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# Chapter 1

# CHRONIC PAIN PATIENTS AND QUALITY OF LIFE INSTRUMENTS – A SYSTEMATIC REVIEW

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**ABSTRACT**
*Background:* Chronic pain is an overwhelmingly complex sensory and emotional experience that has a negative impact in health related quality of life (HRQoL). A meta-analysis was performed to quantitatively estimate HRQoL in chronic pain patients, based on SF-36 results. *Methods:* PubMed, PsycARTICLES, PsycINFO and EMBASE were searched. Query: "(chronic pain) (abstract) and ("quality of life" OR "HRQOL") (abstract)". Included studies should report HRQoL, using general HRQoL questionnaires, in adults with non-cancer chronic pain followed in pain management units. Studies methodological quality was evaluated using the QATSDD scale. The inverse variance method was employed to calculate pooled means and 95% CI for each dimension and subgroup analysis was performed. *Findings:* Electronic search retrieved 4608 articles, 35 were selected. These studies applied 11 HRQoL questionnaires, being SF-36 the most used (n=27, 77%). Pooled mean scores were low for every SF-36 dimension (ranging from 16 [10.06, 22.25], for Physical Role, to 52 [49.01, 54.63] for Mental Health, including summary scales: PCS 29.72 [28.12, 31.32] and MCS 42.89 [38.59, 47.19] (mean [95%CI]). *Discussion:* HRQoL of chronic pain patients is low in all dimensions. Psychological interventions have an important role to improve HRQoL in this population and should be promoted and encouraged.

*Keywords:* chronic pain, pain contexts, SF-36, meta-analysis.

## 1. INTRODUCTION

Chronic pain is a major challenge for medical community (Becker, Sjøgren, Bech, Olsen, & Eriksen, 2000), since it is an overwhelming complex sensory and emotional experience (Mazzola et al., 2009).

Today it is recognized that chronic pain has a negative impact on quality of life (QoL) (Borsbo, Peolsson, & Gerdle, 2009; Breivik et al., 2008; Lamé, Peters, Vlaeyen, Kleef, & Patijn, 2005; Tüzün, 2007). There are several QoL definitions, probably the most used is the World Health Organization's: QoL is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (Chandra & Ozturk, 2005). Some authors make a distinction between global concept of QoL (connected to broader aspects of Humanity) and health related quality of life (HRQoL). HRQoL measures treatment and disease process impact in the holistic aspects of a person's life, embracing emotional, social and physical development and their functional capacity in daily activities (Ferrer, 2002).

HRQoL physical, emotional and social dimensions have impact on chronic pain patient's pain exacerbation or relief (Ferrer, 2002). Even treatment outcomes are affected by cognitive, motivational and emotional factors (Mazzola et al., 2009).

Multidisciplinary pain treatment is probably the most effective for chronic pain patients (Becker et al., 2000), however, for several motives, not all chronic pain patients are treated in specialized pain centers. Valid HRQoL measures in pain units used systematically allow the identification of pain impact in patient's lives, selection of best treatment options, and outcome treatment evaluation (Ferrer, 2002). There is some consensus that individuals with chronic pain

and longer pain duration have lower HRQoL (Jamison, Fanciullo, McHugo, & Baird, 2007). Some studies about pain unit's patients indicate lower levels of HRQoL when compared with other chronic populations (Fredheim et al., 2008). However many of these studies use disease specific HROQoL questionnaires (e.g., Fibromyalgia Impact Questionnaire), or participants have very specific diagnoses (as cancer pain, fibromyalgia, neck pain, lumbar pain, pelvic pain or osteoarthritis) (Ferrer, 2002). SF-36 is the HRQoL questionnaire most widely used (Elliott, Renier, & Palcher, 2003) and over the years it has been refined and culturally adapted in several countries (Alonso et al., 2004; McDowell, 2006).

The SF-36 is a 36-item questionnaire, self-administered, applied in paper pencil or computer versions, that measures health-related functions in eight domains: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), vitality (VT), general health perceptions (GH), social functioning (SF), role limitations due to emotional problems (RE), and mental health (MH). These eight dimensions scales are grouped into two health dimensions (summary scales): physical composite scale (PF, RP, BP, VT) and mental composite scale (SF, GH, RE, MH) (Jamison et al., 2007).

A systematic review was conducted to: 1) to identify HRQoL instruments used to evaluate chronic pain patients followed in pain management units; and 2) to quantitatively estimate HRQoL in non-cancer chronic pain patients, based on SF-36 outcomes, by performing a meta-analysis of studies estimating HRQoL in this population.

## 2. METHODS

### 2.1. Search strategy and inclusion criteria

Research was performed in several electronic databases: PubMed, EMBASE, SocINDEX, CINAHL, PsycARTICLES, PsycINFO and Cochrane Central Register of Controlled Trial and restricted to articles published until April 2011.

To conduct a sensitive search, query search was "(chronic pain) (title/abstract) and ("quality of life" OR "HRQOL") (title/abstract)" in PubMed. For all the others electronic databases query was "(chronic pain) (abstract) and ("quality of life" OR "HRQOL") (abstract)".

Inclusion criteria: a) all studies assessing HRQoL in adults (above 18 years) with chronic non cancer pain in pain contexts (pain clinics, pain management units or hospital pain specialized units) and with pain duration longer than 3 months; and b) studies describing HRQoL questionnaires application in chronic pain patients.

Exclusion criteria: a) articles assessing HRQoL in populations with specific pain diagnoses (e.g. cancer, fibromyalgia or osteoarthritis); b) studies focusing specific conditions in general diagnosis, as moderate to severe pain, intractable pain, or disabled patients by chronic pain; c) interventions that usually aren't first treatment choice, like ablative techniques; d) and, methodological studies as systematic reviews or case studies.

Inclusion process was carried out by one researcher on two occasions: first after reading title and abstract and then after reading full articles. All reasons of article's inclusion or exclusion were recorded and analyzed.

Article's collected information was: a) article's identification (title, author, publication year); b) study design, context, inclusion and exclusion criteria, sample size, pain diagnoses, pain duration, and applied questionnaires; c) and study participant's characteristics (mean age), HRQoL outcomes and predictors.

### 2.2. Statistical analysis

The inverse variance method was employed to calculate pooled means and confidence intervals (95%) for all SF-36 scales at baseline, since they are continuous variables, ranging from 0 to 100. The inverse variance method was also applied to aggregate information of several groups in the same study, which estimated pooled measures (mean, standard deviations and standard error) per study.

Random-effects model was used based on the assumption that estimated effects differ across studies, but follow the same distribution. Software used to aggregate data was

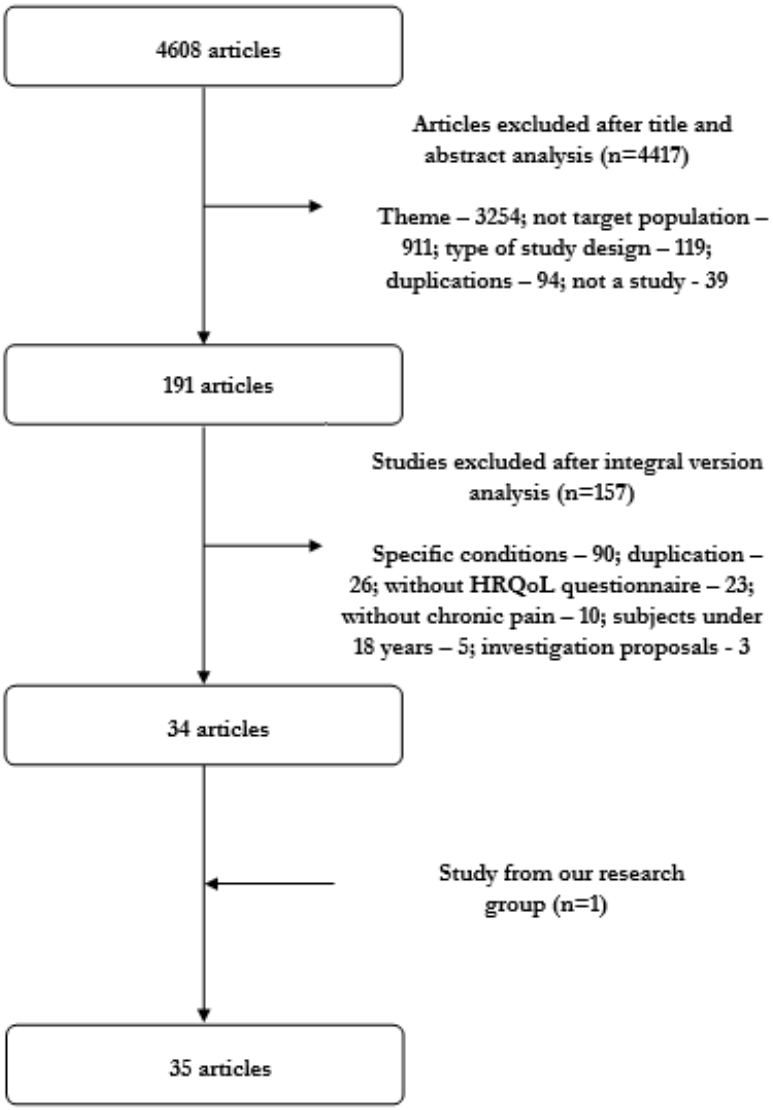
Review Manager 5®, which implements random-effects meta-analysis version described by DerSimonian and Laird (Deeks, Higgins, & Altman, 2011). Heterogeneity was explored through subgroup analyses considering study methodology, type of pain management unit, geographical region, participants mean age, and percentage of patients with low back pain.

Sensibility analysis for each SF-36 scale was performed removing one study at a time and then analyzing different pooled means. Publication bias was assessed by funnel plots for all SF-36 scales.

## 3. FINDINGS

After articles selection process 35 studies were included, see Figure 1.

*Figure 1. Flowchart of literature search and review process.*




Summary of the 35 included studies characteristics is presented in Table 1.

*Table 1. Summary of included studies characteristics.*

| Authors | Type of study | HRQoL measure | Sample size | Age | Years with pain | Type or diagnosis of pain |
|---|---|---|---|---|---|---|
| Abbot et al. (2001), UK | Randomized Controlled Trials | SF-36 | n=105; FH =25; SFH=25; DH=28; NH=27 | FH - 53,6 (44,8-58,8); SH - 48,9 (44,8-53,0); DH - 57,6 (53,5-61,7); NH - 51,4 (48,1-54,7) ; M (95% CI) | FH - 10,9 (7,2-14,6), SH - 11,7 (6,8-16,6); DH - 11,5 (7,2-15,8); NH -10,0 (5,9-14,1); M (95% CI) | Trauma - 9; degenerative - 55; nerve damage - 22; miscellaneous - 5; unknown - 14 |
| Adams (2002), USA | Cross-sectional | SF-36, QOLS | 89 | - | - | - |
| Becker et al. (2000), Denmark | Randomized Controlled Trials | SF-36 | MPT=63; GP=63; WL=63 | MPT - 57,7±15,8, GP- 55,1±14,6, WL- 57,2 ±15,5, M±SD | MPT- 10,2±9,1, GP-7,8±8,1, WL - 9,7±8,0, M±SD | Somatic - 73; neuropathic - 63; visceral - 17; psychogenic - 7; unknown - 7 |
| Azevedo et al. (2007), Portugal | Validation study | SF-36 | 174 | 52,63 ±13,46, M±SD | - | Osteoarticular -47%; trauma – 3%; headache - 1%; surgical intervention - 11%; peripheral vascular disease - 3%; nervous system lesions - 8%; other – 28% |
| Caldwell, Hart-Johnson, & Green (2009), USA | Cross-sectional | SF-36 | 183; whites=92; blacks=91 | 38,2±7,5, M±SD | 5±6,9, M±SD | Leg/foot - 62,7%; hip/pelvis - 53,8%; back pain - 55,6% |
| Cheung, Wong, Yap, & Chen (2008), China | Validation study | SF-36 | 224 | 41,8±10,3, M±SD | 3,2±4,5, M±SD | Injuries at work - 59,4%; pain localization more than 3 sites - 33,5%, one site - 36,2%; back - 60,3%, neck - 11,6%, lower limbs - 8,9%, and other - 19,2% |
| Chibnall & Tait (1990), USA | Validation study | QOLS | 393 | 42,4±12,8, M±SD | 4,6±7,2, M±SD | Work accident - 46,6%; non-work accident - 18,8%; illness or surgery - 12%; no reason - 18,6%; unspecified events - 3,9% |
| Chibnall & Tait (1994), USA | Validation study | QOLS | 765 | - | - | - |
| Choinière et al. (2010), Canada | Longitudinal observational study | SF-36 | 728 | 50,8±12,6, M±SD | 5 (0,5-55), Median (R) | Trauma - 308; surgery - 67; illness - 136; no precise event - 190; other - 27 |
| Cusens, Duggan, Thorne, & Burch (2010), UK | Longitudinal intervention study | SF-36 | IG=33; CG=20 | IG - 46,7±11,5; CG - 48,4±12,3, M±SD | IG – 5,6±2,4; CG – 7,1±3,6, M±SD | Lower back pain: 24% and 45%; arthritis: 26% and 20%; sciatic injury: 18% and 10%; fibromyalgia: 18% and 10%, IG and CG respectively |
| Deshields, Tait, Gfeller, & Chibnall (1995), USA | Cross-sectional | QOLS | 200 | - | - | Low back, head/neck, and extremity pain |
| Elliott et al. (2003), USA | Cross-sectional | SF-36 | 242 | 46±0,8 (19–83), M±SD (R) | 7,1±5,3, M±SD | Back pain - 57%; fibromyalgia/myofascial pain - 44%; neuropathic pain - 35%; headache - 25%; arthritis - 14% |

*Table 1. Summary of included studies characteristics (cont.).*

| | | | | | | |
|---|---|---|---|---|---|---|
| Fredheim, Borchgrevink, Saltnes, & Kaasa (2007), Norway | Validation study | EORTC QLQ-C30, SF-36 | 286 | 45±13, M±SD | - | Generalized pain - 16%; neck pain - 15%; lumbar/thoracic pain - 19%,; localized musculoskeletal pain - 11%; neuropathic pain - 16%; somatoform pain disorders - 9%; other pain - 14% |
| Gerbershagen, Lindena, Korb, & Kramer (2002), Germany | Cross-sectional | NHP, SF-36, German Life Satisfaction Scale | 3294 | 51,3±14,8, M±SD | 7,6±10,3, M±SD | Abdominal - 65; arm - 120; leg - 438; head/face - 853; back - 924; neck/shoulder - 245; fibromyalgia - 210; other - 439 |
| Green & Hart-Johnson (2009), USA | Longitudinal intervention study | SF-36 | 182 | - | - | - |
| Hart-Johnson & Green (2010), USA | Cross-sectional | SF-36 | CP=49; NV: with chronic pain n=27 and without pain n=28 | 61-76 (R), older women | - | - |
| Jamison et al. (2007), USA | Validation study | WHOQOL-BREF, ICQOL-SF | S1=300; S2=336 | S1 - 50,6±13,7; S2 - 51,5±14,5, M±SD | S1 - 8,7±2,0; S2 - 7,6±2,0; M±SD | Low back pain: S1 - 37%; S2 - 42,6% |
| Johnston, Foster, Shennan, Starkey, & Johnson (2010), New Zealand | Randomized Controlled Trials | Quality of Life Inventory | IG=12; CG=12 | 43 (20-84), M (R) | - | - |
| Kassardjian, Gardner-Nix, Dupak, Barbati, & Lam-McCullock (2008), Canada | Validation studies | SF-36, PRISM | Validation n=138; construt validity n=26 | Validation - 50,5 (25–86); Construct validity - 48,6 (34–77), M (R) | >5 years: V - 131; CV - 24; <5 years: V - 7; CV - 2 | Back pain: V - 67; CV - 14; fibromyalgia: V - 19; CV - 1; arthritis: V - 17; CV - 1; headache and facial: V - 6; CV - 2; other: V - 29; CV - 8 |
| Kerr et al. (2004), Australia | Cross-sectional | SF-36 | 632 | 50±16 (20–93), M±SD (R) | - | Work accident - 23%, at work - 10%, at home - 8,5%; motor vehicle accident - 6%; surgery - 12,5%, illness - 2,5%; no reason - 23,5%; other - 11% |
| Kruis et al. (2009), Netherlands | Cross-sectional | SF-36 | 969 | 53±16, M±SD | 5 (2-10), M (R) | - |
| Lamé et al. (2005), Netherlands | Cross-sectional | SF-36 | 1208 | 49,9±14,7, M±SD | - | Headache - 2.4%; neck pain and/or brachialgia - 23.3%; back pain and/or sciatica - 27.9%; other pain - 15.7%; multiple localisations - 30.1% |
| Lee et al. (2005), China | Cross-sectional | SF-36 | 166 | 45,2±13,5, M±SD | - | Work-related injury - 57; accident - 23; illness/surgery - 33; unknown - 42; other - 11 |
| Man, Chu, Chen, Ma, & Gin (2007), China | Longitudinal intervention study | SF-36 | 45 | 42 (23-57), M (R) | 4 (1-27,8), Median (R) | Back - 26; limbs - 10; neck - 3; chest - 2; multiple sites - 2; others - 2 |

*Table 1. Summary of included studies characteristics (cont.).*

| | | | | | | |
|---|---|---|---|---|---|---|
| Marcus (2003), USA | Cross-sectional | SF-36 | H=110; HF= 385; HD=148 | 44,8, M | 50% pain for longer than 5 years | Myofascial - 38.1%; mechanical - 18.0%; headache - 17.1%, radicular/neuropathic - 13.1%; fibromyalgia - 5.9%; other - 7.8% |
| Mazzola et al. (2009), Argentina | Longitudinal intervention study | SF-36 | 38 | - | 12, M | Headache - 30; fibromyalgia - 4; neuropathic pain - 4 |
| Monsalve, Soriano, & De Andres (2006), Spain | Validation study | SF-36 | 112 | 50±12 (21 - 77), M±SD (R) | - | Neuropathic pain - 33,9%; somatic pain - 58%; visceral pain - 8,1% |
| Pecci (2007), Argentina | Cross-sectional | SF-36 | CP=102; PD=208; MH=320 | 65±14,9, M±SD (Chronic pain) | - | - |
| Schofield (2002), UK | Longitudinal intervention study | Sickness Impact Profile | 73 | IG - 48,2 (32-58); CG - 48,0 (29-65), M (R) | IG - 7,5; CG - 6,0, M | Low back pain - 60% |
| Schutze et al. (2009), Germany | Longitudinal intervention study | SF-36 | 189 | 49,3±10,4, M±SD | - | Back pain - 94; headache - 32; other pain - 63 |
| Skevington, Carse, & De C. Williams (2001), UK | Validation studies | WHOQOL-100, SF-36 | 106 | 44 (22–79), M (R) | 8,1±8,6, M±SD | - |
| Tiberghien-Chatelain et al. (2008), France | Longitudinal intervention study | Quality-of-Life Visual Analog Scale | 166 | 50±16, M±SD | 7 (3); M (Median) | Rheumatologic - 33,1%; neuropathic - 28,9%; headache - 13,3%; complex regional pain syndrome - 12,7%; fibromyalgia - 4,8%; others - 7,6% |
| Torre et al. (2008), Spain | Longitudinal intervention study | SF-36 | 119 | 55,1±13,3, M±SD | 7,9±10,6, M±SD | Back pain, osteoarticular pain, fibromyalgia, neuropathic pain and other |
| Vallerand (1998), USA | Validation study | City of Hope Quality of Life Survey | 204 | 40,63±9,96, M±SD | 2,7±4,5, M±SD | Pain origin: skeletal, neuropathic or soft tissue |
| Vranken et al. (2009), Netherlands | Cross-sectional | SF-36 | 388 | - | - | - |

M – Mean; 95% CI - 95% Confidence interval; SD – Standard deviation; R - Range

Eleven HRQoL questionnaires were used in these included studies, but SF-36 is by far the HRQoL questionnaire most applied to chronic pain patients (77%, n=27), regardless study methodology. Besides SF-36, the most frequent HRQoL questionnaires used are Quality of Life Scale (QOLS) (n=4, 11%) and WHOQOL questionnaires (WHOQOL-100 and WHOQOL-Bref, n=2, 6%). All the other HRQoL measures (City of hope Quality of Life Survey, EORTC QLQ-C30, ICQOL-SF, German Life Satisfaction Scale, Nottingham Health Profile, Quality of Life Inventory, Quality of Life Survey, Quality-of-Life Visual Analog Scale and Sickness Impact Profile) were applied in only one study.

There are several advantages of SF-36 use, namely: this is an instrument that has been applied in several populations, with strong reliability and validity and diverse country specific norms, has a survey manual and interpretation guide, is self-administered, can be used in personal or telephone interviews or by mail, and takes between 5 to 10 minutes to complete (Elliott et al., 2003; McDowell, 2006).

Of the 27 studies included with SF-36 outcomes, 16 (59%) studies had information available about SF-36 scales, 12 reported 8 dimension scale's mean and standard deviation (or other measures enabling standard error calculation) and 6 reported summary scales data

(2 studies reported dimension scales as well as summary scales). About the other 11 studies, 4 were abstracts and 7 described values like correlations or had graphic information.

### 3.1. Global quantitative results

Pooled estimates are low for every SF-36 dimension (ranging from 16 [10.06, 22.25], for the dimension Physical Role (Figure 2), to 52 [49.01, 54.63] for the dimension Mental Health (Figure 3) (mean [95%CI])). Scales associated with physical health tended to have lower values than those associated with mental health: Physical Function 25.72 [18.02, 33.42], Physical Role 16.29 [10.06, 22.25], Bodily Pain 25.56 [23.89, 27.23], Vitality 35.01 [32.72, 37.29], General Health 39.91 [37.13, 42.69], Social Functioning 46.43 [41.49, 51.37], Emotional Role 36.33 [26.61, 46.04] and Mental Health 52 [49.01, 54.63] (mean [95%CI]). This pattern was equally observed when pooling mean estimates of SF-36 summary scales: PCS 29.81 [27.32, 32.23] (Figure 4) and MCS 41.58 [38.91, 44.25] (mean [95%CI]) (Figure 5).

*Figure 2. Role physical.*

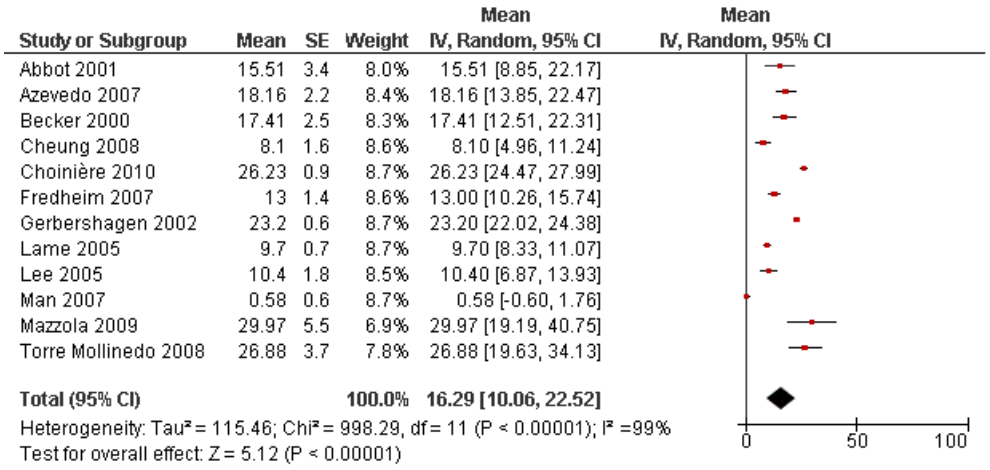



*Figure 3. Mental health.*

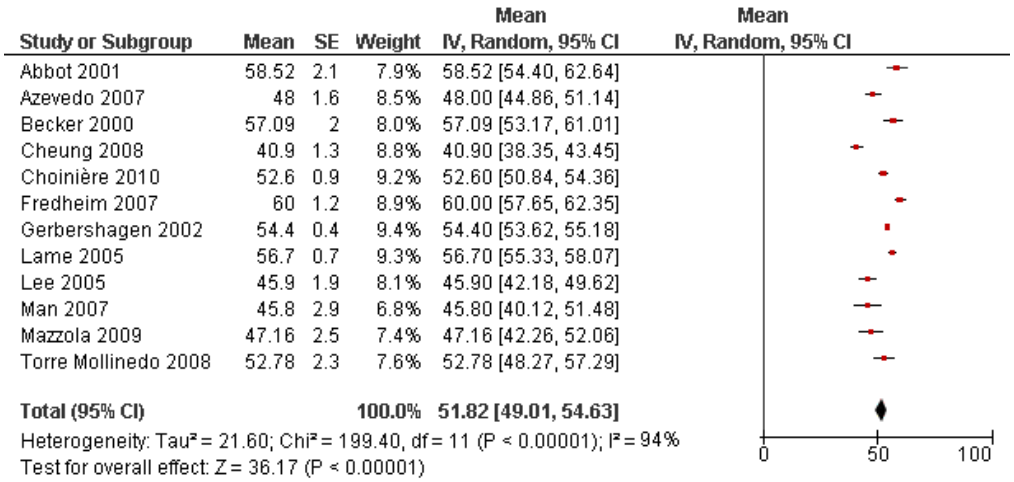


*Figure 4. PCS.*

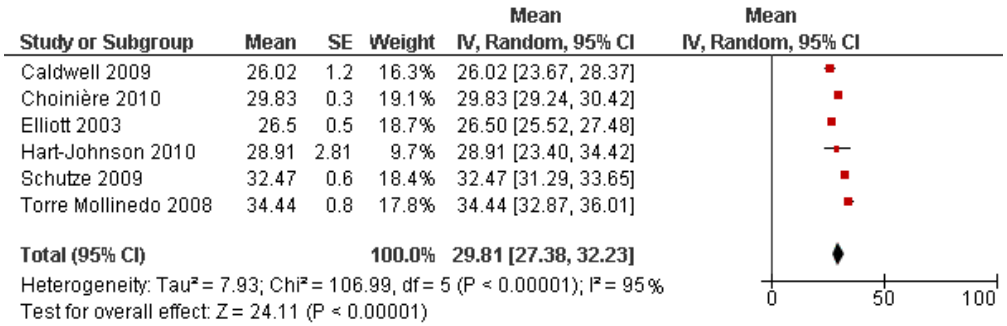



*Figure 5. MCS.*

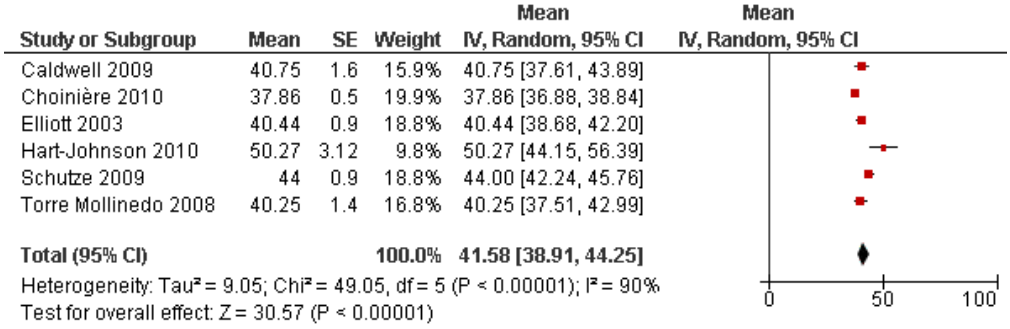
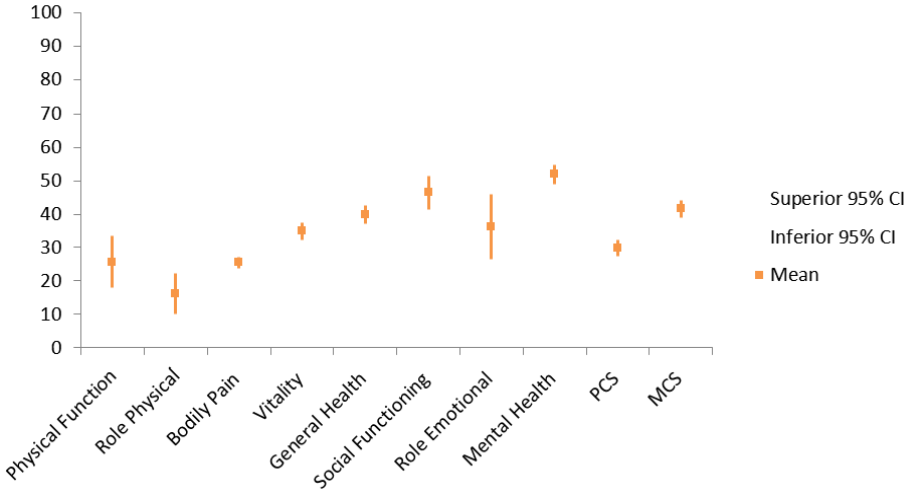



Figure 6 is a graphic presentation of SF-36 dimensions estimates. Only Mental Health dimension has a mean estimate above 50, again SF-36 scales range between 0 and 100, where 100 represents the best HRQoL.

*Figure 6. SF-36 Meta-analysis results.*




### 3.2. Subgroup analysis

All scales had high and significant heterogeneity. To explore moderators of heterogeneity different subgroup analysis were performed by type of study, type of pain management unit, geographical region, participants mean age, and percentage of patients with low back pain.

Considering subgroup analysis by type of study, across several designs differences were not statistically meaningful in most dimensions. In randomized controlled trials, participants tended to have higher scores, except for the Emotional Role dimension. On the other hand, participants in validation studies tended to have lower HRQoL scores. Differences were statistically significant in Physical Functioning (randomized controlled trials participants had higher values than observational and validation studies participants) and Mental Health scores (in intervention studies, randomized trials participants had higher values than longitudinal intervention studies participants).

Comparing summary scales, subjects in longitudinal intervention studies had significantly higher physical scores than participants of observational studies.

When analysing type of pain management unit, the only scale with significant differences between groups was the Mental Health dimension: patients in pain management clinics have lower Mental Health scores than patients in academic pain management centres and in tertiary multidisciplinary centres.

Dividing studies according to geographical region, only 3 continents are represented (America, Europe and Asia). Asian chronic pain patients had systematically lower HRQoL scores and differences were meaningful in Physical Functioning, Physical Role, Vitality, Emotional Role and Mental Health dimensions. Again, mean scores of Bodily Pain dimension of the 3 continents were very similar. Comparing Americans (North and South Americans) with Europeans, Americans tended to have significantly higher scores in Physical Role dimension, while Europeans tended to have significant higher values in Vitality and MCS dimensions.

SF-36 outcome comparison according to participant's mean age was also executed, when that information was available. In studies where participant's mean age was lower than 50 years SF-36 scores tended to be lower than in studies with participants mean age above 50 years. These differences are statistically meaningful in Physical Functioning and Vitality dimensions.

Another comparison performed between studies was based on percentage of low back pain patients in the sample. Considering studies where this information was available, studies with more low back pain patients (above 50% of the patients) had systematically lower HRQoL scores for all SF-36 dimensions. In General Health and MCS scores this difference was statistically significant.

Sensitivity analysis was performed first by removing each study and then considering studies mean quality assessment scale. Removing each study, SF-36 pooled scores remain very similar to the original pooling estimates.

In order to evaluate the risk of publication bias, a funnel plot was created for the pooled analysis of all SF-36 eight dimensions and for the two summary scales. Visual analysis of funnel plots did not detect major asymmetries. We concluded that in this case there was limited evidence of publication bias.

## 4. DISCUSSION

Regarding the identification of HRQoL instruments we concluded that the most frequently used questionnaire worldwide is the SF-36, however, we identified ten other questionnaires that have been used to measure this construct in this specific context. Besides SF-36, that has been extensively validated and is the most frequently used, other relevant questionnaires that deserve a special mention are:

a) The ICQOL-SF – developed specifically for pain patients, is adequately validated, short and easy to use;

b) The Quality of Life Scale – very short and easy to use and was developed specifically for pain patients;

c) The WHOQOL-BREF – generic, short and easy to use and adequately validated in several contexts;

d) Questionnaires specifically developed in cancer populations but have been also used in chronic pain patients with other disease aetiologies, like the EORTC QLQ-C30 and the City of Hope Quality of Life Survey;

e) Other generic, classical and adequately validated HRQoL questionnaires, that are in general more comprehensive (large number of items and long times of completion), like the WHOQOL-100, the Sickness Impact Profile and the Nottingham Health Profile.

Quality of Life Scale and ICQOL-SF are pain specific HRQoL questionnaires, this indicates concern with chronic pain patient's HRQoL. There is a 10 years' time lag between these questionnaires development, probably items and dimensions increment, as well as complexity evolution reflect HRQOL concept's discussion.

It is possible to conclude based on the available evidence that the HRQoL levels of chronic pain patients are in general very low, lower than other chronic conditions and this is particularly true for physical health components of HRQoL. Although 27 studies applied SF-36 questionnaire, only in 16 studies scales outcomes were presented with mean values and standard deviations. Outcomes description and presentation changed according to study aims, and this complicated data aggregation. Even when mean scales and standard deviations were presented, sometimes researchers opted for presenting the 8 dimension scores, while others only presented summary scales and others present both set of scores.

Comparing our meta-analysis pooled estimates with IQOLA Project (Alonso et al., 2004), it is evident to conclude that chronic pain patients followed in pain management units have much lower HRQoL scores than general population and individuals with other chronic conditions (allergies, arthritis, chronic lung disease, congestive heart failure, diabetes, hypertension and ischemic heart disease). The IQOLA Project aggregates SF-36 results based in general population, which included subjects with chronic conditions, in 8 countries.

In subgroup analysis geographical region, age and low back pain are the best moderators of study heterogeneity. Among patients with chronic pain, Asians tend to have lower HRQoL values. We could think cultural conceptions would play a role in answers, but discrepancy with population norms is enormous (Lee et al., 2005), and SF-36 translations have cultural factors in consideration and good psychometric results in different countries. Regarding age, individuals bellow 50 years with chronic pain tend to perceive low HRQoL, and in this study, significant differences are mostly in physical dimensions (Physical Functioning and Vitality). This is consistent with literature probably because older people have pain for a longer time and developed better strategies to cope with pain and limitations in daily life are not seen as so problematic (Rustoen et al., 2005). Literature also supports the diminished HRQoL of low back pain patients (Lamé et al., 2005), usually associated with more functional limitations and catastrophizing thoughts about pain.

Sensitivity analysis conducted allowed to corroborate pooled estimates presented, since studies removal (one at the time) did not affect substantially the pooled estimates.

Although we have not found clear evidence of publication bias, it is always possible that this is a problem in the present study. There was an effort to include all articles regardless publication language (English, German, French, Spanish and Portuguese).

This study had some limitations that deserve further consideration. There are some limitations related to the systematic review process like the difficulty in specifying search terms or queries broad in scope. Thus the initial results of the literature search were quite extensive and it took an important amount of work and time to perform the studies selection phase.

After including only quantitative data from SF-36 applications, we found that an important part of the studies did not presented the adequate quantitative data needed to perform meta-analysis. We have contacted authors and made all efforts available in order to obtain these data.

The studies included in the meta-analysis presented high heterogeneity, associated with a high methodological variability and the existence of very different settings. Thus, we tried to assess the magnitude of the heterogeneity in every analysis performed and explored the sources of heterogeneity using sub-group analysis. However, in most cases the heterogeneity was significant and therefore pooled estimates presented should be analysed with caution.

The relevance of the present study is mainly associated with the presentation of meta-analytic estimates of HRQoL in non-cancer chronic pain patients followed in pain management units. To our knowledge, this is the first work presenting this kind of evidence for

this particular population. This work is an initial attempt to determine HRQoL of chronic pain patients in pain contexts. It would be interesting to evaluate changes in HRQoL during and after specialized pain treatment, enabling HRQoL changes monitorization and evaluate treatment impact of usual or specific treatments, like multidisciplinary treatment and the outcomes of psychological treatment.

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