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KINESIOPHOBIA AFTER MYOCARDIAL SURGERY

KINEZIOFOBIJA NAKON KIRURŠKOG ZAHVATA MIOKARDA

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ABSTRACT

Kinesiophobia is one of the factors that hinder adherence to secondary prevention in cardiovascular patients, limiting their physical activity and kinesitherapy. The aim of this study was to examine the association between the degree of kinesiophobia and specific risk factors in patients after myocardial surgery. The study included 35 patients (11 women, 24 men) with a mean age of 59 ± 8.81 years, who underwent myocardial surgery. Kinesiophobia was assessed using the Tampa Scale for Kinesiophobia, and data on risk factors were also collected. The study was conducted at the University Hospital Centre Zagreb, with prior approval obtained from the institution's Ethics Committee. Differences in the level of kinesiophobia among different patient groups were analyzed using the Kruskal-Wallis test, while the correlation with levels of physical and sedentary activity was examined using correlation analysis. Results showed that 71% of participants exhibited a high level of kinesiophobia. The most prevalent risk factors were elevated blood pressure (77%), overweight and obesity (63%), and a family history of cardiovascular diseases (57%). A statistically significant positive association was found between kinesiophobia and sedentary behavior ($p = 0.03$), while a negative association was observed between kinesiophobia and tobacco consumption ($p = 0.04$). In conclusion, a high level of kinesiophobia is present in patients after myocardial surgery, and reducing sedentary behavior may have a positive effect on its alleviation. The unexpected finding of lower kinesiophobia among smokers requires further research to better understand the possible causes of this relationship.

Keywords: fear of movement, cardiac rehabilitation, myocardial surgical treatment, physical exercise, cardiac muscle

SAŽETAK

Kineziofobija je jedan od čimbenika koji otežavaju pridržavanje sekundarne prevencije kod kardiovaskularnih bolesnika, ograničavajući njihovu tjelesnu aktivnost i kineziterapiju. Cilj ovog istraživanja bio je ispitati povezanost stupnja kineziofobije s određenim čimbenicima rizika kod pacijenata nakon operacije miokarda. U istraživanju je sudjelovalo 35 pacijenata (11 žena, 24 muškarca) u dobi od 59 ± 8,81 godina, koji su podvrgnuti kirurškom zahvatu miokarda. Kineziofobija je procijenjena pomoću Tampa upitnika, a prikupljeni su i podaci o čimbenicima rizika putem anketnog upitnika. Istraživanje je provedeno u Kliničkom bolničkom centru Zagreb, uz prethodno pribavljeno odobrenje Etičkog povjerenstva navedene ustanove. Razlike u stupnju kineziofobije među različitim skupinama ispitanika ispitane su Kruskal-Wallisovim testom, dok je povezanost s razinom tjelesne i sedentarne aktivnosti analizirana korelacijskom metodom. Rezultati pokazuju da 71 % ispitanika ima izraženu kineziofobiju. Najprisutniji rizični čimbenici su povišena vrijednost krvnog tlaka (77 %), prekomjerna tjelesna težina i pretilost (63 %) te obiteljska anamneza kardiovaskularnih bolesti (57 %). Utvrđena je statistički značajna pozitivna povezanost između kineziofobije i sjedilačkog ponašanja ($p = 0,03$) te negativna povezanost između kineziofobije i konzumacije duhanskih proizvoda ($p = 0,04$). Zaključno, visoka razina kineziofobije prisutna je kod pacijenata nakon operacije miokarda, a reduciranje sjedilačkog ponašanja može imati povoljan učinak na njezino ublažavanje. Neočekivani nalaz niže razine kineziofobije kod pušača zahtijeva daljnja istraživanja kako bi se bolje razumjeli mogući uzroci ovog odnosa.

Ključne riječi: strah od kretanja, srčani mišić, kardiološka rehabilitacija, kardijalni zahvat, tjelesno vježbanje

INTRODUCTION

Cardiovascular diseases (CVD) remain a leading cause of death globally, particularly among older populations. Despite advances in treatment, the absolute number of new cases and deaths continue to rise, especially due to aging demographics[13]. Patients may develop a fear of physical activity, which can have multifactorial origins, including emotional and physical challenges during the intensive recovery period. Its presence can be a complicating factor in the rehabilitation process and the return to daily life. The prevalence of physical inactivity is high worldwide and is directly responsible for nearly one-tenth of premature deaths from non-communicable diseases annually[17]. Physical activity (PA) plays an important role in both the primary and secondary prevention of CVD and major cardiovascular (CV) events, making it essential to align strategies for increasing participation in physical activity[2]. Following a cardiac procedure, physical inactivity is observed in up to 49% of patients[8] and is associated with increased long-term mortality. Cardiac rehabilitation, with PA as a key component, reduces the risk of mortality by 20 to 25%, comparable to the effects of medication[9]. The correlation between kinesiophobia and movement in cardiac patients, as well as other risk factors, such as tobacco consumption, high blood pressure, elevated blood cholesterol levels, diabetes, being overweight, sedentary behavior (SB), inadequate nutrition, and excessive alcohol consumption, has not been fully explored. Therefore, identifying the correlation between the fear of movement and the mentioned risk factors would provide a better understanding of the actual danger kinesiophobia poses to patients. The significant association between CVD and a sedentary lifestyle highlights the importance of regular PA and exercise[11]. However, CV patients belong to a low-activity population[6], and they exhibit a high level of kinesiophobia, which is attributed to uncertainty in dosing and progressing physical activity and exercise[3]. As one of the most common barriers for PA, patients point out the fear of overexertion and feeling of being helpless in case of complications that may occur during the activity[7]. The relationship between kinesiophobia and a wide range of risk factors for disease development has not yet been fully explored. Investigating kinesiophobia in patients after myocardial surgery is crucial for identifying this limiting factor in kinesitherapy, particularly in ensuring the timely progression of physical load, which is fundamental to patient recovery.

The main objective of this study was to assess the degree of kinesiophobia in patients after the myocardial surgery and analyze its association with individual risk factors for developing CVD.

PARTICIPANTS AND METHODS

The study was conducted on 35 patients (aged 59 ± 8.81 years) who underwent myocardial surgery, with an average age of 59 (± 8.81) years, including 11 women and 24 men. The exclusion criteria were: severe psychiatric disorders that interfere with participation, reoperations and significant PA limitations due to diagnosis. Of the six diagnosed conditions, the most common were aortic stenosis (34.3%) and mitral insufficiency (31.4%), followed by aortic insufficiency (20%), coronary artery atherosclerotic heart disease (14.3%), ischemic cardiomyopathy (5.7%), and aortic dissection (2.9%).

Measuring instruments

Kinesiophobia was assessed using the Tampa Scale for Kinesiophobia (TSK) and a general data questionnaire, supplemented with specific information necessary for the study. TSK evaluates fear of movement and activity due to potential injury through 17 questions rated on a 4-point Likert scale (1–4). After reversing the scores of specific items, the total score ranges from 17 (no kinesiophobia) to 68 (severe kinesiophobia). A score above 37 indicates the presence of kinesiophobia[14]. The general data questionnaire included sociodemographic information such as age, gender, and education level; the amount of daily PA and SB; diagnosis: type of surgical procedure, and both modifiable and non-modifiable risk factors, some of which were also obtained from medical history evaluated by medical doctors and cardiologists.

Organization of measurement

The study was conducted at the University Hospital Centre Zagreb, with the approval of the institutional Ethics Committee, in accordance with the prevailing ethical guidelines for the conduct of scientific research. All participants were informed about the purpose and methodology and provided their consent to participate in the study. Participants completed the survey questionnaires in the hospital center, and the researcher supplemented the data with information from the medical history.

Data analysis

For all variables, basic central and dispersion parameters were calculated. Differences in the level of kinesiophobia between various participant groups were examined using the Kruskal-Wallis test, while the association between kinesiophobia and the level of daily physical and sedentary behavior was analyzed using correlation analysis. The level of statistical significance was set at $p < 0.05$.

RESULTS

Level of kinesiophobia in participants

The average level of kinesiophobia, as measured by the TSK, is 40 (± 6.98) points, with values greater than 37 points

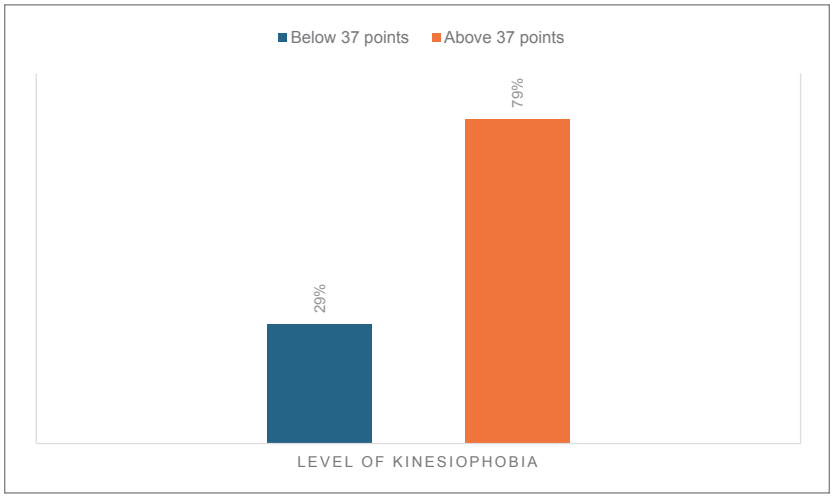

Figure 1. Level of kinesiophobia
Slika 1. Prisutnost kineziofobije

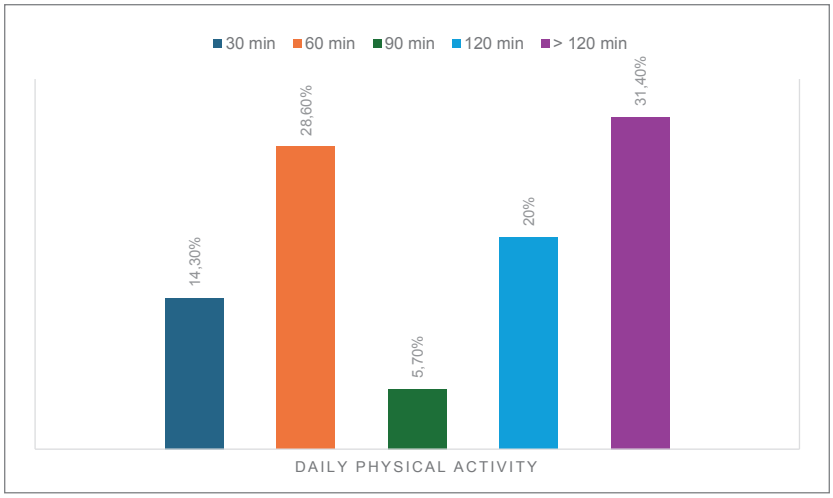

Figure 2. Estimated daily physical activity
Slika 2. Procjena dnevne tjelesne aktivnosti

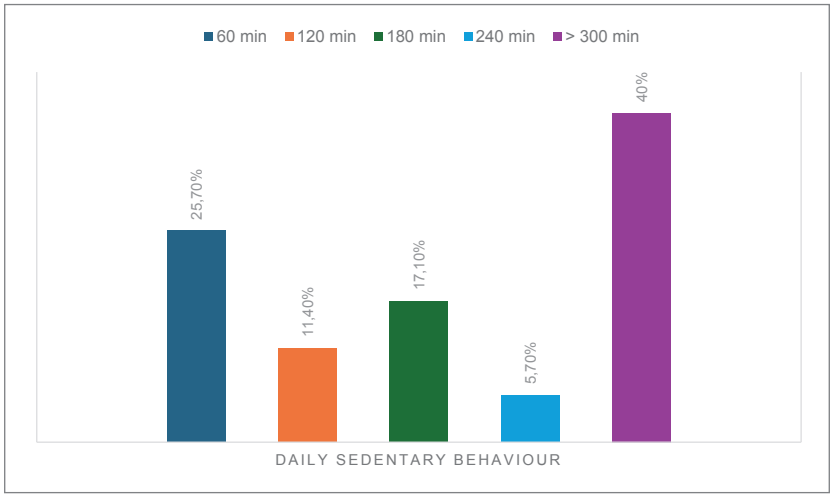

Figure 3. Estimated daily sedentary behavior
Slika 3. Procjena dnevne razine sjedilačkog ponašanja

indicating the presence of kinesiophobia. When comparing men and women, the questionnaire results were 39 (± 6.28) and 43 (± 7.55) points, respectively. Notably, 71% of all participants scored above 37 points (Figure 1).

Daily PA in everyday life was estimated at > 120 minutes by 31.4% of participants, up to 60 minutes by 28.6%, up to 120 minutes by 20%, up to 30 minutes by 14.3%, and up to 90 minutes by 5.7% (Figure 2). SB was estimated at > 300 minutes per day by 40% of participants, up to 60 minutes per day by 25.7%, up to 180 minutes by 17.1%, up to 120 minutes by 11.4%, and up to 240 minutes of daily SB by 5.7% (Figure 3).

Risk factors for CVD

The main modifiable and controllable risk factors for the development of CVD include diabetes, being overweight or obese, tobacco use, high blood pressure, high cholesterol levels, SB, poor diet, and excessive alcohol consumption.

76% of participants report that they are not using tobacco products, 77% have high blood pressure, 26% have diabetes, and 63% belong to the group with excess body weight or obesity. A family history of CVD is confirmed by 57% of participants.

Association of kinesiophobia with risk factors for CVD

Tobacco consumption

The average TSK score for individuals who consume tobacco products is 35.8 (± 6.12), while for those who do not use tobacco products, the score is 41.5 (± 6.75). A significant negative correlation was found between the two variables (p = 0.04) (Table 1).

High blood pressure

The average TSK score for individuals with hypertension is 40.5 (± 6.11), while for those without hypertension, the score is 38.4 (± 9.69), with a p-value for a correlation of 0.47 (Table 1).

Excess body weight / obesity

The average TSK score for individuals with excess body weight is 41 (± 7.73), while for those with normal body weight, the score is 38.5 (± 5.41). The p-value for a correlation of 0.42 indicates no significant correlation between the variables (Table 1).

Diabetes

Analysis of the responses regarding the presence of diabetes in participants showed that the average TSK score for individuals without diabetes is 42.7 (± 5.02), while for those with diabetes, the score is 39.1 (± 7.40). The p-value of 0.14 indicates no significant correlation between the variables (Table 1).

Family history of cardiovascular diseases

Regarding the family history of CVD, the results show that for individuals with a family history of CVD, the average TSK score is 40.3 (± 5.62), while for those without a family history of CVD, the score is 39.7 (± 8.67). No

Table 1. Descriptive indicators and correlation of the level of kinesiophobia with tobacco consumption, hypertension, excess body weight, diabetes, and family medical history

Tablica 1. Deskriptivni pokazatelji i korelacija razine kineziofobije s konzumacijom duhanskih proizvoda, hipertenzijom, prekomjernom tjelesnom masom, dijabetesom i obiteljskom anamnezom

Risk factor		n	Mean (TSK)	SD	Median	p-value
TOBACCO CONSUMPTION	yes	9	35.8	6.12	38	0.04
	no	26	41.5	6.75	41	
HYPERTENSION	yes	27	40.5	6.11	41	0.47
	no	8	38.4	9.69	39.5	
EXCESS BODY WEGHT	yes	22	41	7.73	41	0.42
	no	13	38.5	5.41	39	
DIABETES	yes	9	42.7	5.02	44	0.14
	no	26	39.1	7.40	40	
FAMILY HISTORY OF CVD	yes	20	40.3	5.62	41	0.69
	no	15	39.7	8.67	39	

TSK – Tampa scale for kinesiophobia; SD – standard deviation; CVD – cardiovascular diseases

Table 2. Descriptive indicators and correlation of the level kinesiophobia with daily sedentary behavior and daily physical activity levels

Tablica 2. Deskriptivni pokazatelji i korelacija razine kineziofobije s varijablama dnevne razine sjedilačkog ponašanja i dnevne razine tjelesne aktivnosti

		n	Mean (TSK)	SD	Median	p-value
LEVEL OF DAILY SEDENTARY BEHAVIOR	> 300 min	14	43.4	6.84	42	0.03
	240 min	2	34.5	4.95	34.5	
	180 min	6	42.7	5.68	43.5	
	120 min	4	37	7.07	38	
	60 min	9	35.6	5.39	38	
DAILY PHYSICAL ACTIVITY	> 120 min	11	35.8	5.62	38	0.06
	120 min	7	40.6	2.30	41	
	90 min	2	43.5	2.12	43.5	
	60 min	10	40.1	8.16	41	
	30 min	5	47	7.78	48	

TSK – Tampa scale for kinesiophobia; SD – standard deviation

statistically significant correlation was found between the two variables (p = 0.69) (Table 1).

Sedentary behavior and daily physical activity

The correlation analysis for the variables of daily SB and PA is shown in Table 2. The average TSK score for the group of participants who reported more than 300 minutes of daily SBis 43.4 (± 6.84); for those reporting up to 240 minutes, the score is 34.5 (± 4.95); up to 180 minutes, it is 42.7 (± 5.68); up to 120 minutes, it is 37.0 (± 7.07); and up to 60 minutes, it is 35.6 (± 5.39). The p-value obtained is 0.03, indicating a statistically positive significant correlation between daily SB and level of kinesiophobia.

The mean of the TSK scores for the group that assessed their level of daily PA as > 120 minutes is 35.8 (± 5.62); for those reporting up to 120 minutes, it is 40.6 (± 2.30); up to 90 minutes, it is 43.5 (± 2.12); up to 60 minutes, it is 40.1 (± 8.16); and up to 30 minutes, it is 47 (± 7.78). The p-value for these variables is 0.06, and although no significant correlation was found, there is a visible trend indicating that individuals with higher levels of daily PA tend to have lower levels of kinesiophobia.

DISCUSSION

The aim of the study was to examine the level of kinesiophobia in patients following myocardial surgery and to analyze its association with individual risk factors for CVD. The average TSK score for all participants was 40 points out of a possible 68, with values above 37 indicating the presence of kinesiophobia. A higher score was recorded in women (43 points) compared to men (39 points), indicating that both male and female patients after myocardial surgery have a high level of kinesiophobia. The most prevalent risk factors include elevated blood pressure, excess body weight and obesity, and a family history of CVD. Less prevalent risk factors include tobacco consumption and diabetes. A considerable proportion of participants reported spending extended periods in sedentary activities, despite a notable number also engaging in over two hours of PA daily.

The main finding of this study is the statistically significant negative correlation between the variables of tobacco consumption and the level of kinesiophobia, as well as a significant positive correlation between the variables of daily SB and the level of kinesiophobia, with a clear trend of reduced kinesiophobia among more active participants. The negatively correlated tobacco consumption suggests that its consumption is associated with a decrease in kinesiophobia, which could be interpreted as tobacco users not only lacking fear of the consequences of their consumption but also not having an exaggerated fear of PA. The positively correlated level of SB with the level of kinesiophobia suggests that reducing SB also reduces the level of kinesiophobia. Although no significant correlation was found between the daily level of PA and kinesiophobia after myocardial surgery, there is a clear trend indicating that more active individuals have lower levels of kinesiophobia. Among participants whose daily PA exceeds 120 minutes, a TSK score lower than 37 was observed, whereas this score was significantly higher in those with less than 30 minutes of daily PA. Therefore, it can be concluded that there is a clear trend suggesting that individuals with higher levels of daily PA do not experience kinesiophobia. This claim is supported by the findings of Westerdahl et al., who reported that individuals with lower levels of PA exhibited more pronounced kinesiophobia following myocardial surgery[18]. In addition to the lower fear seen in more active individuals,

physically active individuals also have better physical and mental health, and consequently, better quality of life[10].

The results also indicate that the level of kinesiophobia after myocardial surgery is significantly positively correlated with some of the CVD risk factors, namely the level of daily SB and tobacco consumption. Although there is a significant relationship between tobacco use and the level of kinesiophobia, this correlation is negative.

Despite the problem of kinesiophobia in patients with CVD, research investigating the impact and correlation of various risk factors on the level of kinesiophobia has not yet fully uncovered the complexity of this phenomenon, leaving the central question still unanswered. Numerous studies confirm a high level of kinesiophobia in patients, and it can be concluded that, regardless of the type of surgical procedure, there is a high likelihood of kinesiophobia occurring, particularly in the older population[20], which is consistent with our findings. A recent meta-analysis by Li et al.[12], based on 11 studies with a total of 2,353 participants, found that 1,209 of them exhibited kinesiophobia, while Piepoli et al.[16] reported that the prevalence of kinesiophobia among patients with CVD is 53%. After a myocardial infarction, the average kinesiophobia score is 39[19]. Similar to our study, Bäck et al.[3] report that women exhibit a higher level of kinesiophobia. However, in this study, women were older and significantly fewer in number than men, which means that the higher level of kinesiophobia cannot be attributed solely to CVD.

Although no significant correlations were found between kinesiophobia and body mass index, socio-demographic variables, other conditions, and the duration of CVD, as many as 70% of the patients demonstrated a high level of kinesiophobia[5]. The main cause of kinesiophobia is considered to be the CVD itself, which negatively affects the level of PA.

Although not analyzed in this study, previous research highlights that psychological factors have a significant impact on the development of movement-related fear[15]. It is well known that anxiety, the main emotional component of kinesiophobia, contributes to its development in patients with chronic pain. As such, anxiety is considered a predictor of kinesiophobia[4]. Therefore, it can be assumed that individuals leading a sedentary lifestyle or suffering from high blood pressure may fear they will harm their health. Additionally, depression has a direct negative impact on the pathophysiological changes in various organ systems, affecting values such as heart rate, blood pressure, vascular resistance, vasomotor tone, and blood viscosity. Strong feelings of concern and fear prevail after an acute cardiac event, with nearly 50% of patients experiencing high levels of anxiety and depression[1]. In this context, the high prevalence of kinesiophobia observed in our study (71%) may reflect a broader psychological vulnerability frequently reported in individuals recovering from major CV events.

Despite the high percentage of participants with excessive body weight (63%), no statistically significant correlation was found with kinesiophobia for either the group with normal weight or those with excessive body weight. However, excessive body weight and obesity are associated with an increased likelihood of progressive CVD and all-cause mortality[19]. Yakut et al.[19] suggest that both excessive body weight and disease burden significantly contribute to the avoidance of PA in patients with CVD, and that there is a connection between kinesiophobia and these factors. One of the causes of kinesiophobia is also the dosing and progression of PA and exercise[3]. For this reason, a strategy for reducing kinesiophobia could be patient education about the progression of the type and volume of exercise load, which would make patients more confident in carrying out physical activity.

This study addressed the question of the level of kinesiophobia in patients after myocardial surgery, as well as whether the level of kinesiophobia is proportional to the number of existing risk factors for CVD. The results of the study contributed to the identification of risk factors, more or less associated with kinesiophobia, for the development of CVD. From a practical standpoint, timely identification of the causes of kinesiophobia and its connection to CVD risk factors could improve the targeted management process of kinesitherapy in the rehabilitation of patients after myocardial surgery, aiming to eliminate and prevent potential causes of fear of exercise.

CONCLUSION

Kinesiophobia is a common barrier to adherence to secondary prevention in CVD rehabilitation, significantly hindering patient recovery. It impacts psychological, social, and physical well-being, and the role of PA is essential in reducing the risk of recurrence and mortality. This study confirmed the high presence of kinesiophobia following myocardial surgery, with a statistically significant negative association found between tobacco consumption and positive association with the level of daily SB. The high level of kinesiophobia in these patients highlights the need to raise awareness of the fear of movement. Further research is necessary to explore clinical variables influencing kinesiophobia in CV patients through longitudinal studies, which would help identify potential causal relationships.

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