

DEPRESSION, FEAR OF FALLING, AND QUALITY OF LIFE IN ELDERLY PATIENTS: A HOSPITAL-BASED CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Depression and fear of falling are common yet under-recognized geriatric syndromes that profoundly impair quality of life (QOL) in older adults. However, data examining the interplay between these conditions and their combined impact on QOL domains are limited, particularly from the Indian subcontinent. The objective is to assess the prevalence of depression and fear of falling among elderly patients, to evaluate the association between depression and fear of falling, and to determine the impact of depression and fear of falling on WHOQOL-BREF domain scores. **Materials and Methods:** This hospital-based cross-sectional study was conducted among 120 elderly patients (≥ 60 years) attending a tertiary care hospital. Depression was assessed using the 15-item Geriatric Depression Scale (GDS-15), fear of falling using the Falls Efficacy Scale-International (FES-I), and quality of life using the WHOQOL-BREF. Mann-Whitney U test, Chi-square test, Kruskal-Wallis test, and Pearson correlation analysis were used for statistical analysis. **Result:** The prevalence of depression was 66.7% ($n=80$). High concern for falling ($FES-I \geq 28$) was observed in 88.3% ($n=106$). Depressed patients had significantly higher FES-I scores (47.74 ± 8.72 vs 29.52 ± 6.11 ; $p < 0.001$) and significantly lower scores across all four WHOQOL-BREF domains (all $p < 0.001$). A strong positive correlation was observed between GDS-15 and FES-I scores ($r=0.862$, $p < 0.001$). Strong negative correlations were found between GDS-15 scores and Physical ($r=-0.825$), Psychological ($r=-0.805$), Social ($r=-0.758$), and Environmental ($r=-0.767$) QOL domains (all $p < 0.001$). A dose-response relationship was observed, with progressive worsening of FES-I and QOL scores across increasing depression severity categories (Kruskal-Wallis, all $p < 0.001$). **Conclusion:** Depression, fear of falling, and impaired quality of life are strongly interrelated in elderly patients. Routine screening for depression and fear of falling should be integrated into comprehensive geriatric assessment to enable timely interventions.

INTRODUCTION

Population ageing is a defining global demographic phenomenon of the 21st century. India, with approximately 140 million people aged 60 years and above as per the 2021 Census estimates, is experiencing one of the most rapid demographic transitions in the developing world.^[1] This burgeoning elderly population faces a spectrum of physical, psychological, and social challenges that collectively threaten their quality of life (QOL) and functional independence.^[2]

Depression is the most prevalent mental health disorder among older adults, yet it remains significantly under-diagnosed and undertreated in

clinical practice.^[3] A recent systematic review and meta-analysis estimated the pooled prevalence of depression among the elderly in India to be approximately 47%, with significant regional variations.^[4] Depression in the elderly is associated with increased morbidity, mortality, functional decline, and diminished quality of life.^[5] The 15-item Geriatric Depression Scale (GDS-15), originally developed by Yesavage et al. in 1982 and subsequently validated in its short form, is one of the most widely used screening tools for geriatric depression owing to its simplicity and high sensitivity and specificity.^[6,7]

Fear of falling (FOF) is another prevalent and debilitating geriatric syndrome, defined as an

ongoing concern about falling that leads to avoidance of activities that the individual remains capable of performing.^[8] The prevalence of FOF has been reported to range from 3% to 92% in community-dwelling elderly populations, depending on the study population and measurement tool used.^[9] A scoping review of recent literature documented that FOF prevalence was approximately 58.8% among those with a previous fall history and 40% among those without.^[10] The Falls Efficacy Scale-International (FES-I), developed by Yardley et al. in 2005, is a validated and widely used instrument that measures the level of concern about falling during 16 physical and social activities, with scores ranging from 16 (no concern) to 64 (severe concern).^[11,12]

Depression and FOF share a complex, bidirectional relationship. A clinical review by Iaboni and Flint (2013) demonstrated that depression and falls have a significant bidirectional association, with excessive fear of falling frequently co-occurring with depressive symptoms.^[13] Both conditions are associated with impaired gait and balance mediated through cognitive, sensory, and motor pathways.^[13] Recent evidence from a longitudinal study using the National Health and Aging Trends Study (NHATS) confirmed that depressive symptoms independently predicted both fear of falling and fear-related activity restrictions in community-dwelling older adults.^[14] Furthermore, a 2025 study by Zhang et al. explored the mediating role of attitudes toward aging and social networks in the relationship between FOF and depression among Chinese elderly.^[15]

Quality of life, a multidimensional construct encompassing physical health, psychological well-being, social relationships, and environmental factors, has emerged as a critical outcome measure in geriatric care.^[16] The World Health Organization Quality of Life-BREF (WHOQOL-BREF), developed in 1998, is a cross-culturally validated 26-item instrument that evaluates QOL across four domains: Physical Health, Psychological, Social Relationships, and Environment.^[17,18] Studies have consistently demonstrated that depression adversely affects all domains and facets of the WHOQOL-BREF in elderly populations.^[19] A systematic review by Schoene et al. (2019) further established that FOF was independently associated with diminished QOL, irrespective of actual fall events.^[20]

Despite the individual recognition of depression, FOF, and impaired QOL as significant geriatric problems, studies examining their interrelationship comprehensively remain scarce, particularly from the Indian subcontinent. An earlier Indian study by Bhatt et al. (2017) reported significant correlations between depression, fear of falling, and QOL among 62 elderly individuals, but was limited by small sample size and restricted analytical depth.^[21] In India, the prevalence of FOF among elderly populations has been reported at 33.2% in urban Karnataka,^[22] and 56.1% in residential care settings in Hyderabad.^[23] A hospital-based study from AIIMS Rishikesh

documented high FOF prevalence with associations to depression and functional impairment.^[24]

The present study was designed to bridge this gap by comprehensively evaluating the prevalence and severity of depression and fear of falling among elderly patients attending a tertiary care hospital, examining their correlation with each other, and determining their impact on quality of life as assessed by the WHOQOL-BREF. The study also explores whether increasing depression severity demonstrates a dose-response relationship with worsening fear of falling and QOL outcomes.

MATERIALS AND METHODS

Study Design and Setting: This was a hospital-based cross-sectional observational study conducted in the Department of Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. The study was conducted over a period of [duration] from [month/year] to [month/year].

Study Population and Sample Size: A total of 120 consecutive elderly patients aged 60 years and above who attended the outpatient department or were admitted to the inpatient wards were enrolled using a convenient sampling technique. Patients with severe cognitive impairment precluding reliable questionnaire completion, those with acute life-threatening illnesses, and those who refused consent were excluded.

Ethical Considerations: The study was approved by the Institutional Ethics Committee of the Institute of Medical Sciences, Banaras Hindu University. Written informed consent was obtained from all participants prior to enrollment. Confidentiality and anonymity of the data were maintained throughout the study.

Data Collection and Instruments: A structured proforma was used to collect socio-demographic data including age, sex, religion, caste, marital status, educational status, occupation, place of living, and body mass index (BMI). Clinical data including history of falls, use of walking aids, hearing impairment, visual impairment, chronic pain, urinary incontinence, and laboratory parameters (haemoglobin, serum albumin, and vitamin D levels) were recorded.

Depression was assessed using the 15-item Geriatric Depression Scale (GDS-15), a self-rated instrument validated for elderly populations.^[6,7] A score of 0–4 was classified as normal, 5–8 as mild depression, 9–11 as moderate depression, and 12–15 as severe depression. Patients with a GDS-15 score ≥ 5 were categorized as "Depressed."

Fear of falling was assessed using the Falls Efficacy Scale-International (FES-I), a 16-item questionnaire evaluating concern about falling during daily activities.^[11,12] Each item is scored from 1 (not at all concerned) to 4 (very concerned), yielding a total score ranging from 16 to 64. FES-I scores were

categorized as: Low Concern (16–19), Moderate Concern (20–27), and High Concern (≥ 28).^[12,25]

Quality of life was assessed using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) questionnaire, a 26-item instrument evaluating QOL across four domains: Physical Health, Psychological, Social Relationships, and Environment.^[17,18] Two additional items assess overall QOL (Q1) and general health satisfaction (Q2). Domain scores were transformed to a 0–100 scale, with higher scores indicating better QOL.

Statistical Analysis: Data were analysed using SPSS version 26.0 and Python (SciPy library). Descriptive statistics were expressed as mean $\pm$ standard deviation (SD) for continuous variables and frequencies with percentages for categorical variables. The Chi-square test was used to compare categorical variables between depressed and non-depressed groups. The Mann-Whitney U test was employed for comparing continuous variables between two groups, and the Kruskal-Wallis H test for comparison across multiple groups (depression severity categories). Pearson correlation analysis was performed to assess the linear relationships between GDS-15, FES-I, and WHOQOL-BREF domain scores. A p-value of <0.05 was considered statistically significant.

RESULTS

Demographic and Clinical Characteristics [Table 1]

A total of 120 elderly patients were enrolled in the study. The mean age was 70.17 ± 7.60 years (range: 60–90 years). Males constituted 51.7% (n=62) and females 48.3% (n=58) of the study population. The majority were Hindu (72.5%), married (55.0%), and from rural areas (41.7%). Among the participants, 23.3% were illiterate and 32.5% were retired. The mean BMI was 22.31 ± 4.56 kg/m², with 31.7% classified as underweight (BMI <18.5 kg/m²).

The overall prevalence of depression (GDS-15 ≥ 5) was 66.7% (n=80), with 32.5% (n=39) having mild depression, 20.8% (n=25) moderate depression, and 13.3% (n=16) severe depression. Among clinical characteristics, 32.5% had a history of falls, 13.3% used walking aids, 32.5% had visual impairment, 27.5% had hearing impairment, 42.5% had chronic pain, and 26.7% had urinary incontinence.

On comparing demographic and clinical characteristics between depressed and non-depressed groups [Table 1], BMI was significantly lower in the depressed group (21.78 ± 4.72 vs 23.38 ± 4.07 , U=1244.5, p=0.048). No statistically significant differences were observed between the two groups with respect to age, sex, religion, caste, marital status, educational status, occupation, or place of living.

Prevalence and Correlates of Fear of Falling [Table 2]

High concern for falling (FES-I ≥ 28) was present in 88.3% (n=106) of participants, while 11.7% (n=14)

had moderate concern (FES-I 20–27). No participant had low concern (FES-I 16–19). Among depressed patients, 100% (n=80) had high concern for falling, compared to 65.0% (n=26) of non-depressed patients ($\chi^2=28.39$, p<0.001).

The FES-I score was significantly associated with history of falls. Patients with a fall history had a higher mean FES-I score (46.3 ± 12.0) compared to those without (39.4 ± 11.0 ; U=2108, p=0.003). No significant association was found between FES-I scores and sex (p=0.272), use of walking aids (p=0.327), chronic pain (p=0.657), visual impairment (p=0.960), hearing impairment (p=0.174), or age group (p=0.513).

Comparison Between Depressed and Non-Depressed Groups [Table 3]

The depressed group had significantly higher FES-I total scores compared to the non-depressed group (47.74 ± 8.72 vs 29.52 ± 6.11 ; U=3045.5, p<0.001). All four WHOQOL-BREF domain scores were significantly lower in the depressed group: Physical Health (37.07 ± 14.37 vs 67.06 ± 11.81 ; U=181.0, p<0.001), Psychological (31.72 ± 11.55 vs 60.94 ± 10.45 ; U=88.0, p<0.001), Social Relationships (30.65 ± 16.04 vs 56.68 ± 12.76 ; U=317.0, p<0.001), and Environment (37.64 ± 12.50 vs 58.32 ± 10.72 ; U=343.5, p<0.001).

Overall QOL rating (Q1: 2.33 ± 0.90 vs 3.92 ± 0.73 ; p<0.001) and general health satisfaction (Q2: 2.35 ± 0.98 vs 4.03 ± 0.77 ; p<0.001) were also significantly lower in the depressed group. Among clinical parameters, BMI was significantly lower in the depressed group (21.78 vs 23.38 ; p=0.048), while age, haemoglobin, serum albumin, and vitamin D levels did not differ significantly.

Correlation Analysis [Table 4]

Pearson correlation analysis revealed a strong positive correlation between GDS-15 and FES-I scores (r=0.862, p<0.001), indicating that greater depression severity is associated with a higher fear of falling. Strong negative correlations were observed between GDS-15 scores and all WHOQOL-BREF domains: Physical (r=-0.825, p<0.001), Psychological (r=-0.805, p<0.001), Social (r=-0.758, p<0.001), and Environment (r=-0.767, p<0.001). Similarly, FES-I scores demonstrated strong negative correlations with Physical (r=-0.786, p<0.001), Psychological (r=-0.766, p<0.001), Social (r=-0.713, p<0.001), and Environmental (r=-0.704, p<0.001) domains. All four WHOQOL-BREF domains were significantly positively correlated with each other (r=0.618 to 0.725, all p<0.001).

QOL Across Depression Severity Categories [Table 5]

When participants were stratified by GDS-15 depression severity categories (Normal, Mild, Moderate, and Severe), a clear dose-response pattern was observed across all outcome variables (Table 5). The FES-I scores showed progressive escalation: Normal (29.52 ± 6.11), Mild Depression (40.92 ± 5.76), Moderate Depression (51.96 ± 5.16), and

Severe Depression (57.75 ± 4.09 ; $H=92.94$, $p<0.001$).

Conversely, all WHOQOL-BREF domain scores showed progressive decline with increasing depression severity. Physical Health Domain scores decreased from 67.06 in the normal group to 19.06 in the severe depression group ($H=89.25$, $p<0.001$). Psychological Domain scores declined from 60.94 to

19.06 ($H=91.29$, $p<0.001$). Social Relationships Domain scores decreased from 56.68 to 13.99 ($H=78.87$, $p<0.001$), and Environment Domain scores from 58.32 to 22.81 ($H=73.65$, $p<0.001$). Overall QOL (Q1) and general health satisfaction (Q2) also showed significant progressive decline (both $p<0.001$).

Table 1: Demographic and Clinical Characteristics of Study Population (N=120)

Variable	Category	Total (N=120) n (%)	Depressed (n=80) n (%)	Not Depressed (n=40) n (%)	Test Statistic	p- value
Age (years)	Mean $\pm$ SD	70.17 $\pm$ 7.60	69.54 $\pm$ 7.15	71.42 $\pm$ 8.37	U=1400	0.265
Age Group	60-65	41 (34.2%)	27 (33.8%)	14 (35.0%)	$\chi^2=6.92$	0.140
	66-70	26 (21.7%)	21 (26.2%)	5 (12.5%)		
	71-75	25 (20.8%)	15 (18.8%)	10 (25.0%)		
	76-80	11 (9.2%)	9 (11.2%)	2 (5.0%)		
	>80	17 (14.2%)	8 (10.0%)	9 (22.5%)		
Sex	Male	62 (51.7%)	45 (56.2%)	17 (42.5%)	$\chi^2=1.51$	0.220
	Female	58 (48.3%)	35 (43.8%)	23 (57.5%)		
Religion	Hindu	87 (72.5%)	53 (66.2%)	34 (85.0%)	$\chi^2=8.79$	0.066
	Muslim	25 (20.8%)	20 (25.0%)	5 (12.5%)		
	Christian	4 (3.3%)	4 (5.0%)	0 (0.0%)		
	Sikh	3 (2.5%)	3 (3.8%)	0 (0.0%)		
	Other	1 (0.8%)	0 (0.0%)	1 (2.5%)		
Caste	General	35 (29.2%)	23 (28.7%)	12 (30.0%)	$\chi^2=1.05$	0.788
	OBC	48 (40.0%)	30 (37.5%)	18 (45.0%)		
	SC	22 (18.3%)	16 (20.0%)	6 (15.0%)		
	ST	15 (12.5%)	11 (13.8%)	4 (10.0%)		
Marital Status	Married	58 (48.3%)	34 (42.5%)	24 (60.0%)	$\chi^2=5.19$	0.159
	Widowed	51 (42.5%)	36 (45.0%)	15 (37.5%)		
	Divorced	7 (5.8%)	6 (7.5%)	1 (2.5%)		
	Unmarried	4 (3.3%)	4 (5.0%)	0 (0.0%)		
Educational Status	Illiterate	30 (25.0%)	21 (26.2%)	9 (22.5%)	$\chi^2=7.59$	0.270
	Primary	30 (25.0%)	17 (21.2%)	13 (32.5%)		
	Middle	17 (14.2%)	10 (12.5%)	7 (17.5%)		
	High School	15 (12.5%)	13 (16.2%)	2 (5.0%)		
	Intermediate	11 (9.2%)	7 (8.8%)	4 (10.0%)		
	Graduate	12 (10.0%)	7 (8.8%)	5 (12.5%)		
Occupation	Post-Graduate	5 (4.2%)	5 (6.2%)	0 (0.0%)		
	Retired	23 (19.2%)	13 (16.2%)	10 (25.0%)	$\chi^2=3.45$	0.631
	Homemaker	31 (25.8%)	20 (25.0%)	11 (27.5%)		
	Farmer	18 (15.0%)	12 (15.0%)	6 (15.0%)		
	Labourer	17 (14.2%)	11 (13.8%)	6 (15.0%)		
	Self-employed	18 (15.0%)	15 (18.8%)	3 (7.5%)		
Place of Living	Unemployed	13 (10.8%)	9 (11.2%)	4 (10.0%)		
	Rural	50 (41.7%)	36 (45.0%)	14 (35.0%)	$\chi^2=3.49$	0.174
	Urban	43 (35.8%)	30 (37.5%)	13 (32.5%)		
	Semi-urban	27 (22.5%)	14 (17.5%)	13 (32.5%)		
BMI (kg/m ²)	Mean $\pm$ SD	22.32 $\pm$ 4.56	21.78 $\pm$ 4.72	23.38 $\pm$ 4.07	U=1244	0.048*
BMI Category	Underweight	24 (20.0%)	20 (25.0%)	4 (10.0%)	$\chi^2=4.48$	0.214
	Normal	62 (51.7%)	38 (47.5%)	24 (60.0%)		
	Overweight	29 (24.2%)	18 (22.5%)	11 (27.5%)		
	Obese	5 (4.2%)	4 (5.0%)	1 (2.5%)		
History of Fall	Yes	39 (32.5%)	26 (32.5%)	13 (32.5%)	$\chi^2=0.00$	1.000
	No	81 (67.5%)	54 (67.5%)	27 (67.5%)		
Walking Aid Use	Yes	16 (13.3%)	10 (12.5%)	6 (15.0%)	$\chi^2=0.01$	0.924
	No	104 (86.7%)	70 (87.5%)	34 (85.0%)		
Hearing Impairment	Yes	33 (27.5%)	24 (30.0%)	9 (22.5%)	$\chi^2=0.42$	0.515
	No	87 (72.5%)	56 (70.0%)	31 (77.5%)		
Visual Impairment	Yes	39 (32.5%)	26 (32.5%)	13 (32.5%)	$\chi^2=0.00$	1.000
	No	81 (67.5%)	54 (67.5%)	27 (67.5%)		
Chronic Pain	Yes	51 (42.5%)	30 (37.5%)	21 (52.5%)	$\chi^2=1.88$	0.170
	No	69 (57.5%)	50 (62.5%)	19 (47.5%)		
Urinary Incontinence	Yes	32 (26.7%)	23 (28.7%)	9 (22.5%)	$\chi^2=0.26$	0.609
	No	88 (73.3%)	57 (71.2%)	31 (77.5%)		
Depression (GDS-15)	Normal	40 (33.3%)	0 (0.0%)	40 (100.0%)	$\chi^2=120.00$	0.000**
	Mild Depression	39 (32.5%)	39 (48.8%)	0 (0.0%)		
	Moderate Depression	25 (20.8%)	25 (31.2%)	0 (0.0%)		
	Severe Depression	16 (13.3%)	16 (20.0%)	0 (0.0%)		

* $p < 0.05$, ** $p < 0.01$; χ^2 = Chi-square test; U = Mann-Whitney U test

Depression defined as GDS-15 ≥ 5 ; Overall Prevalence: 80/120 (66.7%)
Mean Age: 70.2 $\pm$ 7.6 years; Male: 62 (51.7%), Female: 58 (48.3%)

Table 2: Prevalence of Fear of Falling (FES-I) and Association with Sociodemographic and Clinical Variables

Variable	Category	Total (N=120) n (%)	Depressed (n=80) n (%)	Not Depressed (n=40) n (%)	Test Statistic	p-value
FES-I Category	Low Concern (16-19)	0 (0.0%)	0 (0.0%)	0 (0.0%)	$\chi^2=28.39$	0.000**
	Moderate Concern (20-27)	14 (11.7%)	0 (0.0%)	14 (35.0%)		
	High Concern (≥ 28)	106 (88.3%)	80 (100.0%)	26 (65.0%)		
Sex	Male (FES: 42.8 $\pm$ 10.9)	62 (51.7%)	45 (72.6%)	17 (27.4%)	U=2008	0.272
	Female (FES: 40.5 $\pm$ 12.5)	58 (48.3%)	35 (60.3%)	23 (39.7%)		
History of Fall	Yes (FES: 46.3 $\pm$ 12.0)	39 (32.5%)	26 (66.7%)	13 (33.3%)	U=2108	0.003**
	No (FES: 39.4 $\pm$ 11.0)	81 (67.5%)	54 (66.7%)	27 (33.3%)		
Walking Aid Use	Yes (FES: 44.5 $\pm$ 11.0)	16 (13.3%)	10 (62.5%)	6 (37.5%)	U=960	0.327
	No (FES: 41.2 $\pm$ 11.8)	104 (86.7%)	70 (67.3%)	34 (32.7%)		
Chronic Pain	Yes (FES: 41.2 $\pm$ 11.2)	51 (42.5%)	30 (58.8%)	21 (41.2%)	U=1676	0.657
	No (FES: 42.0 $\pm$ 12.1)	69 (57.5%)	50 (72.5%)	19 (27.5%)		
Visual Impairment	Yes (FES: 41.5 $\pm$ 12.1)	39 (32.5%)	26 (66.7%)	13 (33.3%)	U=1570	0.960
	No (FES: 41.7 $\pm$ 11.6)	81 (67.5%)	54 (66.7%)	27 (33.3%)		
Hearing Impairment	Yes (FES: 44.0 $\pm$ 12.0)	33 (27.5%)	24 (72.7%)	9 (27.3%)	U=1667	0.174
	No (FES: 40.8 $\pm$ 11.5)	87 (72.5%)	56 (64.4%)	31 (35.6%)		
Age Group	60-65 (FES: 42.3 $\pm$ 11.2)	41 (34.2%)	27 (65.9%)	14 (34.1%)	H=3.28	0.513
	66-70 (FES: 42.2 $\pm$ 11.7)	26 (21.7%)	21 (80.8%)	5 (19.2%)		
	71-75 (FES: 41.0 $\pm$ 11.2)	25 (20.8%)	15 (60.0%)	10 (40.0%)		
	76-80 (FES: 45.5 $\pm$ 12.5)	11 (9.2%)	9 (81.8%)	2 (18.2%)		
	>80 (FES: 37.9 $\pm$ 13.1)	17 (14.2%)	8 (47.1%)	9 (52.9%)		

** p < 0.01, * p < 0.05; FES-I: Falls Efficacy Scale-International (range 16–64)

Low Concern: 16–19, Moderate Concern: 20–27, High Concern: ≥ 28

U = Mann-Whitney U test; H = Kruskal-Wallis H test; χ^2 = Chi-square test

Table 3: Comparison of FES-I, WHOQOL-BREF Domain Scores and Clinical Parameters Between Depressed and Non-Depressed Groups (Mann-Whitney U Test)

Parameter	Depressed (n=80) Mean $\pm$ SD	Not Depressed (n=40) Mean $\pm$ SD	U-statistic	p-value
FES-I Total Score	47.74 $\pm$ 8.72	29.52 $\pm$ 6.11	3045.5	0.000**
Physical Health Domain	37.07 $\pm$ 14.37	67.06 $\pm$ 11.81	181.0	0.000**
Psychological Domain	31.72 $\pm$ 11.55	60.94 $\pm$ 10.45	88.0	0.000**
Social Relationships Domain	30.65 $\pm$ 16.04	56.68 $\pm$ 12.76	317.0	0.000**
Environment Domain	37.64 $\pm$ 12.50	58.32 $\pm$ 10.72	343.5	0.000**
Overall QOL (Q1)	2.33 $\pm$ 0.90	3.92 $\pm$ 0.73	325.5	0.000**
General Health Satisfaction (Q2)	2.35 $\pm$ 0.98	4.03 $\pm$ 0.77	343.5	0.000**
Age (years)	69.54 $\pm$ 7.15	71.42 $\pm$ 8.37	1399.5	0.265
BMI (kg/m ²)	21.78 $\pm$ 4.72	23.38 $\pm$ 4.07	1244.5	0.048*
Haemoglobin (g/dL)	11.41 $\pm$ 1.83	11.81 $\pm$ 2.04	1437.5	0.367
Serum Albumin (g/dL)	3.46 $\pm$ 0.49	3.59 $\pm$ 0.45	1360.0	0.181
Vitamin D (ng/mL)	20.03 $\pm$ 9.79	22.66 $\pm$ 7.41	1298.0	0.093

** p < 0.01, * p < 0.05; Mann-Whitney U test used for all comparisons

WHOQOL-BREF domain scores transformed to 0–100 scale; higher scores indicate better quality of life

FES-I range: 16–64; higher scores indicate greater fear of falling

Table 4: Correlation Matrix — GDS-15, FES-I, and WHOQOL-BREF Domain Scores (Pearson Correlation Coefficient)

Variable	GDS-15 Score	FES-I Score	Physical Domain	Psychological Domain	Social Domain	Environment Domain
GDS-15 Score	1.000	0.862**	–0.825**	–0.805**	–0.758**	–0.767**
FES-I Score	0.862**	1.000	–0.786**	–0.766**	–0.713**	–0.704**
Physical Domain	–0.825**	–0.786**	1.000	0.725**	0.701**	0.674**
Psychological Domain	–0.805**	–0.766**	0.725**	1.000	0.658**	0.618**
Social Domain	–0.758**	–0.713**	0.701**	0.658**	1.000	0.623**
Environment Domain	–0.767**	–0.704**	0.674**	0.618**	0.623**	1.000

** p < 0.01 (all correlations significant at p < 0.001)

Negative r (in red) indicates inverse relationship; Diagonal cells shaded

GDS-15: Geriatric Depression Scale-15; FES-I: Falls Efficacy Scale-International; WHOQOL-BREF domain scores on 0–100 scale

Table 5: FES-I and WHOQOL-BREF Domain Scores Across Depression Severity Categories (Kruskal-Wallis Test)

Parameter	Normal (n=40)	Mild Depression (n=39)	Moderate Depression (n=25)	Severe Depression (n=16)	H-statistic	p-value
FES-I Total Score	29.52 ± 6.11	40.92 ± 5.76	51.96 ± 5.16	57.75 ± 4.09	92.94	<0.001**
Physical Health Domain	67.06 ± 11.81	47.03 ± 11.37	33.08 ± 7.97	19.06 ± 5.24	89.25	<0.001**
Psychological Domain	60.94 ± 10.45	39.18 ± 9.05	28.19 ± 6.91	19.06 ± 9.10	91.29	<0.001**
Social Relationships Domain	56.68 ± 12.76	41.93 ± 12.02	23.72 ± 9.99	13.99 ± 11.07	78.87	<0.001**
Environment Domain	58.32 ± 10.72	45.54 ± 10.00	34.80 ± 8.57	22.81 ± 6.44	73.65	<0.001**
Overall QOL Rating (Q1)	3.92 ± 0.73	2.90 ± 0.75	1.96 ± 0.68	1.50 ± 0.52	75.93	<0.001**
General Health Satisfaction (Q2)	4.03 ± 0.77	3.00 ± 0.73	2.08 ± 0.76	1.19 ± 0.40	77.86	<0.001**

** p < 0.01; Kruskal-Wallis H test used for comparison across four GDS-15 severity categories

All values expressed as Mean ± SD; WHOQOL-BREF domain scores on 0–100 scale
Higher FES-I = greater fear of falling; Higher WHOQOL-BREF = better quality of life
Progressive increase in FES-I and decrease in QOL observed with increasing depression severity

DISCUSSION

The present study provides comprehensive evidence of the strong interrelationship between depression, fear of falling, and quality of life in elderly patients attending a tertiary care hospital in North India. Our findings demonstrate a high prevalence of both depression and fear of falling, with significant adverse effects on all domains of quality of life.

Prevalence of Depression: The prevalence of depression (GDS-15 ≥ 5) in our study was 66.7%, which is substantially higher than the pooled prevalence of 47% reported in a recent Indian meta-analysis.^[4] However, this finding aligns with a North Indian cross-sectional study by Debnath et al. (2023) which reported a depression prevalence of 68.2% among 230 elderly participants using the PHQ-9.^[26] The higher prevalence in our study may be attributable to the hospital-based setting, as patients seeking medical care are likely to have a higher burden of comorbidities and associated psychological distress compared to community-dwelling populations. A study from Puducherry reported a lower prevalence of 41.4% in a community setting using GDS-15.^[27] Another hospital-based study from India documented a prevalence of 57% using GDS-15, with predominance of mild depression,^[28] which is comparable to our findings where mild depression (32.5%) was the most frequent category.

Prevalence of Fear of Falling: An alarmingly high proportion of our study population (88.3%) exhibited high concern for falling (FES-I ≥ 28), with no participant reporting low concern. This prevalence is substantially higher than the 33.2% reported by Mane et al. (2014) in an urban Karnataka community,^[22] and the 56.1% reported in the Hyderabad HOMES study among residential care populations.^[23] A hospital-based study from AIIMS Rishikesh also documented high FOF prevalence among geriatric outpatients.^[24] The higher prevalence in our study may reflect the hospital-based population, which

typically comprises individuals with greater medical comorbidity, physical frailty, and functional limitations. The global prevalence of FOF has been reported to range widely from 3% to 92%, depending on the population characteristics and measurement instruments used.^[9,10]

Association Between Depression and Fear of Falling
Our study revealed a strong positive correlation between GDS-15 and FES-I scores ($r=0.862$, $p<0.001$), demonstrating that depression severity is robustly associated with the degree of fear of falling. This finding is consistent with the clinical review by Iaboni and Flint (2013), which described a significant bidirectional relationship between depression and falls, with excessive fear of falling frequently co-occurring with depression.^[13] A recent Turkish study by Çankaya and Takı (2025) similarly reported a strong positive correlation between FES-I and Beck Depression Inventory scores ($r=0.780$, $p<0.001$) among 639 elderly participants.^[29] Painter et al. (2012) also documented significant relationships between fear of falling, depression, and anxiety in community-dwelling older adults.^[30]

The bidirectional mechanism underlying this association involves multiple pathways. Depression leads to psychomotor retardation, reduced physical activity, muscle weakness, and impaired balance, all of which increase the risk of falls and amplify fear of falling.^[13] Conversely, fear of falling induces activity restriction, social isolation, deconditioning, and loss of independence, which in turn perpetuate and worsen depressive symptoms.^[14,15] A longitudinal study by Luo et al. (2022) using NHATS data confirmed that depressive symptoms independently predicted future fear of falling and activity restrictions.^[14] Lee and Kim (2021) further demonstrated that FOF and its induced daily activity restrictions were associated with a higher likelihood of depressive symptoms.^[31]

Notably, 100% of depressed patients in our study had high concern for falling (FES-I ≥ 28), compared to 65.0% of non-depressed patients ($\chi^2=28.39$,

$p < 0.001$). History of falls was significantly associated with higher FES-I scores ($p = 0.003$), which is consistent with the finding from the Hyderabad HOMES study that fall history increased odds of FOF (OR 1.52).^[23]

Impact on Quality of Life: Our study demonstrated that depressed elderly patients had significantly lower scores across all four WHOQOL-BREF domains compared to non-depressed patients, with the most pronounced deficit observed in the Social Relationships Domain (30.65 vs 56.68) and Psychological Domain (31.72 vs 60.94). This finding is strongly supported by the landmark study of Chang et al. (2015), which demonstrated that depression as assessed by the GDS-15 affects every facet and domain of the WHOQOL-BREF in community-dwelling older adults and may mediate the relationship between physical disability and QOL.^[19] Gallegos-Carrillo et al. (2009) and other investigators have consistently documented that depressive symptoms are potent predictors of diminished QOL, particularly in the psychological and social domains.^[32]

The strong negative correlations between FES-I scores and all WHOQOL-BREF domains ($r = -0.704$ to -0.786 , all $p < 0.001$) further underscore the detrimental impact of fear of falling on quality of life. A systematic review by Schoene et al. (2019), encompassing nearly 30,000 elderly participants, established that FOF was associated with QOL across multiple studies, independent of the specific measurement instruments used.^[20] Göktaş et al. (2023) similarly reported moderate negative associations between FES-I and quality of life measures in elderly populations.^[33] The activity restriction induced by FOF has been shown to accelerate frailty progression, with activity limitations due to FOF exerting a more pronounced impact on frailty than actual falls.^[34]

Dose-Response Relationship: A significant and novel finding of our study is the clear dose-response relationship observed between depression severity and both FES-I and WHOQOL-BREF scores. FES-I scores escalated progressively from 29.52 in the normal group to 57.75 in the severely depressed group, while Physical Domain QOL scores declined from 67.06 to 19.06 across the same severity gradient. This dose-response pattern strongly suggests a causal pathway wherein increasing depression severity drives proportional increases in fear of falling and proportional deterioration in quality of life. A review by Djernes (2006) and later by Huang et al. (2015) documented that an increase in depression severity was consistently associated with poorer global and health-related QOL in older persons, and this association appeared to be stable over time.^[35] Doraiswamy et al. (2001) demonstrated that remitters from geriatric depression showed significantly greater improvement in QOL than partial responders and non-responders, further supporting the direct impact of depression severity on QOL.^[36]

BMI and Depression: Our study found that BMI was significantly lower in the depressed group (21.78 vs 23.38; $p = 0.048$). This finding aligns with a large Chinese study by Qiao et al. (2024), which demonstrated that underweight status was associated with increased risk of depression and anxiety among older adults, with activities of daily living playing a mediating role.^[37] A U-shaped relationship between BMI and depression has been reported, with both underweight and obese individuals at elevated risk.^[38] In the elderly, low BMI may reflect poor nutritional status, sarcopenia, and overall frailty, all of which contribute to depressive symptomatology.

Strengths and Limitations: The strengths of this study include the use of validated and internationally recognized instruments (GDS-15, FES-I, WHOQOL-BREF), comprehensive assessment of multiple QOL domains, and robust statistical analysis including correlation analysis and comparison across depression severity categories. However, several limitations must be acknowledged. The cross-sectional design precludes establishing temporal causality. The hospital-based setting may limit generalizability to community-dwelling populations. The sample size of 120, while adequate for detecting moderate-to-large effect sizes, may not capture variations in smaller subgroups. Additionally, potential confounders such as polypharmacy, cognitive status (MMSE), and specific medical comorbidities were not systematically controlled for in this analysis.

CONCLUSION

This study demonstrates a high prevalence of depression (66.7%) and fear of falling (88.3% with high concern) among elderly hospital patients, with a strong positive correlation between the two conditions ($r = 0.862$). Both depression and fear of falling exert a significant adverse impact on all four domains of quality of life as assessed by the WHOQOL-BREF. A clear dose-response relationship exists between depression severity and worsening of fear of falling and quality of life outcomes. These findings underscore the critical need for routine screening of depression and fear of falling as integral components of comprehensive geriatric assessment. Early identification and targeted multidisciplinary interventions, including pharmacotherapy, cognitive-behavioral approaches, and exercise-based programs, may help break the vicious cycle of depression, fear of falling, and declining quality of life in the elderly.

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