

Co-occurrence of chronic physical pain and psychiatric morbidity in a community sample of older people

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SUMMARY

Background Knowledge about co-occurrence of the most frequent chronic pain symptoms with psychiatric morbidity in older people is very limited.

Objective To study the association of psychiatric morbidity and painful physical conditions in people aged 60 years and over.

Method Population-based random sample of 7,040 household residents, aged 60 years and over, in Brazil.

Results The overall prevalence of pain conditions is 76%. Age-sex specific prevalence of chronic pain conditions such as back pain, joint, abdominal, chest, headaches, reported by respondents ranged from 11.6% up to 51.1%. In logistic regression models, chest pain, head pain, back pain, joint pain and abdominal pain emerged as predictors of psychiatric morbidity. The odds of psychiatric morbidity are also affected by income, ethnicity, origin (urban/rural), and marital status.

Conclusion The association of chronic painful conditions and psychiatric morbidity in late life is statistically strong in this surveyed population. Copyright © 2007 John Wiley & Sons, Ltd.

KEY WORDS — pain; comorbidity; elderly; depression; prevalence; mood disorders

INTRODUCTION

In the last years there has been a rapid growth of research in the association between psychiatric morbidity and long term medical illnesses, particularly those associated with pain. They show high but variable evidence that pain is associated with psychiatric morbidity, particularly depression (Peninx *et al.*, 1998; Benjamin *et al.*, 2000; Livingston *et al.*, 2000; Carrington *et al.*, 2003; Ohayon and Schatzberg, 2003; Carrol *et al.*, 2004; Currie and Wang, 2004; Dunlop *et al.*, 2004; Jackson, 2004).

With exceptions (Thomas *et al.*, 2004; Clausen *et al.*, 2005; Rustoen *et al.*, 2005; Miro *et al.*, 2006), these large epidemiological surveys have mainly focused on the general adult population. It is clear that

results from these samples cannot be unambiguously applied to older age groups because of relevant biological, psychological and socioeconomic differences. We have very limited knowledge of the comorbidity between somatic pain and psychiatric morbidity in older populations. The present study was planned to address this gap in psychiatric epidemiological knowledge.

By using data from a large sample of 7,040 individuals living in the community, the key question addressed concerns the occurrence of painful physical conditions and their association with psychiatric morbidity in elderly subjects aged 60 years and over.

METHODS

This study is an additional analysis of a large multidimensional investigation of health and living conditions of community-living older people in the

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southern state of Rio Grande do Sul, Brazil (Conselho Estadual do Idoso, 1997). This investigation involved 14 university centres which have been brought together to form a consortium under the initiative and support of the State Council on Aging (Conselho do Idoso—Secretaria do Trabalho, Cidadania e Ação Social—Governo do Estado do Rio Grande do Sul). In the first survey the consortium established an overall picture of lifestyle, health and living conditions of the elderly. This report is based on data from this baseline survey.

Study design and sampling

This cross sectional investigation of persons over 60 years old was based on a multistage, stratified random sampling procedure. The first step was to draw a sample from nine homogeneous areas covering the whole state of Rio Grande do Sul, Brazil. The second step was to stratify the 333 municipalities into five categories according to the following criteria: basic economic activity and number of inhabitants. The proportion of each category in each homogeneous zone was calculated. The number of subjects in each stratum was computed to secure a representative proportion of old people in the community. Third, the municipalities were randomly selected proportionally in each stratum. The fourth step was to obtain a random sample of urban census areas of each municipality as supplied by Brazilian Institute of Geography and Statistics (IBGE). Fifth, to get a sample of households from every census area, a block was randomly selected and every eighth house was systematically visited. The selected household was visited by the interviewer in person. One respondent was randomly selected in each household in which there was more than one eligible person. Houses with no eligible person were replaced by the next neighbour.

Participants gave oral consent before proceeding with the interview. This subsequent analysis was approved by the Ethics Committee of the Federal University of São Paulo—UNIFESP. Individuals could be accompanied by a family member if they wished. The field work was conducted in September 1995. No adjustment had to be made to the procedure in the course of fieldwork.

Response

Due to computational problems all data concerning one area were unavailable for analysis. A total of 7,040 persons were approached in the first round: 880 subjects in each area. No proxy information

was collected. Partial non response was negligible. Seventy-nine persons (1.1%) did not take part in the assessment mainly due to refusals, yielding an overall response rate of 99%.

Instruments

To examine the health and living conditions of older people in the community a series of measures including among others, socioeconomic and cultural background, family composition, health status, and living conditions were collected using a structured interview. For the purpose of this study the measures of psychiatric and health status will be described below. The examinations were carried out by lay technical research assistants.

Psychiatric examination

The Short Psychiatric Evaluation Schedule (SPES) developed by Pfeifer (1979) is a short and easily usable 15-item questionnaire designed for conducting epidemiological studies in the general elderly population. This study used an abbreviated SPES six-item version (Short-SPES) particularly sensitive for detecting depressive and anxiety states without necessarily indicating a diagnosable disorder but others conditions were also identified (Blay *et al.*, 1988, 1991). Each question demands a yes/no answer regarding aspects of the elderly mental functional status ('Does it seem that no one understand you?'; 'Have you had periods of days, weeks, or months when you couldn't take care of things because you couldn't "get going"?'; 'Are you happy most of the time?'; 'Are you troubled by your heart pounding and by a shortness of breath?'; 'Do you feel weak all over much of the time?'; 'Do you certainly feel useless at times?'). The total score is calculated by adding the number of positive answers in the test. The Short-SPES has a potential score ranging from 0–6; the higher the score, the worse the mental condition. The validity coefficients of the Short-SPES at the 0–1 and 2+ cut-off point were: sensitivity 82% and specificity 77%. Assuming a 20% prevalence of psychiatric comorbidity in the sample yields a positive and negative predictive value of 47% and 91% respectively, therefore secondary and exploratory results must be evaluated cautiously.

Chronic pain

A chronic pain condition was assessed using a checklist of five frequent conditions described in community or in primary care studies (Verhaak *et al.*,

1988, for a review see Frølund and Frølund, 1986). Pain condition was assessed in a self reported way and included the following questions: In the last six months have you had: 1—problems of rheumatism, joint/articular or arthritis in treatment?; 2—heart problems like angina (chest pain), myocardial infarction in treatment?; 3—back ache in treatment?; 4—gastritis or ulcer in treatment?. Answers to those questions include: 'Yes, with prescription and/or a medical orientation', 'Yes, without prescription but with a medical orientation', 'Yes, without prescription or a medical orientation', 'No', 'Do not know', 'No answer'. These four questions were answered in a yes (yes with prescription or yes without prescription) or no (no, do not know, no answer) fashion; 5—in the last 30 days have you had suffered from headaches? This fifth question was answered in a yes or no fashion.

ANALYSIS

Cross tabulations were used to calculate frequencies and associations. Univariate comparisons were carried out by χ^2 tests. Spearman correlations were used as appropriate. To identify factors associated with the dependent variable 'psychiatric cases', logistic regression analysis was chosen. To accept a variable in the model the value of significance accepted was 0.05. The β coefficients from these analyses were transformed into odds ratios for ease of interpretation. We used log linear models to examine the multidimensional association between pain symptoms. Statistical analysis and 95% Confidence Limits (95% CIs presented here were generated using the SPSS 10 program.

RESULTS

Descriptive information about the study sample is presented in Table 1.

Table 1. Characteristics of respondents

Gender	n	%
Female	4,593	66
Male	2,368	34
Age		
60–64	1,866	26.8
65–70	2,085	29.9
71–74	1,067	15.3
75–80	1,216	17.5
81+	727	10.4
Income		
<US\$200/month	4,323	62.1
≥US\$200/month	2,414	34.7
Birth		
Rural	4,529	65
Urban	2,363	33.9
Marital status		
Married	3,161	45.4
Widow	2,969	42.6
Single/divorced	830	11.9
Education		
<4Years	5,891	84.6
≥4Years	1,047	15
Ethnicity		
Caucasian	5,862	84.2
Non- Caucasian*	1,098	15.8

*African—descendants, Asian, Others.

Co-occurrence of pain symptoms

The co-occurrence of pain symptoms is frequent in this study population. The number of co-occurrences of pain symptoms by gender are presented in Table 2.

Using a log linear model we examined the association between the pain symptoms. As expected there were positive associations between every pair of symptoms ranging from relative risks of 1.44–3.95. Over and above these we also found that there were more people with the combination abdominal plus chest plus head plus joint than we would have expected (2.28 times more, 95% CI 1.31–3.99). There were fewer people than expected with the combination

Table 2. Number of pain symptoms by gender

Symptom combination	Women (n) %	Men (n) %	Total (%)	Women/men ratio
None	848 (18.5)	797 (33.9)	1,645 (23.8)	1.1
One	1,136 (24.8)	695 (29.5)	1,831 (26.4)	1.6
Two	1,144 (25)	454 (19.3)	1,598 (23.1)	2.5
Three	858 (18.8)	283 (12.0)	1,141 (16.5)	3
Four	444 (9.7)	100 (4.3)	544 (7.9)	4.4
Five	144 (3.1)	23 (1.0)	167 (2.4)	6.3
Total	4574	2352	6926	3.0

Table 3. Prevalence of a specific chronic pain along with other pain conditions by gender and age

Age group/yr	Number of subjects	Any pain % (SE)	Abdominal/pain % (SE)	Back pain % (SE)	Chest/heart pain % (SE)	Head/pain % (SE)	Joint/articular % (SE)
Women							
60–64	1,192	81.5 (0.01)	21.8* (0.01)	49.2*** (0.01)	26.8 (0.01)	43.4*** (0.01)	47.5 (0.01)
65–70	1,336	82.8 (0.01)	22.0* (0.01)	48.7** (0.01)	30.4 ⁺ (0.01)	39.8** (0.01)	50.5 (0.01)
71–74	692	81.9 (0.01)	17.1 (0.01)	49.4** (0.02)	35.5*** (0.02)	35.2 (0.02)	50.0 (0.02)
75–80	844	80.5 (0.01)	19.0 (0.01)	45.7 (0.02)	32.2* (0.02)	31.1 (0.02)	49.5 (0.02)
81+	528	79.7 (0.02)	16.7 (0.02)	40.5 (0.02)	33.1* (0.02)	31.1 (0.02)	51.1 (0.02)
Total	4,591	81.5 (0.01)	20.0 (0.01)	47.5 (0.01)	30.9 (0.01)	37.5 (0.01)	49.5 (0.01)
Men							
60–64	673	62.4 (0.02)	16.0 (0.01)	34.2 (0.02)	19.5 (0.02)	23.7 (0.02)	29.7 (0.02)
65–70	749	66.6 (0.02)	15.2 (0.01)	35.2 (0.02)	21.9 (0.02)	23.5 (0.02)	29.0 (0.02)
71–74	375	69.9* (0.02)	13.3 (0.02)	38.7 ⁺ (0.03)	26.1* (0.02)	23.5 (0.02)	29.3 (0.02)
75–80	372	65.6 (0.02)	15.3 (0.02)	31.5 (0.02)	25.8* (0.02)	20.1 (0.02)	32.3 (0.02)
81+	199	73.4** (0.03)	11.6 (0.02)	32.3 (0.03)	27.6* (0.03)	18.8 (0.03)	39.7** (0.03)
Total	2,368	66.3 (0.01)	14.9 (0.01)	34.7 (0.01)	23.0 (0.01)	22.6 (0.01)	30.7 (0.01)

⁺ $p < 0.05$.* $p < 0.01$.** $p < 0.001$.*** $p < 0.000$.

Compared to the lowest frequency for gender and type of pain.

back plus chest plus joint (0.78 times, 95% CI 0.62–0.98) and also fewer with the combination abdominal plus chest plus joint (0.66 times, 95% CI 0.43–0.91). We also fitted a model including sex and interactions with sex and found that the highest order interactions of sex with pain were not significant but two three-way interactions were: women were less likely to have the combination of abdominal and chest (0.71, 95% CI 0.52–0.97) and less likely to have the combination back and joint (0.67, 95% CI 0.52–0.86). The Spearman correlation between the number of pain complaints and the Short-SPES's score was 0.5 being statistically significant ($p < 0.000$).

Prevalence of a specific chronic pain along with other pain conditions

Prevalence of each pain with the possible co-occurrence of other pain conditions is presented in Table 3.

Psychiatric morbidity and chronic pain

There is a significantly higher rate of a specific somatic symptom along with other pain conditions in the subjects who met the criteria for a positive psychiatric condition ($n = 731$ men; 1991 women) than in those who did not ($n = 1637$ men; 2602 women). For men: abdominal 20% vs 12.6%; back 47% vs 29.2%; chest 45.6% vs 12.9%; head 38% vs

15.7%; joint 41.6% vs 25.8%; any pain 84% vs 58.5%. For women: abdominal 26.9% vs 14.8%; back 57.3% vs 39.9%; chest 51.9% vs 14.8%; head 51.3% vs 26.8%; joint 59.7% vs 41.7%; any pain 91.9% vs 73.6%. All measures, regardless of whether a specific pain along with others or any pain is included, exhibit consistently higher somatic comorbidity ($p < 0.0001$).

In a logistic regression analysis we examined the likelihood of a depression and anxiety state when all pain symptoms were simultaneously included in the same model as independent variables as well as other socioeconomic factors (see Table 4). We also tested the interaction of each pain symptom with all other chronic pain conditions for a significant effect on

Table 4. Logistic regression for psychiatric morbidity in elderly respondents with all pain conditions included in the model and significant interactions

Variable	Odds ratio	95% Confidence Intervals	
Chest Pain	5.596	4.937	6.343
Head Pain	2.233	1.977	2.521
Low income (< US\$200/month)	1.680	1.065	1.499
Rural origin	1.502	1.323	1.704
Joint	1.417	1.256	1.600
Non-married/widow	1.287	1.139	1.454
Ethnicity (non-Caucasian)	1.242	1.065	1.449
Interaction			
Abdominal pain/female	1.386	1.008	1.906
Back pain/school < 4	1.431	1.003	2.041

psychiatric morbidity. None of these interactions achieved statistical significance.

DISCUSSION

Occurrence of painful symptoms

This study of a large representative sample of older people living in the community showed that pain symptoms are extremely common. Seventy-six percent of the study subjects had at least one symptom. Similar figures were found by Miro *et al.* (2006) in the region of Catalonia. The prevalence of one specific pain symptom, with no comorbid pain condition, ranges from 1.3% for abdominal pain to 11.6% for back pain in women. Within men, the rates go from 2% for abdominal pain to 11.6% for joint pain. However co-occurrence, two or more pain symptoms, is pervasive reaching 50% of the entire sample. Among individuals with two or more pain symptoms the prevalence rates increase roughly 1.5 to 3-fold reaching 49.5% for women with joint pain and 81.5% for any pain also in women. The rates reported here are higher than observed in other studies investigating general adult samples (Verhaak *et al.*, 1998).

We observed positive associations between all of the pairs of symptoms and also a suggestion that the multiple combinations of abdominal, chest, head and joint were even more common than would be expected from the underlying pairwise associations. This may reflect the existence of a high risk group who are particularly sensitive to pain experiences although since we did not have a specific hypothesis about such a group the finding needs replicating in another sample. The pattern of interactions between sex and pain combinations also needs replication as the effects are quite small and arise from examination of a number of possible interactions.

Consistent with clinical and epidemiological research on comorbidity of pain symptoms and psychiatric morbidity there were statistically significant associations between all pain symptoms and psychiatric co-morbidity in this study. The associations are consistent when examined separately among men and women. An association between depression and somatic morbidity has been reported by others (Livingston *et al.*, 2000; Ohayon and Schatzberg, 2003; Currie and Wang, 2004). In addition, pain associated with depression is commonly represented by back, joint, headaches, chest pain abdominal complaints. In primary care, roughly 70% of patients with depression present themselves

complaining exclusively with physical symptoms (Simon *et al.*, 1999).

In a logistic regression analysis, persons with chest, head or joint pain, low income, rural origin, non Caucasian, non-married or widowed, females with abdominal pain, and back pain within the less educated, are all important factors in predicting psychiatric morbidity. An interesting finding is that neither age nor gender itself reached statistical significance.

Previous investigations have suggested that the number of somatic problems is associated with depression (Kroenke *et al.*, 1997; Patten, 1999). In line with previous findings, a correlation analysis of our data shows a relationship between the number or pain complaints and the total screening score. The pattern and magnitude of the correlation highlights the significance of the association which involves both biological and psychological aspects of human suffering.

Methodological strengths and limitations

The present investigation has a number of strengths. To our knowledge this is the first epidemiological survey of chronic pain symptoms and psychiatric morbidity focusing exclusively on older people. We studied a random sample of the population and the response rate was high, similar to other studies in developing countries (Chandra *et al.*, 1998). As far as we know, no other study in this field has considered this wide and most frequent spectrum of somatic pain complaints simultaneously.

We observed several potential limitations of this study. First, the possibility of bias as a hypothesis for these results needs to be considered. Reliance on self reported illness could be criticized as failing to provide an objective measure of the elderly health status. However, 'given the subjective elements involved in the measurement of chronic pain, an objective assessment of its real prevalence seems a contradiction' (Verhaak *et al.*, 1998). Moreover, with the exception of bone/joint disorders, most patients suffering from one of the more frequent pain categories (headaches, bone/joint, back pain, abdominal pain) will suffer from symptoms rather than from demonstrable diseases. Moreover, there are studies indicating that objective measures of pain are strongly related to self reported illness (Verhaak *et al.*, 1998). Second, the cross sectional study design excluded those people who were temporarily or permanently residing in hospitals or nursing homes, where prevalence of somatic symptoms and

psychiatric morbidity is presumably higher. Homeless subjects were also excluded. In light of these considerations our prevalence estimates are probably conservative ones. Third, the use of a cross sectional design does not allow us to distinguish whether pain is a result of a psychiatric morbidity or vice versa and the relationship among pain and psychiatric status is likely to be complex. Clinical and epidemiological studies (Benjamin *et al.*, 1988) have demonstrated a bidirectional relationship between depression, as well as other forms of psychological distress, and pain. Often pain itself is part of the phenomenological structure of the underlying psychiatric diagnosis. Fourth, the psychiatric assessment was conducted by means of a screening questionnaire and not a comprehensive psychiatric diagnostic interview which limits its ability to further understand the interplay between chronic pain and psychopathology such as dementia, depression and anxiety disorders. Fifth, information regarding treatment for pain or psychiatric comorbidity was not obtained and it could represent a confounder concerning our results. Sixth, male/female sample distribution was unbalanced according to census data. The computational problem leading to the loss of all data from one area may have contributed to this problem.

In summary, these results constitute the first study assessing the prevalence of pain symptoms and its relation to psychiatric morbidity in older people living in the community. The data provide evidence that prevalence of pain symptoms is high, co-occurrence is pervasive and somatic-psychiatric comorbidity is relevant. Our results also suggest that elderly subjects with pain symptoms mainly chest pain and head pain are at risk for psychiatric morbidity. The study indicates the need for further investigation in the relationship between pain and mental health as well as the treatment approach for this comorbid condition.

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