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International Journal of
Social Psychiatry
2014, Vol. 60(2) 197–205

DOI: 10.1177/0020764013496371
isp.sagepub.com
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Expressed emotion among relatives of chronic pain patients, the interaction between relatives' behaviours and patients' pain experience

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Abstract

Background: Chronic pain is a sensory and emotional experience that causes significant disturbances to a patient's life as well as to their family. Whether the family environment is affected by chronic pain and, in turn, affects the patients' pain experience has yet to be investigated. The interaction between patients and spouses has been assessed using the expressed emotion (EE) construct, a tool previously described in the field of mental health. For schizophrenia and other psychiatric illnesses, a correlation exists between family EE and patients' outcomes.

Aims: The main objective of this study was to observe the presence of EE among relatives of chronic spinal pain patients and to evaluate its correlation with their symptoms.

Methods: A prospective observational study was conducted on 54 patients and their spouses currently seen at the Chronic Pain Unit of Hospital Clinic of Barcelona. The following variables were recorded: age, gender, pain score, quality of life and EE.

Results: Data showed that a considerable proportion of spouses were rated as high EE. There was an association between EE and patients' quality of life, and the level of EE predicted some other variables of patients' quality of life.

Conclusion: The EE level of spouses of chronic pain patients affects the patients' quality of life and thus the way that they experience their pain.

Keywords

Expressed emotion, chronic pain, pain intensity, family environment, spouses, quality of life

Introduction

Chronic pain is a complex experience, resulting from the interaction of many biological, social, psychological, environmental and family factors. The individual's response to illness depends upon other factors such as social networks and interpersonal relationships, which may be supportive or create conflict (Marusic & Bhugra, 2008). Thus, patients' chronic pain has an impact on their environment and causes significant changes in their life and in the family life (Keefe, Gil & Rose, 1986). Some studies (Mohamed, 1982; Painters, Seres & Newman, 1980; Roy, 1982; Worrall-Davies, Owens, Holland & Haigh, 2002) suggest that families of chronic pain patients may influence either the improvement or the maintenance of the disease. Therefore the family should be considered as a primary network in the field of pain (Lewandowski, Morris, Burke & Risko, 2007; Turk, Flor & Rudy, 1987). In chronic somatic illnesses, the case studies by Minuchin (1977) are classics in family therapy. He developed a psychosomatic families' classification that appears to be very similar to chronic pain families: (1) a weak establishment of limits between family members; (2) excessive over-involvement with the patient; (3) rigidity of roles and inflexible rules; and (4) lack of problem-solving skills.

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Table 1. Response characteristics of low-EE and high-EE relatives by C. E. Vaughn.

	Low EE	High EE
Cognitive	Genuine illness	Legitimacy of illness in doubt
	Lowered expectations	Expectations unchanged
Emotional	Other focused	Self-focused
	Empathic	Intense anger and/or distress
	Calm	
	Objective	
Behavioural	Adaptative	Less flexible
	Problem-solving approach	Intrusive
	Non-intrusive	Confrontational
	Non-confrontational	

In the last 30 years, different researchers have begun to include family members in understanding the assessment and treatment of chronic pain (Kerns, Otis & Wise, 2002; Kerns & Otis, 2003; Romano & Schmaling, 2001). Cowan, Kelly, Pasero, Covington and Lidz (1998) and Saarijärvi, Alanen, Rytökoski and Hyyppä (1992) report that pain can affect family communication leading to a deadlock in relationships or to changes in roles and family dynamics.

The first empirical studies investigating illness and family variables were carried out in the field of mental health, specifically in schizophrenia.

Relatives' expressed emotion

Minuchin's psychosomatic families show emotional attitudes consonant with expressed emotion (EE) (Brown, Monk, Carstairs & Wing, 1962) especially with over-involved or overprotective attitudes from the relatives towards patients or even intrusive or critical attitudes towards them.

Expressed emotion (EE) is a construct described as a series of behaviours, feelings and thoughts of the family towards patients (Brown et al., 1962). This construct is basically defined by three scales: (1) critical comments (CC) – pejorative, unfavourable remarks relating to the patient's behaviour; (2) hostility (H) – generalization of criticism and/or rejection of the patient; and (3) emotional over-involvement (EOI) – excessive emotional responses, self-sacrificing behaviour and being overprotective of the patient. A high level of EE is recorded when one or more scales exceed the cut-off value depending on the condition being studied (Vaughn & Leff, 1976). In Table 1, differences between low and high EE relatives can be compared on cognitive, emotional and behavioural aspects (Vaughn, personal communication, 1986).

Further variables assessed are: warmth (W) – understanding that the patient is ill and empathic attitudes; and positive remarks (PR) – appreciative remarks about the patient's good qualities. Although the last two have been described in previous EE studies, they were not always utilized to score EE itself. In this study the relationship between EE and the outcome of symptoms will be examined.

Expressed emotion in mental health

The interaction of EE and chronic mental illnesses has previously been studied by many researchers. It has been found that the presence of a high-EE relative predicts relapse rate and illness outcome in the following disorders.

Schizophrenia: One of the most important and widely quoted studies is by Vaughn & Leff (1976), who showed that high EE both in terms of CC and EOI is strongly associated with a high risk of relapse. Kuipers & Bebbington (1988), in a meta-analysis of 14 studies, found that the EE construct has a very good validity. Montero, Gomez, Ruiz, Puche and Adam (1992), in the first Spanish EE study, reported that the association between relatives' EE and relapse became significant on reclassifying their EE scores after decreasing the cut-off point for CC from six to four points. Among all the EE variables, EOI (Vaughn & Leff, 1976) was the best predictor for persistence of severe symptoms. On the other hand, W predicts a good outcome in schizophrenia.

Depression: Schwartz, Dorer, Beardslee, Lavori and Keller (1990) found that a higher degree of maternal EE was associated with a threefold increase in a child's risk for having at least one of the following diagnoses: depressive disorder (major depression or dysthymia), substance abuse or conduct disorder.

Bipolar disorder: Miklowitz, Goldstein, Nuechterlein, Snyder & Mintz (1988), using only total EE scores, reported that high EE scores were associated with a fivefold relapse rate compared with low EE scores.

Agoraphobia: Higher CC tended to predict a better outcome (Peter & Hand, 1988), which was replicated by Chambless and Steketee (1999) who noted that the presence of hostility (H) was related to poorer outcome.

Eating disorders: Modes and Le Grange (1993) and van Furth et al. (1996) both reported low EE levels.

Alcoholism: For Fichter, Glynn, Weyerer, Liberman and Frick (1997), a low number of CC and a high score on W were associated with a lower risk of relapse; EOI was associated with more abstinence. For O'Farrell, Hooley, Fals-Stewart and Cutter (1998), patients with high-EE spouses (on CC and H) were more likely to relapse

Epilepsy: Brown and Jadresic (2000) reported that seizure can predict EE, and a direct relationship between father's CC and mother's EOI was found.

Borderline disorder: Hoffman, Buteau, Hooley, Fruzzetti and Bruce (2003), contrary to expectation, reported that relatives' greater knowledge about borderline disorder was associated among other factors with higher levels of family hostility.

Expressed emotion in physical diseases

The level of EE is not a constant phenomenon; it can vary with time, depending on situations, and it can be modified by therapeutic interventions (Kuipers, Leff & Lam, 2004; Leff, 2005). High levels of EE are not restricted to mental illness but can be found in physical illness, such as the following.

Diabetes: Koenigsberg, Klausner, Pelino, Rosnick and Campbell (1993) found that CC was related to poorer control of glycated haemoglobin levels. Wearden, Tarrier and Davies (2000) found that the only EE variable showing a significant association with patient's depression, anxiety or appraisal of diabetes was PC, which was negatively correlated with patient depression. Worrall-Davies et al. (2002) found that paternal H was associated with elevated glycated haemoglobin, measured 12 months before and after interview.

Inflammatory bowel syndrome: Vaughn, Leff and Sarner (1999) found that a significantly higher proportion of patients with low-EE relatives were in the surgery outcome group. Excluding the surgery group, there was a non-significant trend for patients with high-EE relatives to have a worse outcome.

Crohn's disease: Jaureguizar and Espina (2005) reported that high EE exerted an influence on the course of Crohn's disease and that there was a significant relationship between relapse and the H and EOI expressed by mothers and wives.

Due to the lack of empirical research on chronic pain and relatives' attitudes, the objectives of this study are to evaluate the family environment of patients with chronic pain using EE as a tool; to observe if there is any correlation between EE and close relatives' characteristics; and, finally, to find out whether there is any relation between EE and pain expression and the patients' quality of life. As can be seen, the majority of studies come from the mental health field, especially from research on psychosis. Nevertheless, no studies on relatives' EE and patients' quality of life have been conducted despite the fact that quality of life could be an important variable that may be negatively influenced by pain.

However, two studies on relatives' (not patients') quality of life have been published. Bogren (1997), studying the relationship between relatives' EE and quality of life, found that the parents with high EE and those who rated high on CC more often perceived a low quality of life compared with those with low EE or who rated low on CC. Also, Gómez-de-Regil, Kwapil and Barrantes-Vidal (2013), in a quite complex and interesting study about EE, burden and quality of life of relatives of psychotic patients, found that patients' functional status and relatives' psychological distress were significantly associated with EE, burden and quality of life. This study's results underscore the relatives' need of support to overcome their own distress and concerns about the illness, for the psychological well-being of both patients and relatives. Neither of the two studies addressed how relatives' EE affects patients' quality of life or whether there is some EE scale that can predict the patients' quality of life. Therefore, mounting a study about patients' quality of life is considered an important topic to research.

This is the first study to investigate patients with chronic pain, their relatives' EE and the patients' quality of life.

Methods

The research plan was approved by the ethics committee and the research department of the Hospital Clinic of Barcelona.

Design

The main aim of this study is to determine the levels of EE among relatives of chronic pain patients. A second aim is to investigate the possible relationship between relatives' EE and patients' quality of life. Another is to find out whether the type of relatives' EE differs depending on the evolution of chronic pain over time. Finally, in addition we try to assess the potential predictive power of EE on patients' pain outcomes.

The hypotheses of this research are:

1. Relatives of patients with chronic pain will show high EE attitudes.
2. EE levels of relatives will vary according to their age and gender and the course of the patient's pain over time.
3. High levels of relatives' EE will be associated with a lower quality of life for the patient.

Patients and families

The sample comprised 93 patients with spinal chronic pain, both neuropathic and structural, currently under treatment

at the Chronic Pain Unit of the Hospital Clinic in Barcelona. Of this sample, 29 patients failed to agree to participate for reasons such as difficulties with the time schedule, unavailability of their spouse and lack of interest in the study. Their closest relatives, who were invariably their spouses, were also included. All of those who agreed were included in a research study of a pain management programme (PMP) plus family work as described in Ballús-Creus, Peñarroya and Pérez (2011). The Working with Families method consists of working together with both functional and dysfunctional families. Therefore, the intervention targeted all families (spouses) of patients with chronic back pain, with the aim of facilitating an exchange of experiences between them. The therapist's role was to guide this exchange in a positive direction, enabling dysfunctional families to learn from functional families.

The inclusion criteria were: (1) referral by one of the pain specialists from the pain clinic; (2) suffering from chronic pain of spinal origin (neck, dorsal or lumbar pain); (3) aged between 18 and 70 years; (4) able to write and read; and (5) living with their spouse who acts as principal caregiver. The exclusion criteria were: (1) patients diagnosed with mental disorder axis I and II of the DSM-IV; (2) previous history of alcoholism, drug abuse or brain damage; and (3) involved in an ongoing litigation related to their current health status.

Measures

Socio-demographic data. This data collection included gender, age, civil status and duration of the pain symptoms.

Pain intensity. Pain intensity was measured using the Visual Analogue Scale (VAS) (Huskisson, 1974) – a self-administered scale consisting of a straight line, marked left to right with 0 ('no pain') and 10 ('maximum imaginable pain'). This scale is commonly used in pain-related studies, and despite some reservations about its reliability, it is still a widely used test that is simple to administer.

Quality of life. The Short Form Health Survey (SF-36) (Ware & Sherbourne, 1992), in its Spanish version (Alonso, Prieto & Antó, 1995), was used to measure quality of life. The physical role limitation (PRL) and emotional role limitation (ERL) sub-scales were chosen to assess the impact of these two aspects on patients' daily activities and work performance. It is a widely known questionnaire used in many studies about both pain and mental health.

Expressed emotion. The Camberwell Family Interview (CFI) (Leff & Vaughn, 1985; Vaughn & Leff, 1976) was used to assess EE. This consists of a semi-structured interview to measure the level of EE shown by one member of the family (caregiver) towards another (patient). The Spanish version by Gutierrez (unpublished) was used in this study. One member of the team (AP) modified the CFI interview from its original design for schizophrenia. Questions about the severity of this mental illness were replaced by questions about chronic pain symptoms and patients' behaviours. The CFI pain version was supervised by Prof. Vaughn. The cut-off values used were those established for the original CFI. Thus, a high EE was diagnosed when CC ≥ 6, EOI ≥ 3 or H ≥ 1. W and PR have been scored in previous studies. In schizophrenia, PR was not predictive of outcome, while W predicted a good outcome. Nevertheless, it was decided to use both in order to assess their possible influence on a disorder of a very different nature. Furthermore, in our team's clinical experience as family therapists, it has been noticed that when a relative has a high CC score, the appearance of PR is an indication of the very first step in an improvement in the relationship with the patient (more W and less CC). The cut-off for W was > 3 (Keefe et al., 1986). While for the PR, as there is no cut-off point in the literature, a percentile ≥ 75 (≥ 1 PR) was set. The aim is not to generalize this cut-off point that as it can only be used for comparison with a sample with similar characteristics.

The two CFI raters were trained in London by Prof. Vaughn. Inter-rater reliability was 0.82. The interview, recorded on minidisc, was administered by an interviewer and evaluated by the two trained raters who had previously established their reliability (0.80) with a small sample of interviews. They were blind to the randomization of subjects for all assessments (basal, post-treatment and follow-up) with the aim of avoiding bias. Later, their scores were recorded in the data file.

Procedures

Patients fulfilling the inclusion criteria were referred to the team of psychologists at the pain clinic. A first informative meeting with patients and spouses was carried out to assess eligibility and to obtain the signed consent form. The CFI was then conducted with the spouse. This and the other assessments were conducted three times: at the start of the intervention (baseline), after the six-month intervention (post-treatment) and six months later (follow-up).

Data analysis

This is a prospective observational study. Data are shown as the percentage of patients living with a high-EE spouse. Pearson correlation coefficients were calculated between VAS, quality of life and EE sub-scales. The influence of age and gender on EE sub-scales was determined with a univariate contrast analysis, using comparison of means and student's t-test or χ^2 when appropriate.

A stepwise multiple linear regression analysis was performed to evaluate the predictive power of the different EE sub-scales on VAS and quality of life PRL and ERL components. The entrance criteria to the model was $p \leq .05$ and the

Table 2. Demographic data.

		Patients (n = 54)	Relatives (n = 54)
Gender	Male	38%	62%
	Female	62%	38%
Age (years)		58.1 ± 9.5	59.4 ± 10
Marital status	Married	100%	100%
	Cohabiting	0%	0%
Duration of pain (years)		10.9 ± 8.5	N/A

Table 3. The EE sub-scales scores and correlations.

Scores	M ± SD	Correlations	H	EOI	W	PR
1. CC	3.06 ± 3.3	1. CC	0.39*	0.1	–0.53***	0.22
2. H	2.08 ± 1.38	2. H		0.01	–0.4*	–0.16
3. EOI	0.14 ± 0.44	3. EOI			–0.09	–0.08
4. W	2.9 ± 1.37	4. W				0.3*
5. PR	1.47 ± 1.14	5. PR				

*p < .05, ***p < .001.
EE: expressed emotion; CC: critical comments; H: hostility; EOI: emotional over-involvement; W: warmth; PR: positive remarks.

exit criteria was $p \geq .10$. SPSS 12.0 version for Windows was used for the analyses.

Results

Participants' characteristics

Fifty-four patients and their corresponding spouses were included in the study. General demographic data are shown in Table 2.

Expressed emotion

Of the spouses interviewed, 53% were rated as high EE: 20% scored high for CC; 9.8% for H; and 43.1% for EOI. On the other hand, 39.2% of spouses scored ≥ 0.3 for W and 68.6% made at least one PR.

Positive correlations were found between H and CC ($p < .05$) and between W and PR ($p < .05$). Negative correlations were found between CC and W ($p < .001$) and between H and W ($p < .05$). A summary of all correlations is shown in Table 3.

Spouse's gender and age and impact on EE

In a bivariate analysis, significant differences ($F = 6.7$, $p = .001$) were found in the amount of CC ($t = 3.81$, $p = .001$) and EOI ($t = 2.07$, $p = .001$) by gender. Female spouses scored higher than males on CC (5.35 vs 1.58, p < .001) and on EOI (2.70 vs 1.68, $p < .001$) (Table 4).

There were no changes in EE based on relative's age ($F = -1.46$, $p = .15$), nor in the evolution of pain over time ($F = 0.10$, $p = 0.75$). So these variables have no influence on EE.

Table 4. Bivariate analysis of EE sub-scales related to the relative's gender.

Family gender and EE		
EE	F	p
Critical comments	3.81	.001**
Hostility	1.24	.27
Emotional over-involvement	2.07	.001**
Warmth	1.65	.2
Positive remarks	0.007	.9

**p < .01.

Pain, quality of life and expressed emotion

No associations were found between pain intensity and EE. A positive correlation was found between EOI and the ERL of SF-36 ($r = 0.4$, $p < .05$). A negative correlation between CC and the PRL of SF-36 was found ($r = -0.4$, $p < .05$).

Multiple regression analysis (stepwise)

In order to determine if any of the EE sub-scales could predict patients' quality of life, a stepwise multiple regression analysis was run. Quality of life was used as a target or effect variable, while EE sub-scales (CC, H, EOI, W and PR) were used as explanatory variables.

For quality of life, the best predictor of physical impairment (PRL) was CC ($\beta = -0.043$, $p < .05$) accounting for 19% of its variance; for the emotional component of quality of life (ERL), the best predictor was EOI ($\beta = 0.38$, $p < .05$), accounting for 14% of its variance (Table 5).

Table 5. Multiple regression analysis for quality of life, EE and significant predictors.

Quality of life	R^2	F	Explained variance	Significant predictor variables
Physical role	0.193 p = .009	F = 7.64 p = .009	19%	CC β = 0.195 SE β = 0.070 $\Delta\varepsilon\tau\alpha$ = –0.439 τ = –2.76 p = .009
Emotional role	0.14 p = .02	F = 5.39 p = .02	14%	EOI β = 0.407 SE β = 0.173 $\Delta\varepsilon\tau\alpha$ = 0.38 τ = 2.32 p = .02

Discussion

The present study differs in some respects from previous research on EE. All the samples studied before have consisted of a majority of women who usually are the patients' carers. For both mental health (Bellver, Massanet, Montero, Lacruz & Medina, 2005, Leff & Vaughn, 1985; O'Farrell et al., 1998) and physical diseases (Koenigsberg et al., 1993; Vaughn et al., 1999), the majority of people interviewed have been women and their relationship to the patient usually parental. In our study, the majority of carers interviewed were men and the relationship was marital. Because of this, the variety of the disorders and the variety of studies in the relevant literature, comparisons between them and the present study are questionable. Nevertheless, a survey of the literature attests to the wide applicability of the EE measure.

Previous measurements of the role of relatives' EE in illness outcomes have been carried out mainly on younger patients and their carers, who were frequently their parents, particularly mothers (Bellver et al., 2005; Koenigsberg et al., 1993; O'Farrell et al., 1998; Vaughn & Leff, 1976; Vaughn et al., 1999). Our study considered marital relationships instead because chronic pain is more prevalent among older people, and their carers are normally their spouses (Jaureguizar & Espina, 2005; O'Farrell et al., 1998). Additionally, the majority of spouses were men and therefore most patients were women, as previously seen in only one study (Worrall-Davies et al., 2002). These two facts presented a major difficulty in searching for previous evidence and comparing our results with similar studies. It is worth noting from the EE studies on schizophrenia that if the mother is dead or absent, or incapacitated by illness herself, and the father takes over the caring role, he is prone to develop over-involved attitudes and behaviour.

Among spouses of chronic pain patients, the presence of high EE was 53%. This is higher than that found for EE in other somatic illnesses (Jaureguizar & Espina, 2005; Vaughn et al., 1999; Worrall-Davies et al., 2002) where high EE ranged from 29% to 44%.

In assessing the prevalence of the different EE subscales, we found that the most frequent was EOI followed by CC, and to a lesser extent H. These results differ from previous patterns (Koenigsberg et al., 1993; Vaughn & Leff, 1976; Worrall-Davies et al., 2002) where EOI was not as frequently expressed as CC. However, the presence of H was similar to that reported previously (Vaughn et al., 1999). The majority of male spouses showing EOI in our material contrasts with the usual pattern of CC attitudes in men. This may result from the difference between pain as a problem and psychiatric symptoms, or a different behaviour dependent on gender.

On the positive side, the presence of W and PR were higher than has been reported previously with Crohn's disease (Jaureguizar & Espina, 2005) and diabetes (Worrall-Davies et al., 2002), and similar to what has been reported in studies with families of alcoholic patients (O'Farrell et al., 1998), eating disorder patients (Modes & Le Grange, 1993) and borderline personality disorder patients (Hoffman et al., 2003).

In summary, we found that both male and female spouses of chronic pain patients were characterized by a higher presence of EOI and a lower tendency to express CC.

Concerning the relationship between the different subscales, the pattern of correlations was similar to that found by Vaughn & Leff (1976) and Vaughn et al. (1999). In particular, we have replicated the high negative correlation between W and CC, found in a number of studies and the strong association between CC and H, which is a consequence of the rating conventions of EE. The analysis of spouses' demographic characteristics revealed that the age of the spouse-carers was not related to the presence or absence of high EE. Since no previous studies have examined correlations between age and EE, our findings have no parallel, so that we cannot generalize these results beyond the caregivers of chronic pain patients.

The gender of the spouse affected the patterns of EE sub-scales in our study population. Husbands of chronic pain patients were less likely to exhibit high EOI and made fewer CCs, in accord with previous studies (Bellver et al.,

2005; Hoffman et al., 2003; Jaureguizar & Espina, 2005; O'Farrell et al., 1998; Vaughn & Leff, 1976; Worrall-Davies et al., 2002). It appears that wives share a female pattern of EE in their interaction with their husbands as chronic patients. It would be worth investigating the relationship between these gender patterns and social and cultural factors.

In contrast with other studies on EE and somatic disorders (Jaureguizar & Espina, 2005; Koenigsberg et al., 1993; Worrall-Davies et al., 2002), we did not find any relationship between patients' pain scores and their spouses' EE. However, pain intensity is just one variable of patients' pain experience whereas others, such as quality of life, emotional and social limitations, are taken into greater account within the holistic approach to pain problems.

Concerning quality of life, we found that spouses expressed a higher level of EOI when patients experienced a greater degree of emotional problems due to their pain, and less CC when greater physical difficulties in performing their daily activities were encountered. Thus, a tendency exists for spouses to show protection, caring and helping behaviours that reach the point of over-involvement when their spouses' emotional problems are severe. This may represent a mutual process in which the partners' emotional responses interact and escalate. In previous studies, EOI was found to be related to poorer disease outcomes (Bellver et al., 2005; Jaureguizar & Espina, 2005; Vaughn & Leff, 1976).

The response of over-involvement by carers that we found is likely to undermine the patient's determination to be self-reliant despite the pain – a negative consequence of excessive empathy.

Our second finding concerning CC contrasts with previous studies in which CC predicted severe symptoms and relapses (Koenigsberg et al., 1993; O'Farrell et al., 1998; Priebe, Mueller & Oerlinghausen, 1989; Vaughn & Leff, 1976).

In chronic pain states, spouses are less critical if patients experience more physical limitations that could be taken as symptoms of severity. In their turn, they tend to be more critical when patients experience fewer limitations. This result is similar to that found in schizophrenia (Vaughn & Leff, 1976) where parents tend to be very critical in the presence of symptoms like passivity and lack of initiative, often interpreted as patients' laziness, whereas symptoms such as delusions or hallucinations are more readily identified as indicative of a mental illness. The finding of this negative association between high CC and physical limitations (i.e. less CC is related to higher physical limitations) is potentially unexpected given the well-established link between high EE and poor health outcomes. This seems implausible in the current study. High physical limitation scores (as measured for chronic pain patients) would probably be associated with more physical inactivity being perceived as 'laziness', if it could be measured.

Limitations

The main limitation of this study is the sample size and the difficulty in generalizing our findings to the general population with pain of spinal origin. The cross-sectional design also has the limitation that it is difficult to interpret the direction of impact of the associations found, although a mutual influence in both directions seems highly likely.

Another drawback is the choice of tools for analysis. The SF-36 is a standardized instrument widely used to measure quality of life but of poor specificity for each particular health problem. The VAS summarizes in just one item the patients' pain score, but neglects other individual or environmental factors that indeed affect the measurement.

The cross-sectional nature of our data of course raises the issue of the direction of causality in our findings. An intervention study to alter EE could be used to explore the direction of causality.

Conclusion

In conclusion, our results suggest the important role of family EE in the outcome of chronic pain. This factor, although not directly related to intensity of pain, correlates with some other aspects of patients' pain experience such as quality of life. It raises the possibility of addressing the emotional responses of family carers to chronic pain in their spouse with the aim of improving the quality of life for both partners. These results provide guidelines for the Working with Families project, in particular, interventions to moderate the high EOI response by male spouses, with the aim of increasing the patient's independence.

Acknowledgements

We would like to thank the patients and relatives for their voluntary collaboration with this project, as well as the team of the Chronic Pain Unit of Hospital Clinic of Barcelona. We are also grateful for the invaluable help of Mr José Ruiz and Ms Abiguei Torrents, statisticians of the Assessment Support and Prevention Unit of our hospital. Finally, we would like to knowledge the kind help and encouragement from Prof. Carmen Gomar, chairman of the Department of Anaesthesiology of the University of Barcelona.

Funding

This research was conducted through Grant N-2008-TV72810-0 received from the Marató de TV3, Televisió de Catalunya (Marathon of Catalan TV, TV3).

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