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Original Article

Relevance of a biocultural approach in the assessment of chronic pain: A comparison between Peruvian women living in Nasca and Lima

Enrico Facco[1], Ines Testoni[2], Daniela Di Lucia[2], Lucia Ronconi[2], Andrea Drusini[3]

Abstract. ***Objectives*** *Pain is an unpleasant experience with complex neurobiological, psycho-social and cultural components. The latter deeply affects both its perception and representation. The aim of this study was to check the relationship between psychological, cultural aspects and environmental factors in Peruvian women with chronic pain, comparing the inhabitants of Nasca to those of Lima (that is, people belonging to the same ethnic group, but following different life styles).* ***Subjects and Methods*** *The groups living in Nasca (NG) and Lima (GL) included 242 and 121 participants, respectively, and had similar age range. The subjects filled out the Spanish version of the McGill Pain Questionnaire, and the Ethnicity and Pain Questionnaire (EPQ), according to Bates.* ***Results*** *Both groups showed a similar Pain Rating Index (PRI), while the Present Pain Index (PPI) was significantly lower in group NG. No group differences in the Locus of Control (LOC) was found, but GN subjects with internal LOC reported a significantly lower PPI. On the other hand, GL showed a higher score in most items of EPQ. Despite the lower PPI, GN was significantly more affected by pain in most daily activities and reported a significantly higher pain duration (45 ±73.8 vs. 23±18.6 months).* ***Conclusions*** *Our data confirm the complex relationship between pain, provider's capability of understanding and treating it, socioeconomic and cultural components, making pain medicine far from being a matter of pharmacological or interventional manipulation of pain pathways only.*

Keywords: Chronic pain, ethnicity, McGill Pain Questionnaire, Ethinicity and Pain Questionnaire, Peru

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INTRODUCTION Pain is an universal phenomenon and one of the major health problem in the world, severely affecting the overall quality of life. The international Association for the Study of Pain (IASP) has defined pain as psychosomatic experience involving sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Merskey, 1994). This definition avoids tying pain to nociceptive pathways only, and clearly shows that its nature is essentially a matter of experience.

The subjective nature of pain sets out the great variability in its perception, representation and description, while its assessment depends on cultural and linguistic factors, which are essential determinants of health conditions and their related medical practices (Calderon & Beltran, 2004;

Corrispondence to: Enrico Facco[1], Dept of Neurosciences, Univesity of Padua
Via Giustiniani 2, 35128 Padova, Italy
Phone: +39 0498218024
Fax: +39 0498218229
mailto: enrico.facco@unipd.it

[2]FISSPA Department – Section of Applied Psychology – University of Padua
[3]Department of Medical Diagnostic Sciences and Special Therapies, University of Padua Medical School, Padua, Italy

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Napoles-Springer & Perez-Stable, 2001). The reductionistic and mechanistic approach of scientific medicine leans towards favouring neurobiological aspects of pain and adopts a western (European plus North American) ethnocentric perspective, with the risk of introducing a culturally centred bias. Therefore, pain medicine cannot help with facing ethnic components of pain perception and communication (Cassisi *et al*, 2004; Zatzick & Dimsdale, 1990), in order to properly understand the phenomenology of pain and avoid errors in its assessment and management.

It has been previously reported that European-Americans look to have a higher pain tolerance than African-Americans, while both VAS and McGill Pain Questionnaire (MPQ) are sensitive to ethnic differences (Cassisi *et al*, 2004; Edwards *et al*, 2001). Pain tolerance seems to be more relevant than pain threshold and involves linguistic and cultural differences in pain description and communication; the latter regards both different races and different ethnic groups within a race (Zatzick & Dimsdale, 1990). These ethnic changes in pain behaviour are practically relevant, since pain may be underscored and undertreated in minority patients, such as African-Americans and Hispanics, despite their likely enhancement of pain experience in comparison to whites (Cintron & Morrison, 2006; Edwards *et al*, 2005; Reyes-Gibby *et al*, 2007). However, the mentioned studies assessed pain in minority subjects living in the U.S., a condition which may strongly affect their cultural origin.

Pain is also affected by gender. Women report more severe and longer lasting pain than men and more often seek for pain treatment (Rustoen *et al*, 2004; Sun, 1998); furthermore they show a higher rates of depression, chronic pain related depression and, generally, higher comorbidity with both somatic and psychiatric disorders, which can lead to an increased disability (Bingefors & Isacson, 2004; Munce & Stewart, 2007). On the other hand, a history of trauma detrimentally affects chronic pain, but women seem to maintain a better emotional functioning and capability of managing their pain than men (Spertus *et al*, 1999); likewise, low back pain seems to be less linked to anxiety in women than in man (Robinson *et al*, 2005). In short, it seems that females lean to experience a stronger pain, but better tolerate the suffering.

The above mentioned gender related differences may depend on biological factors, but gender disparities in work, economy, daily living, social life and expectations may also play a major role; for example, the prevalence of pain in women is related to poorer socioeconomic conditions, half-time employment, marriage and life-style (Bingefors & Isacson, 2004). Anyway, gender norms and values substantially change from place to place and evolve over time, making gender related disorders a dynamic process.

The whole of the above mentioned data suggests that pain in females is strongly affected by psychological factors and, thus, by its cognitive, narrative and social components. In Western Countries the cultural-narrative components of pain are probably richer and more complex than in less developed Countries, due to the progress of medicine, health management and information by mass media; on the other hand, in scientific medicine the attention is traditionally focused on objective parameters and their average values in appropriate samples, rather than on subjective narration, thus skipping a relevant aspect of chronic pain.

The aim of this study was to evaluate the relationship between psychological/cultural aspects of pain and environmental factors in women. We focused our attention on persistent and chronic pain in two culturally different groups of Peruvian women, the inhabitants of Nasca (a small village in a rural area about 500 km south of Lima) and town dwellers of Lima, the capital of Peru (that is, people belonging to the same ethnic group, but living in areas following a western model of urbanization), in order to analyze the relationship between description of pain and socio-cultural conditions.

SUBJECTS AND METHODS

The study was conducted in 2009 in Nasca (Peru, region Ica), a small town (35,000 inhabitants) at 520 m above sea level; 242 females were recruited at the Italian Center of Archaeological Center of Pre-Columbian Research (CIRAPC), where an outpatient clinic was set up to assist people who could not pay for medical assistance. The age range was 17-85 years (mean 42.7±16.1). The Nasca Group (NG) was compared to 121 women living in Lima, the capital of Peru with 7,605,742 inhabitants (age range 25-78 years, mean 41.7±11,6) recruited by a call center and offering a visit free of charge for their pain.

The Spanish version of MPQ (Bates, 1996) was administered by co-workers of Peruvian origin in order to minimize problems with language understanding. The MPQ consists of 78 adjectives in 20 descriptors (10 sensory, 5 affective, 1 evaluative and 4 miscellaneous), each of them including two to six items, rated in a Likert scale. It allows to obtain at least two indexes of pain: a) Pain Rating Index (PRI), summing the scores of patient's responses; b) the Present Pain Index (PPI) on a five-point scale. We used the MPQ for three reasons: a) it is generally considered the most comprehensive single multidimensional pain instrument available for measuring pain; b) it is sensitive to ethnic and gender differences (Edwards *et al*, 2005; Kimble *et al*, 2003); c) it has been well recognized and widely used tool for pain cross-cultural studies and, despite some uncertainty persists about its clinimetric properties in some languages (Menezes Costa *et al*, 2009), the Spanish version has proved to be reliable (Bates, 1996; Escalante *et al*, 1996; Zinke *et al*, 2010).

The ethnical aspects of pain perception and communication were investigated using the Spanish version of the Ethnicity and Pain Questionnaire (EPQ), which is based on an emic (or patient's) perspective. It includes 28 questions (Section B) providing information on the localization of pain, its duration, seeking for medical assistance, as well as the relationship between pain, its communication, willingness, traditional knowledge and medical prescriptions; they are rated in a 5-point Likert scale (0 = not applicable; 1= disagree strongly; 2 = disagree somewhat; 3 = agree somewhat; 4 = agree strongly). The last 10 questions (Section D), scored as binary responses (true/false), allow for the assessment of psychological-cognitive style known as locus-of-control (LOC), which has proved effective in the assessment of coping to stressful events, illness and pain (Bates *et al*, 1993; Bates, 1996; Bates & Rankin-Hill, 1994). The external LOC (LOC-EXT) indicates patient's perception or expectation that life events are beyond one's own control and, rather, depend on luck/fate, while an internal LOC (LOC-INT) indicates a sense of personal control and dependence of events from one's own actions. The internally worded items are reverse-scored: therefore a 10-point scale is obtained summing the scores of all responses, where a high values reflects a LOC-EXT tendency, while low values reflect a LOC-INT; a LOC of 5 was considered as neutral, lower values as LOC-INT and higher values as LOC-EXT. Finally, the interference of pain was evaluated using the table by Bates (see (Bates, 1996), Appendix E) in order to check the impact of chronic pain with daily activities, scoring them in a 5-point Likert scale (0 = not applicable; 1 = never difficult; 2 = sometimes difficult; 3 = frequently difficult; 4 = always difficult).

The statistical analysis was conducted with t-test for quantitative data and with χ^2 test for categorical data. We consider two significance level, alpha=.01 and alpha=.05, and we indicated no significant results with "ns". The data were analyzed using the SPSS 17.0 program for Windows (SPSS Inc, Chicago, Ill).

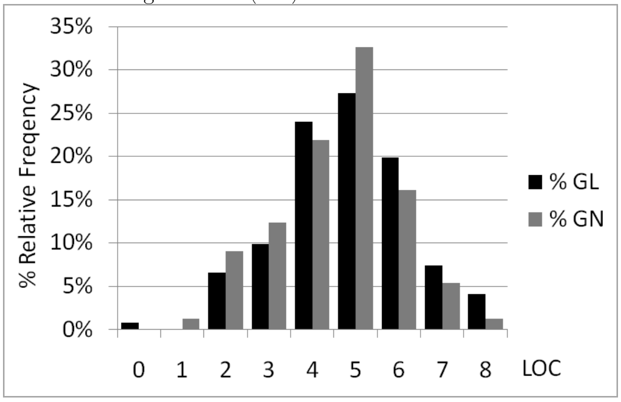
RESULTS

Both groups showed a similar PRI, with an average value of about 41 without age related differences; however, significant differences were found in its components (**Table 1**), with NG showing a significantly lower evaluative score. Pain intensity, as defined by PPI, was also significantly lower in group NG (**Table 1**).

Table 1 Descriptive statistics (mean±SD) and t-test results of McGIll Pain Questionnaire (MPQ) and Locus of Control (LOC) for two groups, women living in Lima (GL) and women living in Nasca (GN)

	GN (N=242)	GL (N=121)	p-value
MPQ			
Sensory	21.26±3.92	20.74±3.87	ns
Affective	7.98±1.89	7.96±1.63	ns
Evaluative	2.81±1.76	3.23±1.36	**<.05**
Miscellaneous	9.41±2.61	9.80±2.30	ns
PRI	41.25±6.47	41.59±6.03	ns
PPI	2.79±1.03	3.26±1.05	**<.01**
LOC	4.52±1.41	4.79±1.51	ns

Figure 1 Locus of Control (LOC) in women living in Lima (GL) and those living in Nasca (GN)



The distribution of LOC was Gaussian, with a mean value of 4.52±1.41 in GN and 4.79±1.51 in GL (**Figure 1**; **Table 1**); the difference between the two groups was not significant and the percent relative frequency of subjects with different LOC style were also similar (**Table 2**).

Table 2 Distribution of participants (number of cases and percentages) in three categories of locus of control, internal locus (LOC-INT), neutral locus (LOC-Neutral) and external locus (LOC-EXT), for total and two groups, women living in Lima (GL) and women living in Nasca (GN)

	LOC-INT	LOC-Neutral	LOC-EXT
GL	50 (41.3%)	33 (27.3%)	38 (31.4%)
GN	108 (44.6%)	79 (32.6%)	55 (22.7%)
Total	158 (43.5%)	112 (30.9%)	93 (25.6%)

The PRI was slightly lower in patients belonging to GN with LOC-INT, due to a significant difference in its evaluative and miscellaneous scores. The lower PPI observed in subjects belonging to GN resulted to be related to LOC, since only those with LOC-INT reported a significantly lower intensity of pain (**Table 3**).

Table 3: Descriptive statistics (mean±SD) and t-test results of McGIll Pain Questionnaire (MPQ) in three categories of locus of control, internal locus (LOC-INT), neutral locus (LOC-Neutral) and external locus (LOC-EXT), for two groups, women living in Lima (GL) and women living in Nasca (GN)

	GN (N=242)	GL (N=121)	p-value
LOC-INT			
Sensory	20.83±3.73	20.60±3.73	ns
Affective	7.63±1.87	7.93±1.87	ns
Evaluative	2.48±1.64	3.12±1.45	**<.05**
Miscellaneous	9.05±2.71	10.02±2.59	**<.05**
PRI	39.87±6.12	41.45±6.50	ns
PPI	2.64±1.03	3.51±0.95	**<.01**
LOC-NEURAL			
Sensory	21.73±4.05	20.99±3.79	ns
Affective	8.40±2.06	7.91±1.29	ns
Evaluative	3.01±1.80	3.12±1.26	ns
Miscellaneous	10.06±2.32	9.68±1.93	ns
PRI	42.89±6.70	41.66±4.96	ns
PPI	2.88±1.05	3.06±1.06	ns
LOC-EXT			
Sensory	21.46±4.08	20.73±4.17	ns
Affective	7.94±1.63	8.03±1.58	ns
Evaluative	3.11±1.83	3.47±1.31	ns
Miscellaneous	9.19±2.68	9.63±2.20	ns
PRI	41.60±6.34	41.72±6.37	ns
PPI	2.96±0.99	3.11±1.11	ns

The section B of EPQ showed a significant difference between GN and GL in 24 out of 32 questions (**Table 4**).

Table 4 Descriptive Statistics (mean±SD) and t-test results of Ethnic Pain Questionnaire, section B: 25 out of 32 responses were significantly different in the two groups, women living in Lima (GL) and women living in Nasca (GN)

QUESTION	GN (N=242)	GL (N=121)	p-value
6-Same friends of infancy	1.97±1.92	1.44±1.82	<.01
9-See relatives	2.87±1.60	3.29±1.41	<.01
10-Identified with traditions	2.98±1.62	3.58±1.20	<.01
11-Tell others about pain	2.73±1.71	1.83±1.83	<.01
12-Helped by telling about pain	2.78±1.65	1.76±1.81	<.01
13-Worked up by telling about pain	2.74±1.67	1.98±1.86	<.01
15-Cannot hide pain	2.46±1.77	2.84±1.61	<.01
16-Impossible carrying on with work	2.56±1.82	2.82±1.43	<.01
17-Stopped work and stayed at home	2.62±1.79	2.88±1.40	<.01
18-Found new activity because of pain	2.78±1.56	2.94±1.35	<.01
19-Made worry by pain	2.78±1.56	2.94±1.35	<.05
16-Fear of cancer or serious disease	3.38±1.27	2.92±1.65	<.01
22-Thinking why has deserved pain	2.69±1.59	3.29±1.17	<.01
23- Less worried if discover cause of pain	3.19±1.30	3.42±1.01	<.05
25-Pain makes angry	3.43±1.17	3.70±.74	<.01
26-Pain makes afraid	3.46±1.10	3.70±.72	<.01
27-Pain makes depressed	3.50±1.06	3.78±.63	<.01
29-Pain makes life unhappy	3.35±1.28	3.76±.70	<.01
30-Went to doctor when first had pain	2.01±1.95	2.90±1.73	<.01
31-Does not believe to medicine for pain	2.81±1.66	2.25±1.92	<.01
33-Has been to a chiropractor	0.67±1.39	3.55±1.05	<.01
34-Stop treatment if not effective in a few days	2.53±1.81	3.51±1.01	<.01
35-Found remedies from friends and relatives	2.51±1.79	3.20±1.25	<.01
36-Turned to friend and relatives for help	2.38±1.84	3.30±1.18	<.01
37-Supported by friend and relatives for pain	2.76±1.74	3.43±1.12	<.01

Group GN reported a higher score in communication of pain to others, a lower trust in drugs for pain and had a stronger fear that pain might be related to cancer or a serious disease. GL showed a higher score in all the other questions, regarding relationship with their relatives and tradition, disability caused by pain, being psychologically affected by pain, going right away to the doctor for pain but discontinuing soon the treatment if looking ineffective and finding remedies and support from friends and relatives. The strongest difference between the two groups was in the attendance of a chiropractor for pain treatment, reflecting its limited availability in Nasca area.

Therefore, subjects belonging to GN, despite the lower PPI, were significantly more affected by pain in most daily activities (**Table 5**), including both personal needs (sleeping, eating, walking, sex) and activities (job, social activity, household chores.

Table 5 Distribution of participants for difficult grade in day life activities and χ^2 test results in the two groups. Women living in Lima (GL) and women living in Nasca (GN)

	GN (N=242)			**GL (N=121)**			
Day life activities	**Not applicable**	**Lower difficult**	**High difficult**	**Not applicable**	**Lower difficult**	**High difficult**	**p-value**
Sleeping	0.0%	36.3%	63.6%	0.0%	87.5%	12.5%	<.01
Eating	0.8%	40.5%	58.7%	0.0%	95.8%	4.2%	<.01
Sport	26.1%	66.8%	7.0%	17.5%	68.5%	14.0%	<.01
Schoolwork	59.1%	33.0%	7.8%	1.7%	98.3%	0.0%	<.01
Job	8.8%	46.8%	44.3%	15.0%	83.3%	1.7%	<.01
Social activities	13.1%	76.4%	10.5%	0.0%	97.5%	2.5%	<.01
Houseold chores	21.2%	48.0%	30.7%	0.0%	98.4%	1.6%	<.01
Driving	40.3%	57.7%	0.8%	51.7%	47.5%	0.8%	<.05
Walking	0.4%	34.2%	65.4%	0.0%	96.0%	4.0%	<.01
Sex	22.7%	47.0%	30.3%	15.8%	81.6%	2.6%	<.01

They also complained lower rate of pain in the back and foot than GN and a higher rate of pain in upper limbs and ill-defined body areas (**Table 6**). The average of pain duration was 23±18.6 months in GL and 45 ±73.8 in GN (p<0.01), leading the latter to go to the doctor for a much longer time (28±54.5 vs.5±7.4 months; p<0.01).

Table 6 Distribution of participants for site of pain and χ^2 test results in the two groups. women living in Lima (GL) and women living in Nasca (GN)

Site of pain	**GN (N=242)**	**GL (N=121)**	**p-value**
Head	29%	29%	ns
Upper limbs	5%	0%	**<.05**
Thorax	10%	8%	ns
Abdomen	65%	72%	ns
Low back	26%	48%	**<.01**
Lower limbs	14%	12%	ns
Foot	5%	12%	**<.05**
Ill-defined	15%	4%	**<.01**
Not classifiable	3%	0%	**<.05**

DISCUSSION

Pain is the most common symptom and concern of humankind: it is a so common and tiring consequence of disease, so universally experienced, as to lead one to believe that it can easily be communicated and shared. Instead, it has been misunderstood and eluded for ages. The reason is complex, since pain is not a matter of medical knowledge only, but has deep psychological, philosophical, ethical and religious implications. Furthermore, pain is a solely subjective experience, related to consciousness and psychic life: as a consequence, it cannot be objectively assessed and measured according to the conventional rules of the scientific method. This aspect has probably played a key role in misunderstanding, underestimating and eluding pain for decades, being its essence at least partly incompatible with the analytic, dualistic approach of scientific medicine, mainly oriented towards organic diseases and objective facts in a reductionistic view. Moreover, for too long a time pain has been perceived by physicians solely as the symptom of an underlying organic disease, thus focusing the clinical interest to the disease, rather than to the suffering patient. This approach may be correct in several instances (when pain is acute, the cause is organic only, and/or pain can be removed treating the disease), but may be misleading in many other exhausting conditions, that is, when chronic pain is the main or the only manifestation of disease, the structural lesion is not manifest, cannot be removed if present or its removal does not provide any benefit to the patient.

Being subjective in nature, pain evaluation closely depends on communication, a factor with manifold facets, including patient's gender, personality, mood, behavior, coexisting neurological deficits and diseases (e.g., those impairing hearing and speech). The IASP, definition of pain emphasizes the nature of pain as experience, which closely depends on affectivity and cultural factors and is far from being expression of nociceptive pathways stimulation only; therefore, language, environment and culture are to be considered as relevant factors of pain perception, elaboration, meaning and modulation, as well as good target for therapy.

Chronic pain may can be regarded as the universal, endemic problem of human condition; it is also an intrusion of the sacred, snatching men away from their ordinary life and confronting them with their limits, the price of life and its transience. As Albert Schweitzer said in 1931: "Pain is a Lord of humankind even worse than death itself" (Schweitzer, 1931). On the other hand, if pain would not exist, man himself perhaps would not exist.

The scientific medicine mainly looks at man as a Cartesian machine, where a disease is a matter of objective organic abnormalities; when pain is concerned, the attention is mainly focused on pain pathways and their modulation with drugs and interventional therapy, thus forgetting the nature of suffering and contradicting the very definition of pain according to IASP: without experience there is no pain, while the experience of disease, pain, grief and their management influence to each other and are deeply affected by social and cultural factors. Even the disease and its diagnosis is someway a conventional fact, a noun attached to a wider and often only partly known process (Berganza *et al*, 2005) and, besides biological aspects, psychological and social frameworks are very relevant in understanding diseases, especially in psychiatry and in pain management.

In short, a so complex functional phenomenon as pain may be strongly misunderstood as a result of an approach forcing it to fit the nouns used for diagnostic and nosographic definitions of diseases: the less the descriptors fit patient's reality on his own perspective, the worse physician's capability of properly understanding him, the higher the risk of misdiagnosis and ineffective treatments.

Although studies comparing pain among African-Americans, Hispanics, and whites have yielded mixed findings, increasing evidence suggests an enhancement of pain experience for African-American and Hispanic patients, including both clinical and experimental components of pain (Edwards *et al*, 2001; Rahim-Williams *et al*, 2007). There are wide ethnic variations of pain intensity and its descriptors, where Hispanic and Latin people report higher PRI than Anglo-Americans and North-Europeans (Bates *et al*, 1993; Bates *et al*, 1995), reflecting a complex array of physical, cultural, psychological and social factors. Pain intensity seems to be related to LOC, as well as to attitudes, beliefs, emotional and psychological states, suggesting the need for an emic approach and a biocultural model for a proper assessment (Bates *et al*, 1993). A loop between chronic pain, its treatment, attitudes, emotions and sociocultural background also exists, where each component affects the other ones, making the relationship between conventional pain diagnosis and management (medications used and surgical interventions) far from being simple, close and clear (Bates *et al*, 1993).

Despite successful adaptation may depend on socioeconomic and cultural factors, including the context of care (providers' world views), a study comparing Puertoricans to Anglo-Americans did not show significant differences in daily activities despite pain was higher in the former (Bates *et al*, 1995). Other studies failed to show significant ethnic differences in measures of pain, depression, psychopathology, or pain-related disability (Edwards *et al*, 2005); however, they emphasized the role of catastrophizing on pain intensity and distress and a greater disability in subjects using prayer/hope as a coping strategy, suggesting the potential benefit of interventions designed to facilitate adaptive coping and a minor role of ethnicity in pain perception (Edwards *et al*, 2005). A more recent study reported that Non-Hispanic blacks and Hispanics had higher risk for severe pain compared with non-Hispanic whites, where lower educational level, comorbidity, psychological distress and being a Medicaid recipient were significant predictors for severe pain (Reyes-Gibby *et al*, 2007). Finally, the worse pain suffered by ethnic and racial minorities in U.S. seems to depend also on disparities in both access to pain management and its quality; it also includes several factors, such as miscommunication and/or misperceptions about pain, patients' acceptance of analgesics as well as provider attitudes, knowledge and beliefs about patients' pain (Rahim-Williams *et al*, 2007; Reyes-Gibby *et al*, 2007; Shavers *et al*, 2010).

The LOC is a relevant factor in pain assessment and its overall management, since it is related to pain intensity, culture, inter- and intra-ethnic background; furthermore, it does not seem to be a permanent, unchanging trait or cognitive interpretation and may be modified by the experience of chronic pain, its duration and evolution (Bates and Rankin-Hill, 1994): if so, a therapeutic strategy targeted to increase patients' sense of control over their lives and their pain might improve chronic pain management (Edwards et al., 2001; Heath et al., 2008). The version of LOC we have adopted has the advantage of being simple, fast, easily understandable by patients and validated in cross-cultural studies, including both Latinos and Angloamericans (Bates et al., 1993; Bates et al., 1995; Bates, 1996; Bates and Rankin-Hill, 1994).

Our study, according to an emic perspective, was aimed to check the relationship between chronic pain and its psychological and cultural factors; unlike previous studies, which mainly compared different ethnic groups (e.g., African-American, Hispanics and American Whites) or ethnic minorities, we studied two different samples belonging to the same ethnic group, that is, Peruvian women living in Lima (with higher education and a western life style) and those living in Nasca (with a lower education level, a different socioeconomic background); we also limited our investigation to women only, in order to avoid gender-related sources of variability (Bingefors & Isacson, 2004).

Our data are in agreement with Bates' results on pain intensity, since the overall values of both PRI and PPI in our subjects were similar to those reported in Latinos and the PPI resulted to be significantly lower in subjects with a LOC-INT style (Bates *et al*, 1993; Bates, 1996). However, the LOC resulted to be much more directed towards LOC-INT than the one reported by Bates et al. in Hispanics immigrated in Worcester area, showing a sizable cultural difference in the psychological style of Peruvian women living in their Country (Bates *et al*, 1993; Bates, 1996). It was also the main cause for the significantly lower PPI reported by subjects belonging to GN but not for GL. Despite the PRI was similar in both groups, the evaluative component was significantly lower in GN: this may depend on the fact that its descriptors seem to reflect pain intensity also (from annoying to unbearable) in a more similar way to PPI than other components of MPQ.

As far as the EPQ is concerned, the GN higher fear of serious diseases or cancer was paralleled by the much longer doctor attendance, stronger distrust in drugs for pain and a stronger disposition to communicate their pain; besides psychological disposition, this is a likely consequence of an overall lower quality of pain management, since misdiagnosis and ineffective treatments make pain more severe and a stronger source for worry, leading to deep concern for its origin and increasing the need for communicating it to others, in the attempt of understanding its meaning.

The higher pain intensity in GL (as defined by PPI), was associated to a significantly higher score in most of other items of EPQ such as worse emotional reaction and disability; their different socioeconomic and cultural context in comparison to GN led them to go to the doctor immediately but with the tendency to quickly discontinue apparently ineffective treatments and looking for alternative therapies (chiropractic) and/or seek for remedies from friends and relatives. The socioeconomic context and lifestyle of a big city probably favors this behavior, due to the easier access to medical facilities and the larger stream of information, allowing for a more critical and active stance. On the other hand, the higher emotional impact reflects a worse adaptation to chronic pain, as already emphasized by Bates at al. (Bates *et al*, 1995). The higher pain intensity and disability leading to stop work or find new activity because of pain in GL (despite the availability of better resources for pain treatment), apart from sample variability, may include the following reasons: a) the rate of work women a big city may be higher, while the eventful lifestyle is more conditioned by duties, engagements and need for efficiency in comparison to a rural environment; b) in such an environment giving up daily activities may be perceived as more disappointing; c) a simpler lifestyle in a rural area with lower availability and quality of medical support might make easier accepting pain as a natural counterpart of life; d) the simpler lifestyle of a rural area may make easier and less disappointing adjusting activity to pain.

The data on work of EPQ seem to be contradicted by those on life activities, where GN reported a major disability in most items, apart from sport (an activity which is much less relevant in the lifestyle of a rural area). Here, the higher rate of problems with sleep, eating, job, social activities, household chores, walking and sex in GN shows the higher impact of pain with daily activities, despite the lower PPI than GL. The seemingly paradoxical association of lower pain intensity and emotional impact with its worse disability, was associated to a stronger disposition to communicate their pain, attending the doctor for a much longer time but with the tendency to distrust in pain medicine: such a condition probably reflects, once again, the lack of an effective pain diagnosis and treatment and, on the other hand, the different sociocultural setting of a rural area, the more quite life of which may allow for adjusting activity to pain; the latter might also help decreasing pain intensity.

In general, both groups revealed an unsatisfactory pain management besides the group related differences, marked by long pain duration despite doctor attendance, seeking for remedies outside the medical context, thinking why deserving pain and worry for its unknown cause, distrust in therapy, its discontinuation, a strong need to communicate pain, seeking for friends' and relatives' support and alternative options. Such a condition may in turn lead to an increase of overall suffering and impact of pain on daily activities, adding to the loop between pain, anxiety, fear and depression. These data are in agreement with other reports on Hispanics too (Bates *et al*, 1993; Bates, 1996; Bates *et al*, 1997), who showed a higher interference of pain with work and daily activities than other ethnical groups and perceived the emotional expression of pain as appropriate response to pain, unlike Americans and Polishes.

The whole of our data confirm the complex relationship between pain, provider's capability of understanding and treating it, socioeconomic and cultural components, making pain medicine far from being a matter of pharmacological or interventional manipulation of pain pathways only: each of these factors may be a relevant resource in pain management, while ineffective treatments may, in turn, be a cause for further suffering.

The term "chain of survival", successfully adopted in emergency medicine, clearly indicates that the effectiveness of resuscitation depends on the strength of the weakest ring of the chain. In pain medicine the same concept might be appropriate: a term like "chain of wellbeing" might emphasize the need for an appropriate strength of all components of pain management, beyond the only availability of powerful drugs and interventional therapy.

Chronic pain is still a poorly understood condition frustrating both patients and physicians with incalculable costs, where the effects of analgesic and adjuvant drugs are far below the expectations. Pain is not merely a symptom but a matter of experience, a suffering involving the whole human being, making the ruling mechanistic and dualistic approach of biomedicine inappropriate for its full understanding: it is not surprising that the view of patient and provider may considerably differ and this can also turn into disappointment, contributing to substantial patient stress and alienation (Bates *et al*, 1997; White & Siebold, 2008). This kind of approach is the original sin of scientific medicine, sprang from Galilean science and Cartesian separation of body and soul, an arbitrary separation non-existent in nature. In fact, it is the byproduct of the political coercion of Inquisition in XVII century, which prevented the emerging science from studying the soul (that is, psyche and mind), rather than the result of a free epistemological reflection. Galileo, forced to abjuration from the Church, wrote on the mystery of creation and universe in his "Discorsi e dimostrazioni matematiche intorno a due nuove scienze" (The Two New Sciences, Day 3, Corollary): "Simili profonde contemplazioni si aspettano a più alte dottrine che le nostre ("Such deep contemplations pertain to higher sciences than our", that is, theology). As a consequence, classical physics has strictly separated the observer from the physical world, while medicine has separated the soul-psyche-mind from the body and focused its attention on the Cartesian "eathern machine" only.

After five centuries, in spite of the full achievement of freedom of science from religious power and the huge evolution of physics in XX century, the paradigm of biomedicine and neuroscience is still conditioned by this separation, while the so-called "hard-problem", that is, the mind-brain relationship is still far from being understood (Chalmers, 1999; Smith, 2006; Smith, 2009). There is an increasing need in medicine to rediscover subjectivity (Zeman, 2001) and overcome the conventional dualistic paradigm, moving towards a mind-body and biopsychosocial integration from an emic persepective and not from the ego- and ethnocentric dualistic filter of the outside researcher and provider. This is not only relevant to understand patients belonging to minorities or living in other Countries, but also for intra-group cultural differences (Bachiocco *et al*, 2002) and, ultimately, for each suffering patient.

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