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Association of elder abuse, crime victimhood and perceived neighbourhood safety with major depression among older adults in India: a cross-sectional study using data from the LASI baseline survey (2017–2018)

T Muhammad , Trupti Meher, T V Sekher

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Department of Family and Generations, International Institute for Population Sciences, Mumbai, Maharashtra, India

Correspondence to
T Muhammad;
muhammad.iips@gmail.com

ABSTRACT

Objective The study aims to explore the associations of elder abuse, crime victimhood and perceived safety with depression among older adults and examine the interactive effects of sex and place of residence in those associations.

Design A cross-sectional study was conducted using a large survey data.

Setting and participants The study used data from the Longitudinal Ageing Study in India wave 1 (2017–2018). The effective sample size was 31 464 older adults (aged 60 years or older).

Primary and secondary outcome measures The outcome variable was major depression, calculated using Short Form Composite International Diagnostic Interview. Descriptive statistics along with bivariate and multivariate analyses were performed to fulfil the objectives.

Results 5.22% of the older adults (n=1587) experienced abuse in the past 1 year. 1.33% of the older individuals (n=402) were victims of a violent crime, and 14.30% (n=1886) perceived an unsafe neighbourhood. Also, 8.67% of the older adults (n=2657) were suffering from depression. Older adults who were abused had 2.5 odds of suffering from depression (adjusted OR (AOR): 2.47, CI: 1.96 to 3.10) and victims of a violent crime were 84% more likely to be depressed (AOR: 1.84, CI: 1.15 to 2.95) compared with their counterparts. Besides, older individuals who perceived as living in unsafe neighbourhood were 61% more likely to be depressed (AOR: 1.61, CI: 1.34 to 1.93) compared with their counterparts. In the interaction analysis, older women who reported abuse had higher odds of suffering from depression (AOR: 3.27; CI: 2.34 to 4.57) compared with older men who were not abused. Similar result was found in older adults reporting abuse and residing in rural areas (AOR: 3.01, CI: 2.22 to 4.07) compared with those urban residents reporting no abuse.

Conclusions Healthcare providers should pay more attention to the mental health implications of elder abuse, crime victimhood and perceived safety to grasp the underlying dynamics of the symptomology of late-life depression.

Strengths and limitations of this study

- The study uses a large nationally representative sample of older population.
- Comprehensive information on elder abuse, crime victimhood and perceived neighbourhood safety has been provided in the study.
- The cross-sectional design is a limitation of the study as it is impossible to establish the observed directions of the relationships.
- The self-reported nature of the data can be subjected to reporting or recall biases.

BACKGROUND

The global population is ageing at a rate that has never been seen before and it is already acknowledged as a worldwide concern.[1] The process of ageing poses challenges related to depression, which is characterised by persistent feelings of sadness and worthlessness, as well as a loss of interest or pleasure in formerly rewarding or pleasurable pursuits.[2] According to the WHO, depression has become a prevalent mental disorder affecting over 264 million individuals throughout the world.[3] In addition, it is presently the third leading cause of global disease burden and according to projections, it will become the leading cause of global burden of disease by 2030.[4] Depression is especially problematic in older individuals, since it is linked to greater disability, cognitive decline, morbidity and decreased quality of life.[5–9] A meta-analysis has reported the global prevalence of depressive disorders among the elderly population to be between 4.7% and 16%.[10] Further, according to this study, India has a greater prevalence of geriatric depression than other countries. Another meta-analysis of 51 studies

in India has found a prevalence estimate of depression to be 34.4% among older adults aged 60 years and above.[11] These findings emphasise the fact that depression is a major public health concern among the elderly. Therefore, identifying the determinants of depression among the older population is crucial for developing intervention strategies that might help thousands of older people live with less pain and suffering.

The physiological restrictions, diminished motor strength and comorbid conditions that affect the population at older ages make them a special population group. They also have a limited financial and social support system. These changes in the elderly leave them susceptible to being abused and mistreated by their families and relatives.[12] The WHO[13] has defined elder abuse as 'a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person'.[13] This definition includes several types of abuse, such as physical, sexual, psychological, emotional, financial as well as voluntary negligence. Elder abuse is becoming widely recognised as a public health and human rights concern.[14–16] In Indian society, elders have always been valued and respected, and families are the primary caretakers of the elderly. However, in the wider context of social and cultural changes, both respect for older persons and the caring traditions of the extended family are waning, making older people expose to abuse, abandonment and loneliness.[17–20] A study conducted in seven demographically oldest states in India has found the prevalence of elder abuse to be 11% and is more common in rural India.[21] However, a report on elder abuse in India has stated that nearly 25% of older adults have been victims of elder abuse.[22]

Any kind of elder abuse can be regarded as a stressful experience that has a severe impact on the physical as well as mental health of older individuals[23 24] with depression and anxiety being the most common psychological outcomes.[25 26] Further, several studies have found that abused older individuals have higher levels of psychological distress and mental health issues, including depression, than those who have never been mistreated.[27–29] In addition, repeated abuse or several forms of elder abuse have been identified as risk factors for depression and anxiety among older adults by Fisher and Regan.[24] Therefore, the current study hypothesises that older individuals who report experiencing elder abuse will have higher odds of depression than those who do not report such experiences.

In addition to physical harm and material loss, being a victim of a criminal act has both immediate and long-term detrimental impacts on mental health.[30 31] A limited but growing body of research relates criminal victimisation to a number of undesirable consequences, such as health issues and psychological discomfort.[32–34] A study by Tan and Haining[35] has found at least one psychological symptom among 86% of crime victims as a consequence of their crime experience.[35] Moreover, depression is one of the most detrimental consequences of victimhood.[33 36] However, adolescents and young adults are generally the focus of such research,[37] with older people being neglected. Nevertheless, there is a dearth of research on the association between crime victimhood and depression in the Indian context. Therefore, this study aimed to assess the relationship between criminal victimhood and depression among older adults.

Perceived safety is an important component of well-being while ageing. Therefore, the well-being of older individuals has been linked to their fear of crime, which indicates a lack of subjective safety.[38] There is a growing body of literature highlighting the negative mental health consequences of fear of crime.[39–41] Furthermore, fear of crime has been associated with stress, anxiety and depression at older ages.[42 43] However, in a range of mental health conditions linked with fear of crime in older age, depression is particularly important due to its high prevalence in late life.[44] Further, a number of studies have found that people's physical and social surroundings have a significant impact on their mental health.[45–47] In particular, research has consistently linked the influence of neighbourhood safety on depressive symptoms.[48 49] Therefore, this study hypothesises a positive association between feeling unsafe and depression among the older population.

Furthermore, gender and place of residence may have a distinct impact on these relationships. Previous research has shown that older women who have been subjected to recurrent psychological abuse or several kinds of elder abuse are more likely to suffer from depression or psychological distress.[24 29 50] According to Begle *et al*,[26] emotional abuse is associated with a greater level of psychological distress among older adults in rural areas.[26] Moreover, as compared with the older individuals in rural areas, those who live in urban areas are more fearful of crime and have a lower perceived safety.[51] Besides, a growing body of research suggests that women are more fearful of crime than men.[52] However, as documented, the association between fear of crime and psychological well-being is stronger in men than in women.[53]

Given the rapid ageing process in developing countries like India, as well as the paucity of studies on psychosocial determinants of healthy ageing, it is crucial to identify the factors affecting older individuals' well-being. Therefore, the aim of this study is to contribute to the literature by evaluating the associations of elder abuse, crime victimhood and perceived safety with depression. The objective of the study is to estimate the prevalence of elder abuse, crime victimhood and perceived safety among older individuals aged 60 years and above in India. Further, the study explores the associations of these three variables with major depression. Additionally, the study examines the interactive effects of gender and place of residence on those associations. The study hypothesised that elder abuse, crime victimhood and perceived safety are positively associated with late-life depression, and gender

and place of residence have moderating effects on these associations.

METHODS

Data source

Data for this study were drawn from the Longitudinal Ageing Study in India (LASI) wave 1, which was conducted during 2017–2018.[54] The LASI is a full-scale national survey of scientific investigation of the socioeconomic and health status of older population and the consequences of population ageing in India.[55] It is a nationally representative survey of more than 72 000 individuals aged 45 years and above across all states and union territories. As mentioned in previous LASI-based studies,[56–58] the survey followed a multistage stratified area probability cluster sampling design to arrive at the eventual units of individuals who are aged 45 years and above and their spouses irrespective of age.[55] The survey in rural areas adopted a three-stage sampling design and in urban areas, a four-stage sampling design. The first stage involved the selection of Primary Sampling Units (PSUs) in each state and union territories, that is, subdistricts (Tehsils/Taluks), and the second stage involved the selection of villages in rural areas and the selection of wards in urban areas in the selected PSUs. In the third stage, households were selected from selected villages in rural areas. However, sampling in urban areas involved an additional stage, that is, one Census Enumeration Block (CEB) was randomly selected in each urban area. In the fourth stage, households were selected from these CEBs.

The survey was designed to select a representative sample at each stage of sample selection. Further, an individual survey schedule was administered to each consenting respondent in the sampled households. The survey also included an individual module on biomarkers and direct health examination of the respondents. As reported in previous analyses of LASI data, the individual response rate of the survey ranged from 96% in Nagaland to 74% in Chandigarh.[59] The detailed methodology, with the complete information on the survey design and data collection, was published in the survey report.[55] The survey agencies that conducted the field survey for the data collection have collected prior consent from all the respondents. The Indian Council of Medical Research extended the necessary guidelines and ethics approval for undertaking the survey. The present study was conducted on the eligible respondents aged 60 years and above. The effective sample size was 31 464 older adults aged 60 years or older.

Variable description

Outcome variable

The outcome variable for the study was depression, which was coded as 0 for 'not diagnosed with depression' and 1 for 'diagnosed with depression'.[55] Major depression among the older adults with symptoms of dysphoria was calculated using the CIDI-SF (Short Form Composite International Diagnostic Interview) score of 3 or more. Using the survey questions, the people having probable depression were screened. The scale has 10 questions and a positive answer to three or more of those leads to the attribution of the label 'diagnosed with depression'. This scale estimates a probable psychiatric diagnosis of major depression and has been validated in field settings and is widely used in population-based health surveys. Cronbach's alpha indicated that the CIDI-SF has excellent reliability (α=0.8). The lowest 10th percentile is used as a proxy measure of severe depression among older adults.[8 55]

Explanatory variables

Elder abuse, crime victimhood and safety perception

1. In the LASI survey, elder abuse was assessed using the question: 'Have you felt that you were ill-treated in the past year?' The response was coded as 'no' and 'yes'.[60]
2. To assess the crime victimhood among older individuals, participants were asked: 'In the last 12 months, have you been a victim of a violent crime, such as assault/mugging/threat to life/others?' This item was used dichotomously (no vs yes).
3. The perception of feeling unsafe in the neighbourhood is a subjective measure of neighbourhood safety. To assess the participants' perceived neighbourhood safety, two questions were used. First, they were asked: 'In general, how safe from crime and violence do you feel when you are alone at home?' Further, the participants were asked: 'How safe do you feel when walking down your street/locality alone after dark?' The responses were: (1) completely safe, (2) safe, (3) not very safe and (4) not safe at all. This item was further dichotomised into 'no' representing not feeling unsafe ('completely safe/safe') and 'yes' representing feeling unsafe ('not very safe/not safe at all' for either of the questions).

Individual factors

1. Age was grouped into 60–69 years, 70–79 years and 80+ years.
2. Sex was categorised as male and female.
3. Marital status was recoded as 'currently in union' and 'not in union'. The latter included those who were widowed, separated, deserted and never married.
4. Living arrangements were categorised into 'living alone', 'with spouse' and 'other living arrangements'.
5. Educational status was categorised as no/primary, secondary and higher.
6. Working status was categorised as never worked, currently working, not working and retired.

Health factors

7. Self-rated health was coded as good which includes very good, good and fair; whereas poor includes poor and very poor.
8. Multimorbidity status was categorised as 0 no for 'no multimorbidity', and 1 yes for 'multimorbidity'.

9. Difficulty in activities of daily living (ADL) was coded as 'no' and 'yes'. ADL is a term used to refer to normal daily self-care activities (such as movement in bed, changing position from sitting to standing, feeding, bathing, dressing, grooming, personal hygiene, etc). The ability or inability to perform ADL is used to measure a person's functional status, especially in the case of people with disabilities and the older adults.[61 62]
10. Difficulty in instrumental ADL (IADL) was coded as 'no' and 'yes'. IADL refers to ADL that are not necessarily related to fundamental functioning of a person, but they let an individual live independently in a community. The set asked was necessary for independent functioning in the community. Respondents were asked if they were having any difficulties that were expected to last more than 3 months, such as preparing a hot meal, shopping for groceries, making a telephone call, taking medications, doing work around the house or garden, managing money (such as paying bills and keeping track of expenses), and getting around or finding an address in unfamiliar places.[61 62]
11. Cognitive impairment was measured through five broad domains (memory, orientation, arithmetic function, executive function and object naming). The overall score ranges between 0 and 43, and a higher score indicates better cognitive functioning. In our study, the respondents who received assistance during the cognition module were excluded from the analysis. The lowest 10th percentile is used as a proxy measure of poor cognitive functioning.

Household factors

1. The monthly per capita consumption expenditure (MPCE) quintile was assessed using household consumption data. Sets of 11 and 29 questions on the expenditures on food and non-food items, respectively, were used to canvas the sample households. Food expenditure was collected based on a reference period of 7 days, and non-food expenditure was collected based on reference periods of 30 days and 365 days. Food and non-food expenditures have been standardised to the 30-day reference period. The MPCE is computed and used as the summary measure of consumption. The variable was then divided into five quintiles, that is, from poorest to richest.[55]
2. Religion was coded as Hindu, Muslim and others.
3. Caste was recoded as Scheduled Castes/Scheduled Tribes (SCs/STs), Other Backward Class (OBC) and others. The SCs include 'untouchables', a group of the population that is socially segregated and financially/economically very backward by their low status as per the Hindu caste hierarchy. The SCs and STs are among the most disadvantaged socioeconomic groups in India. The OBC is the group of people who were identified as 'educationally, economically and socially backward'. The 'other' caste category is identified as having higher social status, mostly referring to the higher Hindu castes.[63]
4. Place of residence was categorised as rural and urban.
5. The regions of India were coded as North, Central, East, Northeast, West and South.

Statistical analysis

In this study, descriptive statistics and bivariate analysis were performed to determine the prevalence of severe depression. X^2 test was used to check for intergroup differences in the prevalence of depression among older adults.[64] Further, binary logistic regression analysis[65] was used to fulfil the aims and objectives of the study. The results are presented in the form of OR with a 95% CI.

The equation for logistic regression is as follows:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 x_1 + \ldots + \beta_M x_{m-1},$$

where $\beta_0, \ldots.., \beta_M$ are regression coefficients indicating the relative effect of a particular explanatory variable on the outcome variable. Further, individual weights were used to make the estimates nationally representative. For the analyses, STATA V.15.1 has been used.

The multivariate analysis provides an unadjusted model and had four models to explain the adjusted estimates. Model 1 provides the adjusted estimates for the control variables. Model 2, model 3 and model 4 provide the interaction effects[66 67] for key variables (elder abuse, crime victimhood and perceived neighbourhood safety) and sex with major depression among older adults. Additionally, an interaction analysis of experiencing violence, being victim of crime and feeling unsafe, and place of residence on major depression was also conducted.

Patient and public involvement

No patient was involved.

RESULTS

Background characteristics of the eligible respondents are presented in table 1. Analysis indicated that 5.22% of the older adults (n=1587) in our sample experienced abuse in the past 1 year. A total of 1.32% of the respondents (n=402) were victims of crime, whereas 14.30% of the older participants (n=2657) perceived an unsafe neighbourhood. A total of 11.29% older participants were from the age group of 80+ years and 38.37% older individuals were currently not in a marital union. A majority of the older adults (73.99%) were co-residing with their families or others. As far as education is concerned, the majority of the older adults were uneducated or had only primary education (74.02%), and only 7.74% of them had more than 10 years of schooling. A total of 29.97% of the older adults were working and 26.43% of them never worked. However, 7.35% of the older adults were retired from their jobs.

Table 2 presents the proportion of older adults suffering from depression by background characteristics. Overall, 8.67% of the older adults (n=2657) were suffering from

Table 1 Socioeconomic profile of the study participants

Background factors	Total (N=31 464) N	%
Elder abuse*		
No	28 840	94.78
Yes	1587	5.22
Victim of crime*		
No	30 025	98.68
Yes	402	1.32
Feeling unsafe*		
No	26 085	85.70
Yes	4354	14.30
Age (in years)		
60–69	18 410	58.51
70–79	9501	30.20
80+	3553	11.29
Marital status		
Currently in union	19 391	61.63
Not in union	12 072	38.37
Living arrangement		
Alone	1788	5.68
With spouse	6396	20.33
Others	23 280	73.99
Educational status		
No/primary	23 289	74.02
Secondary	5741	18.24
Higher	2434	7.74
Work status		
Never worked	8315	26.43
Not working	11 470	36.55
Working	9397	29.97
Retired	2282	7.35
MPCE quintile		
Poorest	6829	21.70
Poorer	6831	21.71
Middle	6590	20.95
Richer	6038	19.19
Richest	5175	16.45
Religion		
Hindu	25 871	82.20
Muslim	3548	11.30
Others	2045	6.50
Caste		
SC/ST	8505	27.10
OBC	14 231	45.20
Others	8729	27.70
Place of residence		
Urban	22 196	29.45
Rural	9268	70.55
Region		
North	3960	12.59
Central	6593	20.95
East	7439	23.64
Northeast	935	2.97
South	5401	22.68
West	7136	17.17

*Sample size may differ due to missing cases.
MPCE, monthly per capita consumption expenditure; N, absolute numbers; OBC, Other Backward Class; SC, Scheduled Caste; ST, Scheduled Tribe.

depression. As evident from the data, 22.58% of those who reported elder abuse were suffering from depression (not reported: 7.89%); 17.70% of the older adults who were victims of a violent crime were suffering from depression (against 8.52% of non-victims). Besides, 13.27% of those who perceived an unsafe neighbourhood were found to be depressed as against only 7.9% of those who had perceived a safe neighbourhood.

State-wise prevalence (%) of elder abuse, crime victimhood and perceived safety among older adults is presented in table 3. The state of Bihar (11.65%) had the highest prevalence of elder abuse among older adults, followed by Karnataka (8.78%) and West Bengal (7.62%). On the other hand, the prevalence of crime victimhood was highest in Madhya Pradesh (3.65%), Delhi (3.33%) and Arunachal Pradesh (3.26%). Additionally, 62.49% of the older participants in Jammu & Kashmir perceived an unsafe neighbourhood followed by Odisha (45.99%) and Karnataka (33.69%). Notably, older adults living in Lakshadweep and Nagaland had low prevalence of all three indicators used in the study.

Table 4 shows the results obtained from the logistic regression analyses of the socioeconomic and health-related variables associated with late-life depression among older Indian adults. Unadjusted estimates reveal that older adults who reported abuse had higher odds of suffering from depression in comparison with those who did not report abuse (unadjusted OR (UOR): 3.13; CI: 2.58 to 3.79). Older adults who were victims of violent crimes had higher odds of suffering from depression in reference to their counterparts (UOR: 1.54; CI: 1.05 to 2.26). Further, it was revealed that those who perceived their neighbourhood as unsafe were more likely to be depressed (UOR: 1.65; CI: 1.38 to 1.96) compared with their counterparts living in a safe neighbourhood. In model 1, which is adjusted for all socioeconomic and health-related variables, it was found that older adults who

Table 2 Bivariate estimates for major depression by background characteristics

Variables	N	%	P value
Elder abuse			<0.001
No	2275	7.89	
Yes	358	22.58	
Victim of crime			<0.001
No	2559	8.52	
Yes	71	17.70	
Feeling unsafe			<0.001
No	2322	7.90	
Yes	316	13.27	
Sex			<0.001
Male	1530	7.50	
Female	771	9.71	
Age (in years)	356		0.207
60–69		8.41	
70–79	1085	8.42	
80+	1572	10.79	
Marital status			<0.001
Currently in union	1472	7.77	
Not in union	1185	10.13	
Living arrangement			<0.001
Alone	238	13.51	
With spouse	519	8.56	
Others	1900	8.32	
Educational status			<0.001
No/primary	2171	9.55	
Secondary	353	6.39	
Higher	133	5.56	
Working status			<0.001
Never worked	615	7.59	
Not working	1133	10.33	
Working	735	7.87	
Retired	174	7.74	
SRH			<0.001
Good	1437	6.19	
Poor	1219	16.42	
Multimorbidity			<0.001
No	1793	7.68	
Yes	861	11.80	
ADL difficulty			<0.001
No	1580	6.69	
Yes	1076	15.34	
IADL difficulty			<0.001
No	894	5.58	
Yes	1759	12.06	
Cognitive impairment			<0.001
No	1839	8.11	
Yes	409	11.46	
MPCE quintile			<0.001
Poorest	592	8.88	
Poorer	526	7.92	
Middle	519	8.17	
Richer	519	8.74	
Richest	501	9.92	
Religion			<0.001
Hindu	2179	8.60	
Muslim	318	9.63	
Others	160	7.94	
Caste			<0.001
SC/ST	703	8.48	
OBC	1283	9.25	
Others	671	7.90	
Place of residence			<0.001
Urban	566	6.34	
Rural	2091	9.62	
Region			<0.001
North	267	6.80	
Central	932	14.53	
East	603	8.28	
Northeast	51	5.63	
South	399	5.82	
West	406	7.69	
Total	2657	8.67	

ADL, activities of daily living; IALD, instrumental activities of daily living; MPCE, monthly per capita consumption expenditure; N, absolute numbers; OBC, Other Backward Class; SC, Scheduled Caste; SRH, self-rated health; ST, Scheduled Tribe.

were abused had 2.5 odds of suffering from depression (adjusted OR (AOR): 2.47, CI: 1.96 to 3.10) compared with those who were not abused. Similarly, crime victims were 84% more likely to be depressed than non-victims (AOR: 1.84, CI: 1.15 to 2.95). Besides, older individuals with a feeling of an unsafe neighbourhood were 61% more likely to be depressed in the study (AOR: 1.61, CI: 1.34 to 1.93) compared with their safe older counterparts. Models 2, 3 and 4 represent the interaction effects of sex of the older adults in the association of the key variables with depression. Older women who reported abuse had 3.3 odds of suffering from depression (AOR: 3.27; CI: 2.34 to 4.57) in reference to older men who were not abused. Similarly, older women who were victims of violent crimes had 2.6 odds of suffering from depression (AOR: 2.62;

Table 3 State-wise prevalence (%) of elder abuse, crime victimhood and unsafe neighbourhood among older adults (60+ years) in India, LASI wave 1, 2017–2018

	Elder abuse*	Crime victimisation	Unsafe neighbourhood
State/UT	%	%	%
Jammu & Kashmir	1.97	0.96	62.49
Himachal Pradesh	1.06	0.87	2.95
Punjab	2.14	0.90	2.29
Chandigarh	5.55	1.34	7.86
Uttarakhand	2.51	0.94	7.15
Haryana	3.47	0.56	5.76
Delhi	3.48	3.33	9.26
Rajasthan	3.28	0.89	4.87
Uttar Pradesh	6.47	1.96	12.67
Bihar	11.65	1.03	5.05
Arunachal Pradesh	4.22	3.26	8.93
Nagaland	0.22	0.00	0.06
Manipur	1.87	0.28	10.01
Mizoram	0.19	0.55	4.10
Tripura	1.65	0.57	0.67
Meghalaya	0.74	0.47	30.48
Assam	2.91	0.99	9.59
West Bengal	7.62	2.03	10.22
Jharkhand	5.63	1.07	14.94
Odisha	2.86	0.75	45.99
Chhattisgarh	5.54	1.04	11.38
Madhya Pradesh	5.13	3.65	7.57
Gujarat	3.04	0.50	6.63
Daman & Diu	3.39	0.60	2.22
Dadra & Nagar Haveli	3.16	1.28	10.04
Maharashtra	3.96	0.73	20.99
Andhra Pradesh	2.12	0.83	21.00
Karnataka	8.78	1.74	33.69
Goa	1.54	0.5	27.79
Lakshadweep	0.00	0.14	0.78
Kerala	3.48	1.40	15.92
Tamil Nadu	2.49	0.40	2.54
Puducherry	1.73	0.73	1.99
Andaman & Nicobar Islands	1.51	2.27	18.60
Telangana	2.24	0.66	21.85
India	5.22	1.32	14.30

*Experienced elder abuse during the last 1 year period.
LASI, Longitudinal Ageing Study in India; UT, union territory.

CI: 1.26 to 5.44) compared with older adults who were non-victims. Additionally, older participants who had a perception of living in an unsafe neighbourhood had 2.2 odds of suffering from late-life depression (AOR: 2.20; CI: 1.68 to 2.88) in comparison with their counterparts who perceived a safe neighbourhood.

Table 5 represents the interaction effect of place of residence on the observed associations. It was found that older adults who reported abuse and residing in rural areas were more likely to have depression (AOR: 3.01, CI: 2.22 to 4.07) compared with those reporting no abuse and had an urban residence. Also, those who were victims

Table 4 Logistic regression estimates of major depression by socioeconomic characteristics among older adults

Variables	Unadjusted OR	AOR (95% CI) Model 1	AOR (95% CI) Model 2	AOR (95% CI) Model 3	AOR (95% CI) Model 4
Elder abuse					
No	1	1		1	1
Yes	3.129*** (2.582 to 3.793)	2.468*** (1.964 to 3.103)		2.470*** (1.965 to 3.105)	2.469*** (1.964 to 3.103)
Victim of crime					
No	1	1	1		1
Yes	1.537** (1.046 to 2.258)	1.842** (1.151 to 2.948)	1.836** (1.148 to 2.936)		1.846** (1.154 to 2.953)
Feeling unsafe					
No	1	1	1	1	
Yes	1.646*** (1.380 to 1.962)	1.611*** (1.344 to 1.931)	1.611*** (1.344 to 1.931)	1.611*** (1.345 to 1.931)	
Sex					
Male		1			
Female		1.354*** (1.112 to 1.649)			
Age (in years)					
60–69		1	1	1	1
70–79		0.765*** (0.643 to 0.911)	0.765*** (0.642 to 0.910)	0.765*** (0.643 to 0.911)	0.765*** (0.643 to 0.911)
80+		0.784 (0.573 to 1.073)	0.783 (0.572 to 1.072)	0.784 (0.573 to 1.073)	0.784 (0.573 to 1.072)
Marital status					
Currently in union		1	1	1	1
Not in union		1.145 (0.941 to 1.393)	1.145 (0.941 to 1.393)	1.145 (0.941 to 1.393)	1.145 (0.941 to 1.393)
Living arrangement					
Alone		1	1	1	1
With spouse		0.871 (0.602 to 1.261)	0.871 (0.602 to 1.260)	0.871 (0.602 to 1.261)	0.872 (0.602 to 1.261)
Others		0.825 (0.601 to 1.134)	0.825 (0.601 to 1.134)	0.825 (0.601 to 1.134)	0.825 (0.601 to 1.133)
Educational status					
No/primary		1	1	1	1
Secondary		0.868 (0.702 to 1.073)	0.867 (0.702 to 1.072)	0.869 (0.703 to 1.074)	0.867 (0.701 to 1.072)
Higher		0.710** (0.505 to 0.999)	0.709** (0.505 to 0.997)	0.711** (0.505 to 0.999)	0.710** (0.505 to 0.998)
Working status					
Never worked		1	1	1	1
Not working		1.595*** (1.281 to 1.986)	1.597*** (1.283 to 1.989)	1.595*** (1.281 to 1.986)	1.596*** (1.282 to 1.987)
Working		1.783*** (1.402 to 2.267)	1.785*** (1.403 to 2.271)	1.783*** (1.403 to 2.267)	1.782*** (1.401 to 2.267)
Retired		1.904*** (1.314 to 2.759)	1.910*** (1.318 to 2.770)	1.903*** (1.313 to 2.758)	1.903*** (1.313 to 2.758)
SRH					
Good		1	1	1	1

Continued

Table 4 Continued

Variables	Unadjusted OR	AOR (95% CI) Model 1	AOR (95% CI) Model 2	AOR (95% CI) Model 3	AOR (95% CI) Model 4
Poor		2.438*** (2.065 to 2.877)	2.437*** (2.065 to 2.876)	2.437*** (2.065 to 2.877)	2.440*** (2.069 to 2.879)
Multimorbidity					
No		1	1	1	1
Yes		1.360*** (1.149 to 1.610)	1.361*** (1.150 to 1.610)	1.360*** (1.149 to 1.610)	1.361*** (1.151 to 1.611)
ADL difficulty					
No		1	1	1	1
Yes		1.717*** (1.394 to 2.116)	1.717*** (1.393 to 2.116)	1.718*** (1.394 to 2.116)	1.717*** (1.394 to 2.115)
IADL difficulty					
No		1	1	1	1
Yes		1.528*** (1.270 to 1.839)	1.529*** (1.270 to 1.840)	1.528*** (1.270 to 1.839)	1.528*** (1.270 to 1.839)
Cognitive impairment					
No		1	1	1	1
Yes		1.019 (0.834 to 1.246)	1.020 (0.834 to 1.247)	1.019 (0.834 to 1.246)	1.018 (0.832 to 1.246)
MPCE quintile					
Poorest		1	1	1	1
Poorer		0.912 (0.737 to 1.127)	0.912 (0.738 to 1.127)	0.911 (0.737 to 1.127)	0.912 (0.737 to 1.127)
Middle		1.008 (0.775 to 1.311)	1.007 (0.774 to 1.310)	1.008 (0.775 to 1.311)	1.008 (0.775 to 1.311)
Richer		1.158 (0.919 to 1.458)	1.158 (0.920 to 1.458)	1.158 (0.919 to 1.458)	1.157 (0.919 to 1.458)
Richest		1.355** (1.070 to 1.716)	1.355** (1.070 to 1.715)	1.355** (1.070 to 1.716)	1.354** (1.070 to 1.715)
Religion					
Hindu		1	1	1	1
Muslim		0.898 (0.709 to 1.138)	0.898 (0.709 to 1.139)	0.898 (0.709 to 1.139)	0.897 (0.708 to 1.138)
Others		1.283* (0.964 to 1.709)	1.284* (0.964 to 1.709)	1.284* (0.965 to 1.709)	1.284* (0.964 to 1.709)
Caste					
SC/ST		1	1	1	1
OBC		1.428*** (1.173 to 1.738)	1.428*** (1.174 to 1.739)	1.428*** (1.173 to 1.738)	1.428*** (1.173 to 1.738)
Others		1.158 (0.930 to 1.442)	1.158 (0.930 to 1.443)	1.158 (0.930 to 1.442)	1.158 (0.930 to 1.442)
Place of residence					
Urban		1			
Rural		1.235** (1.016 to 1.501)	1.235** (1.016 to 1.501)	1.235** (1.016 to 1.502)	1.235** (1.016 to 1.502)
Region					
North					
Central		2.198*** (1.732 to 2.788)	2.197*** (1.732 to 2.788)	2.197*** (1.732 to 2.787)	2.198*** (1.732 to 2.788)

Continued

Table 4 Continued

Variables	Unadjusted OR	AOR (95% CI) Model 1	AOR (95% CI) Model 2	AOR (95% CI) Model 3	AOR (95% CI) Model 4
East		0.976 (0.783 to 1.217)	0.976 (0.783 to 1.217)	0.976 (0.783 to 1.217)	0.976 (0.782 to 1.217)
Northeast		0.778 (0.550 to 1.101)	0.778 (0.550 to 1.100)	0.778 (0.550 to 1.101)	0.778 (0.550 to 1.101)
South		0.520*** (0.395 to 0.683)	0.520*** (0.396 to 0.683)	0.520*** (0.396 to 0.683)	0.519*** (0.395 to 0.683)
West		0.874 (0.669 to 1.143)	0.874 (0.669 to 1.143)	0.875 (0.669 to 1.143)	0.873 (0.667 to 1.143)
Elder abuse # sex					
No # male			1		
No # female			1.364*** (1.109 to 1.677)		
Yes # male			2.566*** (1.841 to 3.577)		
Yes # female			3.271*** (2.342 to 4.567)		
Victim # sex					
No # male				1	
No # female				1.351*** (1.107 to 1.648)	
Yes # male				1.759* (0.949 to 3.261)	
Yes # female				2.621*** (1.263 to 5.437)	
Feeling unsafe # sex					
No # male					1
No # female					1.341*** (1.087 to 1.655)
Yes # male					1.562*** (1.163 to 2.097)
Yes # female					2.202*** (1.683 to 2.882)
Pseudo R^2	0.0225	0.1141	0.1141	0.1141	0.1141

*P<0.05, **p<0.01, ***p<0.001.
Model 1 is adjusted for sociodemographic factors such as age, education, marital status, living arrangement and working status, health variables such as SRH, multimorbidity, ADL/IADL difficulties and cognitive impairment along with household factors of MPCE quintile, religion, caste and place of residence; Models 2, 3 and 4 are interaction models, adjusted for all covariates.
ADL, activities of daily living; AOR, adjusted OR; IADL, instrumental activities of daily living; MPCE, monthly per capita consumption expenditure; OBC, Other Backward Class; SC, Scheduled Caste; SRH, self-rated health; ST, Scheduled Tribe.

of violent crimes and residing in rural areas had higher chances of suffering from depression (AOR: 2.27, CI: 1.25 to 4.14) compared with non-victim urban residents. Respondents who perceived their neighbourhood as unsafe and had a rural residence were almost two (AOR: 1.99, CI: 1.53 to 2.60) times more likely to suffer from depression in comparison with the urban resident participants who perceived a safe neighbourhood.

DISCUSSION

In the present study, a substantial proportion of the older population (aged 60 years and above) was found to be suffering from major depression (8.67%). A community-based study from the northern part of India has also found that 6.8% of the older population was severely depressed.[68] However, the reported prevalence is much lower than the pooled prevalence reported in the reviews of previous studies in India.[10 11] The differences in the results may be explained by screening tools and other methodological or sampling differences. Further, 5.22% of the respondents had experienced elder abuse in the last 1 year and about 14.30% had reported as feeling unsafe while being alone at home or in the neighbourhood. However, the overall prevalence of elder abuse is

Table 5 Interaction estimates of experiencing violence, being victim of crime and feeling unsafe, and place of residence of older adults on major depression

Variables		AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Elder abuse/place of residence	No/urban	1		
	No/rural	1.252** (1.022 to 1.534)		
	Yes/urban	2.754*** (1.614 to 4.697)		
	Yes/rural	3.007*** (2.220 to 4.074)		
Victim of crime/place of residence	No/urban		1	
	No/rural		1.235** (1.013 to 1.506)	
	Yes/urban		1.850* (0.893 to 3.835)	
	Yes/rural		2.272*** (1.246 to 4.142)	
Feeling unsafe/place of residence	No/urban			1
	No/rural			1.224* (0.991 to 1.511)
	Yes/urban			1.551** (1.053 to 2.286)
	Yes/rural			1.994*** (1.528 to 2.601)

*P<0.05, **p<0.01, ***p<0.001.
OR adjusted for sociodemographic factors such as age, education, marital status, living arrangement and working status, health factors such as SRH, multimorbidity, ADL/IADL difficulty and cognitive impairment along with household factors of MPCE quintile, religion, caste and place of residence.
ADL, activities of daily living; AOR, adjusted OR; IADL, instrumental activities of daily living; MPCE, monthly per capita consumption expenditure; SRH, self-rated health.

lower than previously reported in India.[21 69] One probable explanation for under-reporting of elder abuse could be that elder abuse is seen in contrast with Indian cultural values, and as a result, older individuals who have been abused may be ashamed or afraid of stigmatisation, and hence may not reveal this information.[70] In most cases, the caregivers are the primary abusers and it worsens the victims' helplessness and makes them reluctant or afraid to report such incidents. Our results also indicated a large variation in the prevalence of elder abuse, crime victimhood and perceived neighbourhood safety among the states of India.

After adjusting for confounding variables, the regression analysis revealed that gender, work status, place of residence, self-rated health condition, presence of multimorbidity, functional disabilities such as ADL and IADL difficulties, elder abuse, crime victimhood and perceived neighbourhood safety were factors associated with depression in the older population in India, among which elder abuse had the greatest odds (AOR=2.468). Furthermore, the prevalence of depression was much higher among older individuals who had been victims of elder abuse (22.58%) or any crime (17.70%) than among those who had never been victims of these situations. In addition, the older adults who reported feeling unsafe had a higher prevalence of depression (13.27%) than their counterparts.

The findings of this study suggest that elder abuse has a significant and positive association with depression, since older individuals who had been abused or ill-treated were twice as likely to be depressed as those who had no such experience. This finding supports the first hypothesis outlined in the study. The result is also in line with the findings of previous research, which has identified depression as one of the most serious consequences of elder abuse.[24 29 71 72] In general, Indian parents invest in their children until adulthood and always expect to be looked after and cared for as they grow older. However, if this investment is not repaid, they are likely to experience feelings of unfairness, which can lead to psychological distress.[29] Moreover, ill-treatment may deprive a person of much-needed affection, care and emotional support, leaving them despondent and vulnerable to depression. Abuse is believed to be more emotional and less physical in older individuals.[73 74] Further, according to Knight and Hester,[75] emotional or psychological abuse has a more detrimental impact on victims than physical violence and it has a strong link with the increased rate of depression and anxiety in the older population.[75] Nevertheless, a recent study in Nepal has reported that neglect and economical abuse significantly increase the risk of geriatric depression.[76] In concordance with earlier research,[24] the current study has also found significantly increased odds of depression in women who are victims of abuse. Further, in this study, a significant association of elder abuse and place of residence on geriatric depression has been observed in the regression model with interaction analysis.

In accordance with the findings of previous research,[31 33 77] the current study confirms that experience

of criminal victimhood is significantly associated with an increased risk of depression. A previous experience of being unable to avert the crime may elicit sentiments of poor self-efficacy and helplessness and such feelings are a major source of depression.[31] Moreover, fear of crime can also lead to mistrust of others, making it harder to form social relationships[39] and eventually lead to loneliness and depression.[43] Therefore, not only the victim's assessments of the original events but fear of similar incidents also affect their psychological well-being. Further, according to the interaction analysis, older individuals who had been victims of crime and living in rural areas were found to be at higher odds of having depression. This result is inconsistent with previous research.[77] One potential explanation is that in rural regions, there is a lack of law enforcement infrastructure,[78] which increases the feeling of dread after becoming a victim of crime. In addition, older women who had experienced criminal victimhood were more likely to suffer from depression. This may be attributed to the fact that women have a higher fear of crime than men.[53] Regarding the pathways of fear of crime leading to mental illnesses, evidence suggests that older individuals who are afraid of crime limit their social activities and use of services, increasing loneliness and contributing to depression.[79]

The present study also investigated the association between perceived neighbourhood safety and depression among older adults and as hypothesised, a positive association was found between feeling unsafe and late-life depression. This association remained significant even after controlling for other socioeconomic factors. The result is consistent with previous studies.[48 80] Stafford *et al*,[39] in their study on association between fear of crime and mental health and physical functioning, found that individuals reporting high level of fear were 50% more likely to show symptoms of mental disorder and 90% more likely to show symptoms of depression than those who reported low levels of fear.[39] Older individuals are particularly fearful of being attacked, robbed or burgled[81] and the fear of crime usually affects their mental well-being.[41] In addition, another study found that an overall neighbourhood safety is most important for mental health among older adults.[82] However, unexpectedly, our study found that the association between perceived neighbourhood safety and depression is significantly stronger among older individuals living in rural areas. This finding highlights the need for further research in this aspect. The interaction analysis in the study also documented that the magnitude of the association between feeling unsafe and depression was greater in women than in men. This is inconsistent with the finding of a recent study that suggests a stronger negative effect of fear of crime on the psychological well-being of men than women.[53] One possible explanation is that men are more likely than women to under-report their real fear of crime, owing to strong societal gender norms and the expectation of men to demonstrate masculinity.[83]

Our study suffers from several limitations, which should be considered while interpreting the results. The cross-sectional nature of the study does not allow establishing any causal relationship. The self-reported nature of the data, including the questions on elder abuse, crime victimhood and perceived neighbourhood safety, can be subjected to reporting or recall biases. Further, because of social and cultural stigma, elder abuse and crime victimhood might be under-reported. Depressive symptoms may also affect perception in older adults. In addition, older adults suffering from depression may be more likely to recall past traumatic incidents than those who were in good mental condition at the time of the survey. The data were obtained from a questionnaire survey performed through face-to-face interviews, which could lead to asking bias. Nevertheless, one of the major strengths of this study is the wider relevance of its results, since it is based on data from a large-scale, nationally representative survey in India.

CONCLUSIONS

This study fills an important gap in the research on the possible association of elder abuse, crime victimhood, perceived safety and depression among older adults in India. It confirms the association of elder abuse and geriatric depression, paving the way for elder abuse to be recognised as a serious health and human rights issue that can no longer be overlooked. There is a need to develop effective intervention strategies for addressing both elder abuse and depression. Healthcare providers should pay more attention to the health implications of elder abuse, particularly the negative psychological consequences. Further, since the study has established a positive association between crime victimhood and depression in late life, it is also important to investigate the history of the crime in order to grasp the underlying dynamics of the symptomology of depression. The study also highlights the importance of perceived neighbourhood safety for the mental well-being of older adults. Therefore, improving neighbourhood environment (eg, lighting, maintenance) and providing supportive services (eg, transportation, police) would contribute to enhance the perceived neighbourhood safety. Moreover, future research could investigate the influences of elder abuse, criminal victimhood and perceived safety on the mental status of older population with longitudinal design using the follow-up data.

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ORCID iD

T Muhammad http://orcid.org/0000-0003-1486-7038

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