IMPACT OF ANXIETY AND DEPRESSION TO KINESIOPHOBIA (FEAR OF MOVEMENT) LEVEL AMONG PATIENTS WITH CARDIOVASCULAR DISEASES. A COMPARISON STUDY.

Wpływ lęku i depresji na poziom kinezjofobii (lęku przed ruchem) wśród pacjentów z chorobami sercowo-naczyniowego. Badanie porównawcze.

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Abstract

Introduction: Anxiety and depression are often present among cardiac patients. According to a numerous previous studies kinesiophobia is strongly associated with physical inactivity. However still is little known about impact of negative emotional states as a predictors of high level of kinesiophobia.

Aim of the study: Evaluate a kinesiophobia level in patients after myocardial infarction (MI) and after cardiac surgery (CS) as well as investigate the relationship between anxiety, depression and kinesiophobia level in these groups of patient and comparison obtained results with healthy control group.

Material and methods: A total of 144 cardiac patients take part in this study (84 patients with diagnosis of Myocardial Infarction [MI] and 60 patients after cardiac surgery [CS]). The control group [CG] was made up of 116 healthy individuals. In the present study Kinesiophobia Causes Scale (KCS) and Hospital Anxiety and Depression Scale (HADS) were used.

Results: The mean values in KCS scale for each of study groups were as follows: MI=49,3±20,3; CS=50,7±19,6; CG=36,0±18,2; p=0,0000. The highest value in KCS scale were noted in case of factor: "susceptibility to social influence", respectively: MI=61,5±22,5; CS=60,8±24,1; CG=45,8±19,8; p=0,0000. Following baseline data for HADS scale were reported in anxiety (MI=9,76±4,94, CS=8,82±5,13, CG=3,07±1,12) and depression (MI=7,74±3,85, CS=6,23±3,31; CG=4,22±1,95). In both subscale differences between group were significant at p level <0,0001. Significant correlation between anxiety, depression and kinesiophobia level were observed.

Conclusions: Anxiety level and depression level is strongly associated with fear of movement.

Keywords: kinesiophobia, fear of movement, anxiety, depression.

INTRODUCTION

Anxiety is a negative emotion that occurs in response to perceived threats that can come from internal or external sources, can be real or imagined and is characterized by a perceived inability to predict, control, or gain the preferred results when confronted with a threat [1]. In turn, depression is a state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings and sense of well-being [2].

Anxiety is more common than depression among persons with chronic cardiovascular

disease. Epidemiological data show that the prevalence of anxiety among patients who have experienced an acute cardiac event oscillates around 70-80% and this negative feeling persists over the long term in about 20% to 25% of patients [3]. Elevated anxiety scores have been also reported for 20 to 55% patients undergoing CABG surgery [4]. While 31–45% of patients with coronary artery disease (CAD), including those with stable CAD, unstable angina, or myocardial infarction (MI), suffer from clinically significant depressive symptoms [5]. In studies that examine the course of post-MI depression, depressive symptoms remain at constant levels of severity over the 12 months after an MI [6]. Similar results have been observed in patients with implantable cardioverter-defibrillator, where 80% of patients who are depressed at the time of ICD placement continue to suffer from depressive symptoms 2 years later [7].

Both anxiety and depression may have medical and/or psychological consequences. Persistent or severe anxiety may lead to difficulty adhering to prescribed treatments and making recommended lifestyle changes, adoption of or failure to change risky behaviors, increased risk for acute cardiac events, and increased risk for in-hospital complications after admission for acute coronary syndrom [8-10]. Anxious patients with cardiovascular disease slower return to work or not at all compared with non-anxious patients [11]. The impact of depression extends beyond quality of life and functioning outcome. A meta-analyses consistently show that depression increases the risk of overall mortality and the development of cardiovascular-related outcomes, such as heart disease, diabetes, hypertension, stroke and obesity [12,13]. Furthermore, depressed persons are more physically inactive than non-depressed persons and are more likely to smoke, drink excessive amounts of alcohol, eat an unhealthy diet [14].

In the field of chronic pain, this term of kinesiophobia has often been described in relation to the cognitive-behavioural fear-avoidance model. For the individual person, catastrophising, anxiety sensitivity and negative affectivity are examples of negative precursors to developing fear-avoidance behaviour which are adaptive as a natural response to injury. in the acute stages after a cardiac event, similar avoidance behaviours may be regarded as a normal psychological reaction [15,16]. Despite the fear and anxiety are strongly related, according to Asmundson et al., kinesiophobia is rather a construct than an actual disease or a pathological state [17].

The major primary and purpose of the secondary prevention is to modify or eliminate cardiac diseases risk factors, including insufficient physical activity level [18]. The presence of kinesiophobia and its links with avoiding of exercise and low physical activity among patients suffering from cardiovascular disease [19,20] and undergoing cardiac rehabilitation [21] was found in previous studies. However, the occurrence of kinesiophobia in groups of patients with myocardial infarction and after cardiac surgery has so far not been thoroughly investigated. In addition, impact of anxiety and depression to kinesiophobia level has not previously been studied.

The aim of the present study was to: (i) add a new knowledge in the field of kinesiophobia; (ii) assess kinesiophobia level in patients after myocardial infarction (MI) and after cardiac surgery (CS); (iii) investigate the relationship between anxiety, depression and kinesiophobia level in these groups of patient and comparison obtained results with healthy control group.

MATERIAL AND METHODS

Participants

A total of 144 cardiac patients were recruited between 2013 and 2014 at Upper-Silesian Cardiology Center in Katowice, Poland. Subjects were divided into two groups: The MI group, comprising 84 patients (40 women; 44 men) with a confirmed diagnosis of Myocardial Infarction, aged 45 to 76 years (mean=59,2; SD=10,3), BMI: mean=26,7; SD=3,9; The CS group, consisting of 60 subjects (26 women; 34 men) after cardiac surgery who had undergone coronary artery bypass surgery, in age of 42 to 60 years (mean=53,1; SD=9,8), BMI: mean=27,3; SD=4,2. The control group (HCS group) was made up of 116 healthy individuals (56 women; 60 men), aged 41 to 66 years (mean=52,4; SD=11,3), BMI: mean=25,9; SD=2,8. There were no significant differences in age, BMI value and demographic characteristics across all samples.

Measures

Kinesiophobia Causes Scale (KCS) is used to diagnose and identify the causes of motor passivity. The questionnaire consist of 20 closed questions, assessed in a range from 0 to 100 – a higher score indicating a higher fear of movement. Kinesiophobia factors are grouped into two domains. The biological domain (BD) is an average of values of: morphological parameters, an individual need for stimulation, energetic resources, the power of biological drives. The psychological domain (PD) is an average of values of: self-acceptance, self-assessment of motor predispositions, the state of mind and susceptibility to social influence. The total score of kinesiophobia (KCS) is an average value of BD and PD [22].

Hospital Anxiety and Depression Scale (HADS) was originally developed by Zigmond and Snaith in 1983 and is commonly used to determine the levels of anxiety and depression in clinical and non-clinical population. The HADS is a fourteen item scale. Seven of the items relate to anxiety and seven relate to depression. Each item on the questionnaire is scored from 0-3 and this means that a person can score between 0 and 21 for either anxiety or depression. Higher scores indicating more severe distress. Zigmond and Snaith suggested categorising subjects according to subscale score into noncases (0 to 7), possible cases (8 to 10), and probable cases (>10) of clinical anxiety and depression [23]. Validity studies gave a specificity of 0,78 and a sensitivity of 0,90 for anxiety (HADS-A) and specificity of 0,79 and a sensitivity of 0,83 for depression (HADS-D) [24].

Statistical analysis included perform of descriptive statistics: means and standard deviations. The following tests were used for the statistical analysis of the data: the Pearson Chi-square test was used for comparison of percentages, and T-Student test and one-way analysis of variance (ANOVA) for comparison of: means of variables, demographic and characteristics of clinical and non-clinical patients. Correlations were tested by the Pearson r coefficients. The adopted level of statistical significance was $p<0,05$. All analyses was carried out using STATISTICA package in version 10.0.

RESULTS

Means and standard deviations for kinesiophobia, and comparisons between the 2 cardiac groups and healthy individual group are presented in Table 1.

Table 1. KCS: kinesiophobia – descriptive statistics for all groups

Domains and causes of kinesiophobia	Mean ± SD	Mean ± SD	Mean ± SD	p-value
	1. MI group	2. CS group	3. HC group	
morphologic parameters	32,4 ± 23,1	35,2 ± 19,2	26,2 ± 17,3	**0,0161**
individual need for stimulation	47,6 ± 19,0	49,5 ± 15,3	35,6 ± 16,9	**0,0000**
energetic resources	48,2 ± 23,3	44,7 ± 18,6	30,6 ± 18,2	**0,0000**
power of biological drives	40,1 ± 18,8	45,3 ± 21,9	34,7 ± 20,2	**0,0021**
Biological Domain [BD]	42,0 ± 18,9	43,7 ± 17,7	31,8 ± 16,4	**0,0002**
self-acceptance	53,6 ± 20,4	51,6 ± 18,7	38,5 ± 19,3	**0,0000**
self-assessment of motor predispositions	58,7 ± 19,6	61,4 ± 21,2	36,9 ± 16,4	**0,0000**
state of mind	52,8 ± 23,9	56,8 ± 22,0	40,1 ± 17,6	**0,0000**
susceptibility to social influence	61,5 ± 22,5	60,8 ± 24,1	45,8 ± 19,8	**0,0000**
Psychological Domain [PD]	56,6 ± 17,5	57,6 ± 20,8	40,3 ± 18,8	**0,0000**
Total score of Kinesiophobia [KCS]	49,3 ± 20,3	50,7 ± 19,6	36,0 ± 18,2	**0,0000**

As a next stage of analysis, post-hoc tests for domains and causes of kinesiophobia were performed. Following results were obtained: morphologic parameters (1-2: p=0,6425; **1-3: p=0,0492; 2-3: p=0,0214**), individual need for stimulation (1-2: p=0,8457; **1-3: p=0,0000; 2-3: p=0,0000**), energetic resources (1-2: p=0,5893; **1-3: p=0,0000; 2-3: p=0,0000**), power of biological drives (1-2: p=0,5128; 1-3: p=0,3715; **2-3: p=0,0000**), self-acceptance (1-2: p=0,8637; **1-3: p=0,0000; 2-3: p=0,0000**), self-assessment of motor predispositions (1-2: p=0,7664; **1-3: p=0,0000; 2-3: p=0,0000**), state of mind (1-2: p=0,6156; **1-3: p=0,0000; 2-3: p=0,0000**), susceptibility to social influence (1-2: p=0,9084; **1-3: p=0,0000; 2-3: p=0,0000**), BD (1-2:

p=0,9311; **1-3: p=0,0024; 2-3: p=0,0000**), PD (1-2: p=;0,9274; **1-3: p=0,0000; 2-3: p=0,0000**), KCS (1-2: p=0,8997; **1-3: p=0,0000; 2-3: p=0,0000**).

Significant correlations between age and kinesiophobia domains and causes were no observed, as well as, no significant relationships of BMI value with domains and causes of kinesiophobia were found.

Descriptive statistics (means ± standard deviations) for Hospital Anxiety and Depression Scale, in anxiety subscale were as follow: (1) MI Group = 9,76 ± 4,94; (2) CS Group = 8,82 ± 5,13; (3) CG Group = 3,07 ± 1,12. Differences between groups were statistically significant at p=0,0000. Post-hoc tests revealed following results: 1-2: p=0,1983; **1-3: p=0,0000; 2-3: p=0,0000**. In case of depression subscale, baseline values were as follow: (1) MI Group = 7,74 ± 3,85; (2) CS Group = 6,23 ± 3,31; (3) CG Group = 4,22 ± 1,95, and were also statistically significant between groups at p=0,0000. In post-hoc analysis, comparison of groups showed following results: **1-2: p=0,0095; 1-3: p=0,0000; 2-3: p=0,0000**.

Comparison of groups, from point of view of anxiety and depression severity, is shown in Figure 1 and Figure 2, whereas level of differences of domains and causes of kinesiophobia – due to the severity of anxiety (HADS-A) and depression (HADS-D) are demonstrated in Table 2.
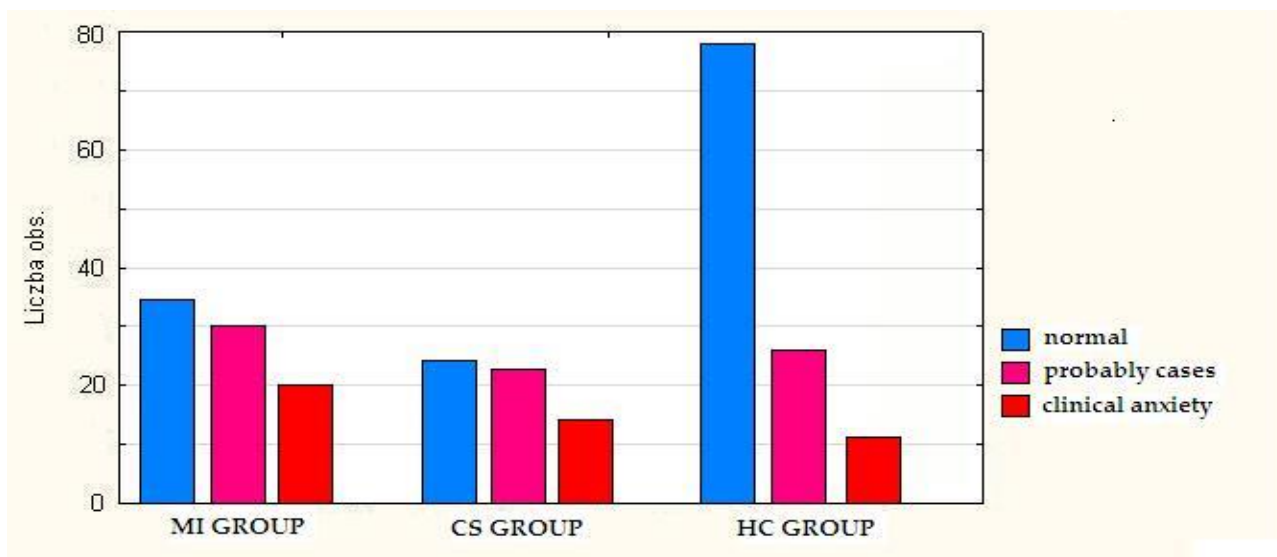

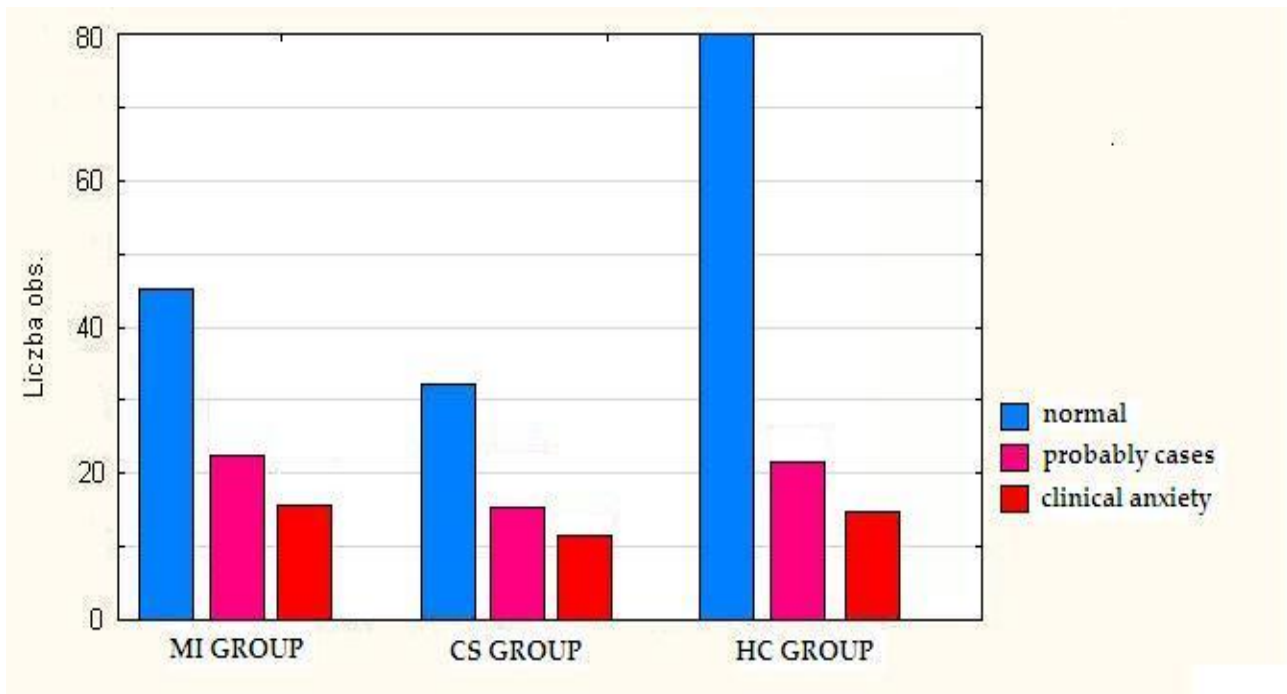**Figure 1. HADS: anxiety due to severity**

Figure 2. HADS: depression due to severity

Table 2. Level of differences of domains and causes of kinesiophobia – due to the severity of anxiety (HADS-A) and depression (HADS-D)

DOMAINS AND CAUSES OF KINESIOPHOBIA	MI GROUP		CS GROUP		HC GROUP	
	HADS-A	HADS-D	HADS-A	HADS-D	HADS-A	HADS-D
morphologic parameters	0,1657	0,2354	0,2212	0,3162	0,5612	0,3634
individual need for stimulation	0,0943	**0,0480***	0,0761	0,0561	0,4776	**0,0297***
energetic resources	0,1429	0,1021	0,1033	0,0742	0,3981	0,1574
power of biological drives	0,1236	0,1376	0,1518	0,0946	0,5943	0,3298
Biological Domain [BD]	**0,0446***	**0,0491***	**0,0466***	0,0653	0,2665	0,1025
self-acceptance	**0,0364***	**0,0479***	**0,0414***	**0,0434***	0,3152	0,2961
self-assessment of motor predispositions	**0,0461***	**0,0273***	**0,0493***	**0,0429***	0,3624	**0,0459***
state of mind	**0,0475***	**0,0351***	0,0538	0,0846	0,6569	0,5237
susceptibility to social influence	**0,0009***	**0,0146***	**0,0014***	**0,0354***	0,5439	0,1126
Psychological Domain [PD]	**0,0011***	**0,0074***	**0,0015***	**0,0222***	0,5638	0,0735
Total score of Kinesiophobia [KCS]	**0,0016***	**0,0035***	**0,0026***	**0,0137***	0,4987	**0,0396***

DISCUSSION

Over 60 years ago, Morris et al., published the results of a study showing that bus conductors in London, who spent their working hours walking the length of the buses as well as climbing up and down the stairs of the English double-decker buses to collect fares, experienced half the coronary heart disease (CHD) mortality rates of their driver counterparts, who spent their

day sitting behind the wheel [25,26]. Based on this, investigators hypothesized that the physical activity in work protected the conductors from developing CHD. Now, regular exercise has a favorable effect on many of the established risk factors for cardiovascular disease. Physical activity promotes weight reduction, can help reduce blood pressure, reduce the low-density lipoprotein level, as well as total cholesterol, and can raise the high-density lipoprotein level [27].

Today, with technological advances and conveniences, people's lives have in many ways become increasingly easier, as well as less active. In addition, people have many personal reasons or explanations for being inactive. Sallis et al.,indicate the following common explanations (barriers) why people are resistance to exercise. These are: insufficient time to exercise, inconvenience of exercise, lack of self-motivation, non-enjoyment of exercise, boredom with exercise, lack of confidence in their ability to be physically active (low self-efficacy), lack of self-management skills, such as the ability to set personal goals, monitor progress, or reward progress toward such goals, lack of encouragement, support, or companionship from family and friends, non-availability of parks, sidewalks, bicycle trails, or safe and pleasant walking paths close to home or the workplace [28,29]. Kori et al., in original definition of kinesiophobia, suggest that fear of movement is associated with vulnerability to painful injury or re-injury [30]. From psychological dimension, hypokinetic attitudes (characterising by avoiding or minimizing physical effort) are consequences of insufficient number of stimuli to physical activity by enviroment.

The results presented here refer to patients with cardiovascular disease. Selection of the study group was targeted because of the presence of anxiety-depression states and a high level of physical inactivity among cardiac patients based on the literature. Mean values of kinesiophobia presented in Table 1 indicate moderate intensity of fear of movement, with greater intensity in psychological domain - compared to biological domain, in all groups. This findings leads to the conclusion that cardiac incident is not a major cause of fear of movement, but rather a certain individual predisposition. Lack of significant correlation of kinesiophobia domains with age and BMI value in both population seems to confirm this thesis.This also applies to the barriers of a physical activity in healthy population (people without heart-related diseases) which accounted for control group. Take into consideration the highest mean values in factor: "susceptibility to social influence"in cardiac groups as well as in healthy subjects - this enviromenal factor seems to be the most important factor of physical inactivity. Furthermore, the size of standard deviations clearly emphasizes the high individual variability in all factors. Analysis of differences between cardiac patients and healthy subjects indicates that intensification of kinesiophobia is stronger in clinical samples. This differences were no reported between MI patients and CS patients what suggest that kind of cardiac intervention have no impact to kinesiophobia level.

Mean values of anxiety in cardiac patients indicate to its moderate intensity with an

indication to statistically significant differences when the results are compared with healthy subjects. In this study, 62,5% (n=50) MI patienst and 60% (n=36) of CS patients suffer from anxiety, however obtained results are similar to epidemiological data presented in background. In case of control group the percentage of population with results above the normal level was 31% (n=36). Higher percentages of the intensity of anxiety between clinical and non-clinical population are understandable.

The results of the present thesis show a significant association between negative emotional states and fear of movement level. Patients with a high level of anxiety were found to have a significantly higher presence of kinesiophobia level ($p<0,01$), compared with patients with a low level of anxiety. Furthermore, patients with a high level of depression also experienced more high fear of movement ($p<0,02$).

Previous studies strongly emphasize the role of kinesiophobia in modification of physical activity level. The study presented in this paper focused on searching a potential factors that contribute to modification of kinesiophobia level. At the base of obtained results we certainly may draw a conclusion that anxiety level and depression level is strongly associated with fear of movement. This findings are important not only for psychology, but also to holistic approach in various medical areas. Identification and early diagnosis of the barriers of physical activity seems to be important not only in the primary prevention of cardiovascular disease, but also in secondary prevention and lead to the improvement of the efficiency of the process of rehabilitation and prevent future hospitalizations. Therefore, its necessery to implement psychoprophylactic programs both at the stage of early hospital rehabilitation as well as ambulatory rehabilitation or/and all stages of hospitalization.

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