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Original Research Article

FUNCTIONAL DECLINE AS A DETERMINANT OF FEAR OF FALLING AMONG THE ELDERLY IN AMRITSAR, INDIA: A CROSS-SECTIONAL STUDY

Sanjeev Mahajan[1], Rohit Duggal[2], Preeti Padda[3], Jasleen Kaur[4], Ishaan Khanna[5]

[1]*Professor & Head, Department of Community Medicine, Government Medical College, Amritsar, India.*
[2]*Junior Resident, Department of Community Medicine, Government Medical College, Amritsar, India.*
[3]*Professor, Department of Community Medicine, Government Medical College, Amritsar, India.*
[4]*Associate Professor, Department of Community Medicine, Government Medical College, Amritsar, India.*
[5]*Intern, Government Medical College, Amritsar, India.*

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Corresponding Author:
Dr. Rohit Duggal,
Junior Resident, Department of Community Medicine, Government Medical College, Amritsar, India.
Email: kvdoc.28@gmail.com

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ABSTRACT

Background: Fear of falling (FoF) is a pervasive concern among older adults that can precipitate functional decline, social isolation, and reduced quality of life. Functional ability—measured by Instrumental Activities of Daily Living (IADL)—is both a marker of independence and a potential predictor of fear of falling. This study aimed to assess the prevalence of fear of falling and to examine the association and correlation between functional decline (IADL) and fear of falling among community-dwelling elderly in Amritsar.

Materials and Methods: A community-based, descriptive cross-sectional study was conducted from August 2023 to July 2024 among 360 participants aged ≥65 years, recruited equally from rural Majitha Block and urban slums of Amritsar, using stratified random sampling. Data were collected via face-to-face interviews using a pre-tested semi-structured questionnaire. Fear of falling was assessed using the 16-item Falls Efficacy Scale-International (FES-I; score range 16–64). Functional status was measured by the IADL scale (score range 0–8). Spearman's rank correlation and chi-square tests evaluated relationships and associations. $p<0.05$ was considered to be statistically significant.

Results: Overall, 81% reported some concern about falling (mild: 43%, moderate: 28%, high: 10%). Only 11% were fully independent by IADL, while 33% were highly dependent. A strong inverse correlation was found between FES-I and IADL scores ($r_s = -0.98$, $p<0.001$). Chi-square showed a significant association between fear of fall categories and IADL levels ($\chi^2=178.25$; $p<0.001$).

Conclusions: Functional decline is a potent determinant of fear of falling. Early identification of functional impairments and targeted interventions—such as balance training and home hazard modification—are essential to mitigate fear of falling among the elderly.

Keywords: fear of falling, functional decline, FES-I, IADL, elderly, India.

INTRODUCTION

The global demographic shift towards an aging population has led to an unprecedented rise in the number of older adults, with the United Nations estimating that by 2050, individuals aged ≥65 years will constitute nearly 16% of the world population.[1] In India, the elderly population has grown from 8% in 2011 to over 10% by 2021, translating into more than 140 million persons.[2]

Falls represent a significant public health concern in this demographic, affecting approximately one in four community-dwelling older adults each year and accounting for substantial morbidity, mortality, and economic burden.[3] In low- and middle-income countries like India, infrastructural challenges, lack of assistive devices, and limited access to preventive services further exacerbate fall risk.

Fear of falling (FoF), defined as "a lasting concern about falling that leads individuals to avoid activities

they are still capable of performing," has emerged as both a consequence and predictor of falls.[4] Measured most commonly by the Falls Efficacy Scale–International (FES-I), this psychological construct quantifies concern across a spectrum of daily activities—from basic ambulation to complex social engagements. Estimates of fear of fall prevalence vary widely, but systematic reviews suggest that up to 50% of community-dwelling older adults report at least mild concern, with even higher rates observed among those with prior fall history.[5] In India, emerging evidence indicates that over one-third of elderly experience fear of falling, though data remain sparse and regionally fragmented.

The implications of fear of falling extend beyond mere apprehension; activity restriction driven by this fear accelerates physical deconditioning, muscle weakness, and balance deficits, thereby creating a vicious cycle of further functional decline and increased fall susceptibility. Psychosocial sequelae—such as social isolation, depression, and reduced quality of life—compound this burden, underscoring the need for holistic assessment and intervention. Instrumental Activities of Daily Living (IADL), as originally conceptualized by Lawton and Brody, assess complex tasks essential for independent community living, including medication management, transportation, and financial handling. Declines in IADL scores not only reflect diminishing functional capacity but may also serve as early indicators of heightened fear of fall, given the close interplay between perceived self-efficacy and daily task performance.

Despite growing recognition of the bidirectional relationship between functional ability and fear of falling, empirical studies quantifying this association in Indian settings—particularly in the socioeconomically diverse milieu of Amritsar—are lacking. Rural elders may face different environmental hazards and support structures compared to their urban counterparts in slum settings, potentially influencing both functional decline and fear of falling. Accordingly, this study was designed to (1) determine the prevalence and severity of fear of falling using FES-I, (2) assess functional independence via IADL scoring, and (3) examine the strength and nature of the association and correlation between fear of falling and functional decline among community-dwelling elderly in both rural and urban areas of Amritsar. By elucidating these relationships, our findings aim to inform targeted interventions to preserve autonomy and reduce fall-related morbidity in this vulnerable population.

MATERIALS AND METHODS

A descriptive, community-based cross-sectional study was conducted from August 1, 2023, to July 31, 2024 under the Department of Community Medicine, Government Medical College, Amritsar. The study was carried out in selected rural villages of Block Majitha and urban slums of Amritsar city, which constitute the designated rural and urban field practice areas of the college.

Study Population

The study population comprised elderly individuals aged 65 years and above who were permanent residents (residing for at least one year) of the selected rural and urban areas.

Inclusion Criteria: The study included individuals aged 65 years and above who were permanent residents of the area for at least one year and were willing to participate by providing written informed consent.

Exclusion Criteria: Participants were excluded if they were bedridden or severely ill, deaf and mute, or unwilling to participate or unable to provide consent.

Sample Size and Sampling Technique

The required sample size was estimated assuming a 30.5% prevalence of fear of falling among the elderly, with a 5% absolute precision and a 95% confidence level, using the standard formula.

The minimum sample size was calculated to be 323. After adjusting for a 10% non-response rate, the final sample size was determined to be 360, with 180 participants each selected from rural and urban areas. A two-stage stratified random sampling technique was used. In the first stage, one village from the rural block (Majitha) and one urban slum from Amritsar city were selected using simple random sampling. In the second stage, a line list of elderly individuals aged 65 years and above was prepared and stratified based on age groups (65–70, 71–80, 81–90 years) and gender. Proportionate allocation was applied to each stratum, and participants were selected using computer-generated random numbers. In the event of non-availability after three consecutive visits, the next eligible household was selected.

Data Collection Tools and Techniques

Data were collected using a pretested, semi-structured questionnaire administered through face-to-face interviews in the local language by the researcher. The tool comprised the following:

- **Socio-demographic profile:** It included information regarding age, gender, marital status, education, occupation, family type, and socio-economic status of the participants.
- **Falls Efficacy Scale–International (FES-I):** A 16-item instrument used to assess fear of falling in daily activities. Total score ranges from 16 to 64, with higher scores indicating greater concern and categorized as: no concern (16-19), mild (20-27), moderate (28-31) and high (≥32). A cut-off of ≥32 was used to define high fear of falling.
- **Lawton and Brody Instrumental Activities of Daily Living (IADL) Scale:** This tool was used to assess functional ability by evaluating independence in 8 domains. Based on the total score (0–8), independence levels were defined as: fully independent (8), mild dependence (6-7), moderate (3-5) and high dependence (0-2).

A second house-to-house visits were conducted in the chosen households, for conduction of one-to-one interview with the study participants. Prior to the interview, a written informed consent was taken from the study participant before inclusion into the study. The participants were assured of confidentiality and their right to withdraw at any time. Interviews were conducted face-to-face, in the local language and the required information was recorded on the developed semi-structured data collection tool. The duration of each interview ranged from 30 to 45 minutes.

Ethical Approval: Prior to commencement of the study, all the required approvals were obtained from the Institutional Research Committee and Ethical Committee.

Statistical Analysis

Data entry was performed using Microsoft Excel and analysis was done using SPSS v26. The association between functional status (IADL score categories) and fear of falling (FES-I categories) was examined using cross-tabulation and tested for significance using the Chi-square test. The strength and direction of the relationship between FES-I and IADL scores (as continuous variables) was assessed using Spearman's rank correlation coefficient. A p-value of <0.05 was considered statistically significant.

RESULTS

Prevalence of Fear of Falling

Based on the FES-I scale scores, the study participants were classified into 4 categories i.e no concern (16-19), mild concern (20-27), moderate concern (28-35) and high concern (>35) (Figure 1). Almost 43% of study participants reported only a mild concern about falling, with 44% of urban and 42% of rural participants. A higher proportion of urban participants (22%) had no concern compared to rural participants (17%), resulting in 19% of the total study participants reporting no concern. In comparison, moderate concern was more common among rural participants (31%) than urban participants (25%), accounting for 28% overall. High concern was slightly higher in the rural participants (11%) than in the urban participants (8%), making up 10% of all study participants. This variation was not found to be statistically significant.

Functional Independence (IADL)

Full independence in daily activities was seen in just 11% of participants—14% of men versus 8% of women (Table1). A higher proportion of rural participants were fully independent (16% of men; 10% of women) as compared to urban participants (12% of men; 6% of women). Mild dependence was present in a similar proportion among men (22%) and women (20%) and little difference between urban and rural groups. High dependence was present in a higher proportion of female participants (40%) as compared to male participants (33%), especially among urban female participants (48%).

Association between Fear of fall (FES-I) and Functional Decline (IADL)

Among participants with no concern about falling, 43% were fully independent, another 43% were mildly dependent, and 14% were moderately dependent; none fell into the high-dependency group or reported high FES-I scores (Table 2). As concern levels increased, the proportion of highly dependent individuals rose sharply—33% in the mild-concern group, 50% in the moderate-concern group, and 86% in the high-concern group. In comparison, full independence declined steadily, dropping from 43% in the no-concern group to 0% among those with high concern.

Correlation between fear of fall (FES-I) and functional decline (IADL)

Scatter-plot showing each participant's FES-I score (fear of falling) on the x-axis and IADL score (instrumental activities of daily living) on the y-axis (figure 2). Participants with lower FES-I scores (around 15–20) had higher IADL scores (4–8), while those with higher FES-I scores (above 40) had IADL scores mostly between 0 and 1. The fitted trend line slopes steeply downward. The Spearman's rank correlation coefficient is –0.98 with a p-value< 0.001.

Table 1: Distribution of study participants according to their independence level in performing ADL (according to IADL scale) (N= 360)

INDEPENDENCE LEVEL	Urban (n= 180)		Rural (n= 180)		Total (N= 360)	
	M (n=82)	F (n=98)	M (n=93)	F (n=87)	M (N=175)	F (N=185)
Fully independent	10 (12)	6 (6)	15 (16)	9 (10)	25 (14)	15 (8)
Mild dependence/ Slight limitation	18 (22)	17 (17)	20 (22)	20 (23)	38 (22)	37 (20)
Moderate dependence/ limitation	24 (29)	28 (29)	31 (33)	31 (36)	55 (31)	59 (32)
Highly Dependent (severe limitation)	30 (37)	47 (48)	27 (29)	27 (31)	57 (33)	74 (40)
Chi-square = 12.22 **(p-value) = 0.006; df**= 3						

Figures in parenthesis are percentages

**** p-value of <0.05 is considered to be significant***

Table 2: Association of fear of falling (FES-I) with activities of daily living (IADL) among study participants (N= 360)

IADL→ / FES-I ↓	Full independence (n= 40)	Mild dependency (n= 75)	Moderate dependency (n=114)	High dependency (n= 131)
No concern (n=70)	30 (43)	30 (43)	10 (14)	0 (0)
Mild concern (n=155)	5 (3)	35 (23)	64 (41)	51 (33)
Mod. concern (n=100)	5 (5)	10 (10)	35 (35)	50 (50)
High concern (n=35)	0 (0)	0 (0)	5 (14)	30 (86)
Chi-square = 178.25 **(p-value) = 0.001; df**= 9				

Figures in parentheses are row percentages.
p-value of <0.05 is considered to be significant

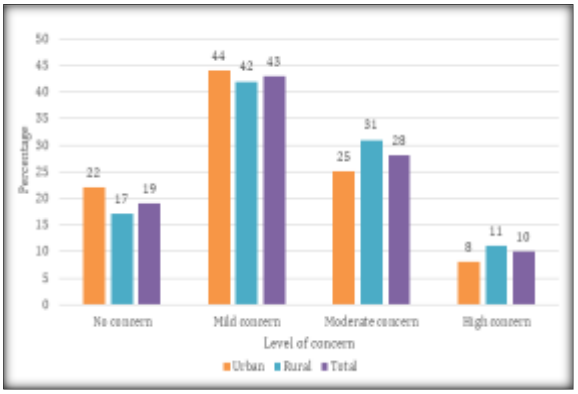

Figure 1: Distribution of study participants according to fear or concern of falling (using FES-I scale) (N= 360)

***(chi-square = 3.3; p-value = 0.347; df = 3)**

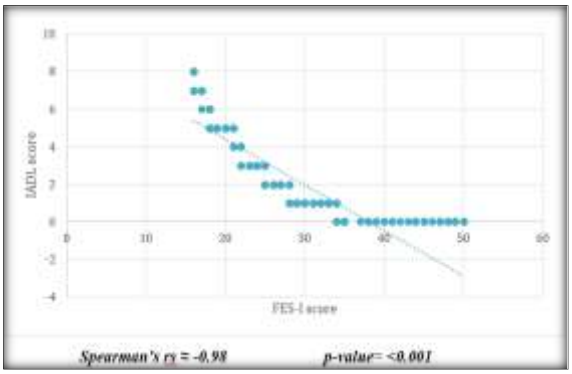

Figure 2: Correlation between FES-I and IADL among study participants (N= 360)

DISCUSSION

An overall prevalence of fear of falling at 81% among the elderly in the present study highlights a significant burden of fall-related anxiety in this population. This figure exceeds the pooled estimates reported in several international studies, where fear of fall prevalence among community-dwelling older adults ranged from 6.96% to 90.34% globally, with an average of about 49.6% (Xiong et al. 2024).[6] Chang et al. reported fear of falling in 56% of older adults,[7] while De costa et al. documented prevalence rates of about 60%, suggesting that the Indian elderly may experience a disproportionately higher burden of such fear.[8] This heightened prevalence may be attributed to a complex interplay of sociocultural and environmental factors, including deeply rooted cultural expectations around aging, greater dependency on family caregivers, limited access to assistive devices, and often hazard-prone home environments in India (Gupta et al; Biswas et al.,).[9,10]

In our study, the marginally higher rate of fear of falling in rural areas (83%) compared to urban areas (79%) further emphasizes the role of infrastructural and healthcare access disparities. Supporting this, Roy et al. found that 74.9% of rural elderly in Odisha experienced fear of falling, citing unsafe housing features like cracked flooring and dim lighting.[11] The World Health Organization (2007) also identifies the lack of handrails, uneven surfaces, and poor illumination as key environmental contributors to falls and related fears.[12] In rural India, these hazards are often compounded by limited access to geriatric care, rehabilitation services, and mobility aids, which intensify and perpetuate the cycle of fear of falling (Marmamula et al). For instance, Marmamula and colleagues reported a fear of fall prevalence of 76% among older adults in semi-rural Telangana, citing insufficient access to walking aids and rehabilitation programs as contributing factors.[13]

Conversely, although urban residents are often exposed to faster-paced environments and crowded infrastructure, they benefit from greater healthcare access, better mobility support and higher awareness of fall-prevention strategies. Gillespie et al. demonstrated that structured interventions—including physiotherapy, strength training, and home safety evaluations—can reduce fear of falling significantly,[14] suggesting that urban elders may be more likely to access such protective resources. Nevertheless, the urban fear of fall prevalence of 79% in the present study remains concerning and may reflect psychosocial vulnerabilities such as living alone in nuclear families, depressive symptoms, and low perceived support. A study by Kulkarni et al. found that urban Indian elders with minimal family interaction and higher anxiety levels exhibited fear of falling rates exceeding 70%, despite better physical environments.[15]

Instrumental Activities of Daily Living (IADL) assessments in our study revealed critical insights into the functional autonomy of older adults—an increasingly recognized determinant of fall-related anxiety. Despite moderate independence in some domains, overall functional dependence was considerable. Only 11% of participants were fully IADL independent, while 36% fell into the highly dependent category. Urban female participants showed the highest dependency rates, with 48%

reporting multiple functional limitations. This may be attributed to a higher prevalence of nuclear family settings, limited physical activity, and reduced participation in social or transactional tasks—factors also discussed in Chauhan et al, who reported that urban elderly women in South Asia had 49% lower odds of maintaining full IADL independence compared to men, due to role withdrawal, widowhood, and social isolation.[16]

A strong and statistically significant inverse correlation was observed between IADL scores and fear of falling, with a Spearman's rank correlation coefficient of rs = –0.98 ($p < 0.001$), suggesting a near-linear relationship. This aligns with Deshpande et al., who found that older adults with reduced IADL scores were 2.4 times more likely to report high fall-related fear and were significantly more prone to activity avoidance, contributing to deconditioning and increased fall risk—a cycle termed the ―fear–function loop.[17]

Our findings are corroborated by van Schooten et al., who found that 73% of older adults with IADL limitations reported high levels of fear of falling, and they were also 60% more likely to have experienced a fall in the past year compared to their functionally independent peers.[18] Similarly, Hausdorff et al. reported that elderly individuals with IADL impairments had a 30% higher gait variability index and walked at speeds 27% slower than those with preserved IADL, both of which are associated with greater fear and fall vulnerability.[19]

CONCLUSION

Functional decline is a critical determinant of fear of falling among elderly in Amritsar. Geriatric assessments should include IADL and FES-I evaluations. Targeted interventions—such as strength training and balance exercises—are essential to mitigate fear and prevent falls.

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