Fear of movement and acceptance of pain in association with depression in persons with chronic widespread pain

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Key words:
chronic widespread pain; depression; fear of movement; acceptance

Received: 4. 9. 2018
Accepted: 3. 3. 2019

Abstract

Background: In persons with chronic widespread pain, symptoms of depression are common; consequently, their quality of life can decrease. The purpose of this study was to investigate the fear of movement, pain willingness and activity engagement in relation with depression.

Methods: The study included 215 participants who were examined at the outpatient clinic for persons with chronic non-malignant pain at the University Rehabilitation Institute between October 2016 and April 2018. All of them completed Beck Depression Inventory (BDI-II), Tampa Scale of Kinesiophobia (TSK) and Chronic Pain Acceptance Questionnaire (CPAQ).

Results: Multivariate analysis of variance showed differences between depressed and nondepressed persons with chronic pain in the fear of movement, pain willingness and activity engagement. Compared to the nondepressed, depressed persons had a higher fear of movement and lower pain willingness and activity engagement.

Conclusion: Due to the high prevalence of depression in persons with chronic pain and its influence on various aspects of their life, appropriate treatment of mood disorders is essential.

Cite as: Zupančič K, Bitenc Č. [Fear of movement and acceptance of pain in association with depression in persons with chronic widespread pain]. Zdrav Vestn. 2019;88(7–8):339–48.

DOI: 10.6016/ZdravVestn.2866

1 Introduction

Chronic widespread pain syndrome is a form of chronic pain which is not cancer-related and is present for at least 3 months (1). The prevalence of the syndrome in the population is around 10%, and it is more common with women and people aged over 40. The pain is accompanied by other symptoms, such as tiredness, difficulties sleeping and concentrating, anxiety and depression (2).

When treating chronic pain the biopsychosocial model is used, which defines the disease as a dynamic and reciprocal interaction between the biological, psychological and socio-cultural factors that impact an individual's response to pain (3). For this reason it is recommended that assessing people with chronic pain should include both different aspects of experiencing the pain, as

well as their physical and psychological activities (4,5).

The most frequent psychological issue of people suffering from chronic pain are mood disorders. Major depressive disorder can crop up with more than a half of this population (7), while milder forms of depression or individual symptoms can be even more frequent (8). Those with chronic pain and depression present a greater burden for the healthcare system (8), and they also have a lower quality of life, suffer from other psychiatric issues and significant physical symptoms as others with pain, but no depression (9,10).

Even though the relation between chronic pain and depression has not been fully explained, there are some changes to the brain that are common to both. With those subjects who are more vulnerable due to personal or environmental factors, long-term pain can lead to depression (12), while the premorbid psychological issues can be a risk factor for developing various types of chronic pain (13).

People with chronic pain more frequently avoid various activities because they fear that their pain would worsen. In the beginning this is an effective strategy, but in the long-term it leads to a worsening of the physical and mental state (14). The term for this condition is kinesiophobia, meaning an excessive, irrational and exhausting fear of physical activity, arising from a sense of vulnerability for injury (15). Studies show that fear of movement is connected to catastrophic thinking about pain and the symptoms of depression (14), while also acting as a mediator in the relation between pain intensity and the inability for performing usual activities (16).

Important psychological factors when dealing with chronic pain include acceptance, which is defined as acceptance of pain, stopping trying to control the pain, acting in accordance with the conviction that pain does not mean inability to live a full, satisfying life in spite of the pain. Greater acceptance of pain is related to lower intensity of pain, lower anxiety and depression, less pain-related avoidance to activity, a lower level of physical and psychosocial inability and a better employment status (17). Acceptance also positively correlates with active engagement and negatively with catastrophic thinking about pain, and also forecasts a better functional status (18).

The objective of this study was to research the fear of movement and two aspects of pain acceptance –pain willingness and inclusion in activities – with regard to the presence of symptoms of depression with people with chronic pain, who have not yet been included in any of the interdisciplinary programmes for managing pain symptoms. Assessing different aspects of physical and mental activity is a standard component of treating these patients, however, no study has yet been made that would have assessed their characteristics with several variables at the same time. Based on previous studies we assumed that when symptoms of depression are present, the fear of movement would be higher and pain willingness lower than with people who do not report of any issues with pain.

2 Method

2.1 Participants and the procedure

The study initially included 232 people who were checked up at the outpatient clinic for the rehabilitation of patients with chronic non-cancer pain at the University Reahabilitation Institute, Republic of Slovenia. Triage examination at the outpatient clinic lasts 3 to 4

hours and includes a check up from a doctor, a physiotherapist, a social worker and a psychologist. A one-hour psychological evaluation includes a structured interview as well as a paper-and-pencil type questionnaire which takes about 20 minutes. Everybody gave their oral consent for participating in this study. When reviewing the data and excluding the outliers, the final sample comprised 215 people, of which 29 were men (13.5%) and 186 were women (86.5%). All were of age, with an average age of 49.5 years ($SD = 8.81$). The study was approved by the Committee for Medical Ethics of University Reahabilitation Institute, Republic of Slovenia on 1 October 2018 (decision no. 73/2018).

2.2 Tools

Beck Depression Inventory - II. The inventory questionnaire (19,20) is aimed at self-assessment of symptoms of depression for ages 13 to 80. It covers 21 topics, pertaining to affective (e.g. pessimism, feelings of guilt, feelings of unsuccessfulness) and somatic (e.g. crying, changes to sleep patterns, issues with concentration) signs of depression. Within each topic the subject has to rate statements with values from 0 to 3. A higher value means that a symptom is more highly expressed, while the value of 0 means it is not present. The subject decides which of the statements within a topic fits them the most over the period of the past two weeks. The values add up into the final score, with 0–13 classified as none or minimum symptoms of depression, 14–19 meaning mild, 20–28 moderate, and 29–63 high. The coefficient of internal consistence for non-psychiatric population is 0.81 (21), while for the population of people with chronic pain it is 0.92 (22).

The Tampa Scale of Kinesiophobia. The questionnaire (15) is intended for self-assessment of kinesiophobia. Participants rate how much each of the 17 statements is true for them on a scale from 1 (not true) to 4 (completely true). The grades are added up for a final score with a value between 17 and 68, with the higher results classifying a higher level of kinesiophobia. The value of 37 is the limit; any results above that are classified as high. In the Dutch study made with participants with chronic back pain (14) the coefficient of the internal consistency scale was 0.77.

The Chronic Pain Acceptance Questionnaire – CPAQ. The questionnaire (23) is intended for self-assessment of the level of chronic pain acceptance. The participants rate each of the 20 statements with a value of 0 (never true) to 6 (always true). The statements are combined into two charts – 9 statements measure pain willingness, which means the realization that avoidance and control are inappropriate methods of adjusting to pain, while the remaining 11 statements measure inclusion into activities relating to inclusion into everyday activities in spite of the pain. The total can be between 0 and 120, with a higher score meaning a higher level of pain willingness. The coefficients of internal consistency of the original chart are at 0.82 for inclusion into activities and 0.78 for pain willingness. In the Slovenian study (24) the reliability coefficient for the whole chart was 0.84.

2.3 Data analysis

The collected data was analysed using IBM SPSS Statistics v 25.0. We first divided the participants into two groups according to the presence of the symptoms of depression, as reported in the BDI-II questionnaire. Those with a score

between 0 and 13 were placed in the non-depressive group, while those with scores of 14 to 60 went into the depressive group. When grouping the participants we took into account the measures proposed by the authors of the questionnaire (19).

We used the multivariate analysis of variance (MANOVA) to establish the differences between the groups. When reviewing the results of the dependant variables a few outliers cropped up, so we calculated the Mahalanobis distance, using it to exclude further 17 participants for whom the distance was above 7.81 ($p = 0.05$) (25). We verified the distribution for all borderline variables (histograms, quantile-quantile plots), and there were no major deviations from the normal. Testing the equality of covariance matrices showed that Box's M is 13.03 ($p = 0.046$). Pituch and Stevens (26) state that the limited test has more power with greater samples, meaning that it is sensible to use the α level of 0.01. As the measure of homogeneity of covariance matrices was not violated, we continued with MANOVA, where the independent variable was the presence or absence of the symptoms of depression, while the dependent variables were fear of movement, participation in activities and pain willingness. To ensure a higher reliability of results we analysed the data also using non-parametric formats of MANOVA (27,28), and in the end we also calculated the correlation between age and the results in individual questionnaires and checked whether men and women differ in the average level of symptoms of depression.

3 Results

Table 1 shows that depressed people reported an average higher level of fear of movement and a lower inclusion in activities and pain willingness than non-depressed people. MANOVA results point to a statistically significant effect of symptoms of depression on dependant variables; Hotelling's $T = 0.18$, $F(3, 211) = 12.86$, $p < 0.001$. Partial η^2 is 0.15, which means the effect is high (29). The results of the non-parametric MANOVA are comparable with the parametric format of the test; Pillai's trace $V = 0.16$, $F(3, 211) = 13.14$, $p < 0.001$. Partial n^2 is the same at 0.15 and $\chi^2(3, N = 215) = 33.70$, exceeding the critical value, which, with $\alpha = 0.05$, equals 7.81. Based on the above we can conclude that the groups of depressed and non-depressed people are statistically highly different with regard to a certain linear combination of ranked dependent variables (fear of movement,

Table 1: Mean values and standard deviations on used charts.

Charts	All people ($n = 215$)		Non-depressed ($n = 106$)		Depressed ($n = 109$)	
	M	*SD*	*M*	*SD*	*M*	*SD*
BDI-II - depression	16.13	10.37	7.49	3.54	24.52	7.51
TSK – fear of movement	39.70	5.22	38.44	4.85	40.93	5.30
CPAQ – inclusion in activities	34.77	10.85	38.71	9.88	30.94	10.41
CPAQ – willingness to experience pain	21.96	8.12	23.40	8.30	20.57	7.71

Table 2: The results of the *t*-test for establishing differences between the depressed and non-depressed people on individual charts, and the data on the level of effect of these differences.

Charts	*t*	*df*	*p*	*d*
TSK – fear of movement	-3.58	212.21	0.000	-0.49
CPAQ – inclusion in activities	5.62	212.87	0.000	0.77
CPAQ – willingness to experience pain	2.58	210.83	0.010	0.35

Note N = 215.

pain willingness and inclusion in activities).

MANOVA was followed by *t*-tests for checking differences between the groups at individual variables; all were conducted with the level of $\alpha = 0.05$. As the increase in the number of univariate tests increases the probability of a type I error (26), we introduced the Bonferroni correction, thereby making 0.017 the new α level. In spite of the stricter measure, the differences between the groups (Table 2) are still statistically significant across all the variables. In accordance with Cohen's measures (29), a major effect of the differences was shown in the chart of inclusion in activities, a median effect in fear of movement, and a small effect in pain willingness.

The results of the *t*-test show that the differences between the sexes in the expression of symptoms of depression are statistically significant; $t(51) = 4.04$, $p < 0.001$. Levene's test showed unequal variance ($F(1.213) = 13.08$, $p < 0.001$), because of which the degrees of freedom were corrected from 213 to 51. For women the average value on the BDI-II questionnaire is 16.94 ($SD = 10.59$), and for men it is 10.90 ($SD = 6.88$). The age variable does not correlate statistically significantly with any of the other measured variables (Table 3).

4 Discussion

The objective of this study was to research the connection between symptoms of depression and fear of movement, and pain willingness in people with chronic pain. Various authors (7,8) have discovered that mood issues can

Table 3: Pearson's correlation coefficient between the age and other factors when measuring the pain.

Charts	*r*	95 % CI	*p*
BDI-II - depression	-0.12	-0.25	0.080
TSK – fear of movement	-0.04	-0.17	0.602
CPAQ – inclusion in activities	0.05	-0.08	0.448
CPAQ – willingness to experience pain	0.02	-0.11	0.732

Note: *N* = 215, CI – confidence interval

occur in more than a half of this population, which was also the case in our sample. Consequently, treating depression is of exceptional importance, because with people who have a smaller number of symptoms of depression the effect of interdisciplinary treatment of chronic pain is higher than with those who have more exceptional issues (28).

Because of the inter- or multi-disciplinary approach the characteristics of the subjects with chronic pain and the results of their rehabilitation are measured across several areas at the same time (31). Taking into account such recommendations, we used in our study the multivariant variance analysis, which provides for a more comprehensive understanding of the researched variables (26). Our expectations were confirmed, and the individuals with depression differed from those who did not suffer from it across all the measured variables. Just like in the Antunes et al. study (32), the depressed people in our sample were also more afraid of moving, which is an obstacle both from the perspective of mitigating pain, as well as depression, and which can worsen their condition (33). Among the more significant factors that cause people with chronic pain to report on more extensive issues in physical and emotional activities are traumatic events, as some individuals end up suffering from post-traumatic stress disorder. Studies (34,35) show that such symptoms have a positive correlation with the intensity of pain, anxiety, depression and fear of movement, and a negative correlation with physical activity, and should therefore be recognized in people with chronic pain and treated appropriately.

Depressive people also had a lower expression of both perspectives of pain acceptance – inclusion in activities and pain willingness, with the effect of the difference between both groups higher for the first variable. In one of the studies (18) it was established that pain acceptance has an important effect on the functional status, pertaining to performing different activities. In combination with fear of movement and the symptoms of depression such a condition can be a vicious circle that leads to more frequent doctor visits, and consequently to increased healthcare costs, however, the individual's problems do not improve significantly (7).

Demographic variables play an important role in the effectiveness of interdisciplinary treatment of those with chronic pain, with the men and a higher level of education forecasting a better result in individuals included in such programmes (36). A key shortcoming of our study was how inhomogeneous the sample was with regard to sex, as women represent 86.5% of the sample, which means that extra care should be taken when generalizing the results. In accordance with the current findings (37) the participants in our study reported on more pronounced symptoms of depression. These are more frequent in women also in the general population (38), as the symptoms of depression are expressed differently with men. US authors (39) have established that when taking into account traditional and alternative measures the frequency of depression with men is very similar to the rates for women. The differences between the sexes are also characteristic for experiencing, responding and dealing with the pain, which is related to both biological and psychosocial factors (40). In Sweden men reported of worse fear from movement than women (41), while women who suffered from the same pain intensity reported higher physical activity, pain acceptance and social support (42). From the perspective of age we did not find any statistically significant corre-

lations with any of the measured variables. No correlation between age and fear of movement was also found by the Swedish authors (41), while Finish researchers (43) only reported on a low negative correlation between age and pain willingness.

Another significant limitation of this study was measuring symptoms of depression using Beck's Depression Inventory questionnaire. Even though it is one of the recommended tools for establishing the mood of people with chronic pain (45), using the questionnaire can be problematic with this population. The questionnaire includes statements pertaining to physical issues (e.g. loss of energy, sleep issues, problems concentrating), characteristic of both depressed people as well as those with depression (7). Consequently the final score on the questionnaire can give the impression that a person in pain is depressed or that the symptoms of depression are present in a higher level than otherwise. As the classification of people in this study into the group with symptoms of depression and the one without was based on this questionnaire, using one that is more adapted to people with physical issues – such as for example HADS (32) – could yield different results.

The study could be in the future expanded to include more variables that are frequently measured when treating people with chronic pain. The psychological ones could include catastrophisation of pain (45), attachment styles (46) or personality traits (47), while the physical ones could include the 6-minute walking test (48), pain intensity and the number of medications they are currently taking. Another possible improvement could be distributing the people with symptoms of depression into several subgroups by intensity. This is the path that the Spanish researchers took (10), establishing that the level of pain for the patients with the most expressed symptoms of depression is higher, and that they are also more tired and sleep worse than those with fewer symptoms of depression.

5 Conclusion

The study has shown that the presence of the symptoms of depression is one of the few factors that differentiate people with chronic pain in terms of fear of movement, willingness to experience pain, and inclusion in activities. The findings are useful from the perspective of the importance of treating symptoms of depression, because with people who have fewer symptoms of depression the effect of interdisciplinary treatment of chronic pain is higher than with those who have more exceptional issues. Further research could differentiate between the intensity of the symptoms of depression, and also include more variables that are important when treating chronic pain.

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