2)	304 (57.8)
Widow/widower	45 (22.0)	174 (54.2)	219 (41.6)
Divorced/separated	1 (0.5)	1 (0.3)	2 (0.4)
Living condition			
Living alone	4 (2.0)	10 (3.1)	14 (2.7)
Living with spouse only	8 (3.9)	7 (2.2)	15 (2.9)
Living with spouse and children	144 (70.2)	133 (41.4)	277 (52.7)
Living with children only	49 (23.9)	167 (52.0)	216 (41.1)
Living with other family members	0 (0)	4 (1.3)	4 (0.8)
Poverty			
Above Poverty Line (APL)	168 (82.0)	273 (85.1)	441 (83.8)
Below Poverty Line (BPL)	37 (18.1)	48 (15.0)	85 (16.2)

Out of the 526 participants, 73% of the participants never smoked beedi or cigarettes in their lifetime, 15.8% were former smokers and 11.2% were current smokers. Out of the former and current smokers, female constituted only 0.6% (2 participants) each. Similarly, 75.7% never consumed alcohol in their lifetime, 14.1% were former alcohol users with all of them being men and 10.3% were current alcohol users among which only two were female participants. Each 1/3 of the participants had sitting time upto 14 hours, >14 to 28 hours and > 28 hours per week. Around 2/3 of the participants had 56 to <70 hours of total bed time per week, 11.4% had <56 hours and 22.2% had ≥70 hours of total bed time per week. Totally, 59.1% were physically active (Table 3).

Table 3. Distribution of participants by behavioural variables

Variables	Men n = 205 (%)	Women n = 321 (%)	Total n = 526 (%)
Smoking			
Never smoker	67 (32.7)	317 (98.8)	384 (73.0)
Former smoker	81 (39.5)	2 (0.6)	83 (15.8)
Current smoker	57 (27.8)	2 (0.6)	59 (11.2)
Alcohol consumption			
Never used alcohol	79 (38.5)	319 (99.4)	398 (75.7)
Former alcohol user	74 (36.1)	0 (0.0)	74 (14.1)
Current alcohol user	52 (25.4)	2 (0.6)	54 (10.3)
Sitting time per week (hours)			
Upto 14 hours	54 (26.3)	106 (33.0)	160 (30.4)
More than 14 to 28 hours	82 (40.0)	109 (34.0)	191 (36.3)
More than 28 hours	69 (33.7)	106 (33.0)	175 (33.3)
Total bed-time per week (hours)			
Less than 56 hours	30 (14.6)	30 (9.35)	60 (11.4)
56 to less than 70 hours	126 (61.5)	223 (69.5)	349 (66.4)
70 hours and above	49 (23.9)	68 (21.2)	117 (22.2)
Physically active			
Yes (>=600 METS per week)	115 (56.1)	196 (61.1)	311 (59.1)
No	90 (43.9)	125 (38.9)	215 (40.9)

Out of the total participants, 58.6%, 14.6% and 15% reported very good, good and fair health respectively and 9.1% and 2.7% reported bad and very bad health, respectively. Around 1/3 of the participants (i.e., 35.4%) did not report any chronic conditions, 1/3 reported only one chronic condition and around 1/3 (31.4%) reported two or more chronic conditions. About 15.2% had depression. Out of the 515 participants, 20.6 % were underweight, 15% were overweight and 26% were obese (Table 4). Arm-span and/or weight could not be measured in 11 participants due to stooped posture (seven), injured lower limb (two), deformed lower limb (one), cerebrovascular accident (CVA) (one).

Table 4. Distribution of participants by clinical variables

Variables	Men n = 205 (%)	Women n = 321 (%)	Total n = 526 (%)
Self-reported health			
Very good	136 (66.3)	172 (53.6)	308 (58.6)
Good	26 (12.7)	51 (15.9)	77 (14.6)
Fair	31 (15.1)	48 (15.0)	79 (15.0)
Bad	10 (4.9)	38 (11.8)	48 (9.1)
Very Bad	2 (1)	12 (3.7)	14 (2.7)
Self-reported diabetes			
Absent	147 (71.7)	211 (65.7)	358 (68.1)
Present	58 (28.3)	110 (34.3)	168 (31.9)
Self-reported hypertension			
Absent	128 (62.4)	145 (45.2)	273 (51.9)
Present	77 (37.6)	176 (54.8)	253 (48.1)
Self-reported asthma			
Absent	197 (96.1)	307 (95.6)	504 (95.8)
Present	8 (3.9)	14 (4.36)	22 (4.2)
Self-reported 'other' chronic condition			
Absent	169 (82.4)	261 (81.3)	430 (81.8)
Present	36 (17.6)	60 (18.7)	96 (18.3)
Self-reported chronic condition (Count)			
Nil	84 (41.0)	102 (31.8)	186 (35.4)
1	70 (34.2)	105 (32.7)	175 (33.3)
2 or more	51 (24.9)	114 (35.5)	165 (31.4)
Depression			
Absent	184 (89.8)	262 (81.6)	446 (84.8)
Present (PHQ-9 score >= 5)	21 (10.2)	59 (18.4)	80 (15.2)
Body mass index (Kg/m^2) (Asian categories) (n = 515)*			
Normal (BMI 18.5 to less than 23.0)	81 (40.1)	117 (37.4)	198 (38.5)
Underweight (BMI < 18.5)	53 (26.2)	53 (16.9)	106 (20.6)
Overweight (BMI 23.0 to less than 25.0)	27 (13.4)	50 (16.0)	77 (15.0)
Obese (BMI >= 25.0)	41 (20.3)	93 (29.7)	134 (26.0)

*Weight and/or arm-span could not be measured in 11 participants.

The one-year prevalence of LBP (95% CI) was 21.5% (18.5, 25.2). Prevalence of LBP among men and women were 27.4% and 12.2%, respectively. Prevalence of LBP among the age-groups 60-64, 65-69 and ≥70 years were 18.4%, 23.6% and 22.2%, respectively. After adjusting for age and sex, the prevalence of LBP was 21.4% (Table 5).

Table 5. Prevalence of LBP among participants

Variables	Number of participants n = 526	LBP present n = 113	Prevalence % (95% CI)
Total	526	113	21.5 (18.0-25.2)
Gender			
Men	205	25	12.2 (8.0-17.5)
Women	321	88	27.4 (22.6-32.6)
Age-group (years)			
60-64	158	29	18.4 (12.7-25.3)
65-69	161	38	23.6 (17.3-30.9)
70 and above	207	46	22.2 (16.8-28.5)

About 24% of the illiterate participants and 17.1% literates had LBP. Around 28.5% of the homemakers, 20.5% of skilled workers, 20% of the unskilled workers had LBP. A total of 16.5% of those who were married, and 28.8% of widow/widower suffered LBP. A total of 15.9% of those living with spouse and children, and 25.9% of those living children only had LBP. Prevalence of LBP among those below and above poverty line was 32.9% and 19.3%, respectively.

About 24.5% of the never smokers, 12% of the former smokers and 15.3% of the current smokers had LBP. 23.9% of those who never used alcohol, 14.9% of former alcohol users 13% of current alcohol users had LBP. Prevalence of LBP among those who had sitting time per week upto 14 hours, >14 to 28 hours and >28 hours were 18.1%, 23.6% and 22.3%, respectively. Prevalence of LBP among those who had total bed time per week <56 hours, 56 to <70 hours and ≥70 hours were 13.3%, 19.5% and 31.6%, respectively. A total of 18.3% of those who were physically active, and 26% of those with low physical activity had LBP.

Around 11% of those who reported very good health and 64.3% of those who reported very bad health had LBP. The prevalence of LBP was 27% among those who reported one or more chronic condition(s) and 11.3% among those who did not report any chronic condition. About 57.5% of those with depression and 12.6% of those without depression had LBP. A total of 16.2% of those with normal BMI, 24.5% of those who were underweight, 27.3% of those who were overweight, 21.6% of those who were obese suffered LBP.

Out of the 113 participants who had LBP in the past one year, 89.4% were suffering LBP currently (at the time data collection). Apart from those suffering from LBP currently, 9.7% out of the 113 participants, had their last episode of LBP in the last three months, 0.9% had their last episode more than three months ago. About $1/4^{th}$ of the participants with LBP were suffering from LBP since last one year or less, around $1/4^{th}$ were suffering from LBP since past two years, around $1/4^{th}$ were suffering from LBP since past three years, and around $1/4^{th}$ were suffering from LBP since more than three years. Most of the participants (87.6%) suffered LBP daily, around 10.7% suffered once in a week, around 2% suffered more than once in a

week and around 1% suffered one to three times in a month. About 30% reported mild pain, 45% reported moderate pain and 25% reported severe LBP (Table 6).

Table 6. Distribution of participants having LBP by characteristics of LBP (n = 113)

Variables	Number of participants with LBP n = 113	(%)
Suffering from LBP now?		
No	12	10.6
Yes	101	89.4
Duration of LBP		
Up to 12 months	29	25.7
13 to 24 months	33	29.2
25 to 36 months	24	21.2
More than 36 months	27	23.9
How many days ago was your last episode of LBP?		
Not applicable	101	89.4
During last three months	11	9.7
More than three months ago	1	0.9
Number of episodes of LBP		
1-3 per month	1	0.9
Once a week	2	1.8
More than once a week	11	9.7
Daily	99	87.6
Severity of LBP		
Mild	34	30.1
Moderate	51	45.1
Severe	28	24.8

Sixteen variables were entered in the bivariable logistic regression analysis to find out any association with LBP. In the analysis sociodemographic variables, namely, gender, age-group, education, previous occupation, marital status, living arrangement and poverty were included. Behavioral variables included for the analysis were smoking, alcohol consumption, sitting time per week, total bed time per week and physical activity. Clinical variables, namely, self-reported health, number of self-reported chronic conditions, depression and body mass index were included for the analysis.

According to current occupation status, only 49 elderly persons were working, out of which only six had LBP. So, it was not included in any of the further analysis. The variables ‘previous occupation that needed weight lifting’ and ‘previous occupation that needed long sitting time’ were not included in the analysis, as there were only a few participants in each of the sub-categories.

In the following variables, few sub-categories were merged together, as there were only a few participants in each of the sub-categories. In the marital status, sub-categories like unmarried, widow/widower and separated were merged together. Similarly, in living arrangement, those ‘living with spouse and children’ and those ‘living with other family members’ were merged together; likewise, those ‘living with spouse only, and those ‘living alone’ were merged together.

Out of the 16 variables entered in bivariable logistic regression analysis, p-value was < 0.2 for 14 variables which were entered in multivariable logistic regression analysis, except age-group and sitting time per week.

In the multivariable logistic regression analysis, it was found that poverty, depression, bad self-reported health, occurrence of two or more self-reported chronic conditions, and being overweight were independently associated with LBP. The statistical significance of the variables are as follows; above poverty line (aOR 0.40, 95% CI: 0.21-0.76, p-value 0.005), bad and very bad self-reported health (aOR 3.83, 95% CI: 1.80-8.16, p-value 0.001), one self-reported chronic condition (aOR 2.10, 95% CI: 1.07-4.14, p-value 0.032), two or more self-reported chronic conditions (aOR 2.89, 95% CI: 1.46-5.71, p-value 0.002), depression (aOR 4.35, 95% CI: 2.23-8.48, p-value <0.001) and overweight (aOR 2.29, 95% CI: 1.11-4.70, p-value 0.024) (Table 7).

Table 7. Association of LBP with socio-demographic, behavioural and clinical variable

Variables	Number of participants n	LBP present n (%)	Unadjusted odds ratio (95% CI)	P value	Adjusted odds ratio (95% CI)	P value
Gender						
Men	205	25 (12.2)	1.0		1.0	
Women	321	88 (27.4)	2.72 (1.67-4.42)	<0.001	2.58 (0.85-7.85)	0.094
Age-group (years)						
60-64	158	29 (18.4)	1.0			
65-69	161	38 (23.6)	1.37 (0.80-2.36)	0.251		
70 and above	207	46 (22.2)	1.27 (0.76-2.14)	0.365		
Education						
Literate	193	33 (17.1)	1.0		1.0	
Illiterate	333	80 (24.0)	1.53 (0.98-2.41)	0.063	1.03 (0.55-1.93)	0.927
Previous occupation						
Homemaker	179	51 (28.5)	1.0		1.0	
Skilled workers	195	40 (20.5)	0.65 (0.40-1.04)	0.073	1.07 (0.57-2.04)	0.827
Unskilled workers	85	17 (20.0)	0.63 (0.34-1.17)	0.142	1.10 (0.47-2.60)	0.821
Others	67	5 (7.5)	0.20 (0.08-0.53)	0.001	0.50 (0.15-1.59)	0.240

Marital status						
Married	222	63 (28.4)	1.0		1.0	
Widow/widower /separated/ unmarried	304	50 (16.4)	0.50 (0.33-0.76)	0.001	0.54 (0.14-2.10)	0.371
Living condition						
With Spouse and children or living with other family members	281	45 (16.0)	1.0		1.0	
With Children only	216	56 (25.9)	1.84 (1.18-2.85)	0.007	0.73 (0.18-2.95)	0.664
With Spouse only or living alone	29	12 (41.4)	3.70 (1.66-8.28)	0.001	2.59 (0.78-8.61)	0.120
Poverty						
BPL	85	28 (32.9)	1.0		1.0	
APL	441	85 (19.3)	0.49 (0.29-0.81)	0.006	**0.40** (0.21-0.76)	**0.005**
Smoking						
Never smoker	384	94 (24.5)	1.0		1.0	
Former smoker	83	10 (12.0)	0.42 (0.21-0.85)	0.016	0.83 (0.23-3.01)	0.776
Current smoker	59	9 (15.3)	0.56 (0.26-0.41)	0.123	0.83 (0.20-3.47)	0.793
Alcohol consumption						
Never used alcohol	398	95 (23.9)	1.0		1.0	
Former alcohol user	74	11 (14.9)	0.56 (0.28-1.10)	0.092	1.62 (0.43-6.06)	0.476
Current alcohol user	54	7 (13.0)	0.48 (0.21-1.09)	0.078	1.50 (0.34-6.49)	0.590
Sitting time per week (hours)						
Upto 14 hours	160	29 (18.1)	1.0			
More than 14 to 28 hours	191	45 (23.6)	1.39 (0.83-2.35)	0.215		
More than 28 hours	175	39 (22.3)	1.30 (0.76-2.22)	0.345		
Total bed-time per week (hours)						
Less than 56 hours	60	8 (13.3)	1.0		1.0	
56 to less than 70 hours	349	68 (19.5)	1.57 (0.71-3.47)	0.261	2.01 (0.73-5.55)	0.178
70 hours and above	117	37 (31.6)	3.00 (1.30-6.96)	0.010	2.53 (0.81-7.86)	0.110
Self-reported health						

Very good & Good	385	56 (14.5)	1.0		1.0	
Fair	79	19 (24.1)	1.86 (1.03-3.35)	0.039	1.02 (0.50-2.08)	0.967
Bad and very bad	62	38 (61.3)	9.3 (5.19-16.69)	<0.001	**3.83** (1.80-8.16)	**0.001**
Self-reported chronic condition (Count)						
Nil	186	21 (11.3)	1.0		1.0	
1	175	43 (24.6)	2.56 (1.45-4.52)	0.001	**2.10** (1.07-4.14)	**0.032**
2 or more	165	49 (29.7)	3.32 (1.89-5.83)	<0.001	**2.89** (1.46-5.71)	**0.002**
Physically active						
Yes (>=600 METS per week)	311	57 (18.3)	1.0		1.0	
No	215	56 (26.0)	1.57 (1.03-0.17)	0.035	1.14 (0.65-2.0)	0.656
Depression						
Absent	446	67 (12.6)	1.0		1.0	
Present (PHQ-9 score >= 5)	80	46 (57.5)	7.65 (4.58-12.80)	<0.001	**4.35** (2.23-8.48)	**<0.001**
Body mass index (Asian categories) (n = 515)*						
Normal	198	32 (16.2)	1.0		1.0	
Underweight	106	26 (24.5)	1.69 (0.94-3.02)	0.079	1.98 (0.95-4.11)	0.067
Overweight	77	21 (27.3)	1.95 (1.04-3.65)	0.038	**2.29** (1.11-4.70)	**0.024**
Obese	134	29 (21.6)	1.43 (0.82-2.51)	0.207	1.11 (0.57-2.19)	0.756

* Weight and/or arm-span could not be measured in 11 participants.

Discussion

In our study, we found that the prevalence of LBP was 21.5% among the elderly persons aged ≥ 60 years and 22.8% among those aged ≥ 65 years.

Similar findings were reported by Kulandaivelan et al. (2018) [1] in Hisar, Haryana, where LBP prevalence among the elderly was 20.7%. Mathew et al. (2013) [11] in Coimbatore, Tamil Nadu, found a prevalence of 17.5%. Both studies used the same definition of LBP as ours.

Studies from other countries reported LBP prevalence between 9.3% and 68.3%. Four studies showed results similar to ours. Ludwig et al. (2017) [25] in Switzerland found 29.2% prevalence among people ≥65 years, and Lavsky-Shulan et al. (2004) [26] in the USA reported 21.7% in the same age group. Both are close to our findings. Dijken et al. (2008) [27] in Sweden found 17.4% among those ≥55 years, while Gilgil et al. (2005) [12] in Turkey reported 30.6% among those ≥56 years. Differences may be due to age group (55–59 years) and sociodemographic factors. None of these studies defined LBP.

However, the studies from other countries reported higher or lower prevalence of LBP compared to ours. Gonzalez et al. (2021) [28] in Brazil found 44.4% among those ≥60 years, using a similar definition to ours. Ikeda et al. (2019) [29] in Spain reported 65.1% among ≥65

years, but did not define LBP. Exarchou et al. (2013) [30] in Sweden found 44.3% among men aged 69–81 years, which may be higher due to male-only participants. Bikbov et al. (2009) [31] in Russia reported 57.3% among ≥65 years, while Woo et al. (2009) [32] in Hong Kong found 43% without defining episode duration. Omokhodian et al. (2004) [33] in Nigeria reported 46% among ≥60 years, possibly influenced by small sample size and unclear definition.

In the present study, poverty, depression, bad self-reported health, one or more self-reported chronic condition(s), overweight were the independent factors significantly associated with LBP.

In the following studies, results were consistent with our study. Ikeda et al. (2019) [29] in Spain found poverty associated with LBP in those ≥65 years. Figueiredo et al. (2013) [34] in Brazil and Meyer et al. (2007) [35] in the USA both showed depression as a significant factor. Altinel et al. (2008) [36] in Turkey identified depression and obesity, while Machado et al. (2018) [13] in Brazil reported overweight, low physical activity, and depression as associated with LBP among the elderly. Quintino et al. (2017) [37] in Brazil found self-reported morbidity and weight lifting associated with LBP in those ≥60 years. Palacios Cena et al. (2014) [38] in Spain reported associations with illiteracy, poor health, obesity, depression, and anxiety in those ≥51 years. Bikbov et al. (2009) [31] in Russia found female gender, obesity, poverty, low physical activity, comorbidity, and depression associated with LBP in those ≥65 years. Differences may be due to variation in LBP definitions and measurement methods such as self-reported height and weight for BMI and CES-D for depression.

However, the following three studies showed different results. Palma et al. (2014) in Brazil reported age, sedentary lifestyle, and sitting time as risk factors. Dijken et al. (2008) [27] in Sweden reported low physical activity associated with LBP in those ≥55 years. Gilgil et al. (2005) [12] in Turkey found female gender and smoking associated with LBP in those ≥56 years. These differences may be due to variations in LBP definition, sociodemographic factors, and inclusion of age group 55–59 years. Physical activity was also measured differently across studies such as IPAQ and other activity categories as compared to GPAQ in our study.

Strength of the study

This is a community-based study among the elderly persons. We used simple random sampling and the response rate was high, making the sample representative. We used a pictorial chart that helped participants identify LBP clearly. Standard tools such as PHQ-9 for depression, GPAQ for physical activity with their validated Hindi versions were used, ensuring better understanding by the participants and comparability with other studies.

Limitations of the study

Due to cross-sectional nature of study, temporality of the associated factors could not be established. Stigmatized behaviours such as smoking and alcohol consumption are likely to be under-reported. Long time-frame (i.e. one year) for recalling LBP could be influenced by recall bias. Severity of LBP was self-reported and was subjective.

Conclusion

In our study, the prevalence of LBP among the elderly persons residing in the urban resettlement colony was 21.5%. The age-adjusted and sex-adjusted prevalence of LBP was 21.4%. The association of LBP with poverty, depression, bad self-reported health, one or more self-reported chronic condition(s) and overweight was statistically significant. Based on these findings, it is recommended that policymakers integrate systematic screening and management of LBP into routine elderly care, with emphasis on physiotherapy and rehabilitation services. Additionally, interventions addressing poverty reduction, chronic disease control, and mental health support should be prioritized to reduce the burden of LBP.

Ethical Approval

Ethical approval was obtained from the Institute Ethics Committee with reference number – IECPG-742/23.12.2020.

Informed Consent

Informed written consent was obtained from all participants. Participants were explained that their identity would remain confidential.

Conflicts of interest

The authors declare that they do not have conflict of interest.

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References

1. Kulandaivelan S, Ateef M, Singh V, Chaturvedi R, Joshi S. One-year prevalence of LBP and its correlation in Hisar urban popualtion. J Musculoskelet Res. 2018 Jun;21(02):1850011-18.
2. Maher C, Underwood M, Buchbinder R. Non-specific LBP. The Lancet. 2017 Feb 18;389(10070):736–47.
3. Driscoll T, Jacklyn G, Orchard J, Passmore E, Vos T, Freedman G, et al. The global burden of occupationally related LBP: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis. 2014 Jun 1;73(6):975–81.
4. Wu A, March L, Zheng X, Huang J, Wang X, Zhao J, Blyth FM, Smith E, Buchbinder R, Hoy D. Global LBP prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. Ann Transl Med. 2020 Mar;8(6):299-312.
5. Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, et al. What LBP is and why we need to pay attention. The Lancet. 2018 Jun 9;391(10137):2356–67.
6. Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet. 2020 Oct;396(10258):1204–22.
7. Situation analysis of the elderly in India [Internet]. Ministry of Statistics & Programme Implementation, Government of India; 2011. Available from: https://www.mospi.gov.in/sites/default/files/publication_reports/elderly_in_india.pdf
8. National policy on older persons. Ministry of social justice and

empowerment, Government of India; 1999. Available from: https://socialjustice.gov.in/writereaddata/UploadFile/National%20Policy%20for%20Older%20Persons%20Year%201999.pdf
9. Elderly in India- Profiles and programmes. Ministry of Statistics & Programme Implementation, Government of India; 2016. Available from: https://www.mospi.gov.in/sites/default/files/publication_reports/ElderlyinIndia_2016.pdf
10. Sample Registration System Statistical Report, SRS 2018. Ministry of Home Affairs, Government of India Available at https://censusindia.gov.in/nada/index.php/catalog/44374/download/48044/SRS_STAT_2018.pdf
11. Mathew A, Safar R, Anithadevi T, Banu M, Ravi Shankar S, Rai BK, et al. The prevalence and correlates of LBP in adults: A cross-sectional study from Southern India. Int J Med Public Health. 2013;3(4):342-6.
12. Gilgil E, Kaçar C, Bütün B, Tuncer T, Urhan S, Yildirim C, Sünbüloglu G, Arikan V, Tekeoglu I, Oksüz MC, Dündar U. Prevalence of LBP in a developing urban setting. Spine (Phila Pa 1976). 2005 May 1;30(9):1093-8.
13. Machado LAC, Viana JU, da Silva SLA, Couto FGP, Mendes LP, Ferreira PH, et al. Correlates of a recent history of disabling LBP in community-dwelling older persons: The Pain in the Elderly (PAINEL) Study. Clin J Pain. 2018 Jun;34(6):515–4.
14. Palma R, de Conti MHS, Quintino NM, Gatti MAN, Simeão SFAP, de Vitta A. Functional capacity and its associated factors in the elderly with LBP. Acta Ortop Bras. 2014;22(6):295–9.
15. Park, Sang-Min & Kim et al. Longer sitting time and low physical activity are closely associated with chronic LBP in population over 50 years of age: a cross-sectional study using the sixth Korea National Health and Nutrition Examination Survey. The Spine Journal. 2018;18. 10.1016/j.spinee.2018.04.003.
16. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between smoking and LBP: a meta-analysis. Am J Med. 2010 Jan;123(1):87.e7-35.
17. Tsuji T, Matsudaira K, Sato H, Vietri J. The impact of depression among chronic LBP patients in Japan. BMC Musculoskelet Disord. 2016 Oct 27;17. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5081964/
18. Pinheiro MB, Ferreira ML, Refshauge K, Maher CG, Ordoñana JR, Andrade TB, et al. Symptoms of depression as a prognostic factor for LBP: a systematic review. Spine J. 2016 Jan 1;16(1):105–16.
19. Edmond SL, Felson DT. Function and back symptoms in older adults. J Am Geriatr Soc. 2003;51(12):1702–9.
20. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ, editors. Global Burden of Disease and Risk Factors. Washington (DC): World Bank; 2006. Available from: http://www.ncbi.nlm.nih.gov/books/NBK11812/
21. WHO STEPS Surveillance manual; Available at

https://www.who.int/docs/default-source/ncds/ncd-surveillance/gpaq-analysis-guide.pdf
22. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. Journal of General Internal Medicine. 2001;16(9):606–13. 10.1046/j.1525-1497.2001.016009606.x
23. Physical status: the use and interpretation of anthropometry. Technical report series 854, World Health Organisation, 1995. Available from: https://apps.who.int/iris/bitstream/handle/10665/37003/WHO_TRS_854.pdf;jsessionid=DE3CF69EC4049374715948869F1CAEC5?sequence=1
24. The Asia-Pacific perspective: Redefining obesity and its treatment. Available from: https://apps.who.int/iris/bitstream/handle/10665/206936/0957708211_eng.pdf?sequence=1&isAllowed=y
25. Ludwig C, Luthy C, Allaz AF, Herrmann FR, Cedraschi C. The impact of LBP on health-related quality of life in old age: results from a survey of a large sample of Swiss elders living in the community. Eur Spine J. 2018 May;27(5):1157–65.
26. Lavsky-Shulan M, Wallace RB, Kohout FJ, Lemke JH, Morris MC, Smith IM. Prevalence and functional correlates of LBP in the elderly: The Iowa 65+ Rural Health Study. Journal of the American Geriatrics Society. 1985 Jan;33(1):23–8.
27. Dijken C, Fjellman-Wiklund A, Hildingsson C. LBP, lifestyle factors and physical activity: A population based-study. J Rehabil Med. 2008;40(10):864–9.
28. Gonzalez GZ, da Silva T, Avanzi MA, Macedo GT, Alves SS, Indini LS, Egea LMP, Marques AP, Pastre CM, Costa LDCM, Costa LOP. LBP prevalence in Sao Paulo, Brazil: A cross-sectional study. Braz J Phys Ther. 2021 Nov-Dec;25(6):837-45.
29. Ikeda T, Sugiyama K, Aida J, Tsuboya T, Watabiki N, Kondo K, Osaka K. Socioeconomic inequalities in LBP among older people: the JAGES cross-sectional study. Int J Equity Health. 2019 Jan 21;18(1):15. doi: 10.1186/s12939-019-0918-1.
30. Exarchou S, Redlund-Johnell I, Karlsson M, Mellström D, Ohlsson C, Turesson C, et al. The prevalence of moderate to severe radiographic sacroiliitis and the correlation with health status in elderly Swedish men – The MrOS study. BMC Musculoskelet Disord. 2013 Dec;14(1):352. doi: 10.1186/1471-2474-14-352.
31. Bikbov MM, Kazakbaeva GM, Zainullin RM, Salavatova VF, Gilmanshin TR, Arslangareeva II, et al. Prevalence of and factors associated with LBP, thoracic spine pain and neck pain in Bashkortostan, Russia: the Ural Eye and Medical Study. BMC Musculoskelet Disord. 2020 Feb 1;21(1):64. doi: 10.1186/s12891-020-3080-4.
32. Woo J, Leung J, Lau E. Prevalence and correlates of musculoskeletal pain in Chinese elderly and the impact on 4-year physical function and quality of life. Public Health. 2009 Aug;123(8):549–56.
33. Omokhodion FO. LBP in an urban population in Southwest Nigeria. Trop Doct. 2004 Jan;34(1):17–20.

34. Figueiredo VF de, Pereira LSM, Ferreira PH, Pereira A de M, Amorim JSC de. Functional disability, depressive symptoms and LBP in the elderly. Fisioter Em Mov Ther Mov. 2013 Sep;26(3):549–57.
35. Meyer T, Cooper J, Raspe H. Disabling LBP and depressive symptoms in the community-dwelling elderly: a prospective study. Spine (Phila Pa 1976). 2007 Oct 1;32(21):2380-6.
36. Altinel L. The prevalence of LBP and risk factors among adult population in Afyon region, Turkey. Acta Orthop Traumatol Turc. 2008;328–33.
37. Quintino NM, Conti MHSD, Palma R, Gatti MAN, Simeão SFAP, Vitta AD. Prevalence and factors associated with LBP in elderly registered in the Family Health Strategy. Fisioter mov. 2017 Apr;30(2):367–77.
38. Palacios-Ceña D, Alonso-Blanco C, Hernández-Barrera V, Carrasco-Garrido P, Jiménez-García R, Fernández-de-las-Peñas C. Prevalence of neck and LBP in community-dwelling adults in Spain: an updated population-based national study (2009/10–2011/12). Eur Spine J. 2015 Mar;24(3):482–92.