ASSOCIATION OF HEALTH RELATED QUALITY OF LIFE WITH PHYSICAL FUNCTION AND FEAR OF FALLING IN GERIATRIC POPULATION

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Abstract

Background:

Aging, primarily defined by chronological age, varies significantly due to genetics and lifestyle, resulting in diverse aging experiences. Psychological factors like fear of falling, diminished self-efficacy, and activity avoidance pose health risks among the elderly.

Objective:

The goal of this investigation was to examine the connections between health-related quality of life, physical function, and fear of falling within the geriatric population.

Methodology:

A cross-sectional survey involved 865 geriatric participants aged 65 and older, both male and female, who had experienced a fall within the past six months and could walk upright with or without ambulatory aids. Exclusions were made for those with a history of fractures, neurological impairments, degenerative diseases, or low self-confidence. Data collection employed the Fall Efficacy Scale International (FESI) and SF-36 questionnaire. Analysis utilized SPSS version 26, exploring significant associations via multinomial logistic regression.

Results :

The study using the SF-36 questionnaire found associations: General Health significantly linked to age, BMI, and current health status ($p<0.05$); Limitations of Activity tied to the 65-70 age group and marital status ($p<0.05$). No significant demographic links appeared for Physical Health Problems. Emotional Health Problems associated with marital status ($p=0.001$). Social Activities linked with age and current health status. In Body Pain, significant associations with gender, age, and good health status ($p<0.05$) . Energy and Emotions correlated with age 71-89, BMI, marital status, and health.

Conclusions:

Ages 65-70, normal BMI, good health, and marriage correlate with higher health-related quality of life. Fear of falling relates significantly to better scores in general health, emotional well-being, social engagement, and vitality.

Key words:

 Fear of Falling, Geriatric Population, Physical health, Quality of Life

LIST OF ABBREVIATIONS

Sr. No.	ABBREVIATION	DESCIPTION
1	WHO	World Health Organization
2	QOL	Quality of life
3	FOF	Fear of falling
4	BADLs	Basic activities of daily living
5	IADLs	Instrumental or intermediate activities of daily living
6	AADLs	Advanced activities of daily living
7	HRQoL	health-related quality of life
8	FESI	Fall efficiy scale international
9	SPSS	Statistical package for social sciences

List of tables

LIST OF FIGURES

Introduction

Aging

A natural phenomenon typically measured by one's chronological age, with individuals aged sixty-five or older often referred to as "elderly." Nonetheless, the aging process varies among individuals due to genetic, lifestyle, and health disparities in the population. (1)

Geriatric Population Prevalence

The global elderly population, aged 65 and above, has steadily increased from 8% in 1950 to 11% in 2009. The world's aging trend is set to continue, with the World Health Organization (WHO) projecting a significant rise by 2050, estimating a surge in the number of people aged 60 and over, including 400 million octogenarians. (2)In 2019, Pakistan had around 15 million individuals aged 60 and above, accounting for 7% of the total population. By 2050, it is anticipated that the elderly population aged 65 and above will quadruple, reaching 12% . (3)

Quality of life

The concept of "quality of life" (QoL) is broad and adaptable, with various interpretations in the literature. These definitions universally consider cultural, social, and environmental factors. According to the World Health Organization, QoL is an individual's assessment of their life situation, expectations, and standards.(4)As individuals age, their diminishing physiological capacity can hinder the execution of various tasks, ultimately affecting their QoL. Aging involves a decline in motor skills, reduced strength, flexibility, speed, and VO2max, which can impede daily activities and the maintenance of a healthy lifestyle. (5)

Fear of falling in older people

The global aging population has elevated falls to a critical global public health concern. Falls pose a significant risk to both physical and mental health, potentially leading to functional decline, disability, and even mortality. Fear of falling (FOF) is a pervasive issue among the elderly, characterized by a persistent fear of falling that restricts individuals from tasks they are capable of. Numerous intervention studies suggest FOF as a valuable focus for geriatric rehabilitation. (6)

FOF, alongside reduced self-efficacy and avoidance of specific activities, presents psychological challenges affecting the overall health of seniors, particularly the elderly. FOF, in particular, holds a pivotal role given its association with falls among the elderly. This multifaceted concern among older individuals can result in negative outcomes such as limitations in activity, social withdrawal, loss of independence, and diminished quality of life. Certain subpopulations, including older women, individuals with fall histories, and those with co morbidities like rheumatoid arthritis and stroke, experience a significantly higher incidence of FOF. (7)

For the elderly, falls are alarmingly common and can have severe consequences, ranking as the leading cause of injuries and injury-related fatalities among those over 65. Roughly one in three community-dwelling elderly individuals experience falls annually, with 24% of them sustaining severe injuries and 6% suffering bone fractures.FOF is attributed to a range of factors and has been associated with both prior fall experiences and other age-related physical changes,

including joint stiffness, muscle weakening, and diminished sensory input, all of which contribute to the increased risk of falls, especially in combination with other risk factors.

Physical status

The general population of fallers, especially older adults, tends to score lower on health-related quality of life (HRQOL), particularly in the physical component. Although few studies in the elderly explicitly address HRQOL and its connection to physical function, broader quality of life (QOL) investigations indicate a lower QOL in this demographic compared to older individuals within the same age range.(8)

Physical functional status plays a crucial role in the health of older individuals, encompassing voluntary motor function and, for more complex tasks, cognitive function. Described as "an individual's capacity to carry out the physical activities of everyday existence" by Garber et al., (9)physical function includes motor control, physical fitness, and regular physical activity. It independently predicts functional independence, disability, morbidity, and mortality.

Evaluating physical health typically occurs on three levels: basic activities of daily living (BADLs), instrumental or intermediate activities of daily living (IADLs), and advanced activities of daily living (AADLs).

Regular physical exercise serves both as a preventive and therapeutic measure for various health issues faced by the elderly (10)

In the geriatric population, comprehensive clinical examination includes assessing physical function using standardized measures like gait parameters, balance, and grip strength .Despite extensive research on QOL in the elderly, studies on physical performance, fear of falling, and their relationship to QOL remain limited.

The scarcity of literature on the association between health-related quality of life, physical function, and fear of falling in the geriatric population necessitates this research. This study aims to provide valuable insights into the prevalence, characteristics, and consequences of the fear of falling in senior individuals living in the Pakistani community, whether they have experienced falls or not. Fear of falling has been identified as a substantial factor affecting the quality of life in older individuals. Understanding these aspects is crucial for enhancing the health-related quality of life among geriatrics in our society.

Materials and methods

Study Design: a cross sectional study
Sampling technique: Non-probability convenience sampling technique.
Study Duration: within 6 months after approval of synopsis**.**
Data collection: from geriatric population and different colonies of Faisalabad**.**
Sample Size: The sample size for this study was determined using the EPI TOOL. The estimated proportion was 10%, with an estimated error of 2%, a 95% confidence interval, and a population size of 200,000. As a result, a sample size of 865 participants was selected. for the study.

Inputs

Estimated Proportion	0.1
Desired precision of estimate	0.02
Confidence level	0.95
Population size	2e+05

Results

Sample size required for specified inputs

Large population	865
Population = 2e+05	862

Figure1 ; Show Sample size calculation using EPITOOL.

Study Selection Criteria:
Inclusion Criteria

1. Both genders.

2. Aged 65 years or older.

3. A documented record of falls within the past six months.

4. Reside autonomously within the local community.

5. Have the ability to stand upright and move, whether with or without assistive walking aids.**(11)**
6. Individuals who expressed a willingness to take part in the study.
        Exclusion Criteria
1. Recent surgical procedures and fractures in their medical history.
2. Neurological challenges, neuromuscular conditions (including autism and brain tumors).

3. A diagnosed degenerative ailment (such as Amyotrophic lateral sclerosis (ALS) or Motor neuron disease).
4. Limited self-confidence.
5. Impaired mobility and/or vestibular issues that hinder standing upright, potentially involving the use of a wheelchair. (12)
6. Unstable or severe medical conditions, including complications from cerebrovascular disease, Parkinson's disease, dementia (of the Alzheimer's type), or other neurological or cognitive disorders.

Study tool
- Demographic questions
- Fall efficacy scale international (FESI)
- SF-36 Questionnaire

Study Collection Procedure
To gather data, consent forms were personally delivered to all participants. Detailed instructions were provided on how to complete the questionnaire, and participants were allocated a 10-minute window to fill out the forms.

Statistical Analysis
SPSS version 26 was employed for data analysis. Multinomial logistic regression was utilized to identify and examine significant associations within the data set.

Results

Table 1: Demographic data

	Frequency	Percent	Mean ±SD
Age			**68.30±4.368**
65-70 Year	504	58.3	
71-80 Year	201	23.2	
Above >80 Year	160	18.5	
Gender			
Female	306	35.4	
Male	559	64.6	
BMI			**25.21±3.563**
Underweight	6	.7	
Normal in Weight	464	53.6	
Overweight	327	37.8	
Obese	68	7.9	
Marital Status			
Married	804	92.9	
Divorced	61	7.1	
Family setup			
Nuclear	393	45.4	
Joint	453	52.4	
Extended	19	2.2	

Life Style			
Sedentary	176	20.3	
Active	655	75.7	
Physical Exercise	34	3.9	
Hand Dominance			
Right Sided	742	85.8	
Left Sided	123	14.2	
Nature of Job			
Part time	109	12.6	
Full time	756	87.4	
Level of Education			
Cannot Read and write	140	16.2	
Primary Education (1-8)	152	17.6	
Secondary Education (9-12)	197	22.8	
Above Secondary Education	376	43.5	
Exercises or Games			
Yes	275	31.8	
No	590	68.2	
Current Health Status			
Good	362	41.8	
Average	474	54.8	
Bad	29	3.4	
History of Smoking			
Smoker	173	20.0	
Ex-smoker	59	6.8	
Non-smoker	633	73.2	
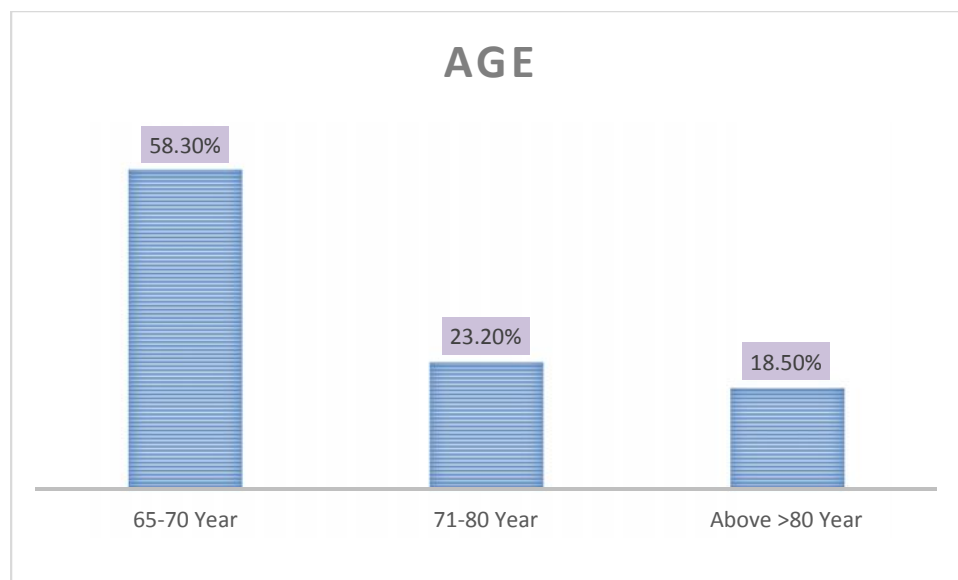
Figure 2: Age distribution

Show age of the participants wherein 58.3% have age 65-70 Year, 23.2% have 71-80 Year, and 18.5% have above 80 year of age.
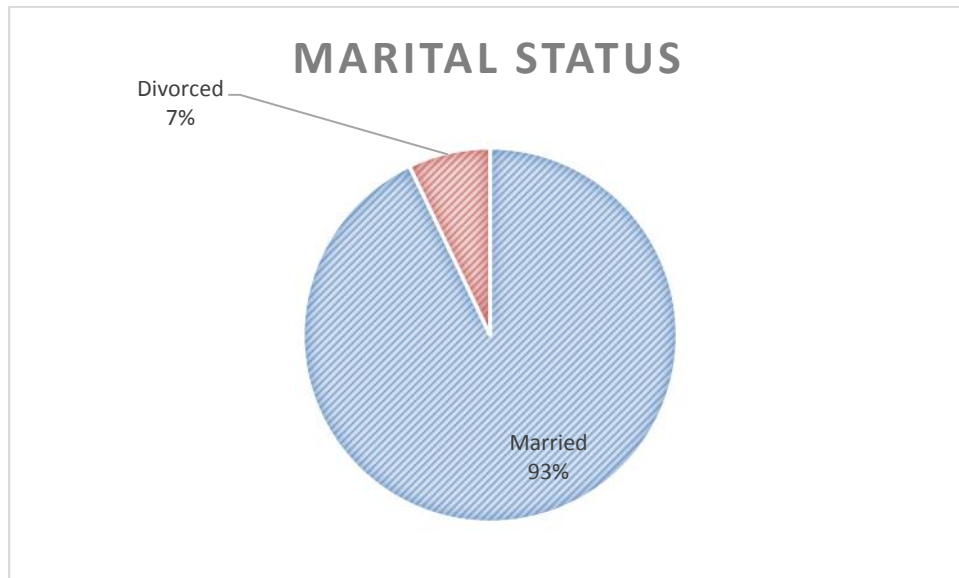

Figure 3: Marital status distribution

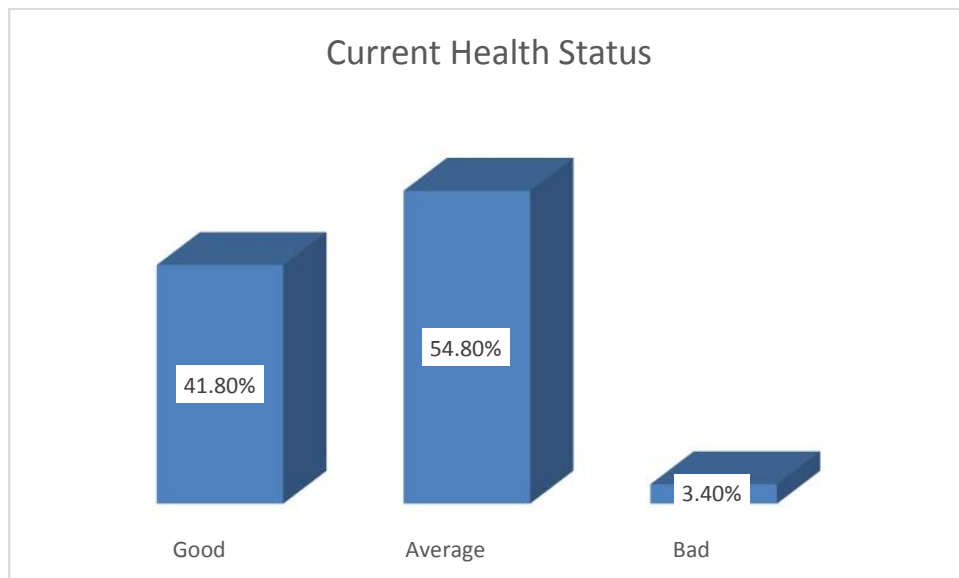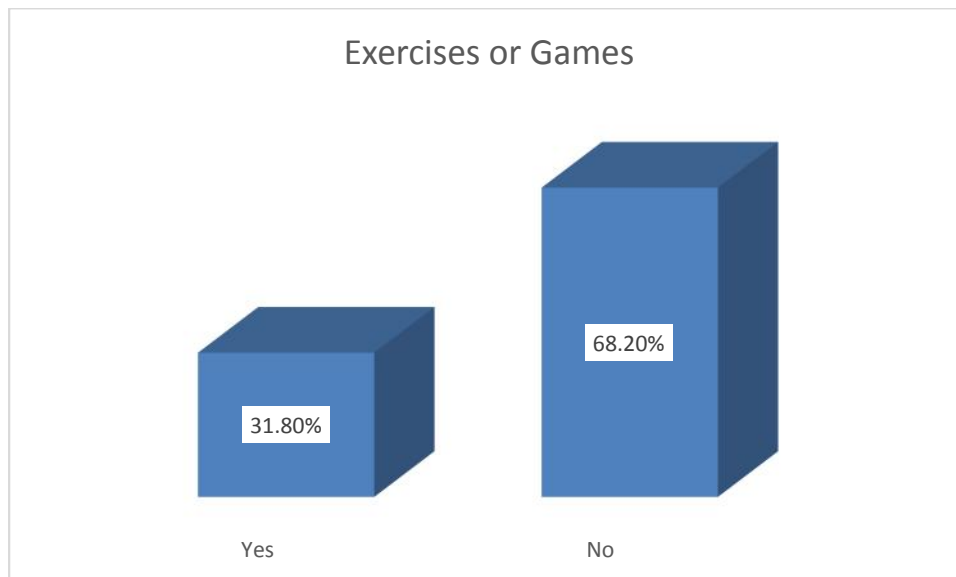93% participants were married and 7% were divorced.

Figure 4: Current health status distribution

The current health status of 362 (41.8%) individuals was good, 474 (54.8%) were having an average health status and 29 (3.4%) of them were in bad health.

Figure 5: Exercises or Games distribution

Most of the individuals were not involved in exercises or games, only 275 (31.8%) individuals participates in games or exercises.

Table 2 : Association of SF36 with demographics

	Variables	General Health		Limitations of Activities		Physical Health Problems		Emotional Health Problems		Social Activities		Body Pain		Energy And Emotions	
		P value	OR	P value	OR	P value	OR	P value	OR	P value	OR	P value	OR	P value	OR
Gender	Female	.282	1.030	.252	1.025	.101	.891	.154	1.126	.644	.975	.000	.851	.841	.998
	Male	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
AGE	65-70 Year	.001	.889	.053	.948	.693	.965	.117	1.181	.001	1.272	.000	1.220	.089	1.028
	71-80 Year	.001	.868	.522	.980	.208	.877	.640	1.060	.011	1.235	.010	1.172	.040	1.039
	Above >80 Year	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
BMI	Underwei	.319	.858	.934	.989	.632	.823	.401	1.47	.708	1.13	.139	1.35	.162	.900

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Normal Weight		.033	.902	.755	.988	.703	1.049	.184	1.226	.542	1.062	.720	1.026	.002	1.070
	OverWeight	.046	.906	.697	.985	.539	1.082	.339	1.161	.077	1.197	.745	.976	.038	1.048
	Obese	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Marital Status	Married	.205	.940	.039	.921	.373	1.118	.001	1.758	.844	.981	.168	1.108	.012	1.058
	Divoiced	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Current Health	Good	.000	.711	.551	.962	.474	1.166	.101	.669	.005	1.561	.000	1.840	.000	1.147
	Average	.003	.782	.939	1.005	.517	1.145	.281	.773	.013	1.460	.001	1.455	.001	1.128
	Bad	Ref		Ref		Ref		Ref		Ref		Ref		Ref	

The table illustrates associations between SF-36 scores and participant demographics. Age, BMI, and current health status significantly related to General Health (p<0.05). Notably, the age group 65-70 and marital status were significant in Limitations of Activity. Conversely, none of the demographics showed significant links to Physical Health Problems. Marital status significantly affected Emotional Health Problems (p=0.001), and age and current health status influenced Social Activities. Gender, age, and good health status were associated with Body Pain (p<0.05). Finally, participants aged 71-80, with normal or overweight BMIs, married, and in good health, significantly impacted Energy and Emotions. These findings offer key insights into the interplay of demographics and SF-36-measured quality of life.

Table 3 :Association of Fall efficacy scale International with demographic

	Not at all concerned		Somewhatconcerned		Fairly concerned		Veryconcerned		P value	OR	95% Confidence Interval	
	f	%	F	%	f	%	f	%			LL	UL
Gender									.000	2.231	1.472	3.383
Female	55	34.6	62	28.6	140	39.1	49	37.4				
Male	104	65.4	155	71.4	218	60.9	82	62.6				
Age									.000	.505	.367	.695
65-70 Year	116	73.0	143	65.9	184	51.4	61	46.6				
71-80 Year	33	20.8	44	20.3	95	26.5	29	22.1				

									P value	OR	LL	UL
Above >80 Year	10	6.3	30	13.8	79	22.1	41	31.3				
BMI									.019	1.431	1.060	1.932
Normal in Weight	90	56.6	114	52.5	192	53.6	69	52.7				
Overweight	61	38.4	80	36.9	138	38.5	48	36.6				
Obese	8	5.0	23	10.6	28	7.8	14	10.7				
Marital Status									.876	1.038	.651	1.655
Married	155	97.5	204	94.0	326	91.1	119	90.8				
Divorced	4	2.5	13	6.0	32	8.9	12	9.2				
Current Health Status									.001	.489	.324	.738
Good	103	64.8	92	42.4	118	33.0	49	37.4				
Average	56	35.2	124	57.1	224	62.6	70	53.4				
Bad			1	.5	16	4.5	12	9.2				

The table shows the relationship between fall efficacy and patient demographics. Gender significantly influenced fall efficacy (p<0.05). Age significantly affected fall efficacy (p<0.05).BMI significantly influenced fall efficacy (p<0.05).Marital status was not significantly associated (p=0.867) with fall efficacy. Current health status significantly influenced fall efficacy (p<0.05).

Table 4 :Association of Fall efficacy scale with SF-36 using Multinomial Logistic regression

	Not at all concerned				Somewhatconcerned				Fairly concerned			
	P value	OR	95% Confidence Interval		P value	OR	95% Confidence Interval		P value	OR	95% Confidence Interval	
			LL	UL			LL	UL			LL	UL
General Health	.014	.881	.796	.975	.013	.898	.825	.977	.954	1.002	.931	1.079
Limitations of Activities	.000	.738	.676	.805	.000	.805	.751	.864	.151	.957	.902	1.016
Physical Health Problem	.712	1.052	.803	1.378	.001	1.457	1.173	1.809	.990	1.001	.825	1.215

s												
Emotional Health Problems	.561	.907	.652	1.261	.674	.948	.738	1.217	.291	1.126	.903	1.405
Social Activities	.021	1.279	1.038	1.575	.002	1.322	1.106	1.579	.241	.913	.783	1.064
Body Pain	.000	1.344	1.161	1.556	.209	1.088	.954	1.242	.001	1.206	1.075	1.352
Energy And Emotions	.000	1.122	1.070	1.176	.004	1.061	1.019	1.105	.294	1.019	.984	1.056
SF-36	.227	1.002	.999	1.004	.000	1.004	1.002	1.007	.000	1.010	1.008	1.012

The table displays the connection between fall efficacy and the SF-36 questionnaire in older adults. Several domains, including General Health, Limitations of Activities, Social Activities, Body Pain, and Energy and Emotions, show no significant association (p<0.05) with the "not concerned at all" category for fall efficacy. However, in some instances, General Health, Physical Health Problems, Social Activities, and Energy and Emotions are significantly (p<0.05) associated with being "somewhat concerned" about fall efficacy in older individuals. Notably, only the domain of Body Pain is significantly (p=0.000) linked to being "fairly concerned" about fall efficacy in the elderly. This highlights the varying relationships between different SF-36 aspects and fall efficacy concerns in older populations.

Discussion

This study aimed to examine the relationships between health-related quality of life (HRQOL), physical function, and the fear of falling among older adults. Additionally, the research explored the association between the fear of falling and an individual's age. A prior study demonstrated the significant role of age in the development of fear of falling among older adults, concluding that an older subjective age was linked to a 24 percent increased probability of experiencing fear of falling seven years later.(13)

Health-related quality of life was assessed using the SF-36 questionnaire, and its various domains were analyzed for associations with age, gender, BMI, and current health status. Generally, straightforward indicators of nutritional status were utilized. Body mass index (BMI) proved to be a valuable metric for assessing the nutritional status of adults in clinical practice. (14)

In this current study, the SF-36 domain of general health was found to have a significant positive association with age and normal weight among participants. Furthermore, no significant association was observed between underweight individuals and their general health status, suggesting that underweight individuals might have poorer health. These findings align with a previous study that explored the relationship between SF-36 and the BMI of non-hospitalized older adults. (15)

Additionally, this study revealed a positive association between marital status and both general and emotional health, suggesting that older individuals who are married tend to have good to average health status. These findings are consistent with those reported in previous studies. (16)(17)

Furthermore, in the present study, fear of falling was significantly associated (p<0.05) with physical inactivity and being alone. Individuals who are physically inactive and alone were more likely to be functionally independent and in better health, which reduced their fear of falling. However, other studies have indicated a connection between being alone and persistent feelings of dread. (18)

Falls and the associated fear of falling pose significant risks to the health of older individuals. This can set off a negative cycle of declining physical function, increased social isolation, reduced physical fitness, changes in posture control, and a loss of self-confidence. These factors collectively heighten the risk and anxiety related to falling.(19)

The evaluation of health-related quality of life was conducted using SF-36 questions, with all domains of this questionnaire assessed for associations with age, gender, BMI, and current health status. In clinical practice, simple indicators of nutritional status are commonly employed, with Body Mass Index (BMI) being a valuable metric for gauging the nutritional status of adults. (20)

Conclusions

Health-related quality of life (HRQOL) exhibits a strong association with several factors, particularly within the age group of 65-70 years. It is significantly linked to individuals within this age range who maintain a normal BMI, report good health status, and are married. Additionally, fear of falling is notably associated with high scores on HRQOL, specifically in domains such as general health, emotional well-being, engagement in social activities, and energy and emotions. These findings suggest that HRQOL and the fear of falling are interrelated, with specific HRQOL components playing a crucial role in influencing the fear of falling in older adults.

Declarations

Competing interests there is no conflict or competing interests.

Funding: there was no funding source involved.

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Ethical committee letter

Ref #: _REC/RCRAHS/333_

Date: _10/11/2021_

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TO WHOM IT MAY CONCERN

SUBJECT: INSTITUTIONAL APPROVAL OF THE RESEARCH STUDY

It is certified that Mr. **Irtisam Ahmad,** Mr. **Muhammad Ubaid Tariq,** and Mr. **Chaudhry Abdullah** are bonafide students of Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Faisalabad. They are enrolled in graduate degree program **"Doctor of Physical Therapy".** On behalf of Research and Ethics Committee (REC), it is to inform that the submitted research proposal entitled **"Association of Health Related Quality of Life with Physical Function and Fear of Falling in Geriatric Population"** has been reviewed and conforms to the REC guidelines. The Committee recommends that the proposal may be commenced as planned.

Please note that this approval is valid for a period of one year only from the date of issuance and will require fresh approval if the study requires any change in the proposal or extension in the duration. It is advised to submit a revised protocol to REC for prior approval. It is emphasized that the study be conducted strictly in accordance with the submitted proposal.

Yours sincerely.

Prof. Anwar ul Haq

Director

Research and Ethical Committee

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