

Relationship between Kinesiophobia, Fall Risk and Activity Level among Elderly Females after Total Knee Arthroplasty

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A B S T R A C T

Objective: The objective of the study was to evaluate co-relation between fall risk, kinesiophobia, and physical- activity level among elderly females after one year of TKA.

Methodology: This study was a cross-sectional survey conducted on females who had their Total Knee arthroplasty from Ghurki Trust & Teaching Hospital and Punjab Medical Centre, Lahore. Data was collected from 200 (n) elderly females who had undergone their Total Knee Arthroplasty at least one year before the study was conducted. Fall risk (Berg Balance Scale), fear of movement (Tampa Scale of Kinesiophobia), and physical activity (IPAQ) were the key outcome measures.

Results: Pearson correlation determined higher levels of association between fall risk, fear of movement and physical activity. Higher the berg balance score, lower the score of Kinesiophobia i.e. negatively significant correlation; $r(198) = -.54, p=0.00$. Higher berg balance scores were also found to be positively related to higher minutes of low, moderate and vigorous exercise per week. Kinesiophobia was found to be negatively significant for physical activity of low, moderate and vigorous intensity i.e. $r(198) = -.11, p= .01, r(198) = -.03, p=.00$ and $r(198) = -.07, p= .02$ respectively.

Conclusion: A significant negative correlation was observed between fall risk and Kinesiophobia. Moreover, a significant positive correlation was observed between fall risk and physical activity in elderly females who have had TKA.

Key words: Berg balance scale, fall risk, kinesiophobia, Total Knee Arthroplasty

Introduction

Total Knee Arthroplasty is the surgical procedure in which the joint articular surfaces, condyles and the tibial plateaus are changed and metallic & plastic implants are implanted therein to replace the affected joint or the portion of the joint. Changes in weight bearing components particularly relieve pain and disability. A poly-ethylene piece is positioned between as a shock absorber.¹ What makes a patient go for a total knee Arthroplasty is the failure of all other conservative

treatments like over-the-counter medications (acetaminophen, ibuprofen, naproxen etc.) exercise / physical therapy weight intra-articular steroid injections knee bracing / shoe inserts. If these do not pay advantage to the patients pain and functional incapacity, the orthopaedic surgeons head closer to the Total Knee Arthroplasty, that too depending on the patients weight, practical requirements and the extent to which damage has been triggered. Majority of adults of age 65-74 years i.e. one

quarter report at least one fall per year and those who are 75 years old or above, the number raises to one third. One of the most common reason for functional disabilities is fall and ultimate risk of death among individuals of age 65 years and older.^{2,3}

Falls are reported to be the most common causes of functional impairments and risk of death in adults who are 65 years old or more.⁴ A state where an individual experiences irrational, unconscionable, and debilitating fear for physical movements and activities as a result of a feeling of susceptibility to an injury or (recurrence) is referred to as Kinesiophobia.⁵ Lack of exercise or physical activity reports to be the second most common reason which is the resultant of kinesiophobia in adults leading to recurrent falls. It has been reported that reduction in fall incidences in high income countries is due to physical activities ranging from leisure activities to daily moderate to vigorous intensity physical activity in older adults.⁶ Kinesiophobia not only affects the physical ability of individuals but also affect their emotional and psychological response to movement leading to exaggerated anxiety and stress related to movements.^{2,7}

Higher levels of kinesiophobia further reduce muscle functions in elderly population with back pain.⁶ In older adults, movement and pain related fear were known to be the strongest prediction of functional performances.⁵ Older adults usually are known to suffer from impairments in terms of physical functions related to muscles and psychological such as pain experiences and kinesiophobia that prove to be major reasons of poor quality of life.⁷ Available literature has no evidences about relationship between fall risk and physical activity among older adults. The association between fall risk, kinesiophobia and physical activity should be studied and recommendations should be provided on how to avoid falls and improve physical activity among the elder females to improve overall quality of life. This study found out the relationship between kinesiophobia, balance and physical activity and determine whether kinesiophobia predicts loss of balance and physical activity among elderly females.

Methodology

This study was a cross-sectional survey conducted on females who had their Total Knee arthroplasty from Ghurki Trust & Teaching Hospital and Punjab Medical Centre, Lahore. The study took 18 months for completion. Females were recruited using the data from entries of the hospitals mentioned above. They were contacted through the contact numbers provided at the time of surgery. The objective of study was explained on call. Sample size of this study was calculated by Epi-tool software and was 200. 200 elderly females aged 60 to

80 years who had their bilateral or unilateral Total Knee Arthroplasties conducted at least one year before were included in the study using non probability convenient sampling technique. Females with serious spinal complications, cognitive impairments and those who were physically handicapped were excluded. Females with any sensory system pathology were also excluded. Ethical consent was approved and females were thus recruited accordingly.

Tampa scale for kinesiophobia i.e. TSK was used to assess kinesiophobia in patients of TKA. A score of 17 is the lowest possible score, and indicates no kinesiophobia or negligible. A score of 68 is the highest possible score and indicates extreme fear of pain with movement.^{2,3}

Berg balance scale was used to assess fall risk in females with Total Knee Arthroplasty. The International-Physical -Activity -Questionnaires (IPAQ) was used to assess physical activity in females with Total Knee Arthroplasty.^{2,3}

The data obtained was analyzed using SPSS software version 23. Statistical significance was set at $p=0.05$. To check the co- relation between the variables Pearson correlation test was applied. Frequency tables were used to summarize the demographics. The variables and their results were depicted by tables.

Results

Mean age of participants was found to be 65.72 years with a standard deviation of 3.807 years. The range of minimum and maximum age for 200 participants was 60 years and 78 years respectively. Data was found to be normally distributed according to the histogram. Out of 200 participants who included in the study, 149 (74.50%) had normal BMI, 36(18.00%) had BMI greater than 29 kg/m². 9 participants i.e. 7.50% fell in the Obese category i.e. BMI greater than 30 kg/m². Out of 200 participants that were included in the study as per the inclusion criteria, 49 i.e. 24.50% had diabetes mellitus, 42 i.e. 21% had cardiac pathologies, 66 i.e. 33% were hypertensive. 38 participants i.e. 19% had other medical problems which included renal failures, gall stones, liver pathologies, respiratory problems etc. 5 participants i.e. 2.50% reported to have no medical associated problems. 45 females had Bilateral TKA's whereas 155 had unilateral with 77 having right knee joint arthroplasty and 78 had their left knee joint arthroplasties.

The scores of Berg Balance scale among participants are given in Table I. Activity level of study participants is shown in Table II. Association between fear of movement, fall risk and activity level in shown in Table III.

Pearson correlation determined higher levels of association between fall risk, fear of movement and physical activity. Higher the berg balance score, lower the score of Kinesiophobia i.e. negatively strong correlation $r(198) = -.54$, $p=0.00$. Higher berg balance scores were also found to be positively related to higher minutes of low, moderate and vigorous exercise per week. Kinesiophobia was found to be negatively significant for physical activity of low, moderate and vigorous intensity i.e. $r(198) = -.11$, $p= .01$, $r(198)= -.03$, $p=.00$ and $r(198)= -.07$, $p= .02$ respectively.

Discussion

This study was conducted in order to determine the association between, fear of movement, fall risk and physical activity among elderly females who had surpassed Total Knee Arthroplasty one year before. In this study, a positive correlation was found between Berg balance scores and physical activity of elderly females who have undergone Total Knee Arthroplasty.

Moreover, a negatively significant correlation was found out between Kinesiophobia and berg balance score which means that the more the patients were stable in terms of balance, the lower was the fear to move and vice versa. Out of 200 participants, very few were found to be physically active and larger number of females were found to be perform some low intensity physical exercises. Percentage of elderly adult females to be physically active in terms of moderate and vigorous intensity exercises was found to be very small as compared to percentages found internationally. This could be because of the reason that our participants were all aged around 60-80 years with a mean age of 65.72 years and age was found to have a negative relationship with physical activity i.e. higher the age, lower the physical activity and vice versa.⁸⁻¹⁰ It was also found that majority of participants had higher risk of fall i.e. lower berg balance scores and had higher score for Kinesiophobia i.e. higher fear of movement and performance of activities. Many of the studies conducted earlier reported only history of falls

Table I: Fall Risk among Elderly Females Berg Balance Scale.

Item to be assessed	Number of participants with score 4	Number of participants with score 3	Number of participants with score 2	Number of participants with score 1	Number of participants with score 0
Sit to stand	22 (11.0%)	85 (42.5%)	52 (26.0%)	41 (20.5%)	0 (0.0%)
Stand Unsupported	48 (24.0%)	38 (19.0%)	45 (24.0%)	48 (24.0%)	21 (10.5%)
Sit with back unsupported	86 (43.0%)	106 (53.0%)	5 (2.50%)	3 (1.5%)	0 (0.0%)
Stand to sit	18 (9.0%)	67 (33.5%)	70 (35.0%)	45 (22.5%)	0 (0.0%)
Transfer	15 (7.50%)	55 (27.5%)	61 (30.50%)	60 (30.0%)	9 (4.5%)
Stand unsupported	65 (32.5%)	48 (24.0%)	30 (15.0%)	30 (15.0%)	27 (13.5%)
Stand with feet together	41 (20.5%)	54 (27.0%)	60 (30.0%)	45 (22.5%)	0 (0.0%)
Reach forward with outstretched hand	13 (6.50%)	54 (27.0%)	69 (34.5%)	48 (24.0%)	16 (8.0%)
Pick up object from floor	58 (29.0%)	34 (17.0%)	23 (11.5%)	56 (28.0%)	29 (14.5%)
Turn to look behind	64 (32.0%)	96 (48.0%)	17 (8.50%)	14 (7.0%)	9 (4.50%)
Turn 360 degrees	60 (30.0%)	60 (30.0%)	39 (19.5%)	21 (10.50%)	20 (10.0%)
Place alternate foot on step	30 (15.0%)	21 (10.5%)	51 (25.5%)	57 (28.5%)	42 (20.5%)
Stand with one foot in front of another	2 (1.10%)	9 (4.52%)	85 (42.71%)	64 (32.16%)	39 (19.60%)
Stand on one leg	1 (0.50%)	11 (5.5%)	27 (13.5%)	85 (42.5%)	76 (38.0%)

Table II: Activity Level among Elderly Females IPAQ

Minutes per week of Physical activity	N	Minimum	Maximum	Mean	SD
Minutes per week of Low Exercise	200	32.00	120.00	56.7350	16.33674
Minutes per week of Moderate Exercise	200	19.00	53.00	33.5050	8.10050
Minutes per week of Vigorous Exercise	200	5.00	29.00	14.3350	5.38776

Table III: Relationship between Fall Risk, Fear of Movement and Physical Activity

Pearson correlation among Variables		Tampa Scale of Kinesiophobia	Minutes per week of low exercises	Minutes per week of moderate exercise	Minutes per week of Vigorous exercise
Berg Balance Scale	r value	-0.54	0.189	0.034	0.234
	P value	0.012	0.007	0.021	0.001
Tampa Scale of Kinesiophobia	r value	-0.03	-0.030	-0.031	-0.07
	P value	0.013	0.031	0.031	0.01
Minutes per week of low exercises	r value	-0.11	0.15	0.17	0.17
	P value	0.012	0.671	0.26	0.26
Minutes per week of moderate exercise	r value				0.32
	P value				0.41

whereas this study provided the relationship and the major factor behind falls in elder females.¹¹ Hence it was difficult to compare results of my study with those conducted earlier. But the percentage of female that were found to have a higher risk of falls closely matched to those who were found to have falls in earlier researches.¹² The results of this study showed a significant correlation between fall risk, fear of movement and physical activity which is why it is found to be comparable with a study conducted earlier in Malaysia that concluded that people with higher physical activity had a lower risk of fall and reported lesser incidences of fall.¹³ This was found to be probably due to smaller sample size, unequal distribution in terms of race and ethnicity. Very surprisingly one of the studies conducted in the past reported higher risk of fall with increased physical activity and higher leg power. They concluded that more household activities imposed a greater risk on the adult males which made them prone to fall every time they involved themselves in an activity. It was also predicted from this study that more powerful men undertook more activities which increased their fall risk.¹⁴ Correspondingly, those males who were involved in lesser household activities were found to have a lesser risk to fall due to the lesser impactful situations they place themselves in a lesser challenging activities they undertake. These results cannot be generalized to whole Pakistan older adult population because the sample size was smaller and there had been an unequal representation of major races due to the convenient non probability sampling technique that was used. The study was also conducted in a limited location and used subjective methods of assessment which is why there had been few loopholes in study.

There have been many studies that determine the relationship between activity and fall risk however correlation between fear of falling, risk of falling and physical activity in elderly females in Pakistan is limited. As Pakistan is known to be a multiethnic state, the perception and understanding about physical activity, falls and Kinesiophobia including other factors which may be cultural barriers and social support is different from those in developed countries.^{15, 16} More researches are required in order to provide more insight into this discipline as we have got to know that lesser balance and higher age make one prone to have frequent falls and lesser physical activity, we should propose some guidelines in order to maintain a better standard of life.

Conclusion

Higher scores of balance made the participants less fearful for moving and performing their functions. Moreover, lesser scores of balance led to a lesser physical activity and higher number of falls in elderly females who have had their TKA.

Limitation: International physical activity questionnaire variables were not compliant with elderly population we have in Pakistan.

Recommendation: Females should be recommended to obtain physical therapy services post Total Knee Arthroplasty in order to regain their muscular strength and remain physically active. To offer a better understanding of fall risk and its relationship with physical activity we should examine activity exposure i.e. Number of falls in relation to amount of activity.

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