Lack of evidence for age differences in pain beliefs

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OBJECTIVE: To assess, in two studies, whether there are any age differences in beliefs about the role of psychological, organic and ageing factors in the experience of chronic pain.
SUBJECTS: Healthy adults free from chronic pain ranging in age from 18 to 86 years (first study); adults with chronic pain due to arthritis, fibromyalgia or other rheumatological disorders ranging in age from 27 to 79 years (second study).
MATERIALS: In both studies, subjects completed the Pain Beliefs Questionnaire which was modified to measure beliefs about the relationship between pain and ageing. In addition, subjects completed various self-assessments of health, pain intensity and depression. Those with chronic pain also completed the Arthritis Self-Efficacy Scale.
RESULTS: There was no evidence of any age differences in beliefs about pain in either the pain-free or chronic pain samples. There was some evidence that elderly patients may report less pain, but there were no age differences found on measures of depression or self-efficacy.
CONCLUSIONS: The elderly were no more likely than younger persons to associate pain with the normal ageing process than with organic factors such as tissue damage, nor were they more likely to deny the importance of psychological factors to the pain experience.

Key Words: *Age differences, Pain Belief Questionnaire, Pain beliefs*

Absence de preuves pour associer les différences d'âge aux croyances sur la douleur

OBJECTIF : Examiner, dans deux études, si les croyances relatives au rôle des facteurs psychologiques, organiques et de vieillissement dans la douleur chronique varient selon l'âge.
SUJETS : Des adultes sains sans douleur chronique, d'âge variant entre 18 et 86 ans (première étude) ; des adultes souffrant d'une douleur chronique due à l'arthrite, la fibromyalgie ou à d'autres affections rhumatismales, d'âge variant entre 27 et 79 ans (deuxième étude).
MATÉRIEL : Dans les deux études, les sujets ont complété le questionnaire de croyances sur la douleur (Pain Belief Questionnaire) modifié pour mesurer les croyances sur la relation entre la douleur et le vieillissement. De plus, les patients ont complété des auto-évaluations sur la santé, l'intensité de la douleur et la dépression. Les sujets atteints d'une douleur chronique ont également complété l'échelle d'auto-efficacité sur l'arthrite (Arthritis Self-Efficacy Scale).
RÉSULTATS : Il n'y avait aucune preuve que les croyances concernant la douleur varient selon l'âge que ce soit dans l'échantillon des patients sans douleur ou dans celui des patients avec douleur. Quelques indices suggéraient que les patients plus âgés rapportaient moins la douleur mais les différences d'âge ne ressortaient pas dans les mesures de la dépression ou de l'auto-efficacité.
CONCLUSIONS : Les personnes âgées n'avaient pas plus tendance que les personnes plus jeunes à associer la douleur avec le processus normal du vieillissement qu'avec des facteurs organiques tels que des lésions tissulaires, de même qu'elles ne niaient pas plus l'importance des facteurs psychologiques dans la douleur.

Pain beliefs represent an individual's understanding of the pain experience, including the causes, meaning, consequences and effective treatments of pain (1). These beliefs are important in the interpretation of physical symptoms and influence symptom reporting, treatment seeking, compliance and outcome (2). We present results from two studies to assess whether there are any age differences in beliefs about the role of psychological, organic and ageing factors in the experience of chronic pain. In study 1, we assessed age differences in pain beliefs held by healthy individuals; in study 2, we assessed pain beliefs of adults with chronic arthritic pain.

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STUDY 1

It has been suggested that the elderly believe that pain is a normal part of the ageing process and, therefore, do not interpret such symptoms as threats to their health. Instead, they may perceive pain as something to be expected, tolerated and not worthy of medical treatment (3). In addition, it has been proposed that the elderly are more reluctant than other age groups to acknowledge the contribution of psychological factors to the pain experience (4).

There is little empirical evidence to support these widely held views. In fact, one study that assessed age differences in health beliefs found that only 2% of an elderly sample attributed their chronic health conditions to ageing and that health beliefs in general were not strongly associated with age (5). Comparable data concerning beliefs specific to pain have not been reported although there have been anecdotal reports that the elderly conceptualize their pain as a normal part of the ageing process (6,7). It has also been suggested that acceptance of pain as a normal part of growing older may be necessary in order for the elderly to continue to enjoy a full and active life (6,7). However, this conclusion is not based on data from any standardized measure of pain beliefs, nor on any comparison with younger groups, making interpretation of these findings difficult.

The present study (study 1) assessed age differences in the beliefs about pain held by healthy individuals. Pain beliefs and the experience of pain were measured in healthy young, middle-aged and elderly adults. It was predicted that there would be age differences in beliefs about the contributions of organic, psychological and ageing factors to the experience of pain. In addition, it was predicted that the elderly would minimize the role of psychological factors while strongly endorsing the role of ageing in the pain experience.

SUBJECTS

The majority of the subjects (n=78) were volunteers recruited from several community centres in Montreal. Ninety-eight questionnaires were distributed and 80 were returned, a response rate of 81.6%. Two of the returned questionnaires were incomplete and were not included in the analysis. The remainder of the subjects (n=19) were recruited from the introductory psychology student subject pool at McGill University and received course credit for their participation.

The results of this study are based on data from 97 adults between 18 and 86 years old. For purposes of analysis, subjects were divided into three age groups: young (18 to 35 years old, mean ± SD: 23.5±5.3 years, n=33), middle-aged (36 to 64 years old, 49.7±9.4, n=29) and elderly (65 to 86 years old, 72.4±5.4, n=35). Table 1 presents demographic information about each of the groups.

TABLE 1
Study 1: Age and sex distribution of subjects

Group	N	Age range (years)	Mean age ± SD	% female
Young	33	18-35	23.5±5.3	75.8
Middle-aged	29	36-64	49.7±9.4	44.8
Elderly	35	65-86	72.4±5.4	68.6

TABLE 2
Pain Belief Questionnaire ageing subscale items

1. People my age are bothered by pain.
2. Pain in old age is related to how well a person cared for themselves earlier in life.
3. Age affects how much one can do to ease pain.
4. Older people are bothered by pain.
5. Pain is a part of the ageing process.
6. Pain is a normal part of ageing.
7. Pain is to be expected as a person ages.
8. Being in pain makes a person think about dying.

METHODS

Procedure

At the community centres, potential subjects were approached and the nature of the study described to them. Participation was voluntary. If a subject expressed interest in participating, informed consent was obtained. Subjects were given the questionnaire along with a stamped, self-addressed envelope. They were instructed to complete the questionnaire on their own and to return it in the mail.

The procedure was identical with the students, except that they returned the questionnaire directly to the experimenter and were then debriefed concerning the study's design and predictions.

Materials

Pain Beliefs Questionnaire (PBQ): The PBQ (8), a measure of the extent to which individuals attribute pain to psychological and organic causes, was modified to include items that specifically assessed beliefs about the relationship between pain and ageing (Table 2). This self-report questionnaire, chosen because it has demonstrated satisfactory reliability and validity, is the only measure of pain attributions that is appropriate for use with pain-free samples because, unlike other scales, the items do not personalize the experience of pain. For instance, on the PBQ, subjects indicate their extent of agreement with statements such as, "Pain is the result of damage to the tissues of the body", whereas other scales are made up of items such as, "The pain I usually experience is a signal that damage is being done" (from the Survey of Pain Attitudes [9]). Scores for each of the subscales (organic, psychological and ageing) range from 1 to 6 with higher scores indicating stronger agreement.

Health self-assessment: Three items were used to measure subjective health. These items assessed an individual's present level of concern with health problems; perceived impairment in daily activities due to health troubles; and overall health rating from poor to excellent. There is evidence that scores on this scale, which range from 3 to 11 with higher scores indicating better health, are correlated with objective measures of health in community-dwelling elderly (10).

Functional health: Functional health involves a person's self-assessed ability to carry out the activities of daily living. A six-item

scale, developed specifically for the elderly, with demonstrated adequate reliability was used. Scores on this scale are highly correlated with objective measures of health and range from 0 to 6 with higher scores indicating less restriction of activities or better health (11).

Pain symptomatology: A checklist of 15 painful symptoms was developed to measure the number of pain symptoms and their location, frequency and intensity. Frequency and intensity were each scored from 1 to 4 with higher scores indicating more frequent and intense pain symptoms.

Pain intensity: The Behavioural Rating Scale (BRS-6) (12) is a measure of pain intensity in terms of its behavioural effects. Subjects choose the best description of their pain from six options ranging from "No pain" to "Pain present, cannot be ignored, rest or bed rest required". Scores range from 0 to 5 with higher scores indicating more intense pain. This self-report scale has shown reliability and validity comparable with other measures of pain intensity. There is also evidence that age is not associated with accuracy of responding on this scale (13).

Depression: The Beck Depression Inventory (14) is a 21-item self-report assessment of various symptoms of depression. The scale is widely used and has demonstrated adequate reliability and validity when used with different age groups (15). Scores range from 0 to 84 with higher scores indicating more severe depression.

RESULTS

Age and health

A multivariate ANOVA (MANOVA) was conducted with sex and age group as the independent variables, and health status and depression as the dependent variables. The three age groups did not differ on the measure of general health ($F[2,90]=0.21$, $P>0.8$). However, there was a significant age group effect on the measure of functional health ($F[2,90]=10.01$, $P\leq0.0001$). Posthoc mean comparisons revealed that the elderly group had significantly poorer functional health than the two younger groups, which did not differ from each other. This scale measures the extent of perceived impairment in daily activities such as walking and climbing stairs. There were no significant sex differences on either measure of health status.

Scores on the Beck Depression Inventory did not differ among the age groups ($F[1,90]=1.13$, $P\leq0.3$). There was a significant sex effect, with women exhibiting significantly higher depression scores than men (mean ± SD: 7.90±5.4 versus 5.74±6.1; $F[1,90]=4.22$, $P\leq0.04$). There were no significant sex by age group interactions on either the health status or depression measures. (See Table 3 for group means and significance levels.)

Pearson's product moment correlations were calculated between age and the other dependent variables to quantify relationships between the variables. $P\leq0.001$ was adopted as the criterion level for significance in the correlation matrix. Results are presented in Table 4.

Age and pain

The most frequently reported painful symptoms were headache, back pain and general aches, with 77.1%, 69.8% and 54.2% of subjects, respectively, reporting each symptom. There were significant effects of age on the pain symptom checklist. The overall number of symptoms reported was significantly different among the groups ($F[2,90]=5.64$, $P\leq0.005$). Paired comparison analysis indicated that the elderly group reported significantly fewer pain symptoms than the young group (8.2 versus 5.1, $P\leq0.01$). The proportion of subjects per age group reporting each of the symptoms was compared using χ^2 analysis. The groups differed on only four of the 15 symptoms: head, tooth, neck and abdominal pain. In each case the elderly were less likely to report the symptom than the young or middle-aged groups (Table 5). The three groups did not differ on the intensity or frequency of painful symptoms as measured by the checklist. Consistent with this, the scores on the BRS-6 were not significantly different among the three groups ($F[2,90]=2.46$, $P\leq0.10$) (Table 4).

There were significant sex differences on the measures of pain intensity and frequency, with women reporting both more frequent (mean ± SD: 1.76±0.6 versus 1.41±0.4; $F[1,90]=4.93$, $P\leq0.03$) and more intense (1.48±0.8 versus 1.32±0.6; $F[1,90]=4.93$, $P\leq0.03$) pain. There was no effect of sex on the number of symptoms reported ($F[1,90]=2.14$, $P\leq0.15$). The sex difference in pain intensity was replicated on the BRS-6 (mean ± SD: 1.32±1.3 versus 0.89±0.8; $F[1,90]=4.32$, $P\leq0.04$). There were no significant sex by age group interactions on any pain measure.

Age and pain beliefs

The internal consistency of the items developed to measure beliefs about the relationship between pain and ageing (ageing subscale) was assessed using Cronbach's coefficient alpha. A value of 0.73 was obtained, indicating good internal reliability of these items.

TABLE 3
Study 1: Mean scores ± SD of the health and depression measures for each age group

Group	Self-assessed health	Functional health*	Depression	BRS-6
Young	8.46±1.86	5.55±0.67	5.94±4.56	1.24±1.00
Middle-aged	8.59±1.59	4.97±1.21	7.62±6.69	1.38±1.18
Elderly	8.29±2.15	4.11±1.37	7.81±5.73	0.92±1.18

*P not significant except *P≤0.0001. BRS-6 Behavioural Rating Scale*

TABLE 4
Study 1: Correlations between age and the other measures

	Age	PBQ-A	PBQ-O	PBQ-P
PBQ-A	–0.048	1.000		
PBQ-O	–0.015	0.322*	1.000	
PBQ-P	–0.124	0.090	0.181	1.000
Pain symptoms	–0.391*	0.078	0.074	0.127
Pain intensity	–0.134	0.106	0.117	0.126
Pain frequency	0.052	0.133	–0.001	0.129
Self-assessed health	–0.059	–0.123	–0.220	0.114
Functional health	–0.495**	0.041	–0.164	0.044
BRS-6	–0.105	0.054	0.101	–0.085
Depression	0.162	0.141	–0.041	–0.188

**P≤0.001; **P≤0.0001. BRS-6 Behavioural Rating Scale; PBQ-A Pain Beliefs Questionnaire (PBQ) Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale*

TABLE 5
Study 1: Painful symptoms reported by age group

	Pain location: n (%)														
Group	Head*	Tooth**	Neck***	Abdominal****	Facial	Migraine	Shoulder	Chest	Back	Hip	Leg	Knee	Foot	Joint	Aches and pains
Young	32 (97)	23 (69.7)	28 (84.9)	17 (51.5)	4 (12.1)	5 (15.5)	15 (45.5)	9 (27.3)	29 (75.8)	8 (24.2)	14 (42.4)	14 (42.4)	7 (21.2)	7 (21.2)	21 (63.6)
Middle-aged	23 (79.3)	12 (41.4)	9 (31.0)	15 (51.7)	1 (3.5)	7 (24.1)	16 (55.2)	9 (31.0)	19 (65.5)	5 (17.2)	9 (31.0)	5 (17.2)	8 (27.6)	10 (34.5)	16 (55.2)
Elderly	19 (55.9)	7 (20.6)	14 (41.2)	8 (23.5)	3 (8.8)	3 (8.6)	14 (41.2)	9 (26.5)	19 (55.9)	8 (23.5)	8 (23.5)	13 (38.2)	10 (29.4)	9 (26.5)	15 (44.1)

P not significant except $*\chi^2=19.1$, $P\leq0.0001$; $**\chi^2=16.5$, $P\leq0.0001$; $***\chi^2=20.9$, $P\leq0.0001$; $****\chi^2=7.1$, $P\leq0.03$

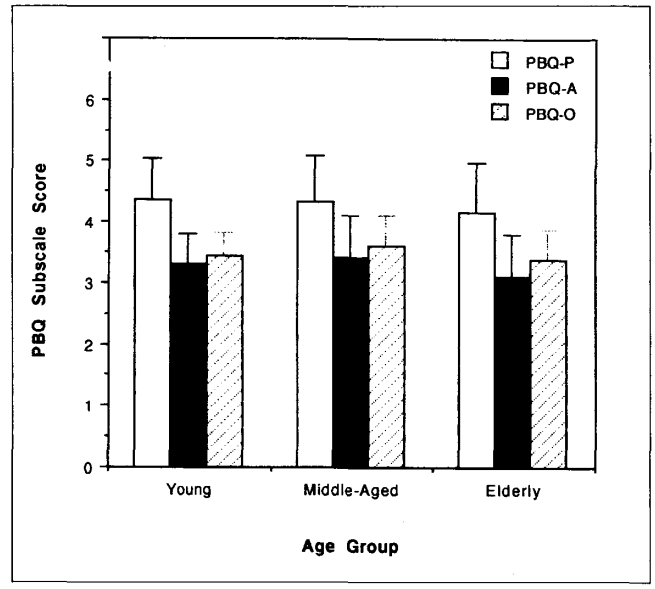

Figure 1) Pain Beliefs Questionnaire (PBQ) subscale scores by age group in a sample of pain-free adults. PBQ-A Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale

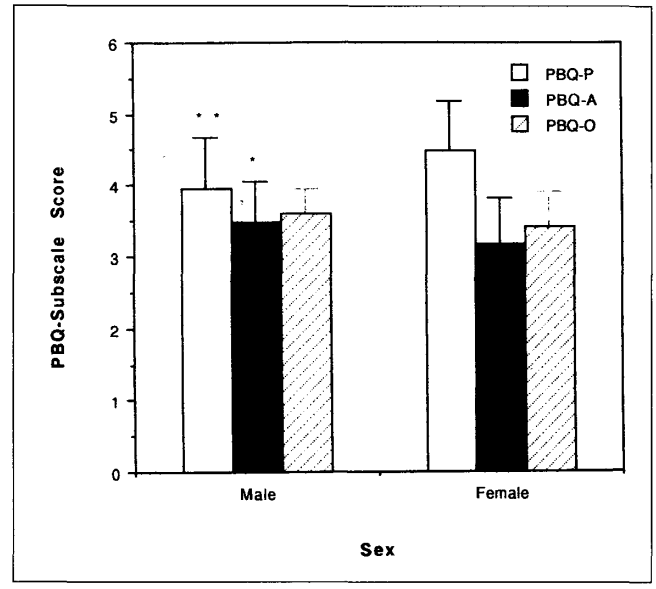

Figure 2) Pain Beliefs Questionnaire (PBQ) subscale scores by sex. PBQ-A Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale. *P≤0.04; **P≤0.001

Correlations of the PBQ subscales with the other dependent variables are presented in Table 3. A MANOVA with group and sex as the independent variables and PBQ subscales as the dependent variables found no significant differences among the age groups on either the organic ($F[1,72]=1.04$, $P\leq0.4$), psychological ($F[1,72]=1.00$, $P\leq0.4$) or ageing ($F(1,72)=2.04$, $P\leq0.1$) subscales of the PBQ (Figure 1). There were significant sex differences on the psychological ($F(1,91)=12.85$, $P\leq0.001$) and ageing ($F,[1,91]=4.39$, $P<0.04$) subscales but not the organic ($F[1,72]=1.83$, $P\leq0.2$) subscale (Figure 2). The interaction between sex and age group was not significant for any PBQ subscale. The results suggest that, regardless of

age group, women are more likely to believe that psychological factors are important in the experience of pain, and that men are more likely to believe that pain is a normal part of ageing (see Figure 2).

PBQ subscale scores within each age group were significantly different ($F[2,150]=47.66$, $P\leq0.0001$) with higher scores on the psychological scale than either the ageing or organic subscales, which did not differ from each other. This result suggests that, within a given age group, subjects were more likely to agree that psychological factors can influence pain than they were to agree that pain is directly related to injury and ageing.

There has been some evidence that pain beliefs vary as a function of pain intensity (16). Because subjects in this sample were healthy, the proportion endorsing high levels of pain intensity was small, making analysis of the relationship between age and pain beliefs at differing levels of pain intensity impossible. However, it was possible to adjust the scores on the PBQ for pain intensity by repeating the MANOVA described above but including BRS-6 scores as a covariate. The results of this analysis were identical to those reported above, suggesting that even when pain intensity is controlled, pain beliefs do not differ among the age groups.

DISCUSSION

The results of this study suggest that although there may be some age differences in the self-assessment of health and the experience of painful symptoms, there is no evidence for age differences in beliefs about pain. The pattern of scores on the PBQ was very similar across the groups. Within each age group, subjects were more likely to endorse psychological beliefs than either organic or ageing beliefs, which did not differ from each other. The elderly were no more likely than younger subjects to deny the importance of psychological factors in the pain experience, nor were they more likely to associate pain with the normal ageing process than with organic factors such as tissue damage. These results did not change when pain intensity was controlled.

The relationship between age and perceived health depended on the measure of health used. Specifically, although there were no age differences in overall health assessments, the elderly group reported greater impairment than the two younger groups in the performance of daily activities as a consequence of health problems. This implies that the functional impairment reported by the elderly may be experienced as a normal part of ageing, and is not a consideration when assessing one's health and, thus, is not associated with poorer health assessments. Unfortunately, objective measures of health and functional status were not available, limiting our interpretation of these findings.

There was some evidence that the elderly report fewer painful symptoms, specifically head, dental, neck and abdominal pain, than the young and middle-aged groups. This finding is consistent with epidemiological studies that reported an age-related decline in the prevalence of painful symptoms (17). In our study there were no age differences on either measure of pain intensity. This suggests that although the elderly may be less likely to experience painful symptoms, those reported are of an intensity comparable with that experienced by younger subjects. This is especially interesting when one considers the BRS-6. This scale measures pain intensity in terms of behavioural consequences, specifically the extent to which pain interferes with the performance of daily activities. Therefore, although the elderly report greater overall impairment due to health difficulties on the functional health assessment, the lack of a comparable age difference on the BRS-6 implies that the impairment in functional health is not associated with pain. In fact, the impact of pain on daily activities does not appear to differ with age.

There were several sex differences found although there were no significant sex by age group interactions. These results suggest that within a sample of healthy adults, women experience greater levels of depressive affect and more intense and frequent pain. Comparable sex differences have been reported previously (18,19) and suggest that the sample used in this study is representative of community-dwelling adults. There were also sex differences on the measure of pain beliefs. Specifically, women showed stronger beliefs in the role of psychological factors in the experience of pain while men were more likely to endorse beliefs suggesting that pain is a normal part of ageing. These differences and their possible consequences should be studied further.

This study, study 1, is based on the self-report of relatively healthy subjects. This population was studied to measure the pain beliefs of adults without chronically painful conditions because it is not clear how ongoing pain may alter pain beliefs. In the following study, study 2, the pain beliefs of individuals of various ages with chronic arthritic pain were assessed to examine this issue.

STUDY 2

It is not clear whether the lack of age differences in beliefs about pain found in pain-free individuals would generalize to people with chronic pain. It is reasonable to assume that the experience of chronic pain will not only be influenced by pain beliefs, but also may modify pre-existing beliefs. For instance, a person who previously believed that pain was directly related to injury may come to appreciate the role that psychological factors play in the exacerbation of one's own chronically painful symptoms.

Edwards et al (8) recently attempted to compare the pain beliefs of chronic pain patients versus pain-free controls. They found a significant interaction between pain status and scores on the PBQ subscales. Chronic pain patients were more likely than controls to endorse items on the organic subscale but less likely to show agreement with items on the psychological subscale. These results suggest that chronic pain patients may place greater emphasis than controls on the organic aspects of pain, while nonpain controls are more likely to believe that psychological factors play a role in the pain experience.

Age differences in the pain beliefs of chronic pain patients have been addressed in two recent studies, the results of which are inconsistent. Strong et al (20) reported no age differences, while Herda et al (21) found that increasing age was associated with

TABLE 6
Study 2: Age and sex distribution of subjects with chronic arthritic pain

Group	N	Age range (years)	Mean age ± SD	% female	Diagnosis: n (%) RA	Osteoarthritis	Other	Pain duration (years)	Number of joints affected
Young	19	27-45	38.4±4.3	68.4	11 (57.9)	4 (21.1)	4 (21.1)	11.9 (8.9)	7.7 (4.3)
Middle-aged	37	46-59	51.3±3.5	90.8	19 (52.8)	10 (27.8)	7 (19.4)	13.7 (14.8)	9.2 (4.5)
Elderly	23	60-79	67.3±5.5	65.2	12 (52.2)	9 (39.1)	2 (8.7)	12.2 (4.7)	6.0 (3.9)

P was not significant for any measure. RA Rheumatoid arthritis

TABLE 7
Study 2: Mean ± SD of the health and depression measures for each age group

Group	Self-assessed health	Functional health	Arthritis Self-Efficacy Scale Pain	Function	Other	Depression	Behavioural Rating Scale
Young	6.26±1.79	3.26±1.05	60.13±22.79	80.35±22.31	72.19±15.84	9.79±9.25	2.26±0.73
Middle-aged	6.41±1.88	3.22±1.25	59.72±20.04	78.83±22.37	69.91±15.35	12.84±9.31	2.56±1.12
Elderly	6.96±2.10	2.73±1.16	58.52±23.27	72.39±22.78	70.33±20.84	10.05±8.25	2.29±0.78

P was not significant for any measure

stronger beliefs that pain is a constant experience and that pain-free intervals are an exception. Unfortunately, neither of these studies was designed specifically to assess the relationship between age and pain beliefs, which may have contributed to the inconsistent results reported. Furthermore, both studies used pain belief assessment instruments that personalize the experience of pain. As a result, subjects may have responded on the basis of their personal experience rather than their general beliefs about pain. Finally, subjects were individuals referred to pain clinics. It has been suggested that the elderly referred for such treatments may not be typical of the larger population of elderly people with chronic pain (22). In the present study, the pain beliefs of adults of various ages with chronic arthritic pain were assessed using the PBQ.

SUBJECTS

Adults with chronic arthritic pain were randomly selected as potential participants from the membership rosters of the Arthritis Society of Quebec. A total of 152 subjects were chosen, and 82 of the 152 questionnaire packages mailed to their homes were returned, a response rate of 53.9%. Three questionnaires were incomplete and were excluded from the study.

For purposes of analysis, the 79 subjects were divided into three age groups: young (27 to 45 years old, mean ± SD: 38.4±4.3 years, n=19), middle-aged (46 to 59 years old, 51.3±3.5 years, n=37) and elderly (60 to 79 years old, 67.3±5.5 years, n=23). The majority of subjects reported that they had received a diagnosis of rheumatoid arthritis; the remainder reported a diagnosis of either osteoarthritis or another rheumatological disorder such as fibromyalgia or degenerative disc disease. The proportion of subjects reporting each of these diagnoses was not significantly different among the three groups (χ^2_4=2.56, P≤0.63). In addition, the duration of pain and the number of joints affected were not significantly different among the three age groups. Table 6 presents demographic information about each group.

METHODS

Procedure

Questionnaires, a cover letter explaining the project and two consent forms were mailed to each subject. The cover letter instructed subjects to complete the questionnaire and mail it and one copy of the signed consent form to the experimenters in the self-addressed, stamped envelope included with the materials.

Materials

Materials were identical to those described in study 1 (see above) except for the following additions.

Self-efficacy: The Arthritis Self-Efficacy Scale (23) is a 20-item self-report questionnaire shown to have good psychometric properties (2). It measures self-efficacy on three subscales: physical functioning, control of pain and control of other arthritis symptoms. Higher scores on this scale indicate greater levels of self-efficacy.

Pain: The short form McGill Pain Questionnaire (24) is a multidimensional measure of the quality of pain experienced. It comprises 15 adjectives, and subjects indicate the extent, from none to severe, to which they experience each quality of pain. This scale gives overall, sensory and affective scores. It also includes a verbal descriptor rating from "No pain" to "Excruciating" and a 100 mm visual analogue scale of present pain intensity. On each of these pain measures higher scores indicate more intense pain.

RESULTS

Age and health

A MANOVA with age group and sex as the independent variables found no significant differences on the measures of self-assessed health, functional health, self-efficacy or depression. There were also no significant interactions between sex and age group on any of these measures. See Table 7 for the group means for each of these variables.

Pearson's product moment correlations were calculated between

TABLE 9
Study 2: Painful symptoms reported by age group

	Pain location: n (%)														
Group	Migraine*	Dental**	Neck	Abdominal	Facial	Head	Shoulder	Chest	Back	Hip	Leg	Knee	Foot	Joint	Aches and pains
Young	2 (10.5)	8 (42.1)	17 (89.5)	11 (57.9)	4 (21.1)	13 (68.4)	17 (89.5)	9 (47.4)	16 (84.2)	12 (63.2)	14 (73.7)	14 (42.4)	17 (89.5)	17 (89.5)	12 (63.2)
Middle-aged	17 (47.2)	14 (38.9)	31 (86.1)	15 (41.7)	8 (22.2)	24 (66.7)	27 (75.0)	14 (38.9)	29 (80.6)	24 (66.7)	29 (80.6)	5 (17.2)	25 (69.4)	31 (86.1)	23 (63.9)
Elderly	3 (13.0)	1 (4.4)	17 (73.9)	7 (30.43)	1 (4.35)	9 (39.1)	14 (60.9)	9 (39.1)	18 (78.3)	12 (52.2)	13 (56.5)	13 (56.5)	19 (82.6)	20 (87.0)	10 (43.5)

*P was not significant except *χ^2=11.97, P≤0.003; **χ^2=9.98, P≤0.007*

TABLE 8
Study 2: Correlations between age and the other measures

	Age	PBQ-A	PBQ-O	PBQ-P
PBQ-A	0.27	1.00		
PBQ-O	–0.07	0.42**	1.00	
PBQ-P	–0.03	0.27	0.38*	1.00
Pain intensity	–0.01	0.18	0.40*	0.15
Pain frequency	0.36	0.12	0.07	0.13
Self-assessed health	0.17	–0.14	–0.21	–0.13
Functional health	–0.15	–0.14	–0.26	–0.06
BRS-6	0.01	0.09	0.15	–0.10
Arthritis Self-Efficacy Scale				
Pain	–0.04	–0.15	–0.03	0.20
Function	–0.10	–0.01	–0.17	–0.12
Other	0.04	–0.24	–0.22	0.00
Depression	–0.05	0.26	–0.32	0.10

**P≤0.001; **P≤0.0001. BRS-6 Behavioural Rating Scale; PBQ-A Pain Beliefs Questionnaire (PBQ) Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale*

age and the other dependent variables to quantify relationships between the variables. P≤0.001 was adopted as the criterion level in the correlation matrix. Results are presented in Table 8.

Age and pain

The data needed to achieve the aims of the present study are provided by the pain symptom checklist and the BRS-6 measure of pain intensity. (A detailed description of the data obtained from all of the pain assessment instruments will be presented in a separate paper.)

The most frequently reported painful symptoms were joint, neck and back pain, with 87.2%, 83.3% and 80.8% of subjects, respectively, reporting each symptom. The three age groups did not differ in the overall number of pain symptoms reported (F[1,44]=0.31, P≤0.6). The proportion of subjects per age group reporting each of the symptoms was compared using χ^2 analysis. The groups differed on only two of the 15 symptoms: migraine and dental pain. The elderly were less likely than the two younger groups to report experiencing dental pain. The middle-aged group was much more likely than both the older and younger group to report migraine (Table 9). The three groups did not differ on the reported frequency of any of the symptoms. Significant differences in reported levels of pain intensity were found in back (F[2,60]=4.09, P≤0.02) and joint (F[2,65]=3.44, P≤0.04) pain. Posthoc comparisons revealed that for both pain locations, the middle-aged group had significantly higher pain intensity scores than the other two groups, who showed no differences. Nonetheless, for the majority of painful symptoms (13 of 15) there were no age differences on the measure of pain intensity. This is further supported by scores on the BRS-6, which were not significantly different among the groups (F[2,56]=2.29, P≤0.5) (Table 8).

Age and pain beliefs

Group differences on the pain beliefs measure were assessed using a MANOVA, with group and sex as the independent variables and PBQ subscales as the dependent variables. There were no significant

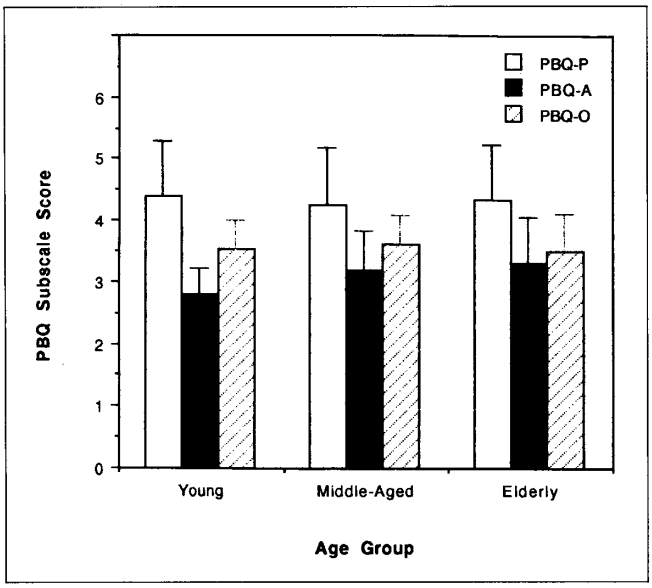

Figure 3) Pain Beliefs Questionnaire (PBQ) subscale scores by age group in a sample of adults with chronic arthritic pain. PBQ-A Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale

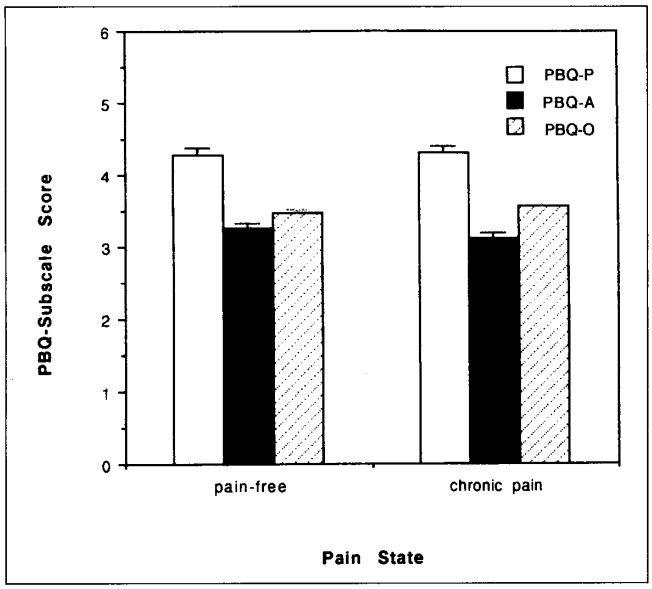

Figure 4) Pain Beliefs Questionnaire (PBQ) subscale scores in a sample of pain-free adults versus a sample of adults with chronic arthritic pain. PBQ-A Ageing subscale; PBQ-O Organic subscale; PBQ-P Psychological subscale

differences among the age groups on the organic ($F[2,72]=0.88$, $P\leq0.4$), psychological ($F[2,72]=0.11$, $P\leq0.9$) or ageing ($F[2,72]=2.34$, $P\leq0.1$) subscales. Furthermore, there were no significant sex differences or sex by age group interactions (Figure 3).

PBQ subscale scores within each age group were significantly different ($F[2,150]=52.66$, $P\leq0.0001$), with higher scores on the psychological subscale than either the ageing or organic subscales, which did not differ from each other. This result suggests that, within a given age group, subjects were more likely to agree that psychological factors can influence pain than they were to agree that pain is directly related to injury and ageing.

Unfortunately, the age distribution of subjects in this study and study 1 are too different to allow direct comparison of pain beliefs using a multifactorial design. However, the average age of the subjects in the two studies was not significantly different (mean ± SD was 48.9±21.7 years in pain-free subjects [study 1] and 52.9±11.5 years in subjects with chronic pain [study 2], $t_{174}=1.46$, $P\leq0.15$). Therefore, it was possible to test the significance of the difference between the correlations of age with each PBQ subscale across the two samples using Fisher's Z transformation. The correlations of age with the organic ($Z=-0.33$) and psychological ($Z=0.62$) subscales were not different between the two groups. The correlation of age with the ageing subscale of the PBQ were significantly different between the groups: $r=-0.05$ in the pain-free subjects while $r=0.27$ in the chronic pain patients ($Z=2.08$, $P\leq0.04$). This pattern of results suggests that increasing age may only be associated with stronger beliefs that pain is a normal consequence of ageing in individuals with chronic pain, but that, regardless of pain state, there is no relationship between age and beliefs about the role of organic and psychological factors.

TABLE 10
Functional health assessments ± SEM by age group and pain state

Age group	Pain-free	Chronic pain
Young	5.35±0.17 (n=48)	3.10±0.19 (n=40)
Old	4.37±0.17 (n=49)	3.08±0.19 (n=38)

There was a significant interaction of pain state and age group ($F[1,171)]=7.22$, $P\leq0.008$)

In order to assess the impact of a chronic painful condition on pain beliefs, independent of age differences, subjects from both study 1 and study 2 were compared. Subjects from study 1 (n=97) formed the pain-free group. Although these individuals did report some painful symptoms, this label was used to differentiate them from the subjects reporting chronic arthritic pain from study 2, who made up the second group (n=79). A MANOVA with study (ie, pain state) as the independent variable and each of the PBQ subscales as dependent variables was performed. There were no significant differences between the two studies on any subscale (Figure 4).

The pattern of age differences found on the health measures was inconsistent across the two studies. The authors were interested in exploring the possibility that this inconsistency might reflect an interaction between age and pain state in the determination of health ratings. There were two self-reported measures of health: functional health, the perceived ability to carry out activities of daily living, and health self-assessments, a more global survey of overall health and concern with health problems. In the pain-free sample (study 1), the elderly subjects had significantly poorer functional health than the middle-aged and young groups. This difference was not found in the subjects with chronic arthritic pain (study 2). To explore this inconsistency, subjects from both studies were divided into a 'young' and 'old' group based on a median split at 51 years old. A MANOVA was then conducted with study (pain state) and age (young versus old) as the independent variables and the two health measures as the dependent variables. There was a significant effect of pain state on

health self-assessments ($F[1,171]=43.82$, $P\leq0.0001$). This result indicates that those with chronic arthritic pain, regardless of age, rated their health as poorer than those who were pain-free. More interestingly, there was a significant interaction between age and pain state on the measure of functional health ($F[1,171]=7.22$, $P\leq0.008$) (Table 10). This interaction suggests that in pain-free individuals there is an age-related decline in self-assessed functional health. However, this decline is not seen in those with arthritis, who report significant impairment in the performance of daily activities regardless of age. Increasing age is not associated with further impairment in arthritic pain patients, but is in pain-free individuals. This does not appear to be a floor effect because the mean score of the older group is greater than the minimum score possible on this scale. This interpretation is further supported by comparison of the correlation between age and functional health found in each study: $r=-0.50$ in pain-free subjects and $r=-0.15$ in those with chronic pain. A comparison of these correlations using Fisher's Z transformation showed that these correlations are significantly different ($Z=-2.56$, $P\leq0.005$).

DISCUSSION

This study presents further evidence that there are no age differences in pain beliefs. The pattern of scores on the PBQ was very similar across the groups. Within each age group subjects were more likely to endorse psychological beliefs than either organic or ageing beliefs, which had similar endorsements. The elderly were no more likely than younger groups to deny the importance of psychological factors to the pain experience, nor were they more likely to associate pain with the normal ageing process than with organic factors such as tissue damage. This pattern of results was independent of pain intensity.

We found no age differences on the measures of health or psychological well-being in subjects with chronic arthritic pain. This implies that regardless of age, these subjects perceived themselves to be impaired to the same extent as a consequence of arthritis. Advancing age was not perceived as an additional source of impairment. The lack of age differences on the Arthritis Self-Efficacy Scale further supports this. Regardless of age, subjects felt themselves equally able to perform physical activities and to control their pain and other arthritic symptoms. These results, as well as the lack of differences in the experience of depressive symptoms, are consistent with previous reports (for review see 25).

There was some limited evidence for age differences in the frequency and intensity of painful symptoms. However, for the majority of symptoms assessed by the pain symptom checklist, the three groups did not differ in either pain frequency or intensity. This was further supported by the lack of an age difference on the BRS-6 measure of pain intensity. These results suggest that the experience of pain and ill health was fairly comparable among the three groups. This makes the lack of age differences in pain beliefs more striking because the three groups not only experienced the same type of pain but also had pain of similar intensity, frequency and duration. Each group perceived themselves to be significantly impaired by arthritis to the same extent. If the elderly subjects believed that their pain was a normal consequence of ageing they would not only have shown greater agreement with items such as "Pain is normal in people my age", but also have been less likely to consider themselves as being in poor health or concerned about their health. Specifically, if they thought arthritic pain was normal at their age, they would not have perceived themselves to be in poor health and therefore would have obtained higher scores on the health self-assessments. This interpretation is, of course, highly speculative and further work is needed to clarify this relationship.

GENERAL DISCUSSION AND CONCLUSIONS

The results of our two studies, designed to measure age differences in beliefs about pain, have been presented. The most consistent finding was that regardless of pain state, there is no evidence for age differences in pain beliefs. In individuals with chronic arthritic pain as well as those with no chronically painful condition, the elderly were no more likely than younger persons to deny the importance of psychological factors to the pain experience, nor were they more likely to associate pain with the normal ageing process than with organic factors. This pattern of results did not change when pain intensity was controlled.

The only difference found between the subjects in the two studies was in the strength of the correlation between age and the PBQ ageing subscale. This result suggests that in individuals with chronic pain, increasing age may be associated with the belief that pain is a normal part of ageing to a greater degree than was found in pain-free individuals. However, as will be described below, most of the evidence suggests that individuals with chronic pain do not differ in their beliefs about pain as a function of age.

A comparison of pain beliefs across our two studies suggests that, independent of age, there are no significant differences in pain beliefs between individuals with chronic pain and those who are pain-free. This fails to replicate the pattern of differences reported by Edwards and colleagues (8), who suggested that chronic pain patients believe more strongly in an organic explanation of their pain than pain-free controls. The discrepancy may be due to sample differences. The subjects in the study by Edwards et al were seeking treatment for their pain while the subjects in the current study, although members of the Arthritis Society, did not complete the questionnaire as a part of any treatment. Furthermore, all chronic pain patients in this study received an organic diagnosis of their pain, which may not have been the case in the sample studied by Edwards et al. It may be assumed that these factors might have influenced the pattern of results that was found.

Age differences in the experience of pain have only recently begun to receive serious empirical consideration. It is not yet clear whether and how the experience of pain changes during a lifetime (for a review see 25). Within the present sample of community-dwelling adults who do not identify themselves as suffering from chronic pain, the experience of painful symptoms appears to decrease with age. Despite this, there was little evidence that the intensity of the painful symptoms changes with age. There was some limited evidence that the intensity of some chronic arthritic pains may peak in mid-life. However, this was only true for a minority of the symptoms assessed. A curvilinear relationship between pain and

age, with a similar mid-life intensity peak, has been reported previously (25). Further study is needed to clarify this issue.

The most striking discrepancy between our study 1 and study 2 was the pattern of results of the self-assessments of functional health (the extent to which the performance of daily activities is limited by health problems). In both, there were no age differences on the overall health self-assessment, although, not surprisingly, those with chronic pain rated their health more poorly than those who were pain-free. More interesting was the measure of functional health. In the pain-free sample, elderly subjects reported significantly greater impairment than the two younger groups. There were no age differences regarding this measure in the chronic pain sample. It is difficult to interpret this finding in terms of beliefs about the relationship between age and pain.

Consideration of data from the Arthritis Self-Efficacy Scale may be helpful (this scale measures one's perceived ability to carry out physical activities and to control the pain and other symptoms of arthritis). There were no age differences on any of the subscales of this instrument, which implies that the elderly perceived themselves as being as capable and in control of their symptoms as the younger groups. If the elderly subjects believed that pain was to be expected and tolerated as a normal part of ageing, then they should not be as confident as younger subjects that they can control their pain. Attributing pain to normal ageing implies that it is inevitable, not controllable, and that the elderly patient is 'helpless' in the face of pain. It can be assumed that such a belief system would be associated with significant depressive symptomatology, more intense pain, greater levels of perceived impairment, more negative self-evaluations of health status and lower levels of self-efficacy. This is clearly not the case because there were no significant age differences on any of these measures.

Therefore, the pattern of results from measures of several domains of functioning and well-being associated with chronic pain suggests that arthritic pain affects the lives of the elderly to the same degree as it affects younger individuals. This lends further support to the idea that the elderly have not relinquished control over their pain to the inevitable forces of ageing. The same conclusion can be drawn from the pain-free sample. In this group the elderly reported greater functional impairment due to health difficulties, but this impairment did not appear to be a consequence of pain because there were no age differences on the BRS-6, a measure of pain intensity in terms of its behavioural consequences.

Overall, the data from study 1 and 2 suggest that there are no age differences in pain beliefs. Therefore, the elderly do not expect or accept pain as a normal part of growing older, nor do they believe there is little to be done to control their pain. As a consequence, elderly individuals with arthritic pain perceive themselves to be no more impaired than younger persons, and believe that they have the same level of control over their symptoms as younger patients. This pattern of results implies that the elderly with chronic pain may be more amenable to pain management strategies than had previously been assumed.

The conclusions drawn from these studies are limited by several factors. It was not possible to compare those who completed the questionnaire with those who did not. It is possible that subjects who did respond may differ in some important ways from nonresponders and that this may have influenced the results of the studies. Also, the number of subjects in each study is small and all of the data are based on self-report of both diagnosis and functional impairments. Future work should attempt to replicate these results with both larger and more directly comparable samples, and should include objective measures of health.

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REFERENCES

1. Williams DA, Thorn BE. An empirical assessment of pain beliefs. Pain 1989;36:351-8.
2. Degood DE, Shutty MS. Assessment of pain beliefs, coping and self-efficacy. In: Turk DC, Melzack R, eds. Handbook of Pain Assessment. New York: Guilford Press, 1992:214-34.
3. Hofland SL. Elder beliefs: Blocks to pain management. J Gerontol Nurs 1992;18:19-24.
4. Blazer DG, Houpt JL. Perception of poor health in the healthy older adult. J Am Geriatr Soc 1979;27:330-4.
5. Segall A, Chappell NL. Making sense out of sickness: Lay explanations of chronic illness among older adults. Adv Med Sociol 1991;2:115-33.
6. Roy R, Thomas MR. Pain, depression, and illness behavior in a community sample of active elderly persons: Elderly persons with and without pain. Clin J Pain 1987;3:207-11.
7. Cook AJ, Thomas MR. Pain and the use of health services among the elderly. J Aging Health 1994;6:155-72.
8. Edwards LC, Pearce SA, Turner-Stokes L, Jones A. The pain beliefs questionnaire: An investigation of beliefs in the causes and consequences of pain. Pain 1992;51:267-72.
9. Jensen MP, Karoly P, Huger R. The development and preliminary validation of an instrument to assess patients' attitudes toward pain. J Psychosom Res 1987;31:393-400.
10. Fillenbaum GG. Social context and self-assessments of health among the elderly. J Health Soc Behav 1979;20:45-51.
11. Rosow I, Breslau N. A Guttman health scale for the aged. J Gerontol 1966;21:556-9.
12. Linton SJ, Gotestam KG. A clinical comparison of two pain scales: correlation, remembering chronic pain, and a measure of compliance. Pain 1983;17:57-65.
13. Jensen MP, Karoly P, Braver S. The measurement of clinical pain intensity: A comparison of six methods. Pain 1986;27:117-26.
14. Beck AT. Depression Inventory. Philadelphia: Center for Cognitive Therapy, 1978.
15. Gallagher D. The Beck depression inventory and older adults: Review of its development and utility. Clin Gerontol 1986;5:149-63.
16. Jensen MP, Turner JA, Romano JM, Lawler BK. Relationship of pain-specific beliefs to chronic pain adjustment. Pain 1994;57:301-9.
17. Sternbach RA. Survey of pain in the United States: The Nuprin pain report. Clin J Pain 1986;2:49-53.
18. Kessler RC, McGonagle KA, Swartz M, Blazer DG, Nelson CB. Sex and depression in the National Comorbidity Survey. I: Lifetime prevalence, chronicity and recurrence. J Affect Disord 1993;29:85-96.
19. Andersson HI, Ejilertsson G, Leden I, Rosenberg C. Chronic pain in a geographically defined population: Studies of differences in age, gender, social class and pain localization. Clin J Pain 1993;9:174-82.
20. Strong J, Ashton R, Chant D. The measurement of attitudes towards and beliefs about pain. Pain 1992;48:227-36.
21. Herda CA, Siegeris K, Balser H. The pain beliefs and perception inventory: Further evidence for a 4-factor structure. Pain 1994;57:85-90.
22. Harkins SW, Pain in the elderly. In: Dubner R, Gebhart FG, Bond MR, eds. Proceedings of the Fifth World Congress on Pain. New York: Elsevier Science Publisher BV (Biomedical Division), 1988:355-7.
23. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. Arthritis Rheum 1989;32:37-44.
24. Melzack R. The short-form McGill Pain Questionnaire. Pain 1987;30:191-7.
25. Gagliese L, Melzack R. Chronic pain in elderly people. Pain. (In press)