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Validity of four pain scales which have been proven reliable by a previous systematic review: Brief pain Inventory, Short-Form McGill Pain Questionnaire, Pain drawing, Visual Analog Pain Scale: a systematic review

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Validity of four pain scales which have been proven reliable by a previous systematic review: *Brief Pain Inventory, Short-Form McGill Pain Questionnaire, Pain drawing, Visual Analog Pain Scale*; a systematic review.

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SERMENT D'HIPPOCRATE

« Au moment d'être admise à exercer la médecine, je promets et je jure d'être fidèle aux lois de l'honneur et de la probité.

Mon premier souci sera de rétablir, de préserver ou de promouvoir la santé dans tous ses éléments, physiques et mentaux, individuels et sociaux.

Je respecterai toutes les personnes, leur autonomie et leur volonté, sans aucune discrimination selon leur état ou leurs convictions. J'interviendrai pour les protéger si elles sont affaiblies, vulnérables ou menacées dans leur intégrité ou leur dignité. Même sous la contrainte, je ne ferai pas usage de mes connaissances contre les lois de l'humanité.

J'informerai les patients des décisions envisagées, de leurs raisons et de leurs conséquences. Je ne tromperai jamais leur confiance et n'exploiterai pas le pouvoir hérité des circonstances pour forcer les consciences.

Je donnerai mes soins à l'indigent et à quiconque me le demandera. Je ne me laisserai pas influencer par la soif du gain ou la recherche de la gloire. Admis dans l'intimité des personnes, je tairai les secrets qui me seront confiés. Reçu à l'intérieur des maisons, je respecterai les secrets des foyers et ma conduite ne servira pas à corrompre les mœurs.

Je ferai tout pour soulager les souffrances. Je ne prolongerai pas abusivement les agonies. Je ne provoquerai jamais la mort délibérément.

Je préserverai l'indépendance nécessaire à l'accomplissement de ma mission. Je n'entreprendrai rien qui dépasse mes compétences. Je les entretiendrai et les perfectionnerai pour assurer au mieux les services qui me seront demandés.

J'apporterai mon aide à mes consœurs et confrères ainsi qu'à leurs familles dans l'adversité. Que les hommes et mes confrères m'accordent leur estime si je suis fidèle à mes promesses ; que je sois déshonorée et méprisée si j'y manque.»

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ABSTRACT

Background: Pain is a multidimensional phenomenon that is subjective with physiological and psychological components. It is necessary to have valid and reliable pain measures. A previous study has identified Brief Pain Inventory (BPI), SF MPQ-1 and 2 (Short Form McGill Pain Questionnaire) as reliable. Visual Analog Pain Scale (VAS) and Pain drawing were less reliable but they are commonly used. The present study aimed to collect validity data of these four scales.

Method: A Medline review via PubMed was carried out with no restriction on the publication date. Only English language papers were examined. Inclusion was conducted until June 2019. Data of validity (convergent, discriminant, construct, face and responsiveness) were extracted for each four scales.

Results: 17 relevant articles were included for BPI, 8 for SF-MPQ-1, 5 for SF-MPQ-2, none for Pain drawing and 2 for VAS. Convergent validity was studied in several articles included for each scale. Construct validity was studied only for BPI and SF-MPQ. Discriminant validity was studied only for BPI in one article. Face validity was studied in one article for both SF-MPQ-1 and 2. Responsiveness was studied in one article for BPI, 2 articles for SF-MPQ-1 and 3 articles for SF-MPQ-2.

Satisfactory validity data were found for BPI and SF-MPQ. Data were inadequate for Pain drawing and insufficient for VAS.

Discussion: The five relevant validities were not all studied for BPI and SF-MPQ. Further studies could supplement these data. It will be necessary to study external validity of VAS, which is very useful in practice.

RESUME

Introduction: La douleur est un phénomène multidimensionnel de nature subjective avec des composantes physiologiques et psychologiques. Il apparaît utile d'avoir des outils valides et fiables pour l'évaluer. Une étude précédente a identifié le Brief Pain Inventory (BPI) et la Short Form du McGill Pain Questionnaire version 1 et 2 (SF MPQ 1 et 2) comme fiables. L'échelle visuelle analogique (EVA) et le Pain drawing étaient moins fiables mais sont couramment utilisées. La présente étude visait à recueillir les données de validité de ces quatre échelles.

Méthode: Une revue de Medline via PubMed a été réalisée sans restriction de date de publication. Seuls les articles de langue anglaise ont été examinés. L'inclusion a été effectuée jusqu'en juin 2019. Les données de validité (convergente, discriminante, de construit, apparente et sensibilité au changement) ont été extraites pour chacune des quatre échelles.

Résultats: 17 articles pertinents ont été inclus pour BPI, 8 pour SF-MPQ-1, 5 pour SF-MPQ-2, aucun pour le Pain drawing et 2 pour l'EVA. La validité convergente est toujours étudiée. La validité de construction est étudiée seulement pour BPI et SF-MPQ. La validité discriminante n'est étudiée que pour BPI et dans un seul article. La validité apparente n'est étudiée que dans un article pour SF-MPQ 1 et 2. La sensibilité au changement est étudiée dans un article pour BPI, dans 2 articles pour SF-MPQ-1 et dans 3 articles pour SF-MPQ-2.
Des données de validité satisfaisantes ont été trouvées pour BPI et SF-MPQ. Les données de validité collectées étaient inadaptées pour le Pain drawing et insuffisantes pour l'EVA.

Discussion : Les cinq validités pertinentes n'ont pas toutes été étudiées pour BPI et SF-MPQ. Des études complémentaires pourraient enrichir ces données. Il sera nécessaire d'étudier les propriétés psychométriques de l'EVA, très utilisée dans la pratique.

1 INTRODUCTION

Pain is a multidimensional phenomenon that is subjective in nature with physiological and psychological components (1). The pain sensation may be hard to explain verbally. The patient self-reports seem to be a reliable indicator of the existence and intensity of pain.

Multidimensional scales make it possible to specify the semiology of pain and to take into account all of its sensory and emotional components but are longer to fill and to score.

Uni-dimensional scales are easy to operate but only the intensity of pain is assessed.

Previous study made an inventory of pain scales to assess pain in the general population. Among the 35 scales available, the most studied scales were the Numerical Pain Rating Scale (NPRS), the Visual Analog Scale (VAS), the Brief Pain Inventory (BPI) the McGill Pain Questionnaire, and its Short Form (SF-MPQ), the West Haven Yale Multidimensional Pain Inventory (WHYMPI) (2).

To be effective, a scale must be reliable and valid. A measuring instrument is reliable if it produces the same score during measurement made at different times by the same examiner and in measurement made at the same time by different examiners (3).

A systematic review collected validity in terms of reliability data of available pain assessment scales in general population. That study highlighted three reliable scales: BPI, SF-MPQ-1 and SF- MPQ-2 (4).

Nevertheless, validity of a scale is also its ability to measure what it is supposed to measure (external validity). This is also a most important metrological quality.

The external validity data of these three reliable scales, BPI, SFMPQ-1 and 2 were studied here. Although Pain drawing and Visual Analog Pain Scale were reliable only on ICC (Intra-class Coefficient Correlation), these two scales have also been added in this systematic review because they are commonly used in practice.

The four scales are to be found in Appendix 1.

- **BPI:**

Two versions of BPI exist: BPI Long Form is used as a baseline measure in clinical trials but the Short Form has become the standard for use in clinical and research applications. Only BPI-Short Form is described below.

The BPI assesses pain severity, pain interference and pain locations using a body diagram. Pain severity is assessed by four items that ask about pain now, worst pain, least pain and average pain. Items use numeric rating scales anchored by a 0 (no pain) to 10 (most severe pain). Pain interference consists of seven items that ask about how pain interferes with aspects of daily living using numeric rating scales anchored by 0 (no interference) to 10 (completely interferes). On the body diagram, patients indicate the location of pain. An item asks to record pain medication and to circle the percentage that most shows how much relief has been received.

- **SF-MPQ:**

The SF-MPQ was developed by Melzack as an abbreviated modification of the original (5).

The SF-MPQ-1 (6) has 15 representative worlds, 11 sensory (throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting) and 4 affective (tiring-exhausting, sickening, fearful, punishing-cruel) words. Each world is scored from 0 to 3 (not selected = 0, mild =1, moderate =2, severe = 3). The scores on the words are added up for the sensory (0 to 33) and affective (0 to 12) subscales as well as the total scale (0 to 45). The SF-MPQ-1 included a 10 cm horizontal VAS for pain with endpoint « no pain » and « worst possible pain » and six words describing Present Pain Intensity (PPI) :

none, mild, discomforting, distressing, horrible, and excruciating corresponding to a 0 to 5 numeric scale.

The SF-MPQ-2 was developed in order to be more sensible to neuropathic pain. The SF-MPQ-2 is self-rated by subjects according to the intensity of pain perceived on a 0-10 numeric scale (0= no pain and 10= the worst pain). It is composed of 22 pain descriptors and distributed as 4 subscales. It include six continuous pain descriptors (throbbing, cramping, gnawing, aching, heavy pain, and tender), six intermittent pain descriptors (shooting, stabbing, sharp, splitting, electric-shock pain, and piercing), six predominantly non neuropathic pain descriptors (hot burning and cold freezing pain, pain caused by light touch, itching, tingling or pins and needles, and numbness), and four affective descriptors (tiring-exhausting, sickening, fearful, and punishing-cruel) The four subscales scores is calculated by summating the numerical value for all 22 items. The total score is the sum of all the values.

- **Pain drawing*:***

There were two main methods of analyzing a pain drawing: qualitative and quantitative (7) (8).

The qualitative analysis looked for dermatome distribution of pain. Based on either penalty point system or on a general impression Pain drawing was characterized as « organic » and « non-organic » (9). The Ransford Penalty Point method gave a semi quantitative interpretation. The four criteria of this method were: the reasonableness of the anatomic distribution, information signaling “Look how bad I am”, whether they reflect “magnification” of pain, the presence of indicators that “I particularly hurt here».

A score of fewer than 3 points was classified as “normal” (=organic) whereas 3 or more points was “abnormal” (=non organic) (10). Other sources classified as normal a score of 2 or

less and abnormal a score greater than 2 (11). Different symbols were used on the body to indicate aching, burning, pins and needles, numbness and stabbing.

The quantitative analysis recorded the proportion of the body surface covered by pain equivalent markings. It gave and estimation of widespread versus localized pain and of the location of pain. The body surface was divided into 45 parts (12), or into a grid system with 256 equal squares (Gatchel and coworkers (13)) or other systems. For each of the area, a score of 1 was given if the patient shadings indicated that pain was present, and a score of 0 was given if pain shadings were absent. The scale is actually subject to many controversies.

- **VAS:**

The Visual Analogue Scale (VAS) is commonly used as the outcome measure for such studies. It is a uni-dimensional scale that varies only in intensity (14). It is usually presented as a 100-mm horizontal line on which the patient's pain intensity is represented by a point between the extremes of "no pain at all" and "worst pain imaginable", or "least possible pain" and worst possible pain" (15). The VAS is scored from 0 (no pain) to 10 (pain as bad as it could be)." It has the advantages of being easily administered and requires no verbal or reading skills (15).

The aim of this study was to investigate the external validity of Brief Pain Inventory, Short-Form McGill Pain Questionnaire 1 and 2, Pain drawing, Visual Analog Pain Scale .

2 METHOD

2.1 General framework of the study

The first part of the research consisted of a systematic review of literature of the four selected pain assessment scales: Brief Pain Inventory, Short Form McGill Pain Questionnaire 1 and 2, Visual Analog Pain Scale and Pain drawing

As proved by the previous work (4), these four scales are reliable, but only on ICC for Pain drawing and Visual Analog Pain Scale. These two scales are commonly used in current practice, so it was decided to study their own validity too.

This study aimed to collect external validity data of these four scales. It was necessary to identify the most relevant types of validity. For each scale, it was checked whether the selected validities were studies

2.2 External validity data

External validity regarding pain could be difficult to assess as it was written in the introduction. The following criteria were selected with the help of the statisticians from research unit SPURBO.

2.2.1 Convergent validity

This validity is the validity against criterion. The scale is compared with another scale as a gold standard. A correlation between the two tools is sought. Pearson coefficient (for linear correlation) and Spearman coefficient (for rank correlation) are used to measure this validity. A scale is a longitudinal variable, so the convergent validity is the equivalence of the contingency table for categorical variables. This validity is more accurate than concurrent validity. It is very close to criterion validity.

2.2.2 Discriminant validity

It is the ability of the scale to give a different measurement in “a priori” different groups. It is a hypothetical-deductive reasoning: hypotheses (theory) are put to the test of the data (the reality). This validity is intended to measure if what is expected is what it is measured. It is a cross-sectional inquiry. For example, two groups of patients with two different types of pain fill the same scale and are compared. The Fisher, Chi2, Wilcoxon are tools used for statistics on this validity.

2.2.3 Content and construct validity

It is when the scale is built. Content validity is the qualifier of the expert clinicians. The experts confront their theoretical model with the data. This is achieved by the appropriate selection of test items when the measure is developed. Construct validity is when the statistics confirm these data and refers to the extent to which scores on the test behave as one would theoretically expect them to behave. This validity is very close to reliability. It is measured by the Confirmatory Factor Analysis (CFA) (16). The higher the variance, the stronger the scale structure is. The CFA is a hypothesis-driven technique that is used for testing the proposed factor structure of a given scale. It differs from the Exploratory Factor Analysis (EFA) in that it can confirm the validity of factor structure determined a priori rather than seeking a new factor structure (17), The Principal Component Analysis (PCA) is also uses, it is a variant of the CFA.

Construct validity can also measure correlation between the subscales in a multidimensional scale.

2.2.4 Face validity

This validity measures how the questions are perceived by the patient. This is in order to see if the questions seem coherents to him.

2.2.5 Responsiveness to treatment and sensitivity to change

A critical psychometric property of pain scale is its ability to detect change. Responsiveness requires treatment to be evaluated whereas sensitivity to change does not require a treatment to be present. These two concepts are sometimes used synonymously. It is the ability of the scale to measure change in pain. These psychometric properties are evaluated by prospective studies and require a huge investment. It is a longitudinal validity. This is the culmination of the construction of a scale. It is rarely done because it is difficult to implement and expensive.

2.3 Information sources

Studies were identified through a search on Medline via PubMed. The search was limited to research studies in humans published in English with no restriction on the publication date of retrieved papers. The systematic review was conducted between September 2018 and June 2019.

Secondly, the bibliography of all the included studies about the validity of these four scales was read in order to include additional articles and to be as exhaustive as possible.

All the articles found by the search equation were included on an excel file (Appendix 7). Abstracts were fully read. It was decided whether or not to include the full corresponding article. The file provided tabs, there was one tab per scale. In these tabs, each article was linked to a number to make it easily identifiable. Another Excel file was edited to distribute validity data by scale and by article (Appendix 4).

2.4 Search

The first step was to build basic equations about the validity of the four scales. The librarian of Brest medical library was asked to help building these equations. All equations are to be found in Appendix 2.

For Medline research, equations combined MeSH words such as “Reproducibility of results”, “psychometrics” and “sensitivity and specificity”.

In order to have the most accurate selection , because the MeSH terms are not all indexed, text and abstract keywords related to validity without MeSH terms were added: “validity and reliability”, “validity”, “sensitivity and specificity”, “psychometric properties”.

For each scale, the name of each scale was added to each equation: [(Name of the scale) AND (equation with MeSH term) OR (Name of the scale) AND (others terms without MeSH)]. For SF-MPQ, it was necessary to write “SF-MPQ-1 OR SF-MPQ-2”.

For Visual Analog Pain Scale, another equation was created: ((visual analog scale [Title]) AND pain[Title/Abstract]) AND validity[Title/Abstract]. It was finally necessary to single out the world “pain” in order to find articles of interest.

2.5 Study selection

For all the articles found by a search equation, the following data were collected: title, author, year of publication, review, language, abstract or not. For each article, title and abstract were screening to determine if the article was relevant to answer the research question. When the abstract was doubtful, the article was included and fully read.

The first step was to determine if the article was off-topic. Four off-topic classes were determined:

- no validity data
- lack of quality (no abstract, article not in English, no IMRAD format, translation of the original article not accessible on PubMed)
- no dealing with humans
- scale used in another field than pain.

Duplicates were noted too.

The next step was to determine exclusion criteria. Five exclusion criteria were:

-specific population (selected according to their age: old people, children)

-convergent validity assessed with an unreliable scale

-only a subset of the scale being analyzed (for multidimensional scale)

-scaling modification but unverified validation procedure of the original

-only anatomo-clinical correlation being analyzed

When the convergent validity was assessed with several scales, the article was included and only the analyses with reliable scales were extracted.

2.6 Data collection process

All the articles likely to be included were fully read. For all the articles included, the following parameters were extracted: language version of the scale, the type of pain assessed, convergent validity, discriminant validity, construct validity, face validity and responsiveness. Some articles could be discarded after full reading if off-topic or exclusion criteria were identified at this stage of the study.

3 RESULTS

3.1 Brief Pain Inventory

3.1.1 Flow chart

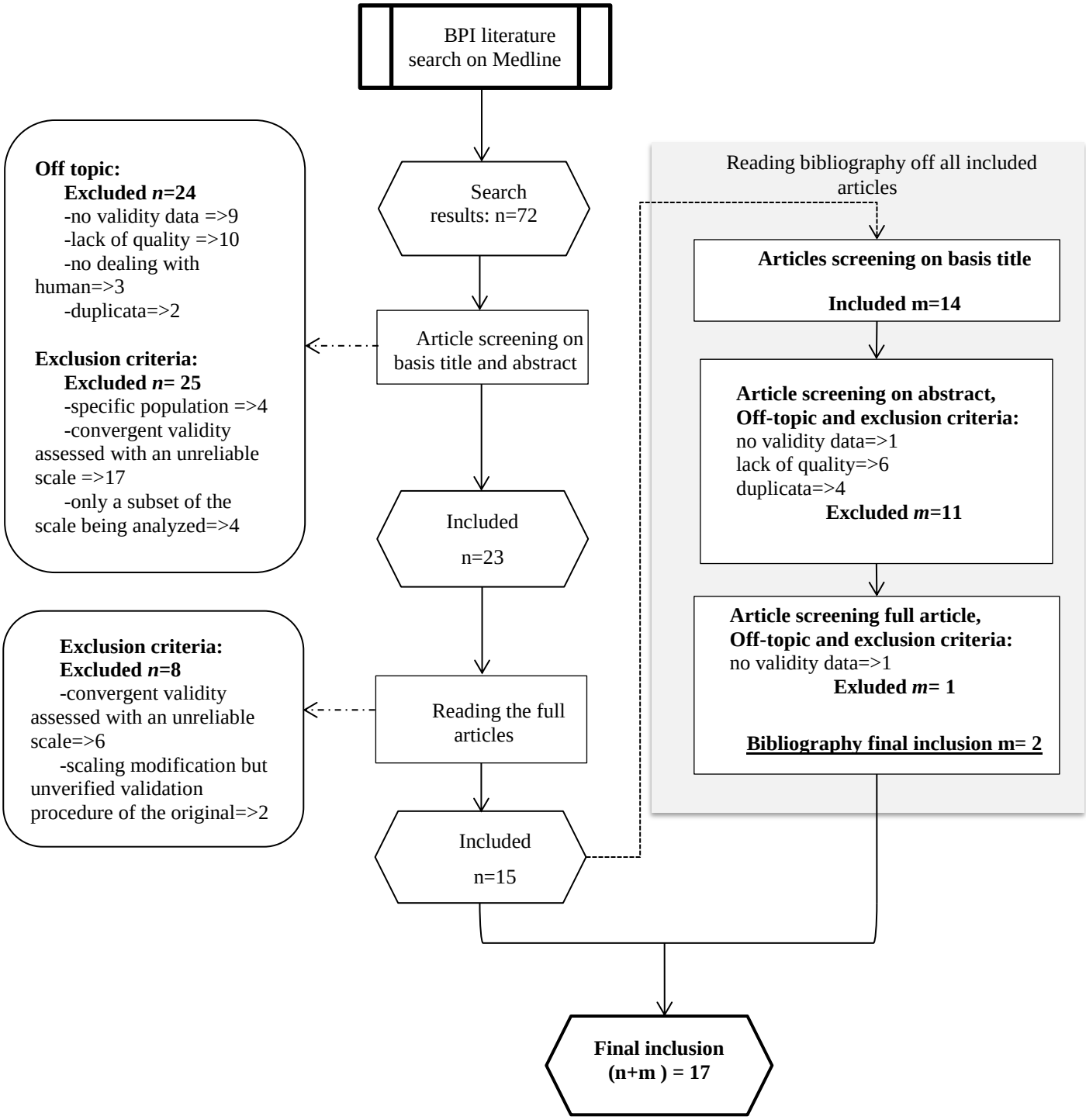

Figure 1: Flow chart BPI

3.1.2 Included articles

Title	Author	Year	Revue
Brief Pain Inventory score identifying and discriminating neuropathic and nociceptive pain.	Erdemoglu AK1, Koc R.	Nov -13	Acta Neurologica Scandinavia
Reliability and validity of the Brief Pain Inventory in individuals with chronic obstructive pulmonary disease.	Chen YW1, HajGhanbari B1, Road JD2, Coxson HO3, Camp PG4, Reid WD5,6,7	Nov -18	European Journal of Pain (London, England)
Validity and reliability of a Turkish Brief Pain Inventory Short Form when used to evaluate musculoskeletal pain.	Celik EC1, Yalcinkaya EY1, Atamaz F2, Karatas M3, Ones K4, Sezer T4, Eren I5, Paker N4, Gning I6, Mendoza T6, Cleeland CS6.	July -05	Journal of back and musculoskeletal rehabilitation
Validation of the Short Form of the Brief Pain Inventory (BPI-SF) in Spanish Patients with Non-Cancer-Related Pain.	de Andrés Ares J1, Cruces Prado LM2, Canos Verdecho MA3, Penide Villanueva L4, Del Valle Hoyos M5, Herdman M6, Traseira Lugilde S7, Velázquez Rivera	Sept -15	Pain practice:the official journal of world institute of Pain
Psychometric evaluation of the Arabic brief pain inventory in a sample of Lebanese cancer patients.	Ballout S1, Noureddine S, Huijer HA, Kanazi G.	July -11	Journal of Pain and Symptom Managment
Development of and psychometric testing for the Brief Pain Inventory-Facial in patients with facial pain syndromes.	Lee JY1, Chen HI, Urban C, Hojat A, Church E, Xie SX, Farrar JT.	Sept -10	Journal of Neurosurgery
Validation of the Turkish version of the Brief Pain Inventory in surgery patients.	Dicle A1, Karayurt O, Dirimese E.	June -09	Pain management nursing:official journal of the American society of Pain Management Nurses
Validation of the Thai Version of Brief Pain Inventory (BPI-T) in cancer patients.	Chaudakshetrin P1.	Jan-09	Journal of the Medical Association of Thailand

Title	Author	Year	Revue
Validation of a modified version of the Brief Pain Inventory for painful diabetic peripheral neuropathy.	Zelman DC1, Gore M, Dukes E, Tai KS, Brandenburg N.	Sept -05	Journal of vascular nursing:official publication of the Society for Peripheral Vascular Nursing
Reliability and validity of a modified Brief Pain Inventory short form in patients with osteoarthritis.	Mendoza T1, Mayne T, Rublee D, Cleeland C.	May -06	European Journal of Pain (London, England)
Validating the brief pain inventory for use with surgical patients with cancer.	Tittle MB1, McMillan SC, Hagan S.	March 2003	Oncology Nursing Forum
The assessment of cancer pain in north India: the validation of the Hindi Brief Pain Inventory--BPI-H.	Saxena A1, Mendoza T, Cleeland CS.	Jan-99	Journal of Pain and Symptom Management
A brief cancer pain assessment tool in Japanese: the utility of the Japanese Brief Pain Inventory--BPI-J.	Uki J1, Mendoza T, Cleeland CS, Nakamura Y, Takeda F.	Dec -98	Journal of Pain and Symptom Management
Analysis of Pain and Interference Patterns With Brief Pain Inventory in Patients With Bone Metastases: A Confirmatory Study.	Zeng L1, Chow E1, Zhang L1, Culleton S1, Holden L1, Jon F1, Khan L1, Uy C1, Tsao M1, Barnes E1, Danjoux C1, Sahgal A1.	June -11	World Journal of Oncology
Using confirmatory factor analysis to evaluate construct validity of the Brief Pain Inventory (BPI).	Atkinson TM1, Rosenfeld BD, Sit L, Mendoza TR, Fruscione M, Lavene D, Shaw M, Li Y, Hay J, Cleeland CS, Scher HI, Breitbart WS, Basch E.	March-11	Journal of Pain and Symptom Management
Development of the Wisconsin Brief pain questionnaire to assess pain in cancer and other diseases	Daut RL, Cleeland CS, Flanery RC.	Oct-83	Pain
Comparison of pain measures in surgical patients	Zalon ML	June -05	Journal of Nursing Measurement

Table 1: Included articles for BPI

3.1.3 Summary of the results

Detailed table of are to be found in Appendix 4.

Validity of BPI that was the most analyzed was construct validity by the Confirmatory Factor Analysis (CFA).

14 articles on the 17 included referred to the CFA. Two or three factor solutions were found. 8 articles showed a two-factor solution and 5 articles showed a three-factor solution. 1 article, which especially studied the CFA, showed that the three-factor solution is best for the BPI'S construct validity (18). 1 article analyzed the construct validity using intensity and interference and studying their own correlation (19).

8 articles included referred to BPI's convergent validity. 1 article used SF-MPQ as the gold standard (20) and 5 articles used VAS (16), (21), (22), (23), (24). 1 used both VAS and SF-MPQ (1). 1 article studied the aptitude of BPI to discriminate neuropathic and nociceptive pain by calculating sensitivity and specificity in neuropathic pain (25).

Only 1 article analyzed the responsiveness of BPI at three month (21).

Most of the time, discriminant validity was not analyzed as expected with the statistician, (20), (21), (26), (27). There was an amalgam with convergent validity or construct validity. Only one article analyzed discriminant validity as expected (25). Face validity was not analyzed in the articles included.

From this study, validity of BPI has been studied in these fields:

<u>-Original version of BPI:</u>

neuropathic and nociceptive pain (25), chronic obstructive pulmonary disease (20), in patients with osteoarthritis (23) , on surgical patients with cancer (24), in patients with bones metastases (26), in surgical patients (1).

-Modified version of BPI:

modified version on painful peripheral neuropathy in diabetic patients (27) and in patients with facial pain (28).

-Translated version of BPI:

on Turkish patients with musculoskeletal pain (16), on Spanish patients with non-cancer related pain (21), on Lebanese patients with cancer pain (22), on Turkish version in surgery (29), on Thai version in cancer patients (30), on North India patients with cancer pain (31), on Japanese patients with cancer pain (32).

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3.2 Short Form McGill Pain Questionnaire

3.2.1 Flow chart

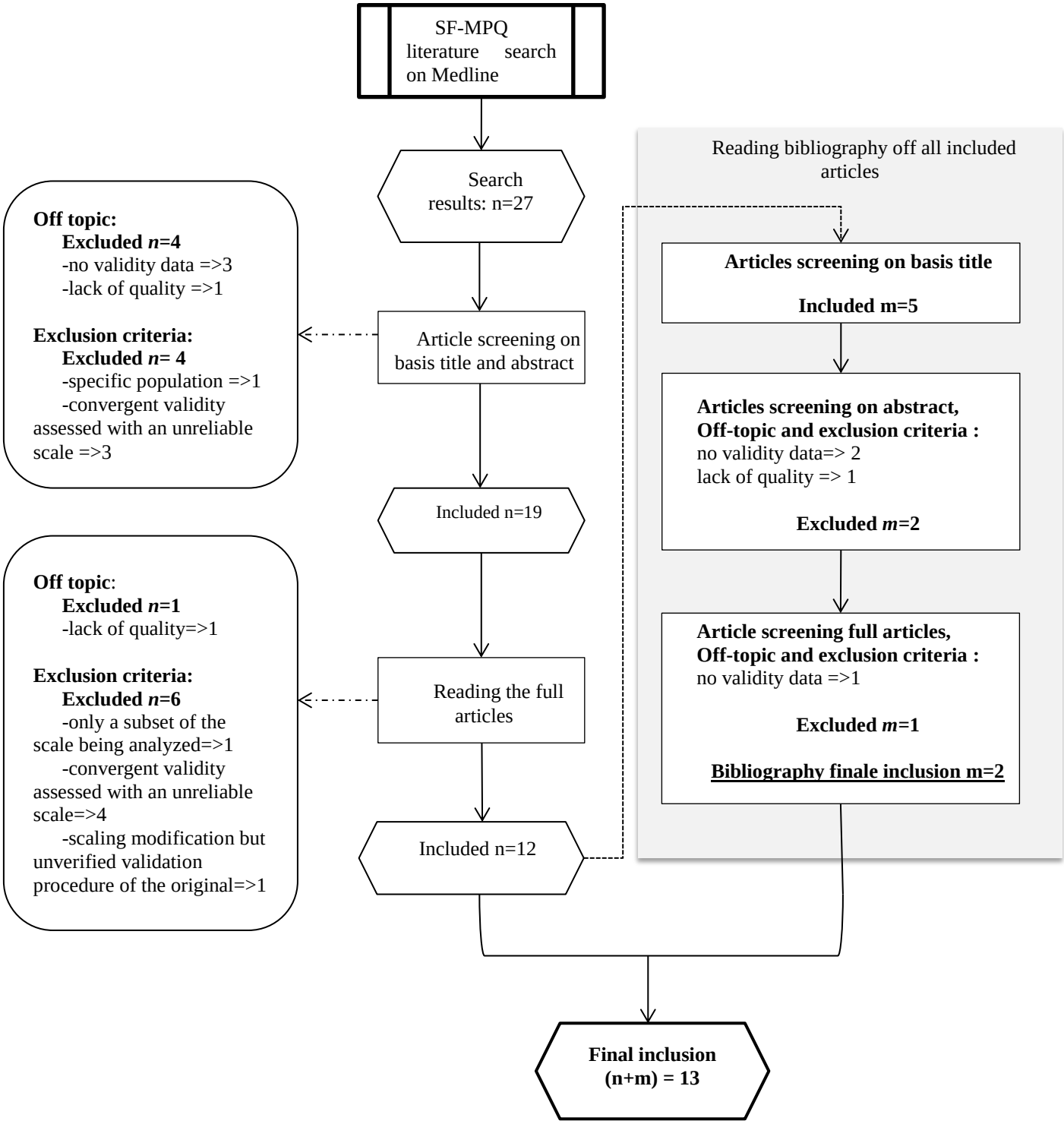

Figure 2: Flow chart SF-MPQ

3.2.2 Included articles

Title	Author	Year	Revue
Use of the Short-Form McGill Pain Questionnaire as a diagnostic tool in women with chronic pelvic pain.	Droz J1, Howard FM.	March April 2011	Journal of Minimally Invasive Gynecology
Development and validation of Arabic version of the Short-Form McGill Pain Questionnaire.	Terkawi AS1,2,3, Tsang S4, Abolkhair A5, Alsharif M5, Alswiti M2, Alsadoun A6, AlZoraigi US2, Aldhahri SF7, Al-Zhahrani T8, Altirkawi KA9.	May-17	Saudi Journal of Anaesthesia
A cross-cultural adaptation and validation of the short-form McGill Pain Questionnaire-2: Chinese version in patients with chronic visceral pain.	Wang JL1, Zhang WJ2, Gao M2, Zhang S2, Tian DH2, Chen J3.	Jan-17	Journal of Pain Research
Validity, reliability, and assessment sensitivity of the Japanese version of the short-form McGill pain questionnaire 2 in Japanese patients with neuropathic and non-neuropathic pain.	Maruo T1, Nakae A, Maeda L, Shi K, Takahashi K, Morris S, Hosomi K, Kanatani H, Matsuzaki T, Saitoh Y.	Nov-14	Pain Medicine (Malden, Mass)
Reliability, validity, and sensitivity measures of expanded and revised version of the short-form McGill Pain Questionnaire (SF-MPQ-2) in Iranian patients with neuropathic and non-neuropathic pain.	Adelmanesh F1, Jalali A, Attarian H, Farahani B, Ketabchi SM, Arvantaj A, Raissi GR.	Dec- 12	Pain Medicine (Malden, Mass)
Results from the translation and adaptation of the Iranian Short-Form McGill Pain Questionnaire(I-SF-MPQ): preliminary evidence of its reliability, construct validity and sensitivity in an Iranian pain population.	Adelmanesh F1, Arvantaj A, Rashki H, Ketabchi S, Montazeri A, Raissi G.	Nov-11	Sports Medicine Arthroscopy Rehabilitation Therapy Technology: SMARTT
Development and initial validation of an expanded and revised version of the Short-form McGill Pain Questionnaire (SF-MPQ-2).	Dworkin RH1, Turk DC, Revicki DA, Harding G, Coyne KS, Peirce-Sandner S, Bhagwat D, Everton D, Burke LB, Cowan P, Farrar JT, Hertz S, Max MB, Rappaport BA, Melzack R.	July -09	Pain

Title	Author	Year	Revue
Thai Short-form McGill Pain Questionnaire.	Kitisomprayoonkul W1, Klaphajone J, Kovindha A.	June-06	Journal of the medical association of Thailand
Factorial validity of the short-form McGill pain questionnaire (SF-MPQ).	Wright KD1, Asmundson GJ, McCreary DR.	2001	European Journal of Pain
The development and validation of a Greek version of the short-form McGill Pain Questionnaire.	Georgoudis G1, Watson PJ, Oldham JA.	2000	European Journal of Pain
A Swedish version of the short-form McGill Pain Questionnaire.	Burckhardt CS1, Bjelle A.	1994	Scandinavian Journal of Rheumatology
Validation of the Short-form McGill Pain Questionnaire-2 (SF-MPQ-2) in acute low back pain.	Dworkin RH1, Turk DC2, Trudeau JJ3, Benson C4, Biondi DM4, Katz NP5, Kim M4.	Avr-15	The Journal of Pain : Official Journal of the American Pain Society
Reliability and sensitivity measures of the Greek version of the short form of the McGill Pain Questionnaire	Georgoudis G1, Oldham JA, Watson PJ.	2001	European Journal of Pain

Table 2: Included articles for SF-MPQ.

3.2.3 Summary of the results

Detailed table of results are to be found in Appendix 5.

The validity of SF-MPQ that was the most analyzed was construct validity by the Confirmatory Factor Analysis (CFA), the Exploratory Factor Analysis (EFA), the Principal Component Analysis (PCA) and content validity by the "33% Melzak criteria" (when creating the scale, Melzak chose adjectives which were approved by 33% or more patients who had very variable pain).

3.2.3.1 SF-MPQ-1

For SF-MPQ-1 (8 articles included), 6 articles were studying construct validity. Among these 6 articles, 3 articles analyzed construct validity by the CFA, the EFA, and the PCA, (33), (34), (35). 3 articles analyzed content validity by the "33% Melzak criteria" (35), (36), (37). So, one article analyzed both construct and content validity (35). 4 articles studied correlation within the scale, using the different items as comparators themselves: VAS and PPI (Present Pain Intensity) versus items about pain (35), (36), (37), (38).

2 articles referred to convergent validity, 1 article used BPI as gold standard (38) and 1 article used VAS as gold standard (39). 1 article assessed face validity (38). 2 articles assessed responsiveness (33),(40). 1 article analyzed responsiveness but the results were not significant (35). No article assessed discriminant validity.

One article studied only the factorial validity of the SF-MPQ-1 in order to know which one is the best between a two factor and a three factor solution (34). The authors concluded that a two dimensional structure is better.

From this study, validity of SF-MPQ-1 has been studied in these fields:

-Original version of SF-MPQ-1:

In women with chronic pelvic pain (39), SFMPQ-1 has a good convergent validity with VAS but cannot be used as a diagnostic test.

-Translated version of SF-MPQ-1:

Validity of the scale has been evaluated in Arabic version in chronic pain (38), in Iranian version in chronic pain in rehabilitation clinic (33), in Thai version in musculoskeletal pain and neuropathic pain (36), in Greek version in spinal and osteoarthritis chronic pain (39), (40) and in Swedish version in rheumatoid arthritis or fibromyalgia syndrome (35).

3.2.3.2 SF-MPQ-2

For SF-MPQ-2 (5 articles included), all the articles referred to construct validity by the CFA and the EFA (17), (41), (42), (43), (44).

4 articles analyzed convergent validity. Among these four articles, 1 article used VAS and SF-MPQ-1 as gold standard (17), 1 article used SF-MPQ-1 (its VAS and PPI) (42), and 2 articles used BPI as gold standard (43), (44).

One article assessed face validity (42). 3 articles assessed responsiveness (42) (43), (44). No article referred to discriminant validity.

From this study, validity of SF-MPQ-2 has been studied in these fields:

- Original version of SF-MPQ-2:

In acute low back pain, SF-MPQ-2 showed convergent validity, construct validity and responsiveness (44).

- Translated version of SF-MPQ-2:

Validity of the scale was evaluated in Chinese patients with visceral pain for more than three weeks (41), in Japanese patients with neuropathic and non- neuropathic pain (17), in Iranian patients with subacute and chronic non neuropathic pain and patients with painful diabetic peripheral neuropathy (42).

3.3 Pain drawing

3.3.1 Flow chart

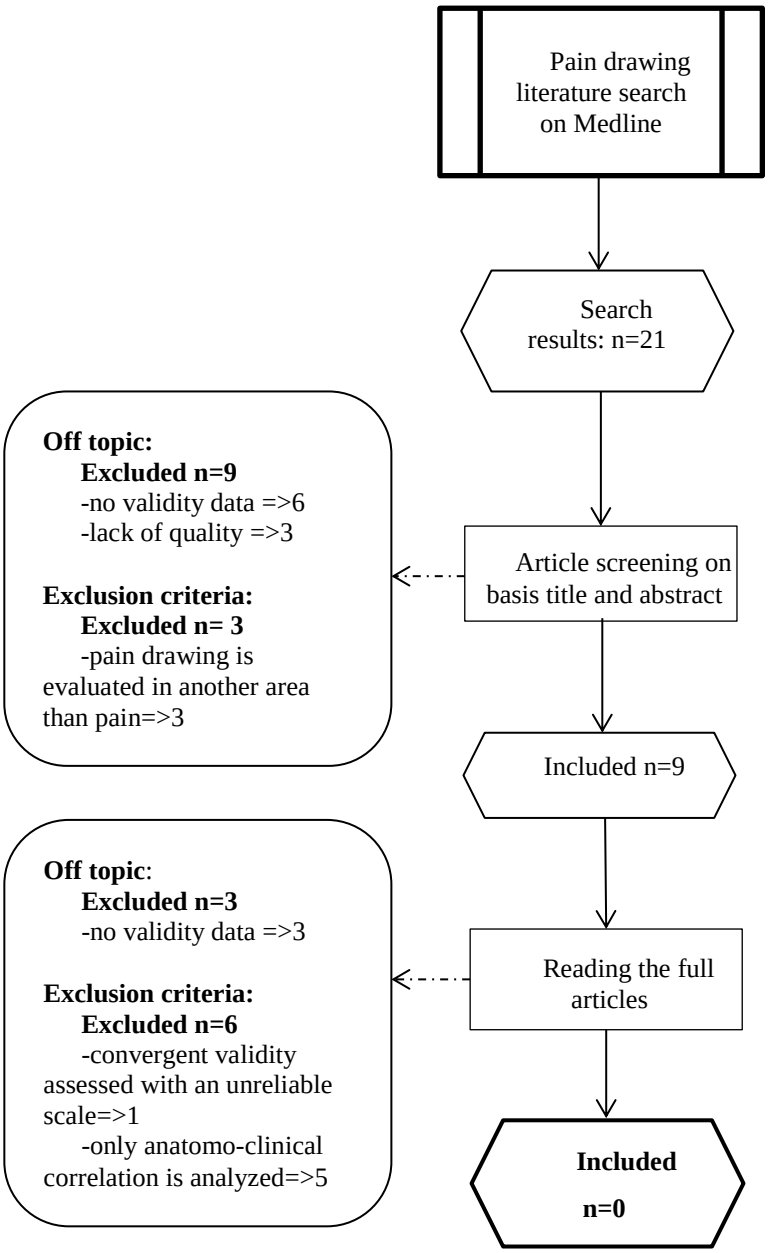

Figure 3: Flow chart Pain drawing

3.3.2 Summary of the results

9 articles have been fully read. 5 articles assessed convergent validity of Pain drawing but in order to know predictive anatomo-clinical value of this scale. The question of whether to include these articles or not was raised. Convergent validity was assessed with clinical examination or radiological examination. This convergent validity did not given information on the assessment of the intensity or interference of pain but on its localization. It was eventually decided to exclude these 5 articles (45), (46), (47), (48), (49).

Several studies have actually examined the use of pain drawings as predictors of psychological involvement in pain.

The validity of Pain drawing was therefore not analyzed for pain assessment in itself.

3.4 Visual Analog Pain Scale

3.4.1 Flow chart

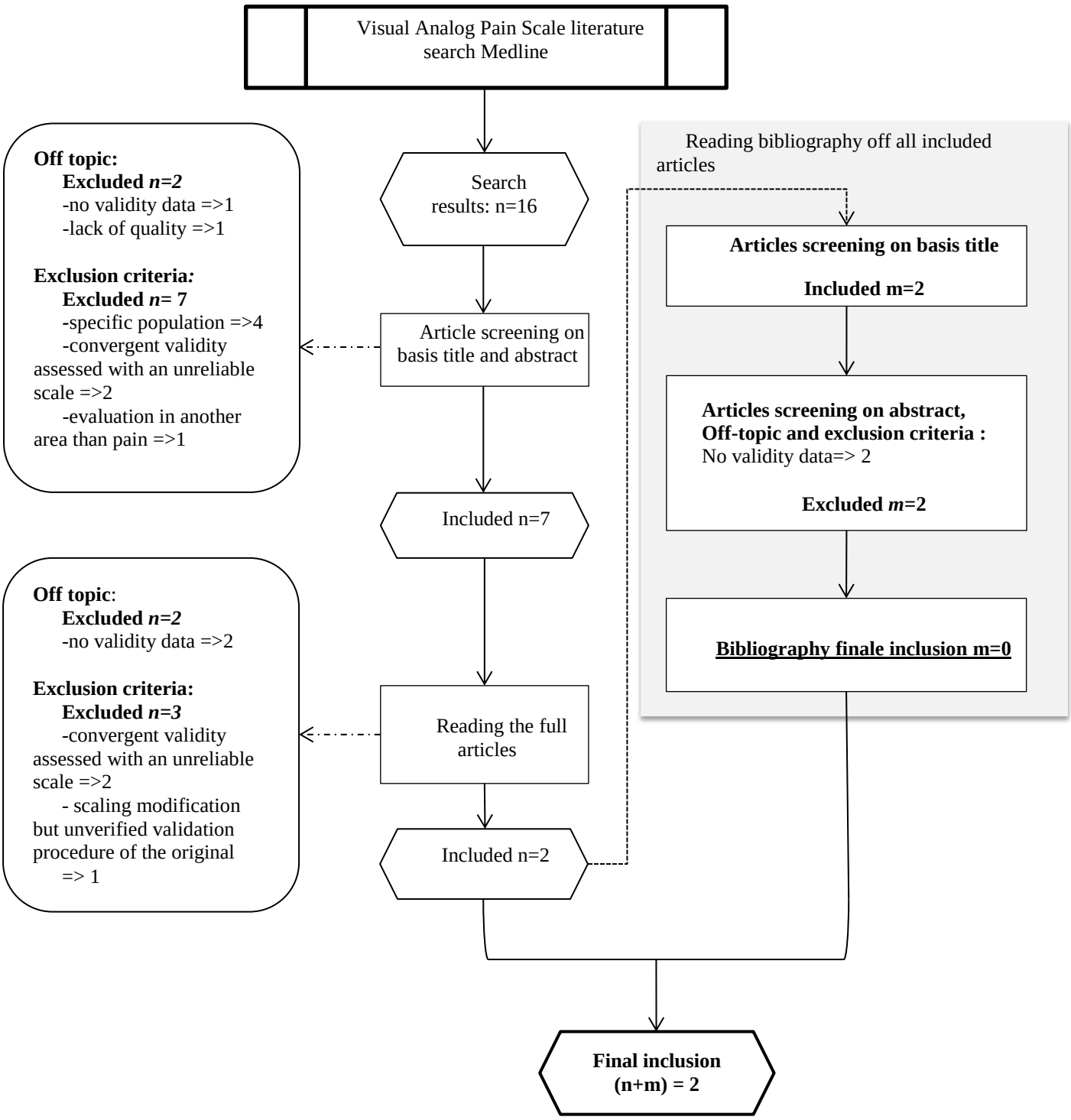

Figure 4: Flow chart VAS

3.4.2 Included articles

Title	Author	Year	Revue
Correlation of change in visual analog scale with pain relief in the ED.	Fosnocht DE1, Chapman CR, Swanson ER, Donaldson GW.	January 2005	The American Journal of Emergency Medicine
Reliability and validity of a visual analog scale for acute abdominal pain in the ED.	Gallagher EJ1, Bijur PE, Latimer C, Silver W.	July 2002	The American Journal of Emergency Medicine

Table 3: Included articles for VAS

3.4.3 Summary of the results

Detailed table of results are to be found in Appendix 6.

Only 2 articles have been included. Convergent validity was assessed with Verbal Descriptors Scale (VDS) in these two studies. At the time of each repeated pain VAS measurement, patient indicated whether their pain was “much less, a little less, about the same, a little more, or much more” than at the time of their last pain measurement. The correlation between the change in VAS scores and the verbal was calculated.

The first article (50) studied patients with painful injury or illness in the ED (Emergency Department). Patients receiving pain medication provided a second VAS 30mn after medication, and all patients filled VAS at the time of discharge. The article showed that change on VAS was moderately correlated with a VDS of change in pain in the ED. Change in pain was not a valid indicator of pain relief for individual patients.

The second article (15) studied population in the ED with acute abdominal pain. Mean and median VAS scores increased in a linear and graduated fashion as the description of change in pain escalated from “much less pain” to “much more pain”. VAS seemed to be a valid instrument for measuring acute abdominal pain in the ED. Unfortunately, reliability was studied only on ICC.

No modified version and no translated version of VAS have been found in this study.

4 DISCUSSION

4.1 Synthesis of the results

Table 4: summary of the results.

	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
BPI. **17 articles included.**	8 articles	1 article	14 articles	0	1 article
SF-MPQ-1 and SF-MPQ-2. **13 articles included.**	6 articles 2 for SFMPQ1 4 for SFMPQ2	0	11 articles 6 for SFMP1 5 for SFMPQ2	2 articles 1 for SFMPQ1 1 for SFMPQ2	5 articles 2 for SFMPQ1 3 for SFMPQ2
Pain drawing**. 0 article included.**	5 articles (excluded/ anatomo clinical correlation)	0	0	0	0
Visual Analog Pain Scale. **2 articles included.**	2 articles	0	0	0	0

Abreviations : *BPI : Brief Pain Inventory, SF-MPQ : Short Form McGill Pain Questionnaire.*

These results indicated that BPI was the most studied scale, then SF-MPQ, then Pain drawing and finally VAS.

For BPI and SF-MPQ, the most studied validity was the construct validity with 14 articles for BPI and 11 articles for SF-MPQ.

Convergent validity was also commonly studied with 8 articles for BPI and 6 articles for SF-MPQ. Face validity was only studied for SF-MPQ, and only in 1 article for SF-MPQ-1 and 1 article for SF-MPQ-2. Discriminant validity was most of the time not studied as expected, and an amalgam was observed with construct and convergent validity. Only one

article, for BPI, studied discriminant validity. Responsiveness, as expected, was poorly studied: 1 article for BPI and 5 articles for SF-MPQ were found.

For VAS and Pain drawing, convergent validity only was studied.

Validity of VAS was hardly studied. Only 2 articles were included and one of them concluded that this scale was not valid to evaluate pain relief for individual patients in emergency. VAS seemed to be valid only in abdominal acute pain to emergency department. Unfortunately, it was not reliable enough in this article, because only the ICC (Intraclass Coefficient Correlation) was analyzed. Moreover, for VAS, convergent validity was assessed with verbal pain descriptors as gold standard. No relevant data were found on literature about such a comparator.

For Pain drawing, 5 articles were found for convergent validity. This work highlighted that validity of this scale was well studied according to our criteria but only in order to do anatomo-clinical correlation. They were excluded.

Finally, satisfactory psychometric data were found in several studies for BPI and SF-MPQ. Validity of SF-MPQ was studied in four on the five validities chosen and was evaluated in responsiveness, so SF-MPQ seemed to be the most valid scale.

These results were congruent with the two previous studies (2), (4). In the study listing the different scales of pain, scales more studied and used as gold standard were NPRS, VAS, BPI, MPQ, SF-MPQ and WHYMPI. In the study listing their reliability, only BPI and SF-MPQ showed enough reliability data to be considered reliable.

To be congruent with the two previous works, the present study excluded several articles for convergent validity when the gold standard was an unreliable scale like NPRS (Numerical Pain Rating Scale) and NRS (Numerical Rating Scale) or SF-36 BPS (Short Form-36 Bodily Pain Subscale). In the previous study (4),VAS was not considered reliable because only ICC

value was found, as for Pain drawing. This current study confirmed that these two scales were insufficiently studied. About reliability, data about Cronbach's alpha for internal consistency and Cohen's kappa for inter-rater reliability should be studied. About validity, all validities will have to be assessed by next studies.

Despite this result, VAS seemed to be very convenient and easy to use in practice. Pain drawing made it possible to evaluate by various means the surface felt as painful by the patient. These two scales should be more studied.

As the previous work (4), BPI and SF-MPQ-1 and 2 showed the best psychometric qualities. SF-MPQ showed better validity than BPI because it was evaluated in more fields. These two scales could be considered reliable and valid.

For uni-dimensional scales, these three successive studies ((2), (4) and this one) raised the same limit: none can be assimilated as gold standard.

Very few similar studies were found on PubMed. Only one systematic review was found for BPI (51) and two for Pain drawing (52), (53). Unfortunately, for BPI the article was in German. For Pain drawing, the two articles referred to identifying psychological distress and doing psychological screening, so it was not to evaluate pain in itself.

To our knowledge, that work in three stages is led for the first time. To my mind, the BPI is the most complete scale to assess pain in all its dimensions: intensity, interference with daily life, treatment's efficiency, pain localization. In general medicine, we must take into account the patient in his life context. BPI seems to me to meet this requirement. If I could not understand the patient's description of pain, I would choose SF-MPQ: its sensorial and affective terms are varied and precise. For neuropathic pain, SF-MPQ-2 and its 22 items can be very helpful. VAS seems to me relevant for acute pain in emergencies.

4.2 Limitations

Five main biases have been identified in the current study:

-during the development of the search equation

-single screening investigator to do inclusion

-inclusion of English articles only

-exclusion of some specific populations

- only one database.

For search equation, the build of one equation per scale was not done first. Hypothesis of relevant terms about validity and search them into the MeSH was done. Unfortunately, “validity” alone, “validity and reliability” were not indexed. Arbitrary choice of terms in the equation was done. Four equations per scale were used at the beginning (Appendix 2). While reading articles, relevant validity were spotted but the inclusion had already begun. Terms that seemed to be more precise were not added in our equation so as not to restrict the search. Indeed, few articles were found. For VAS, it was finally necessary to separate the word “pain” from the name of the scale. It was not intuitive because VAS is used in many other fields than pain. To reduce this bias, the design of search equation was discussed with the librarian.

An interpretation bias can be identified because only one investigator proceeded to the inclusion. To reduce this bias, exclusion criteria and articles bringing back questions were discussed in research group. Nevertheless, some articles may have been forgotten or wrongly excluded.

A selection bias can be identified because only articles in English were included and several articles were excluded for BPI, SF-MPQ and Pain drawing. For example, one article for Pain drawing was excluded because in German but it seems to be interesting from the title (54).

Another selection bias can be discussed: all articles about older people or children were excluded in order to study, as much as possible, general population. These two populations are those for which the evaluation of the pain is the most difficult: psychometric properties of the pain scales have to be studied in those particular contexts.

Another limit is that only one database was screened. Results obtained cannot be exhaustive. Nevertheless, Medline via PubMed is widely used in medical and scientific community.

5 CONCLUSION

BPI and SF-MPQ-1 and 2 are both multidimensional scales and they have been more studied than uni-dimensional scale. They seemed to be efficient. They have been tested in various languages and for different types of pains.

Multidimensional scales assess not only the intensity of the pain but also its interference with daily life. They allow a more precise description of the pain. Filling the questionnaire of BPI and SF-MPQ is fast enough and give valuable information about the feeling of pain.

Next studies should explore responsiveness of BPI and SF-MPQ 1 and 2, indeed it is the strongest validity. Very few articles were found for face validity, it seemed unfortunate that it was not a priority. It might be interesting to consult patient's opinion for each scale. Discriminant validity would give information of the same scale in different populations during the same study.

VAS and Pain drawing did not showed efficiency data. VAS was insufficiently studied, it could not be considered enough valid. In practice, using VAS is extremely common especially to emergencies. Its validity and reliability should be studied first. Pain drawing's interpretation remains complex and seems to be not consensual. Its validity is only studied for anatomo-clinical correlation. Pain drawing seems to be very interesting for radicular and neuropathic pain. It is actually studied more and more.

International Association for the Study of Pain defines pain as: "Pain is a sensory and uncomfortable experience, associated with or described in actual or potential tissue injury".

Pain is significantly studied and the means to relieve it are more and more effective. Field of research is huge. Nevertheless, very few pain scales are relevant in their psychometrics properties. It will be interesting to monitor new studies about uni-dimensional pain scale in

order to have gold standard, and to complete study of validity for multidimensional scales to be more efficient.

ABBREVIATIONS LIST

BPI: Brief Pain Inventory

CFA: Confirmatory Factor Analysis

ED: Emergency Department

EFA: Exploratory Factor Analysis

EVA: Echelle Visuelle Analogique

ICC: Intraclass Coefficient Correlation

MeSH: Medical Subject Headings

NPRS: Numerical Pain Rating Scale

PCA: Principal Component Analysis

PPI: Present Pain Intensity

SF-MPQ: Short Form McGill Pain Questionnaire

SF-MPQ-2: Short Form McGill Pain Questionnaire 2

SF-36 BPS: Short Form-36 Bodily Pain Subscale

SPURBO: Soins primaires, Santé publique, Registre des cancers de Bretagne Occidentale.

VAS: Visual Analog pain Scale

VDS: Verbal Descriptors Scales

WHYMPI : West Haven Yale Multidimensional Pain Inventory

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APPENDIX 1: THE FOUR SCALES

BPI SHORT FORM

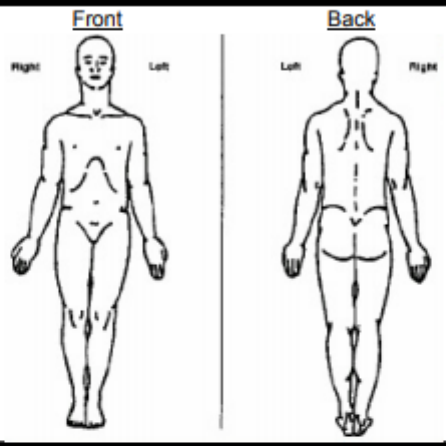
(55)

Brief Pain Inventory (Short Form)

1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?

☐ Yes ☐ No

2. On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



3. Please rate your pain by marking the box beside the number that best describes your pain at its worst in the last 24 hours.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

4. Please rate your pain by marking the box beside the number that best describes your pain at its least in the last 24 hours.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

5. Please rate your pain by marking the box beside the number that best describes your pain on the average.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

6. Please rate your pain by marking the box beside the number that tells how much pain you have right now.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

Page 1 of 2

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7. What treatments or medications are you receiving for your pain?

8. In the last 24 hours, how much relief have pain treatments or medications provided? Please mark the box below the percentage that most shows how much relief you have received.

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
☐ No Relief	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Complete Relief

9. Mark the box beside the number that describes how, during the past 24 hours, pain has interfered with your:

A. General Activity

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

B. Mood

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

C. Walking ability

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

D. Normal Work (includes both work outside the home and housework)

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

E. Relations with other people

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

F. Sleep

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

G. Enjoyment of life

☐ 0 Does Not Interfere	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10 Completely Interferes

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BPI LONG FORM

BPI long form is used as a baseline measure in clinical trials but the short form has become the standard for use in clinical and research applications.(56)

Date: ___/___/___

Name: _____ _____ _____
Last First Middle Initial

Phone: (___) _____ Sex: ☐ Female ☐ Male

Date of Birth: ___/___/___

1) Marital Status (at present)

1. ☐ Single 3. ☐ Widowed
2. ☐ Married 4. ☐ Separated/Divorced

2) Education (Circle only the highest grade or degree completed)

Grade	0	1	2	3	4	5	6	7	8	9
	10	11	12	13	14	15	16	M.A./M.S.		

Professional degree (please specify) _____

3) Current occupation _____
(specify titles; if you are not working, tell us your previous occupation)

4) Spouse's occupation _____

5) Which of the following best describes your current job status?

1. ☐ Employed outside the home, full-time
2. ☐ Employed outside the home, part-time
3. ☐ Homemaker
4. ☐ Retired
5. ☐ Unemployed
6. ☐ Other

6) How long has it been since you first learned your diagnosis? _____ months

7) Have you ever had pain due to your present disease?

1. ☐ Yes 2. ☐ No 3. ☐ Uncertain

8) When you first received your diagnosis, was pain one of your symptoms?

1. ☐ Yes 2. ☐ No 3. ☐ Uncertain

9) Have you had surgery in the past month? 1. ☐ Yes 2. ☐ No

If YES, what kind? _____

10) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, toothaches). Have you had pain other than these everyday kinds of pain during the last week?

1. ☐ Yes 2. ☐ No

10a) Did you take pain medications in the last 7 days?

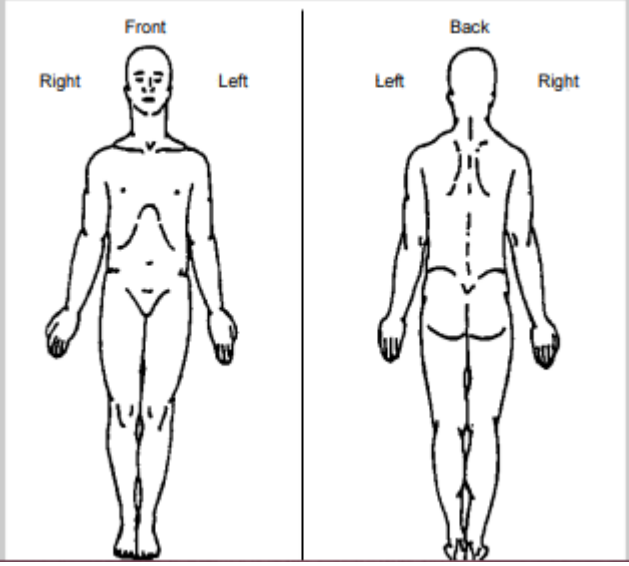
1. ☐ Yes 2. ☐ No

10b) I feel I have some form of pain now that requires medication each and every day.

1. ☐ Yes 2. ☐ No

IF YOUR ANSWERS TO 10, 10a, AND 10b WERE ALL NO, PLEASE STOP HERE AND GO TO THE LAST PAGE OF THE QUESTIONNAIRE AND SIGN WHERE INDICATED ON THE BOTTOM OF THE PAGE.
IF ANY OF YOUR ANSWERS TO 10, 10a, AND 10b WERE YES, PLEASE CONTINUE.

11) On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



12) Please rate your pain by circling the one number that best describes your pain at its worst in the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

13) Please rate your pain by circling the one number that best describes your pain at its least in the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

14) Please rate your pain by circling the one number that best describes your pain on the average.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

15) Please rate your pain by circling the one number that tells how much pain you have right now.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

16) What kinds of things make your pain feel better (for example, heat, medicine, rest)?

_____

_____

17) What kinds of things make your pain worse (for example, walking, standing, lifting)?

_____

_____

18) What treatments or medications are you receiving for pain?

_____

_____

19) In the last week, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No Relief										Complete Relief

20) If you take pain medication, how many hours does it take before the pain returns?

1. ☐ Pain medication doesn't help at all
2. ☐ One hour
3. ☐ Two hours
4. ☐ Three hours
5. ☐ Four hours
6. ☐ Five to twelve hours
7. ☐ More than twelve hours
8. ☐ I do not take pain medication

21) Check the appropriate answer for each item.
I believe my pain is due to:

☐ Yes ☐ No 1. The effects of treatment (for example, medication, surgery, radiation, prosthetic device).
☐ Yes ☐ No 2. My primary disease (meaning the disease currently being treated and evaluated).
☐ Yes ☐ No 3. A medical condition unrelated to my primary disease (for example, arthritis).
Please describe condition: _____

22) For each of the following words, check Yes or No if that adjective applies to your pain.

Aching	☐ Yes	☐ No
Throbbing	☐ Yes	☐ No
Shooting	☐ Yes	☐ No
Stabbing	☐ Yes	☐ No
Gnawing	☐ Yes	☐ No
Sharp	☐ Yes	☐ No
Tender	☐ Yes	☐ No
Burning	☐ Yes	☐ No
Exhausting	☐ Yes	☐ No
Tiring	☐ Yes	☐ No
Penetrating	☐ Yes	☐ No
Nagging	☐ Yes	☐ No
Numb	☐ Yes	☐ No
Miserable	☐ Yes	☐ No
Unbearable	☐ Yes	☐ No

23) Circle the one number that describes how, during the past week, pain has interfered with your:

A. General Activity

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

B. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

C. Walking Ability

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

D. Normal Work (includes both work outside the home and housework)

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

E. Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

F. Sleep

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

G. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

24) I prefer to take my pain medicine:

1. ☐ On a regular basis
2. ☐ Only when necessary
3. ☐ Do not take pain medicine

25) I take my pain medicine (in a 24 hour period):

1. ☐ Not every day
2. ☐ 1 to 2 times per day
3. ☐ 3 to 4 times per day
4. ☐ 5 to 6 times per day
5. ☐ More than 6 times per day

26) Do you feel you need a stronger type of pain medication?

1. ☐ Yes 2. ☐ No 3. ☐ Uncertain

27) Do you feel you need to take more of the pain medication than your doctor has prescribed?

1. ☐ Yes 2. ☐ No 3. ☐ Uncertain

28) Are you concerned that you use too much pain medication?

1. ☐ Yes 2. ☐ No 3. ☐ Uncertain

If Yes, why? _____

_____

29) Are you having problems with side effects from your pain medication?

1. ☐ Yes 2. ☐ No

Which side effects? _____

30) Do you feel you need to receive further information about your pain medication?

1. ☐ Yes 2. ☐ No

31) Other methods I use to relieve my pain include: (Please check all that apply)

Warm compresses ☐ Cold compresses ☐ Relaxation techniques ☐

Distraction ☐ Biofeedback ☐ Hypnosis ☐

Other ☐ Please specify _____

32) Medications not prescribed by my doctor that I take for pain are:

_____

_____

SF-MPQ 1
(6)

SHORT-FORM McGILL PAIN QUESTIONNAIRE

RONALD MELZACK

PATIENT'S NAME: _____ DATE: _____

	NONE	MILD	MODERATE	SEVERE
THROBBING	0) ____	1) ____	2) ____	3) ____
SHOOTING	0) ____	1) ____	2) ____	3) ____
STABBING	0) ____	1) ____	2) ____	3) ____
SHARP	0) ____	1) ____	2) ____	3) ____
CRAMPING	0) ____	1) ____	2) ____	3) ____
GNAWING	0) ____	1) ____	2) ____	3) ____
HOT-BURNING	0) ____	1) ____	2) ____	3) ____
ACHING	0) ____	1) ____	2) ____	3) ____
HEAVY	0) ____	1) ____	2) ____	3) ____
TENDER	0) ____	1) ____	2) ____	3) ____
SPLITTING	0) ____	1) ____	2) ____	3) ____
TIRING-EXHAUSTING	0) ____	1) ____	2) ____	3) ____
SICKENING	0) ____	1) ____	2) ____	3) ____
FEARFUL	0) ____	1) ____	2) ____	3) ____
PUNISHING-CRUEL	0) ____	1) ____	2) ____	3) ____

NO PAIN |————————————————| WORST POSSIBLE PAIN

P P I

0 NO PAIN ____
1 MILD ____
2 DISCOMFORTING ____
3 DISTRESSING ____
4 HORRIBLE ____
5 EXCRUCIATING ____

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Fig. 1. The short-form McGill Pain Questionnaire (SF-MPQ). Descriptors 1–11 represent the sensory dimension of pain experience and 12–15 represent the affective dimension. Each descriptor is ranked on an intensity scale of 0 = none, 1 = mild, 2 = moderate, 3 = severe. The Present Pain Intensity (PPI) of the standard long-form McGill Pain Questionnaire (LF-MPQ) and the visual analogue (VAS) are also included to provide overall intensity scores.

SFMPQ2
(57)

Short-Form McGill Pain Questionnaire-2 (SF-MPQ-2)

This questionnaire provides you with a list of words that describe some of the different qualities of pain and related symptoms. Please put an **X** through the numbers that best describe the intensity of each of the pain and related symptoms you felt during the past week. Use 0 if the word does not describe your pain or related symptoms.

1. Throbbing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
2. Shooting pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
3. Stabbing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
4. Sharp pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
5. Cramping pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
6. Gnawing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
7. Hot-burning pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
8. Aching pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
9. Heavy pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
10. Tender	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
11. Splitting pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
12. Tiring-exhausting	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
13. Sickening	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
14. Fearful	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
15. Punishing-cruel	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
16. Electric-shock pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
17. Cold-freezing pain	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
18. Piercing	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
19. Pain caused by light touch	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
20. Itching	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
21. Tingling or 'pins and needles'	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*
22. Numbness	*none*	0	1	2	3	4	5	6	7	8	9	10	*worst possible*

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Information regarding permission to reproduce the SF-MPQ-2 can be obtained at www.immpact.org.

PAIN DRAWING
(46) (48)

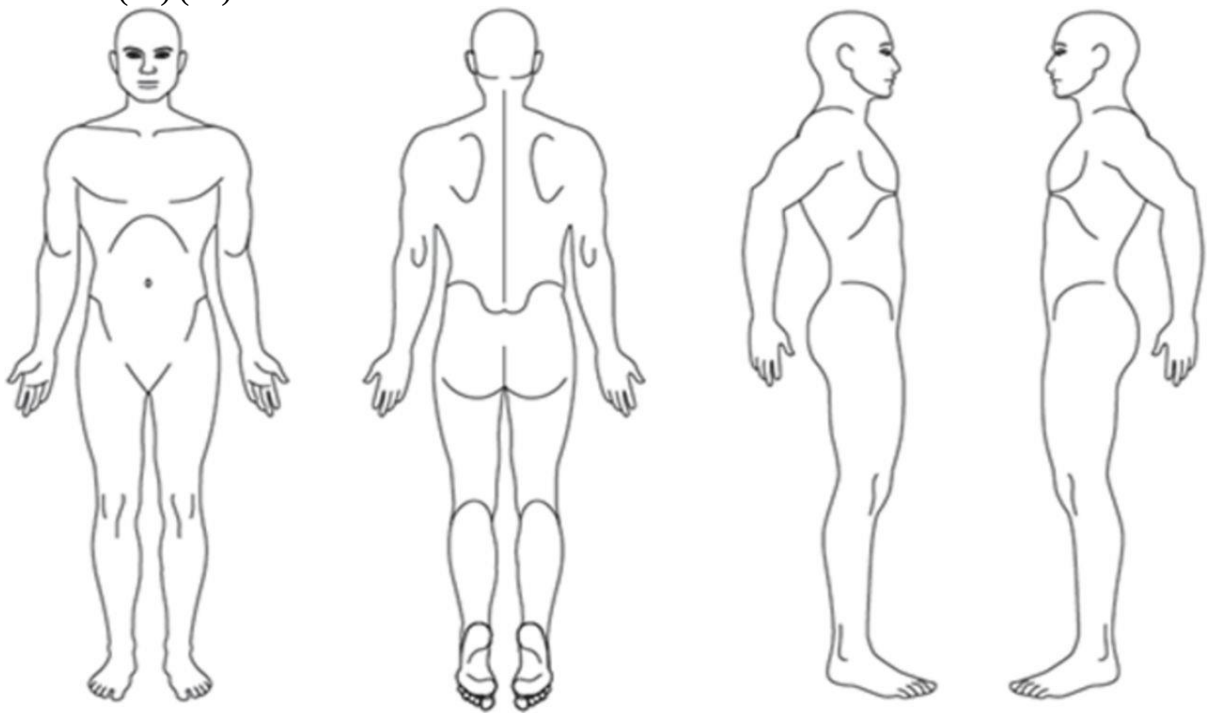

Table 1. Quantified Pain Drawing: Penalty Point Scores

A. "Nonspecific" subgroups related to poor anatomic localization and widespread extent
   1. Unreal drawings (poor anatomic localization, scores 2 points for each subheading unless indicated)
      1.1 Total leg pain
      1.2 Lateral whole leg pain (trochanteric area and lateral thigh allowed)
      1.3 Circumferential thigh pain
      1.4 Bilateral anterior tibial area pain (unilateral allowed)
      1.5 Circumferential foot pain (scores 1)
      1.6 Bilateral foot pain (scores 1)
      1.7 Use of five different modalities suggested in instructions (scores 1)
   2. "Look how bad I am" (scores 1 or 2 points depending on extent)
      2.1 Additional painful areas in the trunk, head, neck, or upper extremities are drawn in
      2.2 Tendency toward "total body pain"
   3. "Expansion" or "magnification" (scores 1 point for each subheading unless indicated)
      3.1 Back pain radiating to iliac crest, groin, or anterior perineum (coccygeal pain allowed)
      3.2 Anterior knee pain
      3.3 Anterior ankle pain
      3.4 Pain drawing outside the outline as an indication of magnification (scores 1 or 2 points depending on extent)

B. "Specific" subgroup showing "additional emphasis"[65]
   4. "I particularly hurt here" (each subheading scores 1)
      4.1 Add explanatory notes
      4.2 Circle painful areas
      4.3 Draw lines to demarcate painful areas
      4.4 Use arrows
      4.5 Excessive detail in demonstrating pain areas (using suggested symbols)

Modified after Ransford.[70]

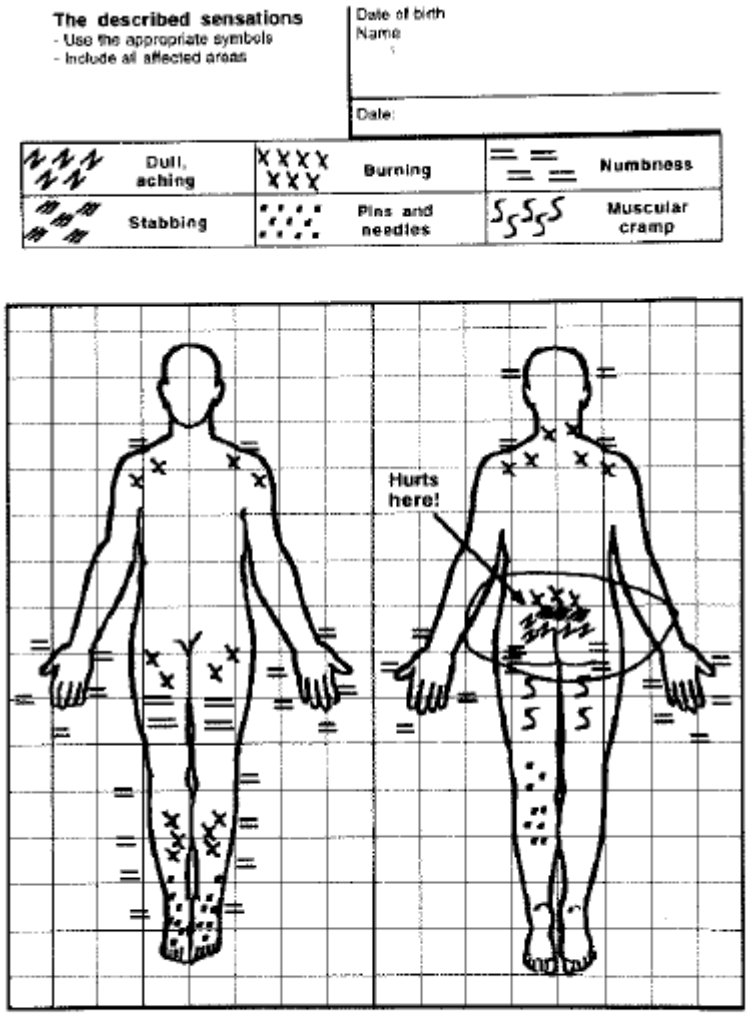

Figure 2. Pain drawing features with contributions from all four subgroups of the penalty point system (refer to Table 2). Penalty point score = 18, the sum of the value of each subgroup (6 + 3 + 5 + 4). The corresponding area raw extent assessment score = 95 (see Figure 1).

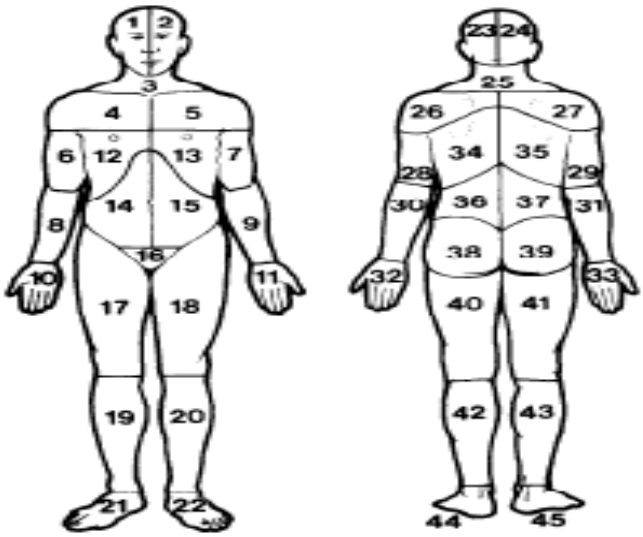

Fig. 1. Scoring template for pain drawing.

VISUAL ANALOG SCALE
(58)

Visual Analogue Scale (VAS)

Instructions for producing a VAS Bedside card:

OPTION 1

- Double-sided print or photocopy the next 2 diagrams ensuring that the lines are exactly 10 cm in length and superimposed
- Laminate the VAS Bedside card for patient use

PLEASE NOTE: For purposes of double-sided print, the numbers on this scale are reversed.

OPTION 2

- Print or photocopy the next 2 diagrams on an A4 sheet ensuring that the lines are exactly 10 cm in length
- Fold at the dotted line
- Do not show the patient the numbered scale

APPENDIX 2: SEARCH EQUATIONS

BPI

- ((brief pain inventory[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])). *((brief pain inventory[Title]) AND ("Sensitivity and Specificity"[Mesh]))*

- ((brief pain inventory[Title]) AND (validity[Title/Abstract] AND reliability[Title/Abstract])) *((brief pain inventory[Title]) AND ("Reproducibility of Results"[Mesh]))*

- ((brief pain inventory[Title]) AND validity[Title/Abstract])

- ((brief pain inventory[Title]) AND psychometric properties[Title/Abstract]) *((brief pain inventory[Title]) AND "Psychometrics"[Mesh])*

((brief pain inventory[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract]))OR((brief pain inventory[Title]) AND ("Sensitivity and Specificity"[Mesh]))OR((brief pain inventory[Title]) AND (validity[Title/Abstract] AND reliability[Title/Abstract])) OR ((brief pain inventory[Title]) AND "Reproducibility of Results"[Mesh])) OR ((brief pain inventory[Title]) AND validity[Title/Abstract])) OR ((brief pain inventory[Title]) AND psychometric properties[Title/Abstract])) OR ((brief pain inventory[Title]) AND "Psychometrics"[Mesh]))

➔72 articles

SF-MPQ

- ((Short-form McGill pain questionnaire[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])) *(("Short form mcGill pain questionnaire"[Title] OR "SF-MPQ 1"[Title] OR "SF-MPQ "[Title] AND ("Sensitivity and Specificity"[**Mesh**]))*

- ((Short-Form McGill Pain Questionnaire[Title]) AND validity[Title/Abstract]) AND reliability[Title/Abstract]) *(("Short form McGill Pain Questionnaire"[Title] OR "SF-MPQ 1"[Title] OR "SF-MPQ 2"[Title]) AND "Reproducibility of Results"[**Mesh**])*

- ((Short Form McGill pain questionnaire[Title]) OR SF-MPQ 1[Title]) OR SF-MPQ 2[Title]) AND validity[Title/Abstract])

- ((Short-form McGill pain questionnaire[Title]) AND psychometric properties[Title/Abstract]) *((Short form McGill pain questionnaire [Title]) OR SF-MPQ 1[Title]) OR SF-MPQ 2[Title]))) AND "Psychometrics"[**Mesh**])*

((Short-form McGill pain questionnaire[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract]))OR (("Short form mcGill pain questionnaire"[Title] OR "SF-MPQ 1"[Title] OR "SF-MPQ "[Title]) AND ("Sensitivity and Specificity"[Mesh])) OR((Short-Form McGill Pain Questionnaire[Title]) AND (validity[Title/Abstract]) AND reliability[Title/Abstract])) OR((short form mcgill pain questionnaire[Title]) OR SF-MPQ 1[Title]) OR SF-MPQ 2[Title]) AND validity[Title/Abstract])) OR(("Short form mcGill pain questionnaire"[Title] OR "SF-MPQ 1"[Title] OR "SF-MPQ 2"[Title]) AND ("Sensitivity and Specificity"[Mesh]))OR(("Short form McGill Pain Questionnaire"[Title] OR "SF-MPQ 1"[Title] OR "SF-MPQ 2"[Title]) AND "Reproducibility of Results"[Mesh]))

➔26 articles with finale search equation

And when terms were separated, one additional article (Article : Use of the Short-Form McGill Pain Questionnaire as a diagnostic tool in women with chronic pelvic pain.) (Short-form McGill pain questionnaire[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])

➔27 articles

PAIN DRAWING

- ("pain drawing"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract]) *("pain drawing"[Title]) AND ("Sensitivity and Specificity"[**Mesh**])*
- ("pain drawing"[Title]) AND (validity[Title/Abstract] AND reliability[Title/Abstract]) *("pain drawing"[Title]AND "Reproducibility of Results"[**Mesh**])*
- ("pain drawing"[Title]) AND validity[Title/Abstract])
- ("pain drawing"[Title] AND psychometric properties[Title/Abstract]) *(("pain drawing"[Title])AND "Psychometrics"[**Mesh**])*

("pain drawing"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract]))OR(("pain drawing"[Title]) AND ("Sensitivity and Specificity"[Mesh]))OR("pain drawing"[Title] AND (validity[Title/Abstract] AND reliability[Title/Abstract]))OR("pain drawing"[Title] AND "Reproducibility of Results"[Mesh])OR("pain drawing"[Title] AND validity[Title/Abstract])OR(("pain drawing"[Title])AND "Psychometrics"[Mesh])OR("pain drawing"[Title] AND psychometric properties[Title/Abstract])

➔19 articles with finale search equation,

Unfortunately**,** during the last check of the equation it appears that one article were not found again with the global equation but three were found by the lower level equations.

➔(19-1+3)=21 articles

Articles found by the lower level equations

Patient pain drawing is a valuable instrument in assessing the causes of exercise-induced leg pain. Article 2. ("pain drawing"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])

The accuracy of pain drawing in identifying psychological distress in low back pain-systematic review and meta-analysis of diagnostic studies. Article 4 ("pain drawing"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])

Pain drawing in the assessment of neurogenic pain and dysfunction in the neck/shoulder region: inter-examiner reliability and concordance with clinical examination. Article 19("pain drawing"[Title]) AND "Reproducibility of Results"[Mesh])

Article not found by the global equation
"Association between pain drawing and psychological factors in musculoskeletal chronic pain: A systematic review"

VAS

- (("visual analog pain scale"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract])) *("visual analog pain scale"[Title] and "Sensitivity and Specificity"[**Mesh**])*
- ((visual analog pain scale[Title]) AND validity[Title/Abstract]) AND reliability[Title/Abstract]) *((visual analog pain scale[Title] AND "Reproducibility of Results"[**Mesh**]))*
- (("visual analog pain scale"[Title]) AND validity[Title/Abstract])
- ("visual analogue pain scale"[Title]) AND psychometric properties[Title/Abstract]) *("visual analogue pain scale"[Title]) AND "Psychometrics"[**Mesh**]*
- ((visual analog scale[Title]) AND pain[Title/Abstract]) AND validity[Title/Abstract]

(("visual analog pain scale"[Title]) AND (sensitivity[Title/Abstract] AND specificity[Title/Abstract]))OR("visual analog pain scale"[Title] and "Sensitivity and Specificity"[Mesh])OR((visual analog pain scale[Title]) AND validity[Title/Abstract]) AND reliability[Title/Abstract]) OR((visual analog pain scale[Title] AND "Reproducibility of Results"[Mesh]))OR("visual analog pain scale"[Title] AND validity[Title/Abstract]) OR((visual analog scale[Title]) AND pain[Title/Abstract]) AND validity[Title/Abstract)

➔15 articles

And when terms were separated, one additional article: “Can patients accurately read a visual analog pain scale”? ("visual analog pain scale"[Title]) AND ("Sensitivity and Specificity"[Mesh])

➔16 articles

APPENDIX 3: OFF-TOPIC AND EXCLUDED ARTICLES

	BPI	SF-MPQ	Pain drawing	VAS
OFF TOPIC				
no validity data	3,39,44,47,59,61,62, 67,69, biblio article 42 number 5, biblio article 4 number 10	14,17,29,biblio article 2 number 1,biblio article 28 number 43	7,12,13,17,18, 20,21,14,15	3,10,12,biblio article 19 number 10, Article 17 number 2
lack of quality (no abstract, no IMRAD, article not in English, no article about initial translation on PubMed)	*16*,19,46,55,58,60,68,70,72,73, biblio article 15 number 7, biblio article 20 number 24, biblio article 37 number 17, biblio article 52 number 10, biblio article 31 number 21 et 22	27,26,biblio article 13 number 26	8,16,22	8
no dealing with human	27,28,50			
evaluation of the scale in another area than pain			4,6,9	11, (15)
duplicata	33,18, biblio article 31 number 8, 12 et 19, biblio article 52 number 13			
EXCLUSION CRITERIA				
convergent validity assessed with an unreliable scale	2,8,9,11,13,14,17,21,22,29,30,36,38,45,51,56,57,40,41,54,64,66,71	6,11,12,3,9,16,19,biblio article 13 number 11	10	2, 9,16, 13
only a subset of the scale is analyzed	5,24,49,63	23		
specific population: children or old people	7,12,48,65	8		6,7,14,18
scaling modification but unverified validation procedure of the original	34,35	18		12,15
only anatomoclinic correlation is analyzed			2,3,5,11,19	

BPI: Brief Pain Inventory, SF-MPQ: Short Form McGill Pain Questionnaire, VAS: Visual Analogue Pain Scale

APPENDIX 4: BPI INCLUDED ARTICLES AND THEIR VALIDITIES

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
BPI score identifying and discriminating **neuropathic and nociceptive pain.**	For neuropathic pain: Se 79,4% Sp 46,9% AUC =0,69	Wilcoxon, 2 groups of patients	Factor analysis: 3 factors (*Pain intensity for one and pain interference item for two*) explained 68,6% of the total variance. 70,68% for nociceptive group 66,48% for neuropathic group		
Reliability and validity of the BPI in individuals with **chronic obstructive pulmonary disease.**	Spearman = 0.79 between BPI total score and SF-MPQ total score	=convergent	Factor analysis : 2 factors explained 77% of the variance. 66,9 % for intensity 10,4 % for interference		
Validity and reliability of a *Turkish* brief pain inventory short form when used to evaluate **musculoskeletal pain.**	Spearman=0,21-0,35 between Turkish BPI and VAS : High correlation P<0.005		Factor analysis : 2 factors explained 56.4% of the total variance. 9,2% for intensity 47,2% for interferences		
Validation of the short form of the BPI in *Spanish* patients with **non-cancer related pain.**	Spearman between BPI and VAS were moderate to high : BPI severity : 0.472 BPI interference: 0,511	=convergent			High level of responsiveness : effect size increases at 3 months
Psychometric evaluation of the Arabic BPI in a sample of ***Lebanese* cancer patient.**	Pearson r = 0,63 p<0,01 between VAS and Arabic BPI		Factor analysis: 2 factors explained 67% of the variance: 11,3% for intensity 55,8% for interferences		
Validation of the *Turkish* version of the Brief Pain Inventory in **surgery patients.**			Factor analysis: two factors explained 72,02% of the variance 13,4% for intensity 58,6% for interferences		

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Validation of the *thai* version of the BPI in **cancer patient**.			Factor analysis: two factors explained 65% of the variance		
Reliability and validity of a modified BPI short form in patient with **osteoarthritis.**	Convergent validity with VAS : at or above 0.60 for study one (hip) and 0.41 for study 2 (knee)		Factor analysis: three factor accounted of 86% (study 1 hip) and 84% (study 2 knee) of the scale's variance: -pain intensity -pain interference on activity -impact of pain on mood		
Validating the Brief Pain Inventory for use with **surgical patients with cancer.**	Pearson: 0,51-0,83 p<0,01 between VAS and BPI pain items in the two groups (medical and surgical) except for average pain, significantly correlated with VAS for medical but not for surgical patients Pearson: 0,60-0,71 p<0,01 between VAS and BPI pain interference similar in the two groups except for walking (higher for surgical patients)				
The assessment of **Cancer pain** in *North India*: the validation of the *hindi* Brief Pain Inventory.			Factor structure is similar between Hindi and English version. Factor one and factor two are interference and severity subscales.		
A Brief Cancer pain assessment Tool in **Japanese**: The Utility of the Japanese Brief Pain Inventory.			Factor analysis: two factor solution Pain intensity Pain interference		
Analysis of Pain and Interference Patterns With Brief Pain inventory in Patients With **Bones Metastases**: A Confirmatory Study.		=construct	CFA : comparison between two (pain and interferences subscales) and three (pain, activity and affect subscales) factors models: correlation in the two factor model between: pain and interference = 0,77. correlation in the three factor model between: pain and activity = 0,75, pain and affect = 0,76. activity and affect = 0,92 sleepd does not correlate well with the other items		

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Using Confirmatory Factor Analysis to Evaluate **Construct Validity** of the Brief Pain Inventory.			model 2 >model 1: RMSEA (>0,08) = 0,081 and 0,165. CFI (>0,90) = 0,941 and 0,750. model 3>model 2: RMSEA= 0,075 and CFI = 0,953 for model 3. model 3 = the best fit. The three factor solutions are invariant across disease type age and ethnicity groups.		
Development of and psychometric testing for the Brief Pain Inventory-Facial in **patients with facial pain syndromes.**			Three factors were identified with an eigenvalue (variance of factor) > 1.0. Three factors accounted for 97.6% of the variance. Kaiser criterion confirmed the retention of 3 factors as well.		
Validation of a modified version of the Brief pain Inventory for **painful diabetic peripheral neuropathy**.		=convergent and not reliable	Factor analysis: two factors explain 77.6% of the total variance.		
Development of the Wisconsin Brief pain questionnaire **to assess pain in cancer and other diseases**			Significant correlation between the worst pain and pain's interference with daily life Worst pain is moderately correlated with interference in each of the 6 areas (mood, social relationships, walking, sleep, work, enjoyment of life). Ratings of usual pain are significantly correlated only with interference with sleep (r=0,277 p<0,005)		
Comparison of pain measures in **surgical patients**	Pearson correlation = 0,33 to 0,76 p<0,001 (between BPI, VAS-R, VAS-M and SFMPQ) correlations between subscales of the BPI SF (intensity, physical emotion sensory affective) and the SF MPQ (sensory, affective) 0,33 to 0,63 for present pain and 0,37 to 0,66 for pain over 24h Pearson = modest but statically significant				

CFA : Confirmatory Factor Analysis, RMSEA: Root-Mean-Square_Error of approximation, CFI: Comparative Fit Index SF-MPQ: Short Form McGill Pain Questionnaire. VAS: visual analog scale, PPI: Pain Point Index

APPENDIX 5: SF-MPQ INCLUDED ARTICLES AND THEIR VALIDITIES

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Use of the Short Form McGill pain questionnaire as a diagnostic tool **in women with chronic pelvic pain**.	Total MPQ pain descriptor score correlates with VAS: Spearman 0,34-0,35 (worst least mean VAS)				
Development and validation of **Arabic version** of the Short-Form McGill Pain Questionnaire.	Association with BPI pain severity and interference: moderately correlated Pearson rs= 0,39-0,49 p<0,001 (r<0.3 =weak, strong >0,5)		Correlation SF-MPQ PPI and NRS (NRS = VAS): with PPI rs=0,47-0,57 p<0,001, with VAS rs=0,38-0,42 p<0,001	Five questions: majority of patients find the questions clear and easy	
A cross-cultural adaptation and validation of the short-form McGill Pain Questionnaire-2: ***Chinese*** *version in patients with chronic visceral pain.*			EFA =0,866 and 4 components with a variance of 73,55% were extracted (consistent with the original version). CFA were tested: GFI and NFI for the 4 subscales were >0,90, acceptable fit.		
Validity, reliability, and assessment sensitivity of the ***Japanese*** *version of the short-form McGill pain questionnaire 2 in Japanese patients with* ***neuropathic and non-neuropathic pain.***	Concurrent validity among the SF-MPQ-2-J, VAS, SF-MPQ-J, LF-MPQ-J Spearman significant if >0,40 p<0,05. Spearman >0,40: 0,61 with VAS, 0,64 with SF-MPQ-J.		CFA based on GFI >0,90 and on RMSEA <0,05 good,<0,08 acceptable, >10 poor. CFA: good fit for each four subscales GFI = 0,917, RMSEA = 0,05 no significant results for discriminating neuropathic and non-neuropathic pain.		

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Reliability, validity, and sensitivity measures of expanded and revised version of the Short-Form McGill Pain Questionnaire (SF-MPQ-2) in ***Iranian*** *patients with* ***neuropathic and non-neuropathic pain.***	Compared with VAS and PPI (in the SF MPQ 1). High correlation (>0, 90) between VAS and mean total score r=0,926 p<0,01 for all participants, r=0,93 for patients with painful DPN. *No correlation calculated with PPI*		EFA ok>0,4. 4 components comprising 57,49% of the variance. similar to the original SFMPQ 2.	"easily understand able" but some problems of translation for two words	The Patient Global Impression to Change (PGIC) was administered to all patients at T1 T2 T3: ok pain reduction in the two group (neuropathic and non-neuropathic)
Results from the translation and adaptation of the Iranian Short-Form McGill Pain Questionnaire(I-SF-MPQ): preliminary evidence of its reliability, construct validity and sensitivity in an **Iranian** pain population.			Principal component analysis PCA (ok oblimin rotation) correlation between scores of each sensory (factor 1) and affective (factor 2) word was compared with the total number of sensory and affective words.		Questionnaire in the morning in the evening and 3 weeks after ttt: *assessed by pair t-test analysis:* significant difference between pre and post treatment p<0,001 and significant decrease in the mean pain score in all subclasses
Development and initial validation of an expanded and revised version of the Short-form McGill Pain Questionnaire (SF-MPQ-2).	SF MPQ 2 total and subscale scores were significantly correlated with BPI intensity and interference for web survey and interference for baseline data of painful DPN trial		EFA three factor solution (affective descriptors were not included) accounted of 41% of the variance. CFA: acceptability if GFI>0,90 SRMR<0,08 RMSEA <0,10: GFI were all >0,90 RMSEA max 0,14		SFMPQ 2 total and subscale scores all significantly improved from baseline to the end four weeks later in the randomized control trial of painful DPN
Thai Short-form McGill Pain Questionnaire.			Content validity using "33% Melzak criteria»: three pain descriptors did not meet the 33% Melzak criteria. Only three, so considered similar to the result of the Melzak study Pearson between two interviewers of total score (sensory and affective) 0,90 VAS 0,83 PPI 0,86		

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Factorial validity of the Short-Form McGill pain questionnaire (SF-MPQ).			Two dimensional structures is better CFI AGFI SRMR RMSEA are better with the final model		
The development and validation of a **Greek** version of the Short-Form McGill Pain Questionnaire.			All items demonstrated usage greater than the 33% threshold Pearson's calculated for the total affective sensory VAS and PPI scores. sensory and affective r=0,55=high VAS and PPI r=0,33. VAS and affective r=0,29.		
A **Swedish** version of the Short-Form McGill Pain Questionnaire.			7 items 15 <33% for RA (so the words are not appropriated for RA) et 2/15 for fibromyalgia. Three distinct factors (affective, sensory and more chronic sensory) Swedish version of SF MPQ compared with **PPI VAS**: PPI (r=0,41 in Fibromyalgie group and 0,60 in rheumatoid arthritis group) VAS (r= 0,30 and 0,53) p<0,005		no signifiant result
*Validation of the Short-form McGill Pain Questionnaire-2 (SF-MPQ-2) in **acute low back pain.***	Correlation Pearson between SF MPQ 2 and the BPI SF intensity: from 0,21 to 0,42= ok to extend but not redundant. Between SF MPQ 2 and BPI interference 0,21 to 0,52.		Three factors: Continuous subscale: strong for all intermittent and affective subscale: ok GFI and SRMR but poor for RMSEA neuropathic subscale ok SRMR GFI but poor for RMSEA		Significant improvements from baseline to day 5 for the entire sample of patients: so SF MPQ total score and its 4 subscales are all responsive to change
Reliability and sensitivity measures of the **Greek version** of the Short Form of the McGill Pain Questionnaire					Statistically significant differences were detected for all scores pre- and post-treatment

AGFI: Adjusted Goodness of Fit Index, EFA: Exploratory Factor Analysis, CN : Chinese version, CFA : Confirmatory Factor Analysis, DPN: Diabetic Peripheral Neuropathy,, GFI: Goodness of Fit Index, NFI: Normed of Fit Index, PCA: Principal Component Analysis, PPI: Pain Point Index, PGIC: Patient Global Impression to change. RMSEA: Root-Mean-Square_Error of approximation, SRMR: Standardized Root Mean Residuals, SF-MPQ: Short Form McGill Pain Questionnaire. VAS: visual analog scale,

APPENDIX 6: VAS INCLUDED ARTICLES AND THEIR VALIDITIES

Articles	Convergent validity	Discriminant validity	Construct validity	Face validity	Responsiveness
Correlation of change in visual analog scale with pain relief in the ED.	Correlation between the change in VAS scores VDS (5 points: much less, little less, about the same, little more,much more) using Spearman. Spearman correlation of change in VAS and patient VDS of change in pain was 0,667 p<0,001 (moderately). => the two types of measures are quantifying the same property of change in pain. *VAS 1-VDS 1 when they arrive* *VAS 2-VDS 2 30 minutes after medication* *VAS 3-VDS 3 at the time of discharge*				
Reliability and Validity of a Visual Analog Scale for Acute Abdominal Pain in the ED.	*VAS at time 0* *VAS at one minute* *VAS each 30 minutes for 2 hours or until the patient was discharged from the ED or admitted* *=>5 paired measurements* *AND 5 categorical descriptors: "much less pain" "a little less pain" "about the same pain" "a little more pain" "much more pain"* =>calculating the mean, median and standard deviation of the difference between each consecutive pair of measurement =>mean and median VAS scores increase as the pain descriptors. F= 79,4 p<0,001				

Abreviations : VAS : Visual Analogue Scale , VDS : Verbal Scale Descriptors

APPENDIX 7: INITIAL LIST OF ALL ARTICLES FOUND BY SEARCH EQUATION

https://drive.google.com/open?id=1ru4iYKMAgsUmHHBxEKPPo-WJJA9kDfdg

ROIGNAN (Sophie) - Validity of four pain scales which have been proven reliable by a previous systematic review: *Brief pain Inventory, Short-Form McGill Pain Questionnaire, Pain drawing, Visual Analog Pain Scale*; a systematic review.
Th. : Méd. : Brest 2019

ABSTRACT:

Background: Pain is a multidimensional phenomenon that is subjective with physiological and psychological components. It is necessary to have valid and reliable pain measures. A previous study has identified Brief Pain Inventory (BPI), SF MPQ-1 and 2 (Short Form McGill Pain Questionnaire) as reliable. Visual Analog Pain Scale (VAS) and Pain drawing were less reliable but they are commonly used. The present study aimed to collect validity data of these four scales.

Method: A Medline review via PubMed was carried out with no restriction on the publication date. Only English language papers were examined. Inclusion was conducted until June 2019. Data of validity (convergent, discriminant, construct, face and responsiveness) were extracted for each four scales.

Results: 17 relevant articles were included for BPI, 8 for SF-MPQ-1, 5 for SF-MPQ-2, none for Pain drawing and 2 for VAS. Convergent validity was studied in several articles included for each scale. Construct validity was studied only for BPI and SF-MPQ. Discriminant validity was studied only for BPI in one article. Face validity was studied in one article for both SF-MPQ-1 and 2. Responsiveness was studied in one article for BPI, 2 articles for SF-MPQ-1 and 3 articles for SF-MPQ-2.

Satisfactory validity data were found for BPI and SF-MPQ. Data were inadequate for Pain drawing and insufficient for VAS.

Discussion: The five relevant validities were not all studied for BPI and SF-MPQ. Further studies could supplement these data. It will be necessary to study external validity of VAS, which is very useful in practice.

KEYWORDS:

VALIDITY

REPRODUCIBILITY OF RESULTS

PSYCHOMETRICS

JURY:

Président :	M. Le Professeur Jean-Yves Le Reste
Membres du Jury :	M. le Pr Chiron Benoît
	Mme le Dr Barais Marie
	Mme le Dr Belhadj Myriam
	Mme le Dr Bourillet Catherine

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