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Vulnerability to Elder Abuse and Geriatric Depression in Rural Tamil Nadu: A Mixed-Methods Explanatory Sequential Study from Kanchipuram District, India

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ABSTRACT

Background: Elder abuse is an emerging public health concern among ageing populations, particularly in rural settings where dependency, chronic illness, and social isolation are common. This study assessed vulnerability to elder abuse, geriatric depression, and associated factors among elderly in rural Tamil Nadu.

Methods: A mixed-methods explanatory sequential study was conducted among 250 adults aged ≥60 years in rural Kanchipuram district. Quantitative data were collected using the Vulnerability to Abuse Screening Scale, Geriatric Depression Scale-15, and Lubben Social Network Scale. Hierarchical logistic regression identified predictors of abuse vulnerability. Subsequently, in-depth interviews with 22 vulnerable elderly participants explored lived experiences of abuse.

Results: Higher vulnerability to abuse was identified among 13.2% participants, while geriatric depression was present in 22.8%. Illiteracy, female gender, unemployment, and widowhood were associated with greater vulnerability. Geriatric depression and comorbid diabetes with hypertension emerged as strong independent predictors. Social support showed a significant negative correlation with abuse vulnerability. Qualitative findings revealed a cyclical process of dependency, household power reversal, psychological entrapment, neglect, and silence within changing family systems.

Conclusion: Elder abuse vulnerability in rural elderly populations is closely linked with depression, chronic illness, and weakened social support. Integrated community-based screening, mental health interventions, and strengthening of social support systems are essential for prevention and early identification.

Keywords: Elder Abuse, Older Adults, Depression, Geriatric, Rural Population, Social Isolation

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Introduction

Demographic transformation in the twenty-first century has been unprecedented, marked by rapid global population ageing. The worldwide proportion of individuals aged 65 years and above has nearly doubled from 5.5% in 1974 to 10.3% in 2024, and is projected to reach 20.7% by 2074.[1] In parallel, the number of people aged 60 years and older is expected to rise from 1 billion in 2023 to 1.4 billion by 2030, representing one of the most significant demographic shifts in human history.[2]

While high-income regions such as Europe, North America, Australia, New Zealand, and parts of Eastern and Southeastern Asia have experienced this demographic transition earlier and thus have more advanced ageing populations, developing countries, including India, are currently undergoing rapid demographic changes.[3,4] This shift has brought increasing attention to elder abuse as a critical and emerging public health issue that threatens the fundamental rights, dignity, and well-being of older adults.

Elder abuse remains a largely hidden problem, often occurring within families and institutional settings without being reported. The World Health Organization (WHO) defines 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." Globally, approximately 15.7% of older adults are estimated to experience some form of abuse.[5] However, prevalence estimates vary widely across regions due to differences in cultural norms, awareness, reporting practices, and methodological approaches.[6]

In India, the reported prevalence of elder abuse ranges broadly from 9.6% to 61.7%.[6,7] Findings from the Longitudinal Ageing Study in India (LASI) indicate that 14.4% of older adults experience abuse frequently, 52.8% occasionally, and 32.8% only a few times.[8] Additional evidence, such as the HelpAge India report (2018), highlights substantial regional variation, with cities like Mangaluru reporting prevalence as high as 47%. Furthermore, several studies suggest that elder abuse is more prevalent in rural areas compared to urban settings.[7,9]

The pattern of abuse in India reflects sociocultural dynamics, with psychological abuse being the most common, followed by neglect, financial exploitation, and physical abuse.[6] Direct physical violence is often socially condemned, whereas psychological and financial forms of abuse tend to remain concealed within family structures.

Despite the growing body of evidence, significant research gaps persist. It is estimated that only one in twenty-four cases of elder abuse is reported to authorities, underscoring the magnitude of underreporting.[10] Factors such as stigma, fear of retaliation, emotional and financial dependence on perpetrators, and lack of standardized definitions contribute to this invisibility. In the Indian context, rapid socioeconomic transitions including urbanisation, migration, and the shift towards nuclear family systems are weakening traditional support structures for older adults. As a result, many elderly individuals face reduced family care, increased financial insecurity, and limited access to mental health services.[11-13]

Given these complexities, understanding elder abuse requires not only quantification of its prevalence but also a deeper exploration of the social, cultural, and familial contexts in which it occurs. Such an approach is essential for developing effective prevention and intervention strategies tailored to vulnerable ageing populations.

Despite existing research on the prevalence and correlates of elder abuse in India, there remains a paucity of studies employing mixed-methods approaches that integrate quantitative findings with in-depth qualitative insights to better understand the underlying dynamics of abuse. The present study, conducted in rural Kanchipuram, aims to address this gap with the following objectives:

The present study aimed to estimate the prevalence and pattern of elder abuse among elderly individuals residing in Kancheepuram district, Tamil Nadu, assess the prevalence of geriatric depression, and determine the association between elder abuse vulnerability and related sociodemographic, social, and clinical factors. In addition, the study sought to explore the lived experiences of elderly individuals vulnerable to abuse using a qualitative approach and to integrate both quantitative and qualitative findings within a sequential explanatory mixed-methods framework to obtain a more comprehensive understanding of elder abuse vulnerability.

Methodology

Study Design: The study follows a mixed-methods explanatory sequential study design. The first 3 objectives follow a cross-sectional study design conducted among the elderly living in a rural area of Serapanancheri, Kancheepuram district, Tamil Nadu, from May to August 2025. The fourth objective follows a qualitative study design among the elderly who were vulnerable to abuse, as found from the quantitative data.

Study Population: Elderly individuals aged 60 and above residing in the rural area of Serapanancheri in the Kancheepuram district were included as study participants. Those individuals with severe cognitive impairment or mental disorders, those who refused or could not give informed consent, those residing in institutional care facilities outside the district, such as old-age homes or other nursing homes, and those patients needing immediate hospitalisation for acute medical conditions were excluded from participating.

Sample size calculation: Using the study by Chandanshive P., which reported a prevalence of 19.4% for any form of abuse, the minimum required sample size was calculated with the formula $4PQ/L^2$, with an allowable error of 5%.[6] Prevalence (19.4%) was based on a study done in an urban slum setting in eastern India (Chandanshive et al.). Although the context differs from the current population, the setting was used due to the lack of consistent prevalence data and the variability in reported elder abuse prevalence in India. The estimate used was reasonable and conservative for the sample size calculation. The required sample size was calculated to be 250.2, which was rounded off to 250.

Sampling Method: Simple random sampling was used to select the study participants. The list of eligible elderly individuals registered at the rural health centre of the tertiary medical college in Serapanancheri, Kancheepuram district, was used as the sampling frame, comprising 396 individuals. All the elderly people's names were arranged in alphabetical order, and each was assigned a unique number. Participants were selected using a computer-generated random number table until the required sample size was achieved.

Data collection: The individual corresponding to the randomly selected number was visited in the village, and data were collected. After written informed consent was obtained, participants were interviewed by trained investigators using standardised and validated tools. Each interview lasted approximately 30-40 minutes. Interviews were conducted in the local language to minimise this bias, and assistance regarding the same was provided for illiterate participants. Completed questionnaires were reviewed on-site by supervisors to verify completeness, and any missing information was clarified immediately with participants. The Lubben Social Network Scale (LSNS-6) was used to assess social isolation among participants in the study. The scale is a 6-item self-report instrument that measures the size, closeness, and frequency of interactions within the respondent's social network, including both family and non-family relationships. The items are scored from 0 to 5, and the total score ranges from 0 to 30, with higher scores indicating greater social interaction. A cutoff point of less than 12 is used to assess the risk of social isolation among respondents. The instrument has been validated for use among the elderly community-dwelling population and has been found to have good internal consistency and reliability.[14] The Geriatric Depression Scale (GDS-15) was used to measure depression. This scale is a commonly used and validated scale for measuring depression in older adults. It was developed by Yesavage JA and Sheikh JI (1986).[15] It has been shown to be reliable and valid for different populations. The GDS was applied to assess depression in the participants in its simplified 15-item format, and a score of ≥5 was used to indicate the presence of depression, as per standard recommendations for community-based screening.[16]

The Vulnerability to Abuse Screening Scale (VASS) was used in the assessment of elder abuse. It consists of a total of 12 questions with dichotomous responses with psychometric properties for screening of elder abuse over a period of the past 12 months. It has four subscales, namely, dependence, dejection, vulnerability, and coercion, with each subscale consisting of 3 questions. The scale was used with a cut-off≥ 6 to define higher vulnerability, based on prior validation of the VASS-12 in a rural Indian population.[17] It is to be noted that VASS is a screening scale to measure vulnerability to abuse rather than actual abuse. A structured questionnaire for the morbidity profile was used to collect information on chronic illnesses, which included conditions such as type 2 diabetes mellitus, hypertension, and other self-reported comorbid conditions. The questionnaire was designed according to the standard format for a clinical history-taking form and was reviewed by subject experts.

Data analysis: The data was entered into Microsoft Excel and analysed using IBM SPSS version 26.0. Data completeness was ensured during data collection with on-site verification of questionnaires. There were no missing data for the variables included in the analysis. The categorical variables were described using frequencies and percentages. Vulnerability to abuse (VASS) was recoded into lower (0) and higher (1) vulnerability. Bivariate analysis was performed using the Chi-square test to assess associations between the independent variables and the outcome. Unadjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated for 2x2 tables. Variables with $p < 0.05$ in bivariate analysis and those with conceptual relevance based on previous literature were selected for multivariable modelling. A hierarchical binary logistic regression analysis was done in three steps according to conceptual relevance and statistical associations. Model 1 included sociodemographic variables, Model 2 included social variables, and Model 3 included clinical variables. Adjusted odds ratios (AOR) with 95% CI were presented. Model fit was assessed using -2 Log likelihood, Cox & Snell R^2, Nagelkerke R^2, and the Hosmer & Lemeshow test, with $p < 0.05$ indicating statistical significance.

Qualitative Component: A qualitative study with a grounded theory design was undertaken to gain insight into the experiences of older people who had been abused. Twenty-two participants who were identified with higher vulnerability to abuse (VASS) in the quantitative study were purposefully selected. In-depth interviews were conducted using a pre-tested semi-structured schedule. The research team comprised two male and two female researchers from the field of community medicine, trained in qualitative research with previous research experience in the field of geriatric and mental health research. The researchers recognised the potential impact of their clinical and public health perspectives

on the interpretation of the findings. To promote reflexivity and prevent bias, the interviews were undertaken using a semi-structured approach with neutral probing questions. A peer debriefing was conducted to discuss coding. The interviews were conducted in the participants' homes or community settings, in private spaces with only the researcher and the participant, and each interview lasted about 30 to 40 minutes. Before the interview, rapport was established with the participants to make them feel at ease. Data collection and analysis were done concurrently, and saturation was based on when there were no new codes from consecutive interviews. This was established at the 20th interview, and two more interviews were done to confirm saturation. The interviews were audio-recorded, and the transcripts were translated into English. Data analysis was done manually. A coding framework was developed through a repetitive process whereby open-coded codes were categorised into groups through axial coding and further synthesised into overarching themes and a core construct through selective coding. Credibility was also ensured through member checking, where participants were sought for validation of interpretations and emerging themes, as well as peer debriefing.

Ethical Approval and Informed Consent: Ethical approval was obtained from the Institutional Human Ethics Committee of Sree Balaji Medical College and Hospital in Kancheepuram district (Approval number 002/SBMCH/IHEC/024/2315). Participants were informed about the purpose of the study and written informed consent in the local language was obtained from study participants before enrolment.

RESULTS

A total of 250 elderly participants were recruited for the study. Most of the participants were male (59.6%), while females accounted for 40.4%. Two-thirds (66.8%) of the participants were above 65 years of age. Most participants were literate (75.2%), and 78.8% were currently employed. In terms of marital status, 68.4% of the participants were married and living with their spouses, and more than half (59.2%) of the elderly had more than two children. Most of the elderly (72.8%) owned their own houses. (Table 1)

Nearly four-fifths (79.2%) of the participants reported receiving pension benefits. Government hospitals were the preferred healthcare facility for 75.2% of the elderly. Geriatric depression was found in 22.8% of the participants and higher vulnerability to abuse, as measured by VASS, was found in 13.2% of the study population. Moreover, 25.2% of the participants had both Type 2 diabetes mellitus and hypertension. (Table 2)

Higher vulnerability to abuse was significantly associated with female gender (OR = 2.23; 95% CI: 1.06-4.69; p = 0.031), illiteracy (OR = 2.59; 95% CI: 1.21-5.55; p = 0.012), unemployment (OR = 2.45; 95% CI: 1.12-5.39; p = 0.022), and widowed or not living with a spouse (OR = 2.30; 95% CI: 1.09-4.84; p = 0.025). Participants with both Type 2 diabetes mellitus and hypertension had significantly higher odds of vulnerability (OR = 12.17; 95% CI: 5.25-28.21; p < 0.001). Geriatric depression had a very strong positive association with vulnerability to abuse (OR = 48.9; 95% CI: 15.99-149.76; p < 0.001). There was no statistically significant association with age, retirement status, preferred hospital type, or source of medical expenditure. (Table 3)

Table 1: Sociodemographic Characteristics of the Study Participants (N = 250)

Variable	Participants (%)
Gender	
Male	149 (59.6)
Female	101 (40.4)
Age Group	
60-65 years	83 (33.2)
>65 years	167 (66.8)
Education	
Illiterate	62 (24.8)
Literate	188 (75.2)
Occupation	
Unemployed	53 (21.2)
Employed	197 (78.8)
Marital Status	
Married & living with spouse	171 (68.4)
Widowed / Not living with spouse	79 (31.6)
Number of Children	
No children	30 (12)
<2 children	72 (28.8)
>2 children	148 (59.2)
Ownership of House	
Rented house	38 (15.2)
Own house (children's name)	30 (12)
Own house (self-name)	182 (72.8)

Table 2: Health-related and Support System Characteristics of the Elderly participants (N = 250)

Variable	Participants (%)
Receiving Pension	
Yes	198 (79.2)
No	52 (20.8)
Preferred Type of Hospital	
Government	188 (75.2)
Private	62 (24.8)
Source of Money for Medical Treatment	
Depend on children	179 (71.6)
Own money / savings	71 (28.4)
Geriatric Depression (GDS)	
Present	57 (22.8)
Absent	193 (77.2)
VASS (Vulnerability to Abuse Scale)	
Higher vulnerability	33 (13.2)
Lower vulnerability	217 (86.8)
Both T2DM and Hypertension	
Yes	63 (25.2)
No	187 (74.8)

Table 3: Association between Higher Vulnerability to Abuse and related variables (N = 250)

Characteristics	Higher Vulnerability (n=33)(%)	Lower Vulnerability (n=217) (%)	Unadjusted OR	95% CI	P value
Gender Female (Ref Male)	19 (18.8)	82 (81.2)	2.23	1.06-4.69	0.031*
Age >65 years (Ref 60-65 yrs)	25 (15.0)	142 (85.0)	1.65	0.71-3.84	0.241
Illiterate (Ref Literate)	14 (22.6)	48 (77.4)	2.59	1.21-5.55	0.012*
Unemployed (Ref Employed)	12 (22.6)	41 (77.4)	2.45	1.12-5.39	0.022*
Widowed/Not living with spouse#	16 (20.3)	63 (79.7)	2.30	1.09-4.84	0.025*
Receiving Pension	24 (12.1)	174 (87.9)	0.66	0.29-1.52	0.325
Prefer Government Hospital (Ref Private)	26 (13.8)	162 (86.2)	1.26	0.52-3.07	0.608
Depend on children for medical expenses$	21 (11.7)	158 (88.3)	0.65	0.30-1.41	0.276
Having Both T2DM & HTN	24 (38.1)	39 (61.9)	12.17	5.25-28.21	<0.001*
Geriatric Depression (GDS) present	29 (50.9)	28 (49.1)	48.9	15.99 - 149.76	<0.001*

#Ref - Married & living with spouse; $Ref – Own saving as a source for medical expenses
*Statistically significant at $p < 0.05$

Table 4: Hierarchical Logistic Regression Analysis for Higher Vulnerability to Abuse (N = 250)

Variables	Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Female	2.71 (1.25-5.90)*	3.26 (1.36-7.81)*	3.36 (0.98-11.48)
Illiterate	3.15 (1.42-6.98)*	2.04 (0.85-4.91)	6.97 (1.63-29.86)*
Unemployed	-	3.22 (1.21-8.58)*	2.55 (0.57-11.41)
Widowed / Not living with spouse	-	2.12 (0.95-4.71)	2.06 (0.59-7.19)
T2DM + HTN	-	-	22.29 (5.71-86.99)*
GDS Present	-	-	55.28 (13.86-220.43)*
Model Fit Statistics			
-2 Log Likelihood	182.828	174.981	79.07
Cox & Snell R^2	0.048	0.077	0.371
Nagelkerke R^2	0.088	0.143	0.685
Hosmer-Lemeshow χ^2 (p-value)	0.189 (p = 0.910)	0.832 (p = 0.975)	2.949 (p = 0.890)

*Statistically significant at $p < 0.05$; Hosmer-Lemeshow test indicates good model fit when $p > 0.05$.

In Model 1, which included sociodemographic variables, female gender (AOR = 2.71; 95% CI: 1.25-5.90) and illiteracy (AOR = 3.15; 95% CI: 1.42-6.98) were significant predictors. The model explained 8.8% of the variance (Nagelkerke $R^2 = 0.088$). Model 2, which included the social variables, showed that female gender (AOR = 3.26; 95% CI: 1.36-7.81) and unemployment (AOR = 3.22; 95% CI: 1.21-8.58) were significant predictors. The model explained the variance modestly (Nagelkerke $R^2 = 0.143$). In the final model (Model 3), after adding the clinical variables, both T2DM with hypertension (AOR = 22.29; 95% CI: 5.71-86.99) and geriatric depression (AOR = 55.28; 95% CI: 13.86-220.43) were strong independent predictors. (Table 4)

The model had excellent explanatory power (Nagelkerke $R^2 = 0.685$). The Hosmer and Lemeshow goodness-of-fit test was not significant for any of the three models ($p > 0.05$). (Table 4)

The mean Lubben Social Network Scale-6 (LSNS-6) was also significant (T test), showing a lower value for the group of participants who had a higher vulnerability to abuse (5.39 ± 5.58) compared to those who had a lower value of vulnerability (7.94 ± 5.17) ($p = 0.009$). This showed a lower level of social support for the group of participants who had a higher vulnerability to abuse. Among those participants who were susceptible to social isolation (LSNS-6 < 12), 27 (81.8%) were classified as higher risk and 166 (76.5%) were considered low risk, thus reflecting that most of the participants of both the vulnerable groups have been categorized below the threshold level of social isolation.

A strong negative correlation was observed between social network scale and vulnerability to abuse ($r = -0.678$, $p < 0.001$), indicating that those with stronger social networks had significantly lower vulnerability to abuse.

Qualitative Study Results: Twenty-two in-depth interviews were carried out with older adults who had experienced abuse in the family context. Both men and women aged 60 and older, most of whom were living with their children, were included in the study. Using open, axial, and selective coding, a grounded theory was developed that describes how vulnerability to abuse is generated and maintained. The core category that emerged was "Entrapment in Dependency within Changing Family Systems." This central phenomenon captures how structural vulnerability, health-related dependence, and changing family power relations interact to generate and maintain elder abuse.

The results are reported in five major categories: (a) Structural Vulnerability, (b) Power Reversal in the Family System, (c) Symptoms of Abuse, (d) Psychological Entrapment, and (e) Coping with Silence and Resilience

a) Structural Vulnerability: Basis of Dependence

The participants described several pre-existing con-

ditions that placed them in vulnerable positions within the family. These included widowhood, unemployment or retirement, economic dependence, illness, and loss of physical strength.

The women, especially the widowed, reported a considerable drop in their status following the death of their husbands. A 67-year-old widowed participant said, “Since my husband passed away, everything is different. In the past, people consulted me before making any decisions. Now, nobody asks me.” Widowhood typically initiates economic and emotional dependence on adult children.

Unemployment and the loss of earning capacity further lowered the participants' status within the family. Several participants equated their productivity with their respect. As one 61-year-old recently unemployed male participant explained, “While I was earning, they listened to me. "Now that I'm not working, my opinion doesn't matter."

Physical dependence was a result of chronic conditions such as type 2 diabetes and hypertension. Those who required help with things like getting to the hospital, managing their medications, and handling everyday activities often felt like they were a burden.

A 63 year female participant with T2DM said that, “I cannot go to the hospital alone. If they do not take me, I simply forgo the visit.” Physical vulnerability became an essential antecedent to dependency.

These structural vulnerabilities constituted the context in which abuse later occurred.

b) Household Power Dynamics

A notable change was observed in the distribution of power within households. Participants reported a change from being in charge to needing help and resources from others.

Financial control was a key point of disagreement.

Many participants reported not having access to, or being denied access to, their retirement or savings. A 62-year-old pensioner woman said, “My pension arrives, but my son holds the ATM card. I must ask him even for small purchases.” Ownership of property also became contentious. Participants reported being coerced into transferring ownership of property. “They asked me to sign the documents. I did not understand completely, but I signed,” said 64-year-old female participant.

The participants reported that decision-making authority had passed to younger generations, especially sons and daughters-in-law. Participants reported that they could no longer question anything in the household. As a 67-year-old female participant explained, “They make decisions about everything. If I point out anything, they tell me I am interfering.”

This power imbalance led to a situation where disrespect became normalized and abuse became possible.

C). Manifestations of Abuse

The abuse was mostly of a psychological, verbal, and neglectful nature, although financial exploitation was also common.

Emotional and verbal abuse included yelling, belittling, and ignoring. A 61-year-old male participant said, “They yell at me for little things. Sometimes they insult me in front of guests.”

Neglect of healthcare needs was a theme that came up, especially among participants with chronic conditions. Some of the complaints included being denied timely medical care, irregular medication administration, and ignoring food restrictions. A 68-year-old widowed male participant said, “My sugar levels rise because they do not serve me food on time.” Another 70-year-old widowed female participant said, “When I ask to go to the hospital, they tell me they are busy.”

Financial exploitation included taking pensions and refusing to give money for personal use. Participants also spoke of being made to feel guilty for spending. “They tell me I am wasting money on medicines,” said one elderly 64-year-old male participant.

Social isolation was another form of abuse that was subtle but painful. Participants reported being locked in a room, being denied access to family discussions, and being ignored at social events. “They talk among themselves. I sit in the corner quietly,” said 63-year-old female participant.

d) Psychological Entrapment

There was a deep sense of psychological entrapment that came through in the interviews. Participants had internalised their experiences and tended to normalise or justify abuse.

Feelings of worthlessness and being a burden were common. “Maybe I am the problem. I am old and sick,” said a 62-year-old participant thoughtfully. Many participants spoke of fearing abandonment and having nowhere else to go. “If I leave, where will I go?” asked another 66-year-old female unemployed participant.

Depressive symptoms were also clear in the accounts of participants who spoke of feeling depressed all the time, crying spells, staying away from people, and hopelessness. Some participants spoke of having passive death wishes. “Sometimes I feel it would be better if God takes me,” said one 72-year-old male widowed participant in a whisper.

Crucially, depression was not only a result but also a factor that reinforced dependency. The participants with low moods lacked the motivation to seek help or to stand up for themselves, thus further entrenching the cycle of abuse.

e) Coping through Silence and Endurance

Despite the abuse, most of the participants did not

seek professional help. Silence was the most prevalent coping mechanism.

Most of the participants rationalised their endurance as a means to uphold the honour of their families. "They are my children. I cannot complain outside," said one 65-year-old female participant. The fear of social stigma and community disapproval discouraged them from speaking out.

Spiritual coping was also prevalent. The participants expressed their dependence on their faith for emotional sustenance. "I leave everything to God," said one elderly 70-year-old woman. Others spoke of accepting suffering as fate.

Shielding the children's reputation was also a common reason. "If I say anything against them, society will blame them. I don't want that," said a 65-year-old male participant.

The Emergent Theoretical Model: The grounded theory proposes a cyclical relationship. Vulnerabilities in the structure, such as widowhood, unemployment, and illness, lead to dependency. Dependency is the cause of power reversal in the household, which, in turn, enables abuse. Abuse leads to psychological entrapment and depression, which further increases dependency by reducing autonomy and help-seeking behaviour. This cyclical relationship maintains and further establishes vulnerability over time.

Thus, elder abuse in this scenario is not a one-off occurrence but a process that is dynamically embedded within ever-changing family systems and further maintained through economic and health-related dependence.

Integration with Quantitative Findings: The qualitative findings help to explain the results obtained from the quantitative data. The important link between female gender and abuse is highlighted in the stories of widowhood and patriarchal power relations. Unemployment and economic non-productivity were identified as important triggers for lack of respect. The important link between T2DM, hypertension, and vulnerability is explained by health-related dependency and neglect. Finally, the important link between geriatric depression and abuse is highlighted in the stories of psychological entrapment, hopelessness, and silence.

The findings together help to highlight elder abuse as a complex issue that is related to dependency, power, and unmet psychological needs.

Subgroup Analysis:

Gender-stratified subgroup analysis: The gender-stratified subgroup analysis was done on females (n = 101) and males (n = 149). For females, vulnerability to abuse was significantly related with older age >65 years (OR = 3.32; 95% CI: 1.19 - 9.28; p = 0.018), illiteracy (OR = 3.77; 95% CI: 1.22 - 11.63; p = 0.016), unemployment (OR = 6.96; 95% CI: 1.66 - 29.18; p = 0.003) and geriatric depression (OR = 34.42; 95% CI: 8.60 - 137.80; p < 0.001). No significant association between marital status and vulnerability to abuse was found among females (p = 0.236). For males, geriatric depression was the only significant predictor of higher vulnerability to abuse (OR = 90.24; 95% CI: 11.09 - 734.33; p < 0.001). None of the variables: age, education, occupation and marital status showed any significant associations. Therefore, the results indicated that although geriatric depression was a predictor for higher vulnerability among both male and female elderly individuals, illiteracy, unemployment and older age were significant predictors among females.

Age-stratified subgroup analysis: An age-stratified subgroup analysis was done on participants aged between 60-65 years (n = 83) and those aged above 65 years (n = 167). In the case of those aged above 65 years, vulnerability was significantly related with being female (OR = 3.32; 95% CI: 1.19 - 9.28; p = 0.018) and geriatric depression (OR = 90.24; 95% CI: 11.09 - 734.33; p < 0.001). Vulnerability among participants aged 60-65 years was significantly associated with illiteracy (OR = 3.77; 95% CI: 1.22 - 11.63; p = 0.016), unemployment (OR = 6.96; 95% CI: 1.66 - 29.18; p = 0.003), and geriatric depression (OR = 34.42; 95% CI: 8.60 - 137.80; p < 0.001).

T2DM and hypertension subgroup analysis: The subgroup analysis stratified by the presence of both T2DM and hypertension was done among those who have the two conditions (n = 63) and those who do not have (n = 187). Illiteracy was a significant predictor among those with both T2DM and hypertension (OR = 11.10; 95% CI: 2.14 - 57.54; p = 0.001). Similarly, lack of pension (OR significant; p = 0.001) and geriatric depression (OR = 47.60; 95% CI: 10.29 - 220.10; p < 0.001) was significantly associated with higher vulnerability among the same group. Occupation, marital status, age, and gender were not significantly associated in the aforementioned subgroup. On the other hand, for those without both T2DM and hypertension, geriatric depression (OR = 53.91; 95% CI: 6.44 - 451.18; p < 0.001) was the major predictor of vulnerability.

Discussion

It was found that 13.2% of the rural elderly in Kanchipuram district had a higher vulnerability to abuse as quantified by the VASS Scale. This value is within the wide range of 9.6% to 61.7% reported in Indian studies, although it is much lower than the values reported from rural Puducherry (50.2%)[18] and Mangalore (44.6-50.7%)[9]. These variations may have been partly due to the differences in the screening tools, definitions of abuse, and the difference between confirmed abuse and vulnerability to abuse. The VASS used in this study measures vulnerability and predisposition rather than direct disclosure of abusive behaviours, which may partly explain the relatively conservative estimate. A study in Delhi using the

same tool reported a prevalence of 24.3%, indicating that regional, cultural, and socioeconomic factors substantially influence rates.[19]

As with other Indian studies, female gender was an independent predictor of higher vulnerability to abuse (AOR = 3.36). Women, particularly widows, have been found to be structurally disadvantaged within Indian households following the death of their spouse, losing both economic power and social status.[20,21] In the current study, widowhood was found to be significantly associated with higher vulnerability in bivariate analysis, and the qualitative data clearly indicate this process, in which women reported a rapid loss of their decision-making powers and social recognition following bereavement. Illiteracy was found to be a significant predictor in the final model (AOR = 6.97), supporting the findings of the Longitudinal Ageing Study in India (LASI) study, which identified education as a major protective factor, stating that literate people show greater functional autonomy and are less likely to be in a position of economic dependence.[8]

The most interesting result that emerged from this study was the extremely high correlation between geriatric depression and the susceptibility to abuse (AOR = 55.28; 95% CI: 13.86-220.43). This is in line with the emerging literature from India. A study done by Sembiah S et al., in rural West Bengal, found depression to be an independent predictor of abuse,[22] and the association between depression and abuse was found to be one of the highest of all the variables tested in a study done by Dey D et al.[23] The most significant aspect of the current study is that the qualitative results show that this correlation is actually bidirectional, where depression is not just a co-existing condition with abuse but is actually a factor that contributes to the exacerbation of dependency, and the loss of motivation to seek help, which is a crucial part of the cycle of entrapment. This bidirectional relationship was further explained in a study done by Koga C et al, in which it was found that elder abuse can lead to depression and depression can become a cause for abuse.[24] This complex interplay between the two conditions, encapsulated in the central construct of "Entrapment in Dependency within Changing Family Systems" in the grounded theory model, provides a critical mechanistic insight into the nature of the relationship identified by the quantitative studies as a statistical correlation. The results of the qualitative study indicate that the importance of addressing geriatric depression is not only a critical health outcome in its own right but may also provide a critical point of intervention to break the cycle of abuse.

The results obtained in the present qualitative research were in line with the findings of previous qualitative research done in India. For example, a qualitative study from Chennai found that, elder abuse has deep roots in family systems and is perpetuated by socioeconomic dependency, fear of losing family support systems, and the lack of willingness to seek external help.[25] Similarly, in previous studies, elderly individuals were seen as a burden in changing family systems and it occurs at the hands of the immediate family members such as the son and daughter-in-law.[25,26] The present research extends the results obtained in previous studies by developing the following grounded theory of “Entrapment in Dependency within Changing Family Systems,” which conceptualizes elder abuse as a dynamic process.

The co-existence of Type 2 diabetes mellitus and hypertension was a very strong independent predictor of risk (AOR = 22.29; 95% CI: 5.71-86.99). A study done by Sathya T et al. found that multimorbidity in India is strongly and dose-dependently associated with elder abuse, with the risk of abuse being directly proportional to the number of chronic conditions.[27] The mechanism seems to be one of functional dependence, whereby older people with T2DM and hypertension usually need to be hospitalised regularly, have their medications managed, and follow specific diets, all of which would require the involvement of caregivers and provide opportunities for abuse. This process has been exactly reflected in the qualitative findings of this study, whereby the participants reported being denied hospital visits on time, having their dietary restrictions flouted, and being guilt-tripped about the cost of their medications, all of which represent different aspects of medical neglect and financial exploitation made possible by chronic health dependence.

The highly negative correlation between the strength of social networks and vulnerability to abuse ($r = -0.678$, $p < 0.001$) emphasises the protective function of social integration, as confirmed by Lubben J et al[11], and Oyovwi MO et al[28], in which it was found that socially isolated older people are significantly more vulnerable to abuse because of the lack of external monitoring and informal support systems. This result is also supported by themes emerging from the qualitative component of the study, in which participants reported being deliberately excluded from family conversations and locked in their rooms, representing a form of enforced isolation that both reflects and reinforces vulnerability. Increasing social network strength through community engagement initiatives and regular home visits by community health workers could thus be an important preventive measure in addition to therapeutic ones.

There are a few limitations to this study that warrant mention. The cross-sectional nature of this study means that it is not possible to determine causality or the direction of the relationship between depression and abuse. The study was also carried out in one rural health centre catchment area in Kanchipuram, and it may not be generalizable to other rural or urban settings in Tamil Nadu. VASS, although validated, is a measure of vulnerability to abuse and not actual abuse, and it may underestimate the actual prevalence of abuse, as it is a well-known fact that there is a problem of underreporting, which is estimated to be 1 in 24 cases actually coming to official notice.[10]

Social desirability bias and fear of consequences may have further reduced the reporting. The qualitative sub-sample, although purposively sampled, consisted of only 22 people from one district, and saturation in a small sample size should be treated with caution.

The results of this study have several implications for public health practice. There should be routine depression screening in the geriatric population in rural Tamil Nadu using the GDS-15 scale which is a validated and reliable tool for community-based screening[13], as part of elder care consultations, given the high burden of depression documented in rural Tamil Nadu.[29] Community health workers should be trained to recognise structural vulnerability indicators, such as widowhood, unemployment, illiteracy, and chronic illness, which should alert them to the need for closer follow-up. At the policy level, although the Maintenance and Welfare of Parents and Senior Citizens Act of 2007 provides a legal framework that is not well known among rural elderly people, panchayat-level awareness campaigns may help improve its effectiveness.[30] There is a pressing need for multidisciplinary programs involving social work, mental health professionals, and community-level programs to address the complex, cyclical, and family-embedded nature of elder abuse, as has been brought out in this study.

Future studies should concentrate on longitudinal studies to determine the direction of the relationship between elder abuse and geriatric depression. Intervening in depression among elders may be a vital chance to stop the vicious cycle of dependency and abuse identified in this research. Moreover, the efficiency of community health worker-based screening programs for early identification and intervention will have to be examined. Lastly, qualitative studies from different geographical and cultural locations are necessary to assess the generalizability and applicability of the grounded theory model developed in this research.

Limitations

A sampling frame was used, which was based on a rural health centre's register, which can be considered a facility-based sampling frame rather than a population-based sampling frame. Elderly people who are not registered with the health centre, especially those who are socially isolated, may be at a disadvantage and may be excluded from the sampling frame, which could result in a possible bias in the results, as the actual risk of abuse may be underestimated.

It is to be noted that VASS-12 measures vulnerability to abuse and not actual abuse events. This might result in an underestimation of abuse.

Adjusted odds ratio for the key predictors, especially geriatric depression and comorbid diabetes and hypertension, had wide confidence intervals, suggesting a lack of precision for the estimates. This may be explained by the smaller number of participants in the high vulnerability group, which comprised only 33 participants. This may influence the stability of the regression model.

Conclusion

The study found that 13.2% of the rural elderly population in Kanchipuram district showed greater susceptibility to abuse, with female gender, illiteracy, unemployment, and widowhood being established as important sociodemographic predictors. Comorbid Type 2 Diabetes Mellitus with Hypertension and Geriatric Depression were found to be the most important independent clinical predictors, with Geriatric Depression demonstrating a particularly strong link that the results of the qualitative analysis make clear is a two-way relationship between deepening dependency and silencing help-seeking, thus perpetuating the cycle of abuse. The Grounded Theory model of "Entrapment in Dependency within Changing Family Systems" brings together all the findings into a cohesive explanatory model, showing that elder abuse is a dynamic, self-reinforcing process that is embedded within the ever-changing family systems, and that together these findings make clear that there is a pressing need for screening for depression and functional dependency at the primary care level, increased community awareness of the legal rights of older people, and targeted welfare interventions to rebuild the social support networks that have been destroyed by the impact of urbanization and family breakdown.

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Availability of Data: The datasets generated and/or analyzed during the current study are not publicly available as they contain sensitive information. However, the data may be shared on reasonable request with the corresponding author after approval from the ethical committee.

Declaration of Non-use of Generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

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