

KINESIOPHOBIA AND ITS ASSOCIATION WITH SHOULDER AND ELBOW JOINT MOBILITY IN POST CABG PATIENTS

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Abstract**Background:** Kinesiophobia (also known as fear of movement) is defined as an excessive, irrational and debilitating fear to carry out a physical movement, due to a feeling of vulnerability to a painful injury or re-injury;(2)**Methodology:** This was a descriptive cross-sectional study. Through no probability convenient sampling data was collected from 219 Post CABG patients Age of patients lies in 45 to 65 years and all those patients were included who were one week post CABG .and have no concomitant surgery done were included. Those with congenital heart disease, ongoing bleeding, fracture and serious diseases were excluded. A semi structured questionnaire was used. Tampa scale TSK SV heart was used for kinesiophobia. It comprises of 17 questions. And goniometer is used to asses ROM of shoulder and elbow joint. (3)**Results:** A high level of kinesiophobia was found in 80.3%. A high level of kinesiophobia was found in age between 51 to 55 and female were more kinesiophobic as compared to men;(4).**Conclusion:** The study concluded that high level of kinesiophobia was found in post CABG patients**1.Introduction**

The term “kinesiophobia” (kinesis=movement) was introduced by Kori, et al. in 1990; this condition has been described as “an excessive, irrational and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to a painful injury or a new injury” (Luque-Suarez, Martinez-Calderon, & Falla, 2019) Kinesiophobia has been shown to have a negative influence on the outcome of rehabilitation and is consequently of importance in the clinical situation. More specifically, kinesiophobia is associated with impaired physical performance, increased self-reported disability, and may predict

future occupational disability (Luque-Suarez et al., 2019). Kinesiophobia is the most extreme form of fear of movement (Celletti, Castori, La Torre, & Camerota, 2013). People with kinesiophobia would change their movements to avoid pain and adjust their motor behaviors (Xu et al., 2020). Kinesiophobia was one of the most commonly used conceptual definitions which could describe fear in relation to pain (Xu et al., 2020).

Kinesiophobia (also known as fear of movement) is defined as an excessive, irrational and debilitating fear to carry out a physical movement, due to a feeling of vulnerability to a painful injury or reinjury. Both constructs are very similar, and

essentially, they have the same clinical relevance. While kinesiophobia is usually assessed with the Tampa Scale for Kinesiophobia (TSK), there is not a specific tool to assess fear of movement. The prevalence of kinesiophobia in persistent pain ranges from 50% to 70%. It can be acquired through two forms: a direct aversive experience (e.g.; pain or trauma) or social learning (observation and instruction). Kinesiophobia may be associated with pain and associated outcomes (disability and quality of life) in several ways.

First, kinesiophobia alters how people move, possibly with the initial goal to avoid pain. It causes adjustments of motor behavior which affects the performance of actions related to the management and control of pain and pain-related disability

Second, the processing of pain and pain-related information in people with CMP could be related to how kinesiophobia is perceived. Indeed, a greater degree of kinesiophobia predicts greater levels of pain (Asiri et al., 2021).

Kinesiophobia was one of the most commonly used conceptual definitions which could describe fear in relation to pain (Xu et al., 2020). Kinesiophobia is found to be a central factor in the process of pain developing from acute to chronic stages (Larsson, Ekvall Hansson, Sundquist, & Jakobsson, 2016) when a painful experience is interpreted as threatening, it can generate catastrophizing cognitions that activity will result in more pain and re/injury. As this goes on, this can lead to avoidance behavior, which in the long run causes disability, disuse and depression as well as a patient trapped in a cycle of increased fear of pain, more pain and disability self-efficacy relates to the belief in one's own capacities and individuals with high self-efficacy seem to have a higher ability to manage challenging situations and setbacks than individuals with low self-efficacy. Another cognitive aspect that is strongly associated

with the occurrence of pain among older adults is self-perception of health. Poor self-perceived health has also been found to relate to poor recovery from chronic pain (Larsson et al., 2016).

FAM-Fear Avoidance Model

Kinesiophobia was first coined by Miller and colleagues (1990), as an aspect of the fear-avoidance model. Kinesiophobia is "a condition in which a patient has an excessive, irrational and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or re-injury" (1990,) It is now defined as a fear of movement, due to the fear of re-injury with individuals who are highly fear-avoidant believing pain to be a sign of bodily harm, and that any activity causing pain is dangerous and should be avoided (1) Kinesiophobia is a psychological construct within the Fear Avoidance Model (FAM) . The FAM explains how and why pain injuries result in chronic pain and its comorbidities (disuse, depression, and disability). FAM may be the major cause of functional dysfunctions in patients with kinesiophobia. According to this model, fear can result in avoidance and inactivity behavior, eventually leading to disability. The basic principle of the model is that the way pain is interpreted can lead to two different pathways. When acute pain is perceived as non-threatening, patients are likely to remain involved in daily activities through which functional recovery is promoted. In contrast, a vicious circle can be initiated when the pain is catastrophically (poorly) interpreted. These dysfunctional interpretations give rise to pain-related fear and associated safety-seeking behaviors, such as avoidance/flight and hypervigilance, which may be adaptive at the stage of acute pain, but paradoxically worsen the problem in the case of long-term pain (Castanho, Cordeiro, & Pinheira, 2021).



Figure. 01 FAM-Fear Avoidance Model

2.Literature review:

This research was conducted by Ewa Malchrowicz-Moško, and all the level of kinesiophobia in breast cancer women undergoing surgical treatment. The study was conducted in the Breast Surgical Oncology Department, Breast Cancer Unit, Greater Poland Cancer Center, Poznan, Poland. They interviewed 285 women (132 patients from Greater Poland Cancer Center using Polish adaptation of the Tampa Scale of Kinesiophobia (TSK). Research results show that women with BC suffer from kinesiophobia (>37 points) significantly.(Malchrowicz-Moško et al., 2023)

The research conducted by Daisuke Higuchi and all Health-Related Quality of Life Is Associated with Pain, Kinesiophobia, and Physical Activity in Individuals Who Underwent Cervical Spine Surgery. A questionnaire was distributed to 280 individuals with DCM/R. The questionnaire comprised the four items including HRQOL (EuroQol 5-dimensions 5-level), neck pain (numerical rating scale [NRS]), kinesiophobia (11-item Tampa Scale for Kinesiophobia [TSK-11]), and physical activity (paid work, light exercise, walking, strength training, and gardening). Hierarchical multiple regression analysis was performed using the NRS, TSK-11, and physical activity as independent variables. Neck pain, kinesiophobia, and physical activity (specifically paid work and walking) were independently associated with HRQOL in individuals with postoperative DCM/R.(Higuchi, Kondo, Watanabe, & Miki, 2024)

The Tampa scale of Kinesiophobia and pain, disability and grip strength in patients with lateral Epicondylalgia: A narrative review of the literature research was conducted by Kiran Jeswani, Manisha Rathi. A review was performed of all published studies which used the fear avoidance model and assessed TSK in individuals with Lateral Epicondylalgia. Various databases like Pub Med, Pedro, Cochrane and google scholar were searched initially on March 17, 2020. On April 19, 2020 these databases were searched for a second time to find new articles. Keywords used were Tampa scale of Kinesiophobia, Lateral Epicondylalgia. Only studies which assessed TSK in adult Lateral epicondylalgia population and were available in English were included. Studies which reported Lateral epicondylalgia combined with any other musculoskeletal conditions were excluded. The fear avoidance model can be applied to Lateral epicondylalgia patients and there is value from a psychometric perspective in using the TSK to assess kinesiophobia.(Jeswani & Rathi, 2021)

3.Materials and Methods:

3.1: Study design and setting:

The current study is a descriptive cross-sectional study. Data was collected from: Rawalpindi institute of cardiology, PIMS, Rawal general and dental hospital.

3.2: Sampling technique:

Non-probability Convenience Sampling technique will be used to collect the data.

3.3: Sample size:

The sample size was calculated using Epitool software with the help of the parent article. The sample size of the current study is 219

3.4: Study duration:

Study was conducted in 06 months, after the approval of proposal.

3.5: Sample collection:

The patients included in the study were between 45 to 65 years old, were qualified for post coronary artery bypass surgery, and agreed to participate in the study, and their mental state enabled them to understand the questions included in the questionnaire, and also allowed to measure ranges of motion in shoulder and elbow joint.

4.Data collection tools:

4.1: Self structured questionnaire:

Self-structured questionnaire includes past heart attack history any past surgery and inclusion criteria.

4.2: Goniometer:

The goniometer is a fundamental tool utilized in clinical assessments to measure joint range of motion (ROM) and flexibility. Its reliability and validity in assessing joint ROM contribute to its widespread use in physical therapy, orthopedics, and rehabilitation settings. The simplicity of the goniometer, combined with its accuracy, makes it an indispensable instrument for both diagnostic purposes and ongoing monitoring of joint health and functionality (Youngcharoen, Saraboon, Aree-Ue, Chintapanyakun, & Kawinwonggowit, 2021).

4.3: Tampa scale:

The Tampa Scale, short for Temperature Scale, is a subjective rating system employed in healthcare and research settings to gauge an individual's perception of thermal sensations. Participants are typically asked to rate their subjective experience of temperature on a numerical scale, often ranging from cold to hot, with corresponding descriptors at various points along the scale.

4.4: Statistical analysis:

Data will be evaluated through SPSS statistics version 25.

4.5: Ethical consideration:

In conducting research on the association between kinesiophobia and shoulder and elbow joint mobility in post-coronary artery bypass graft (CABG) patients, stringent ethical considerations are paramount. Participants will be fully informed of the study's purpose, procedures, and potential risks, providing voluntary, informed consent with the right to withdraw at any stage without repercussions. Privacy and confidentiality measures, including data anonymization and secure storage, will be strictly implemented. Minimization of physical and psychological harm is prioritized during joint mobility assessments, with close monitoring for signs of discomfort. The research design aims for a balance between potential benefits to post-CABG patients and any associated risks. Researchers involved are qualified, adhering to professional standards, and the study undergoes independent ethics review board approval. The voluntariness of participation is emphasized to prevent coercion, and continuous monitoring ensures compliance with ethical standards, with any adverse events promptly reported. Results will be transparently disseminated, upholding the study's integrity and contributing ethically to the field of post-CABG rehabilitation.

5: Result:

Out of 219 participant 176 were kinesiophobic with TAMPA score of more than 37 and 43 were less than 37 which are considered non kinesiophobic, out of which 116 were male and 103 were female. 80.3% were kinesiophobic. With age 45-50, 16 were kinesiophobic and 21 were not kinesiophobic, with age of 51-55, 54 were kinesiophobic and 13 were not kinesiophobic with age of 56-60, 48 were kinesiophobia and 9 were not kinesiophobic, with age of 61-65, 58 were kinesiophobic.

Table 2: Gender and Kinesiophobia cross tabs

Tampa Scale	Kinesiophobic	nonkinesiophobic	Total
Gender			
Male	73	43	116
Female	103	0	103
Total	176	43	219

Out of 219 participants 176 were kinesiophobic in which 73 males were kinesiophobic and 103 females were kinesiophobic.

Table 3: Age and Kinesiophobia Cross Tabs

Age of Participants	Frequency	kinesiophobic	non kinesiophobic	Total
	45-50	16	21	37
	51-55	54	13	67
	56-60	48	9	57
	61-65	58	0	58
Total		176	43	219

Out of 219 participants with age 45-50, 16 were kinesiophobic and 21 were not kinesiophobic, with age of 51-55 54 were kinesiophobic and 13

were not kinesiophobic with age of 56-60, 48 were kinesiophobic and 9 were not kinesiophobic with age 61-65, 58 were kinesiophobic.

Table 4: Right Side Shoulder Flexion

Joint	Movement		Mean	Standard deviation
Elbow joint	Flexion	Right	137.32	6.318
		Left	134.0	6.561
	Extension	Right	6.29	2.099
		Left	5.09	2.077

The mean and standard deviation of 219 participants for right side elbow joint flexion is 137.32 and 6.318 respectively, for left side it is 134.0 and 6.561. For Right side extension of

elbow joint mean is 6.29 and Standard deviation is 2.099, left side extension is 5.09 and 2.077 respectively.

Table 5 : Right and Left Shoulder Joint

Joint	Movement		Mean	Standard deviation
Shoulder joint	Flexion	Right	20.20	1.833
		Left	11.50	2.368
	Extension	Right	15.03	1.428
		Left	7.18	1.617
	Abduction	Right	29.96	4.226
		Left	11.16	1.045
	Adduction	Right	9.96	2.472
		Left	6.40	1.293

	Internal rotation	Right	40.56	6.90
		Left	40.05	1.089
	External rotation	Right	19.54	2.814
		Left	11.68	1.673

The mean and standard deviation of 219 participants for right side shoulder joint flexion is 20.20 and 1.833 respectively, for left side it is 11.50 and 2.368. For Right side extension of shoulder joint mean is 15.03 and Standard deviation is 1.428, left side extension is 7.18 and 1.617 respectively. For Right side abduction of shoulder joint mean is 29.96 and Standard deviation is 4.226, left side abduction is 11.16 and 1.045 respectively. For Right side adduction of

shoulder joint mean is 9.96 and Standard deviation is 2.472, left side adduction is 6.40 and 1.293 respectively. For Right side internal rotation of shoulder joint mean is 40.56 and Standard deviation is 6.90, left side extension is 40.05 and 1.089 respectively. For Right side external rotation of shoulder joint mean is 19.54 and Standard deviation is 2.814, left side external rotation is 11.68 and 1.673 respectively.

Table 6: Tampa Scale Frequency and percent

Variable	Tampa scale points	Frequency	Percent
I'm afraid that I might injure myself if I exercise	Strongly disagree	3	1.4
	Disagree	23	10.5
	Agree	112	51.1
	Strongly disagree	81	37.0
	Total	219	100
If I were to try to overcome it, my pain would increase	Strongly disagree	16	7.3
	Disagree	16	7.3
	Agree	103	47.0
	Strongly disagree	84	38.4
	Total	219	100
My body is telling me I have something dangerously wrong	Strongly disagree	18	8.2
	Disagree	52	23.7
	Agree	108	49.3
	Strongly disagree	41	18.7
	Total	219	100
My pain would be relieved if I were to exercise	Strongly disagree	58	26.5
	Disagree	95	43.3
	Agree	47	21.5
	Strongly disagree	19	8.7
	Total	219	100
People aren't taking my medical condition seriously enough	Strongly disagree	56	25.6
	Disagree	59	26.9
	Agree	68	31.1
	Strongly disagree	36	16.4
	Total	219	100
	Strongly disagree	29	13.2

My accident has put my body at risk for the rest of my life	Disagree	78	35.6
	Agree	72	32.9
	Strongly disagree	40	18.3
	Total	219	100
Pain always means I have injured my body	Strongly disagree	37	12.3
	Disagree	38	17.4
	Agree	109	49.8
	Strongly disagree	47	20.5
	Total	219	100
Just because something aggravates my pain does not mean it is dangerous	Strongly disagree	43	19.6
	Disagree	75	34.2
	Agree	89	40.6
	Strongly disagree	12	5.5
	Total	219	100
I am afraid that I might injure myself accidentally	Strongly disagree	30	13.7
	Disagree	49	22.4
	Agree	90	41.1
	Strongly disagree	50	22.8
	Total	219	100
Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening	Strongly disagree	20	9.1
	Disagree	55	25.1
	Agree	75	34.2
	Strongly disagree	69	31.5
	Total	219	100
I wouldn't have this much pain if there weren't something potentially dangerous going on in my body	Strongly disagree	35	16.0
	Disagree	44	20.1
	Agree	100	45.7
	Strongly disagree	40	18.3
	Total	219	100
Although my condition is painful, I would be better off if I were physically active	Strongly disagree	24	11.0
	Disagree	43	19.5
	Agree	108	49.3
	Strongly disagree	44	20.1
	Total	219	100
Pain lets me know when to stop exercising so that I don't injure myself	Strongly disagree	21	9.6
	Disagree	29	13.2
	Agree	124	56.6
	Strongly disagree	45	20.5
	Total	219	100
	Strongly disagree	31	14.2

It's really not safe for a person with a condition like mine to be physically active	Disagree	56	25.6
	Agree	77	35.2
	Strongly disagree	55	25.1
	Total	219	100
I can't do all the things normal people do because it's too easy for me to get injured	Strongly disagree	34	15.5
	Disagree	58	26.5
	Agree	83	37.9
	Strongly disagree	44	20.1
	Total	219	100
Even though something is causing me a lot of pain, I don't think it's actually dangerous	Strongly disagree	56	25.5
	Disagree	80	36.5
	Agree	62	28.3
	Strongly disagree	21	9.6
	Total	219	100
No one should have to exercise when he/she is in pain	Strongly disagree	48	21.9
	Disagree	31	14.2
	Agree	74	33.8
	Strongly disagree	66	30.1
	Total	219	100

Out of 219 participants, 3 (1.4%) strongly disagreed, 23 (10.5%) disagreed, 112(51.1) agreed and 81(3.7%) strongly agreed. As shown in the table, more participants 112 (51.1%) had agreed to statement 1. 16 (7.3%) strongly disagreed, 16 (7.3%) disagreed, 103 (47%) agreed and 84(38.4%) strongly agreed. As shown in the table, more participants 103 (47%) had agreed to statement 2. 18 (8.2%) strongly disagreed, 52 (23.7%) disagreed, 108 (49.3%) agreed and 41(18.7%) strongly agreed. As shown in the table, more participants 108 (49.3%) had agreed to statement 3. 58 (26.5%) strongly disagreed, 95 (43.4%) disagreed, 47 (21.5%) agreed and 19(8.7%) strongly agreed. As shown in the table, more participants 95 (43.4%) had disagreed to this statement 4. 56 (25.6%) strongly disagreed, 59 (26.9%) disagreed, 68 (31.1%) agreed and 36 (16.4%) strongly agreed. As shown in the table, more participants 68 (31.1%) had agreed to statement 5. 29 (13.2%) strongly disagreed, 78 (35.6%) disagreed, 72 (32.9%) agreed and 40 (18.3%) strongly agreed. As shown in the table, more participants 78 (35.6%) had disagreed to statement 6. 27 (12.3%) strongly disagreed, 38 (17.4%) disagreed, 109 (49.8%) agreed and 45 (20.5%) strongly agreed.

As shown in the table, more participants 109(49.8%) had agreed to statement 7. 43 (19.6%) strongly disagreed, 75(34.2%) disagreed, 89(40.6%) agreed and 12 (5.5%) strongly agreed. As shown in the table, more participants 89 (40,6%) had agreed to statement 8. 30 (13.7%) strongly disagreed, 49(22.4%) disagreed, 90 (41.1%) agreed and 50 (22.8%) strongly agreed. As shown in the table, more participants 90(41.1%) had agreed to statement 9. 20(9.1%) strongly disagreed, 55 (25.1%) disagreed, 75 (34.2%) agreed and 69 (31.5%) strongly agreed. As shown in the table, more participants 75(34.2) had agreed to statement 10. 35 (16.0%) strongly disagreed, 44 (20.1%) disagreed, 100 (45.7%) agreed and 40 (18.3%) strongly agreed. As shown in the table, more participants 100 (45.7%) had agreed to statement 11. 24 (11.0%) strongly disagreed, 43 (19.6%) disagreed, 108 (49.3%) agreed and 44 (20.1%) strongly agreed. As shown in the table, more participants 108 (49.3%) had agreed to statement 12. 21 (9.6%) strongly disagreed, 29 (13.2%) disagreed, 124 (56.6%) agreed and 45 (20.5%) strongly agreed. As shown in the table, more participants 124 (56.6%) had agreed to statement 13. 31 (14.2%) strongly

disagreed, 56 (25.6%) disagreed, 77 (35.2%) agreed and 55 (25.1%) strongly agreed. As shown in the table, more participants 77 (35.2%) had agreed to statement 14. 34 (15.5%) strongly disagreed, 58 (26.5%) disagreed, 83 (37.9%) agreed and 44 (20.1%) strongly agreed. As shown in the table, more participants 83 (37.9%) had agreed to statement 15. 56 (25.6%) strongly disagreed, 80 (36.5%) disagreed, 62 (28.3%) agreed and 21(9.6%) strongly agreed. As shown in the table, more participants 80 (36.5%) had disagreed to statement 16. 48 (21.9%) strongly disagreed, 31 (14.2%) disagreed, 74 (33.8%) agreed and 66 (30.1%) strongly agreed. As shown in the table, more participants 74(33.8%) had agreed to statement 16. 48 (21.9%) strongly disagreed, 31 (14.2%) disagreed, 74 (33.8%) agreed and 66 (30.1%) strongly agreed. As shown in the table, more participants 74(33.8%) had agreed to statement 17.

5.Discussion:

In this study, the rate of kinesiophobia is 80.3% in one week post CABG while another study by Hanife Baykal Şahin¹, there results show a high level of kinesiophobia was present in 74.5% of the patients in the study of Brunetti et al., the rate of kinesiophobia was 86% (which is similar to our percentage) in patients with acute coronary syndrome and 79% in patients with acute heart failure (Şahin et al., 2021).

In current study Kinesiophobia has been assessed after 1 week post CABG and our results shows high kinesiophobia (80.3%) while In previous study by Maria Bäck a,b,*, They assessed kinesiophobia after 6 months of CABG .In there results A high level of kinesiophobia was found in 20% of the patients.In another study by Megha O. Joshi there results shows The mean of TSK -SV Heart score on 4th day post CABG in group A and group B was 43.42 (±7.717) and 43.45 (±4.64) respectively. The mean of TSK -SV Heart score on one month post CABG in group A and group B was 35.82 (±8.372) and 39.51 (± 6.03) respectively (Joshi & Pagare, 2020).

In current study the results show a high level of kinesiophobia in women as compared to men

similarly same results were obtained by Martyna Kluszczyńska. There result also shows that females are more kinesiophobic than men. The level of kinesiophobia was significantly higher among women than among men (Kluszczyńska et al., 2021).

In current study both previously and newly diagnosed patients were included and the result shows high level of kinesiophobia While in previous study by their results show Majority of cardiac patients included in the study had coronary artery disease and rheumatic heart disease. Patients presented an elevated level of kinesiophobia.(Nair, Harania, & Rajguru, 2018). Another study by Janusz Kocjan et al. investigated the level of kinesiophobia among patients with coronary artery disease. The research group consisted of 135 patients over 60 years of age. It turned out that over 76 percent of the respondents had a high level of kinesiophobia(Kocjan & Sport, 2016). Dąbek et al. have determined the degree of kinesiophobia in people with coronary artery disease and the relationship between physical activity and socio-demographic conditions and morbidity. Based on the group of 217 patients, whose average age was 67 years, they came to the following conclusions. Over 70% of hospitalized patients showed a high degree of kinesiophobia (based on the Tampa Scale > 39points) (Dąbek et al., 2020).

In this study, we only included one week post CABG patients and concluded that high level of kinesiophobia was present. Similarly another study by P.keessen ,C.H.M Latour included patients after 2 3 weeks of hospital discharge. There result also shows high level of kinesiophobia.(Keessen et al., 2020)

When individuals are unable to perform activities because they believe they will increase their pain, kinesiophobia develops. This situation negatively affects the functions of the patients, namely their Activities of Daily Living (ADL) and practice of exercise and/or physical activity. Therefore, users are not only afraid of pain but also fear of movement that can cause pain.

Thus, for a clinician it is very important to assess kinesiophobia and fear level in cardiac patients

which will help them to set appropriate goals for cardiac rehabilitation. The study however had few limitations in the form of large sample size and inability to assess long term effects of cardiac rehabilitation on kinesiophobia and fear avoidance belief levels.

Limitations:

- Sample size was Large.
- Large study setting.
- In our study, we didn't get permission in our settings for data collection.
- The study is conducted on small geographical area on Rawalpindi and Islamabad.
- It's a study design descriptive cross-sectional study. It was based on self-reported information provided by patients accordingly, there is some potential for reporting bias, which may have been due to participants, perception of the questions.

Conclusion: A high level of kinesiophobia was found in post CABG patients

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