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KINESIOPHOBIA AMONG PATIENTS WITH MUSCULOSKELETAL PAIN IN PRIMARY HEALTHCARE

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Objectives: **To describe the occurrence of kinesiophobia and to investigate the association between kinesiphobia and pain variables, physical exercise measures and psychological characteristics in patients with musculoskeletal pain.**

Design: **A prospective descriptive study involving 2 selected physiotherapy departments within a primary healthcare setting in the south-west of Sweden.**

Patients: **Included were 140 of 369 (38%) consecutive patients (aged between 18 and 65 years) with musculoskeletal pain.**

Methods: **Questionnaires including background data, pain variables, physical exercise measures and psychological characteristics were sent to the patients prior to their appointment with the physiotherapist. A simple and a multiple logistic regression model were performed to identify associations among the variables where kinesiophobia was defined as the dependent variable.**

Results: **A high degree of kinesiophobia and psychological distress were observed in approximately 50% of the responders. According to the simple logistic regression analysis the factors that seemed to be associated with kinesiophobia were interference, disability, pain severity, pain intensity, life control, affective distress, depressed mood and solicitous response. The multiple logistic regression analysis showed no significant associations.**

Conclusion: **Kinesiophobia is a commonly seen factor among patients with musculoskeletal pain, which ought to be taken into consideration when designing and performing rehabilitation programmes.**

Key words: primary healthcare, physical therapy, psychological stress.

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INTRODUCTION

Pain-related fear has been shown to be a very salient predictor of pain disability in a chronic pain population and is even more predictive than biomedical status and pain intensity (1, 2). It has been stated that pain-related fear is more disabling than pain itself (3). Pain-related fear predicts future disability and health status in the general population (4).

There are different terms for describing pain-related fear. In 1983, Lethem et al. (5) introduced the "fear-avoidance" model. The model is an attempt to explain how and why some individuals develop a stronger psychological reaction to their pain problems than others. Kori, Miller and Todd subsequently applied the ideas about fear-avoidance to chronic pain and physical movement, with the introduction of the term "kinesiophobia" in 1990 (6). 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". Vlaeyen et al. (2) elaborated on the kinesiophobia phenomenon, defining it as a fear of movement/(re)injury, a specific fear believed to cause injury or re-injury. Several questionnaires have been developed to quantify pain-related fears including the Fear Avoidance Beliefs Questionnaire (FABQ) (1); the Pain Anxiety Symptoms Scale (PASS) (7) and the Tampa Scale for Kinesiophobia (TSK) (8). The TSK was designed for the assessment of kinesiophobia. The Swedish version (TSK-SV) has been found reliable and valid for use on a Swedish pain population (9). The TSK-SV is a relatively short questionnaire that can be used easily in a primary healthcare setting.

From a psychological perspective it is also important to be able to differentiate between functional disabilities due to a sensory experience of pain and behaviours that are driven by fear-avoidance (5, 10). The association between kinesiophobia, disability and physical performance has been investigated previously (3, 11).

The physiotherapist is usually the first person who people suffering from musculoskeletal pain encounter when they seek care. An increase in the use of physiotherapy has been observed in Denmark (12), which is consistent with the increase in the prevalence of musculoskeletal problems in the general population. Epidemiological studies in Denmark showed that 6% of the Danish population were referred to a physiotherapist each year (13). In Sweden, a program designed by a physiotherapist is the most common method for the treatment of musculoskeletal disorders. Since kinesiophobia is said to have a negative influence on the outcome of rehabilitation it would be of interest to investigate the occurrence in a Swedish pain population.

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Objectives

The objectives of this study were to describe the occurrence of kinesiophobia and to investigate the association between kinesiophobia and pain variables, physical exercise measures and psychological characteristics in patients with musculoskeletal pain.

METHODS

Subjects

The current study is a prospective descriptive study involving 2 selected physiotherapy departments within a primary healthcare setting in the south-west of Sweden. The patients had sought care from a physiotherapist due to pain. Inclusion criteria were an age of 18–65 years and musculoskeletal pain. Exclusion criteria were neurological disease and inability to understand written Swedish. The study was approved by the Ethics Committee of Göteborg University.

Design and measures

The questionnaires were posted to the patients prior to their first visit to the physiotherapist. The patients returned the completed questionnaires to an independent researcher. The questionnaires included background data, pain variables, physical exercise measures and psychological characteristics. All measures were self-reported.

Background data

The background data comprised age, gender, whether they had a diagnosis and native language.

Pain variables

The patient reported the duration of pain. Pain duration of less than 6 months was considered acute and more than 6 months was deemed chronic. The pain intensity, at the time of completing the questionnaire, was rated on a 100-mm visual analogue scale (VAS), ranging from "no pain" to "worst imaginable pain". Pain localization was marked on a pain drawing and the number of localizations counted according to the classification by the International Association for the Study of Pain (IASP)(14).

Physical exercise measures

Physical exercise was measured by open questions constructed by the authors about level, type and frequency of physical activity. The questions about physical activity concerned both the current status and the status prior to the onset of pain.

The Disability Rating Index (DRI) is a questionnaire comprising 12 items for the assessment of physical disability (15). The DRI is a self-administered questionnaire, where patients rate their perceived ability to perform daily physical activities on a 100-mm VAS. An index is obtained by measuring the distance in mm. The mean value of these measurements provides the DRI index (15). The definition of a high degree of disability varies dependent upon the diagnosis. The DRI has been found to be reliable and valid for use on Swedish patients with long-term pain.

Psychological characteristics

Kinesiophobia was measured using the Swedish version of the TSK (9). The TSK questionnaire comprises 17 items assessing the subjective rating of kinesiophobia. Each item has a 4-point Likert scale with scoring alternatives ranging from "strongly disagree" to "strongly agree". A total sum is calculated after inversion of the individual scores of items 4, 8, 12 and 16. The total score varies between 17 and 68. A high TSK value indicates a high degree of kinesiophobia. Vlaeyen et al. (16) defined a cut-off >37 as a high degree of kinesiophobia. The TSK-SV has been found to be reliable and valid for use on a Swedish pain population (9) and was therefore used in this study.

Depressed mood was measured by means of the Beck Depression Inventory (BDI) (17). The BDI comprises 21 questions where each item ranges from 0 to 3 points, summarized to a theoretical maximum of 63 points. In a clinical setting 9 is used as a cut-off score for depressed mood in a non-psychiatric population. The BDI has been widely used in clinical settings but no work has yet been published with reference to the reliability and validity of the Swedish version.

The complexity of pain was measured using the Swedish version of the Minnesota Multidimensional Pain Inventory (MPI-S) (18). The MPI-S is a questionnaire containing 47 questions ranging from 0 to 6 on a numerical scale, divided into different subscales, which are summarized into 1 psychosocial (part 1) and 2 behavioural (parts 2 and 3) sections. Section 1 (22 items) consists of 5 scales: Pain Severity, Interference, Perceived Life Control, Affective Distress and Social support. Section 2 (12 items) consists of 3 subscales: Punishing Responses, Solicitous Responses and Distracting Responses. Section 3 (13 items) is summarized as general activity. Bergström et al. (18) found the psychometric properties of MPI-S to be reliable and valid. They also presented cut-off scores for the 5 subscales from a gender perspective (19), as shown in Table I.

Statistics

All data were computerized and analysed by the Statistical Package for the Social Sciences (SPSS 11.0, Chicago, IL, USA). Data on the ordinal level (such as ratings from the questionnaires) were analysed taking the rank-invariant properties into account. The median value and the percentiles were used as descriptive measures. Differences in age and gender between responders and non-responders, as well as differences in pain variables, physical exercise measures and psychological characteristics between acute and chronic pain, were tested with a Student's t-test for variables on the interval level with Mann-Whitney U test for variables on the ordinal level, and with χ^2-test for variables on the nominal level. A simple logistic regression analysis was performed. The variables that were found significant in the simple analysis were subsequently analysed in a multiple logistic regression model. Multiple logistic regression analyses were performed with dichotomized variables in order to obtain a multivariate perspective. Kinesiophobia was defined as a dependent variable. Pain variables, physical exercise measures and psychological factors were independent variables. All variables were dichotomized according to the cut-off score mentioned in the method section. When a cut-off score was not previously reported the median value from data obtained in this study was used.

All reported confidence intervals (CI) were 95%. The significance level was set to 0.05.

RESULTS

For the present study 369 patients were recruited consecutively, of whom 140 (38%) returned complete questionnaires. The

Table I. *The cut-off scores for the Multidimensional Pain Inventory*

		Cut-off score	
Variable	Measured by	Men Mean	Women Mean
Pain severity	MPI-ps	3.47	3.89
Interference	MPI-i	3.68	3.94
Life control	MPI-lc	3.36	2.97
Affective distress	MPI-ad	2.67	2.92
Social support	MPI-s	4.54	4.25
Punishing responses	MPI-pr	1.23	1.07
Solocitous responses	MPI-sr	3.18	3.00
Distracting responses	MPI-dr	3.38	3.00
General activity	MPI-ga	2.89	3.01

MPI-S as reported by Bergström et al. (19).
MPI = Multidimensional Pain Inventory; ps = pain severity; i = interference; lc = life control; ad = affective distress; s = social support; pr = punishing responses; sr = solicitous responses; dr = distracting responses; ga = general activity.

Table II. *Description of the patients included in the study*

Sample	Participants (*n*)	Mean age (years) Median (min–max)	Pain duration (months) Median (min–max)	Primary pain localization (IASP (14)) Head	Cervical	Upper limbs	Thoracic	Lower back	Lower limbs	Pelvic	Multiple*
Total	140	49.0 (20–65)	12.0 (1–456)	2	23	23	2	31	17	1	41
Women	97	47.0 (20–64)	12.0 (1–456)	2	18	15	2	18	10	1	31
Men	43	51.5 (20–65)	15.0 (1–216)		5	8	0	13	7		10

*The localiz'ation multiple is not defined by the IASP (14), but added by the authors.

participants of the studies are described in Table II. The complete questionnaires contained 146 questions. To be able to participate in the study a minimum of 80% of the questions must have been completed. The descriptive results for all the variables and the internal missing values are presented in Table III. There were no differences between those who gave their consent and those that chose not to participate regarding gender or age. In the present study, 45 patients had acute pain and 79 had chronic pain (16 failed to answer this question). No statistically significant difference was found in any of the variables between the acute and chronic pain groups. Before the onset of pain 35 patients reported that they took part in physical exercise compared with 48 after the onset of pain. Before the onset of pain 21 patients exercised once a week compared with 14 after the onset, 28 patients exercised twice a week compared with 26 after the onset, 23 patients exercised 3 times a week compared with 18 after the onset, and 23 patients exercised more than 3 times a week compared with 31 patients after the onset. All in all the patients reported 42 different kinds of physical exercise activities.

Occurrence of kinesiophobia

One of the objectives was to examine the occurrence of kinesiophobia in a pain population seeking care at 2 selected physiotherapy departments. In the present study 54% of the patients presented a cut-off >37. The percentile values of the TSK-SV are presented in Table IV.

Association between pain variables, physical exercise measures, psychological factors and kinesiophobia.

Factors that according to the simple logistic regression analysis appeared to be associated with kinesiophobia were: interference, disability, pain severity, pain intensity, life control, affective distress, depressed mood and solicitous response. Factors that according to the simple logistic regression analysis did not appeared to be associated with kinesiophobia were;

Table III. *Descriptive results for all the variables (n=140) included*

Variable	Measured by	Internal Missing (*n*)	Current value Median (min–max) Men	Women
Pain variables				
Pain intensity	VAS	5	60.5 (7–97)	59.0 (0–100)
Pain localizations	Number	0	2 (1–6)	3 (1–7)
Physical exercise measures				
Physical exercise	Dichotomized question			
Past	(Yes/No)	5	1 (0–1)	1 (0–1)
Current		8	1 (0–1)	1 (0–1)
Disability	DRI	8	39.3 (2–86)	42.8 (0–81)
Psychological characteristics				
Kinesiophobia	TSK-SV	21	40.0 (22–59)	37.0 (20–64)
Depression	BDI	42	6.0 (0–17)	8.5 (0–45)
Pain severity	MPI-ps	3	3.7 (0.7–6.0)	4.0 (0.7–6.0)
Interference	MPI-i	1	3.6 (0.1–6.0)	3.3 (0.0–6.0)
Life control	MPI-lc	4	3.3 (0.5–5.8)	3.5 (0.3–5.5)
Affective distress	MPI-ad	4	3.0 (0.0–5.3)	3.0 (0.0–6.0)
Social support	MPI-s	5	4.5 (0.0–6.0)	4.5 (0.0–6.0)
Punishing responses	MPI-pr	18	1.0 (0.0–4.7)	0.7 (0.0–6.0)
Solicitous responses	MPI-sr	20	3.0 (0.5–5.5)	2.7 (0.0–6.0)
Distracting responses	MPI-dr	19	3.3 (0.0–6.0)	2.7 (0.0–6.0)
General activity	MPI-ga	16	2.8 (0.4–4.7)	3.1 (0.0–5.8)

VAS = Visual Analogue Scale; DRI = Disability Rating Index; TSK-SV = Tampa Scale for Kinesiophobia, Swedish Version; BDI = Beck Depression Inventory; MPI = Multidimensional Pain Inventory; ps = pain severity; i = interference; lc = life control; ad = affective distress; s = social support; pr = punishing responses; sr = solicitous responses; dr = distracting responses; ga = general activity.

Table IV. *Percentile values of The Tampa Scale for Kinesiophobia, Swedish Version (TSK-SV). The sum scores of the TSK-SV vary between 17 and 68 points*

Percentiles	All patients $n=140$	Women $n=97$	Men $n=43$	Acute $n=45$*	Chronic $n=79$*
10	26	26	28	26	29
20	30	30	30	29	31
30	33	33	32	32	33
40	35	35	35	34	35
50	38	37	40	37	38
60	40	40	45	39	40
70	44	42	49	44	44
80	48	45	51	49	47
90	51	49	54	51	51

*Sixteen patients failed to answer the question about pain duration.

punishing responses, number of pain localizations, whether or not the patient was engaged in physical activity (either currently or in the past), general activity, whether or not the patient had a diagnosis, social support, gender, distracting responses and duration of pain. The simple logistic regression analyses are presented in Table V. The variables that were found to be statistically significant in the analysis of the raw odds ratios ($p < 0.05$) were analysed by a multiple logistic regression analysis. It is worth noting that the BDI was not included, due to the high incidence of internal missing values in that questionnaire. The multiple logistic regression model is presented in Table VI.

Secondary findings

Secondary findings were the high occurrence of psychological distress. About 47% of the patients suffered from depressed mood in accordance with Beck's definition measured by BDI. On the MPI-S 67% of the men exhibited a high degree of pain severity, 53% a high degree of affective distress and 51% a high degree of interference. Of the women, 68% exhibited a high degree of life control, 57% a high degree of affective distress, 56% a high degree of pain severity, 56% a high degree of general activity and 52% a high degree of social support. A high degree according to the MPI variables was more precisely defined as a value greater than the cut-off scores presented in Table I.

DISCUSSION

The most interesting finding in this study was that 54% of the patients who sought care at a physiotherapy department presented a high degree of kinesiophobia. Since kinesiophobia is said to have a negative influence on the outcome of rehabilitation (3, 4), this phenomenon ought to be taken into account in the clinical situation. If half of the patients who seek care for long lasting pain suffer from kinesiophobia they will most likely fail to benefit from ordinary rehabilitation based solely on a biomedical approach. Therefore it seems relevant to document the degree of kinesiophobia in patients who need rehabilitation. An important issue however, is how kinesiophobia is defined. There is a lack of a consistent operational definition of the construct. Depending upon the operational definition used, the occurrence of kinesiophobia will vary. A variety of different means and medians have been presented as reference values, of which the minimum was 35 and the maximum 42.3 (20). For the purpose of this study we used a cut-off score >37, i.e. the original operational definition presented by Vlaeyen et al. (16). The use of this value was supported by a study performed on a Swedish pain population (9). Boersma et al. (21) used a cut-off of >35. If we had used

Table V. *Summary of the simple regression analysis. The internal missing is here referring to the missing values between Tampa Scale for Kinesiophobia, Swedish Version and each variable. In the column "Valid" the numbers of patients in each analysis is presented (n=140). The variables are arranged by increasing p-values. Kinesiophobia is the dependent variable*

Variable	Measured by	Internal missing	Valid	Odds ratio	Confidence interval	p-value
Interference	MPI-i	20	120	4.1	1.92–8.95	0.000
Disability	DRI	28	112	3.5	1.61–7.63	0.002
Pain severity	MPI-ps	22	118	3.2	1.48–6.87	0.003
Pain intensity	VAS	26	114	2.7	1.27–5.79	0.010
Life control	MPI-lc	21	119	0.4	0.19–0.87	0.020
Affective distress	MPI-ad	20	120	2.3	1.08–4.76	0.030
Depression	BDI	55	85	2.5	1.05–6.09	0.039
Solicitous response	MPI-sr	29	111	2.2	1.03–4.79	0.042
Punishing response	MPI-pr	29	111	2.0	0.91–4.25	0.089
Pain localization		20	120	1.8	0.77–4.15	0.173
Physical exercise/No exercise (past)		25	115	1.7	0.73–4.00	0.219
General activity	MPI-ga	27	113	0.7	0.32–1.43	0.310
Diagnosis/No diagnosis		23	117	1.4	0.69–3.02	0.324
Social support	MPI-s	22	118	1.3	0.64–2.71	0.462
Physical exercise/No exercise (current)		24	116	1.3	0.62–2.84	0.472
Gender		20	120	1.3	0.60–2.81	0.509
Distracting response	MPI-dr	29	111	1.2	0.58–2.59	0.605
Acute/chronic		31	109	1.1	0.51–2.47	0.786

MPI = Multidimensional Pain Inventory; DRI = Disability Rating Index; VAS = Visual Analogue Scale; BDI = Beck Depression Inventory; i = interference; ps = pain severity; lc = life control; ad = affective distress; sr = solicitous responses; pr = punishing responses; ga = general activity; s = social support; dr = distracting responses.

Table VI. *Summary of the multiple logistic regression model. The model is calculated based on the complete questionnaires between Tampa Scale for Kinesiophobia, Swedish Version and the other variables (n = 100). The variables are arranged by increasing p-values. Kinesiophobia is the dependent variable*

Variable	Measured by	Odds ratio	Confidence interval	*p*-value
Solicitous response	MPI-sr	2.3	0.93–5.69	0.073
Interference	MPI-i	2.0	0.61–6.58	0.251
Disability	DRI	1.5	0.56–3.93	0.424
Affective distress	MPI-ad	1.5	0.51–4.24	0.482
Pain severity	MPI-ps	1.4	0.44–4.32	0.575
Pain intensity	VAS	1.3	0.50–3.46	0.572
Life control	MPI-lc	0.9	0.31–2.66	0.853

MPI = Multidimensional Pain Inventory; DRI = Disability Rating Index; VAS = Visual Analogue Scale; sr = solicitous responses; i = interference; ad = affective distress; ps = pain severity; lc = life control.

the latter value as a cut-off value, 60% of the patients would have presented a high degree of kinesiophobia. Although there are problems associated with the use of cut-off value, we wanted to use the original operational definition in order to be able to compare our results. In our opinion, the problem of operationalizing kinesiophobia boils down to the lack of a consistent conceptual definition of kinesiophobia. There is a need for further research that can present a more consistent operational definition of kinesiophobia.

Based upon our prior knowledge and clinical experience we wanted to test which variables were associated with kinesiophobia. In order to do so we chose to use a logistic regression analysis. According to our findings from the simple logistic regression analysis interference, disability, pain severity, pain intensity, life control, affective distress, depressed mood and solicitous responses seemed to be associated with kinesiophobia. However, none of the factors included in the multiple logistic regression were statistically significant. By using a logistic regression analysis we were forced to dichotomize all variables, which make the analysis coarser than if we could have divided the variables in a more fine tuned analysis. Another reason might be that the factors included were too similar, meaning that the factors were too strongly correlated. Finally, we might simply have had too little data to detect a significant difference. A higher number of internal missing in the multiple logistic regression compared with the simple logistic regression analysis is due to the fact that only data with valid values of each variable are included in the multiple analyses. Depressed mood has previously been found to be associated with kinesiophobia in patients with long-lasting pain (22). Previous research has shown an association between disability and kinesiophobia (3, 16, 22, 23). Most of the studies were performed on patients with low back pain, but an association between TSK and disability was also found in patients suffering from neck pain (24). Despite employing different questionnaires and statistical methods, all studies (3, 13, 22, 23) indicate an association between kinesiophobia and disability.

A moderate correlation was previously found between kinesiophobia and pain intensity in a low back pain population (24). Swinkels-Meewisse et al. (23) showed that pain intensity predicts disability in patients with acute low back pain, where disability also plays a mediating role in the association between pain intensity and kinesiophobia. The multidimensionality of pain, measured by the MPI-S has not been tested against kinesiophobia, measured by the TSK. However, Asmundson et al. (25), using the original MPI (29) found that patients classified as "dysfunctional" reported more pain-related fear than those classified as "interpersonally distressed" or "adaptive copers". For the purpose of this study we did not perform a cluster analysis on the MPI-S and, consequently, no comparison with the results from Asmundson could be made.

Our study showed that psychological distress was common among the patients who participated. Cairns et al. (27) found that one-third of patients in a recurrent low back pain population referred for physiotherapy exhibited high levels of distress. In a primary healthcare setting one-quarter to one-third of the patients suffered from some level of psychological distress. Psychological distress was also common among patients with musculoskeletal illness who were referred for physiotherapy (13). How can these results be of interest for personnel involved in the rehabilitation of patients suffering from pain? Psychological distress has previously been found to be prevalent in primary healthcare and often remains undetected, especially in the presence of physical symptoms (13, 28, 29). High anxiety and depression are associated with a greater impact of generalized musculoskeletal pain on daily activity. Persistent pain and inactivity may also lead to depression (30). Psychological distress was more common in a population of general practice patients with musculoskeletal illness than in a population of consecutive general practice patients (13). Poor psychological health can be a complication of pain that becomes apparent at an early stage of chronic pain (29). There has been much debate about whether psychological distress is an antecedent or a precedent of chronic pain, but the hypothesis that increased levels of psychological distress are a consequence of pain (31) has found the strongest support. Others have found that widespread chronic pain does not in itself predict future psychological distress (32).

What are the clinical implications of these findings? In the identification of plausible risk factors, screening procedures may be useful for finding patients at risk, preferably in the earliest possible phase of pain (33). The primary healthcare setting has been considered one of the most important arenas for early identification of disability (34, 35). Primary healthcare is often poorly equipped to assess psychological variables (36). Screening would enhance the allocation of resources to those patients within primary care that are most likely to benefit from them. We used various measures in an attempt to screen for psychological distress from different perspectives. The patients in the current study presented a high degree of kinesiophobia, a high degree of

depressed mood and pain that indicated a negative impact on their psychological distress level. According to Cairns et al. (27) the vast majority of physiotherapists do not feel that they have the necessary skills or resources to either identify or manage these issues in the clinical setting. It is of course difficult to tell exactly what skills are required to identify and manage patients with long-lasting pain. In our opinion, physiotherapists could benefit from using questionnaires as a form of screening procedure before starting the planned treatment. To screen for kinesiophobia is of relevance for the design of a successful rehabilitation program. Using simple questionnaires such as the TSK is one way of identifying pain patients with elevated scores of kinesiophobia. It is also important for physiotherapists to have the option to identify the needs of additional treatment of psychological distress. The findings of this study also highlight the need for a more holistic approach when analysing and treating patients with long lasting pain.

Several factors did not turn out to be associated with kinesiophobia. One of those factors was physical exercise. Since this was measured by questions constructed by the authors we would like to elaborate on the operationalizing of physical exercise. At the time when we constructed our questions we did not find a suitable reliable and valid measurement, which answered our questions. We preferred open questions to collect data as close to the patient's view of the truth as possible. One limitation of this design was that the patients did not clearly enough define physical exercise. Some patients answered that they did not participate in physical exercise, but on subsequent questions answered that they walked their dog 3 times a day. A great advantage with the open questions was that valuable information was received for interpreting the data and designing future studies.

Another factor that did not turn out to be significant was, among others, general activity. This might also indicate that to be active is of significance when avoiding disability. Disability as a factor was found to be associated with kinesiophobia. Another interesting finding was that whether or not the patient had a diagnosis was not found to be associated with kinesiophobia, or other factors. This is interesting that from a biomedical perspective there is a strong focus on diagnosing. According to the present study diagnosing seemed not to be a factor of interest for the patients' psychological distress. This further supports the fact that patients suffering from long-lasting pain need an elaborated holistic approach.

The drop-out rate was high in this study. It is interesting to note, however, that very few studies address the issue of dropout in primary healthcare studies where participants are included consecutively. In research related to kinesiophobia only Swinkels-Mewisse et al. (23) mentioned difficulties in the study design that might have affected their results. We refrained from investigating the high drop-out rate mainly to conform to the ethical principles of "The World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects", which restricted the scope of our research and led to a low response rate. Furthermore, to minimize the impact on the patient's physical and mental integrity we distributed the questionnaires by post. Another reason for mailing the questionnaire was that, as the construct under investigation was "fear", we considered it inappropriate to distribute the questionnaire in conjunction with the scheduled appointment with the physiotherapist. Finally, we did not want the data to be affected by personal relationships. The patients investigated came from small town communities where it is common to be on familiar terms with the physiotherapist.

The present findings showed that kinesiophobia is a commonly seen factor in patients with musculoskeletal pain. This study further indicated that kinesiophobia is associated with pain variables (pain severity and pain intensity), physical exercise measures (disability) and psychological characteristics (interference, life control, affective distress, solicitous response and depressed mood). In conclusion, kinesiophobia is a factor that plays an important part in the rehabilitation process and hence ought to be taken into consideration when planning and designing rehabilitation programmes.

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