

THESES OF DOCTORAL WORK

**EPIDEMIOLOGICAL AND CLINICAL
INVESTIGATIONS ON THE ASSOCIATION OF
CHRONIC PAIN PROBLEMS AND DEPRESSIVE
SYMPTOMATOLOGY**

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INTRODUCTION

The epidemiology of pain has attracted wide interest in the last two decades and a vast amount of information has been collected concerning the topic. All of these investigations have come to the conclusion that chronic pain symptoms add up to a major challenge in public health as the source of individual suffering and considerable health-care costs. By comparing results from different parts of the world we may conclude, that 20-51 % of the population is affected by severe chronic pain problems, and 30-61 % is affected by middle grade pain problems. The prevalence of pain-associated disability is estimated in the range of 10-20%.

Our other starting point besides the epidemiology of chronic pain is the association of chronic pain and depression, their comorbidity. This phenomenon apparent between experimental, clinical, and epidemiological circumstances as well is an important feature of the affective dimensions of pain, primarily the chronic forms. From a theoretical perspective the association between pain and depression might be defined at three levels: neurobiological (neurotransmitters, common pathways), psychological, and behavioral. At the neurobiological level, the neurotransmitters found to play a role in depression (serotonin and noradrenaline) have also been shown to modulate pain perception. At the level of psychological mechanisms, negative emotions worsen the perception of the severity of pain symptoms. At the behavioral level the decreased activity and

disability caused by chronic pain may cause depression, which might be seen as a form of learned helplessness.

National health surveys have diverse objectives; they serve information about the most important health problems to the specialists, decision makers and the general population. Information about risk factors, and possible health services in connection to health problems can also be distributed. These data help in assessing morbidity trends, the distribution of risk factors in the population, and the utilization of health services. Surveys can also be the starting point of focused clinical investigations.

OBJECTIVES OF THE RESEARCH

The primary objective of the research was the assessment of the comorbidity of chronic pain problems and depressive symptomatology in epidemiological and clinical samples. According to our hypothesis we predicted higher prevalence of co-occurring depressive symptomatology in groups of higher age, lesser educational level, and the employment groups of physical workers.

During the investigation and analyses the following questions were postulated as objectives of the research:

1. What is the prevalence of chronic pain problems in the investigated population samples? What is the prevalence of chronic pain-associated disability in the same samples?

2. What is the co-prevalence of depressive symptomatology in the subjects reporting chronic pain problems?
3. Which sociodemographic factors increase the risk of chronic pain problems and the comorbidity of chronic pain problems and depression?
4. In the clinical group of patients with depression what is the prevalence of pain problems?
5. What factors play a role in the development of pain problems among depressed patients?
6. In the group of patients with musculoskeletal diseases what is the prevalence of depressive symptomatology?
7. How can our epidemiological results be used in the preventive and clinical services?

METHODS

HUNGAROSTUDY 1995 health survey

The analyses and results are based on data from the HUNGAROSTUDY 1995 national representative survey that was carried out in the Hungarian population. The investigation included 12.640 individuals above the age of 16 and was conducted by means of a door-to-

door survey. The sample was composed by combining stratified and multi-step sampling procedures.

Chronic pain-associated disability was assessed together with the shortened form of the Beck Depression Inventory. Sociodemographic variables were tabulated as well. Results were analyzed as descriptive statistics, categorical variables were compared by means of the Chi-square test. Associations between sociodemographic variables and pain-associated disability and co-occurring depressive symptomatology were calculated by a multivariate logistic regression analysis.

Young women's health survey (1998)

The framework of the study was the *Young women's health survey 1998* as part of the Better Health for Women health promotion program organized by the Institute of Behavioural Sciences (Kopp, 1998). The sample of the cross-sectional survey included 3615 subjects and was a representative sample of the population of young women between 15-24 years, selected by a multi-level stratified sampling method. The two major groups in the sample were young women still studying in secondary school or higher education institutions (2016 subjects) and the group of young women not studying anymore at the time of the survey (1599 subjects).

In a list of other health complaints and symptoms interviewees were asked in the questionnaire whether they have frequently returning headaches and frequent musculoskeletal pain-problems. Possible answers

to these questions were yes or no. The rationale for choosing these variables was that headaches and musculoskeletal pain are unspecific symptoms that are leading types of chronic pain. Furthermore the shortened form of the Beck Depression Inventory was used to assess depressive symptomatology. Prevalence rates were calculated and were presented as descriptive statistics. Average depression scores were compared with the t-test based on not equal variances. Associations between sociodemographic variables and pain-associated disability and co-occurring depressive symptomatology were calculated by a multivariate logistic regression analysis.

Follow-up study of depressive patients (1999)

The follow-up study of the patients with depression was realized in cooperation with the Psychiatry Unit of the University Ulm, Germany. 91 inpatients with an ICD-10 diagnosis of major depressive disorder were enrolled in the study (mean age 43,9 years, 47 females). The patients completed the pain-questionnaire after admission to the ward and 4-6 months after discharge, which included questions on pain symptoms in terms of location, intensity, and frequency. The full-length version of the BDI was used to assess depressive symptomatology.

Average pain intensity scores were compared with the t-test based on not equal variances.

Clinical investigation of musculoskeletal patients (2001)

This clinical investigation took place at the day Hospital National Institute of Rehabilitation (Budapest). The objective of the study was to assess the prevalence of depressive symptomatology in this patient group. 57 patients (37 women and 20 men, mean age 50 years) were enrolled in the sample. The typical admission diagnoses were degenerative spine and small articular disease, osteoporosis, fibromyalgia, spondylitis ankylopoetica, Schauermann-disease, and scoliosis.

The patients treated in the completed the full-length BDI after admission and before discharge. The cutoff scores for mild and moderate depression were determined as a score above 9 and 18. Admission and discharge scores were compared with the Mann-Whitney test.

RESULTS

HUNGAROSTUDY 1995 health survey

The rate of interviewees reporting any grade of pain-associated disability was 32.7%. Further sub-groups were defined by gender and the different degrees of reported pain-associated disabilities. Furthermore 15.1%, 12.3 %, and 5.0% of the population described pain symptoms as causing disabilities to a low , to a considerable , and to an extreme extent, respectively. Overall pain prevalence reported by women is significantly

higher than prevalence reported by men (36.8% and 27.7%, respectively), which remains statistically significant in the adjusted results (OR = 0.54; 95% CI = 0.48-0.61). All age groups yielded statistically significant increasing rates of pain-associated disability with growing age. Comparisons depending on education, marital status, employment, and occupational status resulted in considerable differences observed as crude prevalence rates, however only the group of people holding a university degree (OR = 0.5; 95% CI = 0.3-0.9), widows (OR = 1.5; 95% CI = 0.1.5-2.1), and unskilled workers (OR = 1.4; 95% CI = 1.1-1.9) showed statistically significant different prevalence rates of pain-associated disability. In general, prevalence of pain-associated disability was higher among groups with lower educational background, or working as skilled or unskilled workers.

The prevalence of moderate or severe depressive symptomatology was 13.4% in the whole sample. If the group reporting pain-associated disability was selected, the proportion with moderate or severe depressive symptoms was 30.2%. The co-prevalence of depressive symptomatology did not differ statistically significantly in women and men, what is reflected also by the equal odds ratios. Age groups yielded an increasing tendency with higher age, which was statistically significant in the age groups of 30-39 years (OR = 2.1; 95% CI = 1.3-3.4), of 60-69 years (OR = 2.0; 95% CI = 1.1-3.8), and over 70 years (OR = 3.0; 95% CI = 1.5-6.1). The prevalence of depressive symptomatology decreased with rising levels of education, the differences were statistically significant in the groups

holding a secondary school (OR = 0.5; 95% CI = 0.3-0.8), or a university degree (OR = 0.4; 95% CI = 0.2-0.9). It is noteworthy that the groups of unemployed people (OR = 6.1; 95% CI = 1.3-20.4), skilled (OR = 2.0; 95% CI = 1.3-4.5), and unskilled workers (OR = 2.4; 95% CI = 1.3-4.5) also reported significant co-prevalence rates of depressive symptomatology.

Young women's health survey (1998)

The overall prevalence of frequent headaches and musculoskeletal pain-problems was 43.8%, and 25.8%, respectively. If the groups of students and non-students were investigated separately non specific-headaches yielded prevalence rates of 47.4% in students, and 45.5% in non-students, musculoskeletal problems yielded prevalence rates of 27.2% in students, and 23.9% in non-students.

The rate of depressive symptomatology was more prevalent and higher in terms of intensity in the groups with pain problems. The intensity of depression was compared by the average of the corrected BDI score between groups with and without pain problems. The average score in the group reporting frequent headaches was 8.83 (SD=7.93) in contrast to the group without headaches, where the average score was 5.88 (SD=6.32) ($t=11.824$; $df=2980.742$; $p<0.001$). In the case of musculoskeletal pain problems the average score was 8.74 (SD=8.00) in contrast to the average

score of 6.68 (SD=6.85) in the group without musculoskeletal pain problems ($t=6.757$; $df=1324.096$; $p<0.001$). The prevalence of co-occurring depressive symptomatology in the sub-sample of interviewees reporting non-specific headaches was 11.2% in contrast to the 4.6% prevalence in the pain-free group. In the subsample reporting musculoskeletal pain-problems the co-prevalence value was 10.3%, in contrast to the 6.6% in the pain-free group. The overall prevalence of depressive symptomatology in the whole sample was 7.6%.

The association of pain problems with sociodemographic factors was tested with logistic regression analysis. The prevalence of musculoskeletal pain problems decreased with higher age and increased with the smaller size of residence. However the logistic regression analysis revealed no statistically significant association between the prevalence of musculoskeletal pain symptoms and sociodemographic variables.

Follow-up study of depressive patients (1999)

During the inpatient treatment out of 91, 40 patients (44%) reported chronic pain problems, at the time of the follow-up out of 56, 23 patients (41%) had clinically significant pain problems. Mean intensity was compared in three body locations (head, neck-shoulder, and back) for patients fulfilling the criteria of chronic pain. We found no statistical significant difference when comparing the intensity of the admission and follow-up results by the t-test based on not equal variances. Comparing the

mean BDI scores yielded statistical significance by the t-test based on not equal variances ($p<0,01$).

Clinical investigation of musculoskeletal patients (2001)

Out of 75 patients enrolled 33 at admission, and 13 at discharge reported depressive symptomatology (58% and 23%-). The number of patients with mild depressive symptomatology decreased from 24 to 10, with moderate depressive symptomatology from 5 to 2, and with severe depressive symptomatology from 4 to 1. Comparing the mean BDI scores at admission and at discharge with the Mann-Whitney test the difference was statistically significant (Mean BDI score after admission: 16,36; $SD=6,05$, at discharge: 9,15; $SD=7,16$; $U = 880.5$; $p<0,01$).

DISCUSSION AND CONCLUSIONS

The main results of the epidemiological investigations is that, according to our results indicate that disabling pain symptoms have an impact on almost one-third of the general population, 17.9% of the population suffers from pain-associated disabilities to a considerable or extreme extent. The results of the 1998 survey indicate that over 45% of the interviewees suffer from frequent headaches and over 25% have musculoskeletal pain problems.

According to the multivariate analyses disabling pain problems show an increasing tendency and higher risk in women, with lower education and occupational levels.

Our results indicate that the risk of co-occurring depressive symptoms is highly elevated in groups of lower educational level, in the group of unemployed, and at higher age.

The main result of the follow-up study of depressed patients is that while the intensity of the depressive symptoms decreased, the pain problems remained at the time of the follow-up. This result must be corroborated by other studies, but the importance of the finding must be stressed. In the other clinical investigation 57% of patients showed at least mild depressive symptomatology, and in the case of 10% the diagnosis of a major depression can be hypothesized, according to the newest validity-results of the BDI.

In the light of the above findings, we propose the implementation of results in four areas:

Based on the association of chronic pain problems and musculoskeletal diseases all measures of health promotion and social marketing must be used to prevent musculoskeletal diseases. The social gradient observable in chronic pain-problems draws attention to access-problems **(1)**.

At the meso-level the results on chronic pain-associate disability underscore the importance of workplace health promotion and

rehabilitation. This issue is further stressed by the higher prevalence rates and odds ratios for disability in the groups of skilled and unskilled workers. **(2)**.

In primary care settings the high comorbidity of pain problems and depression deserves attention. The gatekeeper function of general practitioners could improve by the successful diagnosis of these problems, which is part of good disease-management **(3)**. Guidelines for the treatment of chronic pain have been successfully introduced in Hungary recently.

In inpatient settings the possibility of comorbidity must be taken into account in patients treated for depression or musculoskeletal pain problems. Diagnostic and treatment issues must be considered as well. Questionnaires are easily usable in both patient groups, and can help in setting up a tentative diagnosis of comorbidity **(4)**

The better understanding of the relationships between sociodemographic factors, pain-associated disabilities, and depression is essential for efficient management of chronic pain in clinical settings, for preventive measures, and for the allocation of resources.

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