

The McGill Pain Questionnaire as a Multidimensional Measure in People with Cancer: An Integrative Review

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■ ABSTRACT:

First published in 1975, the McGill Pain Questionnaire (MPQ) is an often-cited pain measure, but there have been no systematic reviews of the MPQ in cancer populations. Our objective was to evaluate the MPQ as a multidimensional measure of pain in people with cancer. A systematic search of research that used the MPQ in adults with cancer and published in English from 1975 to 2009 was conducted. Twenty-one articles retrieved through computerized searches and nine studies from manual searches met the criteria. Review of the 30 studies demonstrated that pain intensity (n = 29 studies) and pain quality (n = 27 studies) were measured more frequently than pain location, pattern, and behavior parameters. Measuring cancer pain using the MPQ provided insights about disease sites, magnitude of pain, and effectiveness of treatment and intervention. Additionally, the MPQ data informed speculations about pain mechanisms, emotional status, overall sensory pain experience, changes in pain over time, and alleviating and aggravating behaviors/factors. Findings supported the MPQ as an effective multidimensional measure with good stability, content, construct, and criterion validity and showed sensitivity to treatment or known-group effects. The MPQ is a valid, reliable, and sensitive multidimensional measure of cancer pain. Cancer pain is a subjective complex experience consisting of multiple dimensions, and measuring cancer pain with the MPQ may help clinicians to more fully understand whether those dimensions of cancer pain influence each other. As a result, clinicians can provide better and effective cancer pain management.

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The evaluation of cancer pain remains a troubling issue because of the subjective experience of pain and the complexity of the disease (McGuire, 1995; Wilkie & Monreal, 1999). Many investigators have used the multidimensional conceptualization of cancer pain as a framework for assessing and studying cancer pain as a subjective perception (Turk, Monarch, & Williams, 2002). The McGill Pain Questionnaire (MPQ) is a comprehensive multidimensional measure (Ahles, Blanchard, & Ruckdeschel, 1983; McGuire, 1995; Melzack & Wall, 1965; Wilkie & Monreal, 1999) that quantifies neurophysiologic as well as psychologic domains of pain. The MPQ thus allows a comprehensive approach to measure cancer pain. Although the MPQ has been used in many cancer studies, few reviews have been found to date on its use in exclusively cancer populations. Therefore, the purpose of the present integrative review was to critically analyze the knowledge about the multiple dimensions of pain when measured by the MPQ in cancer populations.

Based on the Gate Control Theoretical framework, Melzack and Torgerson (1971) developed the MPQ to measure the pain experience from multiple dimensions: sensory (pain location, intensity, quality, and pattern), affective (fear, depression, and anxiety related to pain); cognitive (overall pain appraisal), and behavioral (aggravating and alleviating actions) (Ahles, Blanchard, and Ruckdeschel, 1983; Melzack, 1975; Melzack & Torgerson, 1971). Widely used in multiple studies, the MPQ has demonstrated good reliability and validity (Melzack, 1975) and has discriminated among different pain diagnoses. Because participants take ~25-30 minutes to complete the MPQ long version, it is commonly used in clinical research more than in practice (Flaherty, 1996).

The MPQ includes five main measures (McGuire, 1984; Melzack, 1975; Wilkie, Savedra, Holzemer, Tesler, & Paul, 1990):

1. *Pain location (sensory dimension)*. On a drawing of the human body with both anterior and posterior sides, participants indicate the areas of their bodies that have pain. The number of pain sites is summed as an indicator of the sensory pain dimension.
2. *Pain intensity (sensory dimension)*. Participants rate the intensity of their current, least, and worst pain and their worst headache, stomachache, and toothache by responding to six separate questions on the strength of their pain. From a list of six words, the patient selects the one best word describing the intensity of pain: 0 = none; 1 = mild; 2 = discomforting; 3 = distressing; 4 = horrible; and 5 = excruciating.
3. *Pain quality (sensory, affective, and cognitive dimensions)*. Participants respond to the question, "What does your pain feel like?" by selecting from 78 descriptors

in 20 subclasses. The descriptors are used qualitatively or they are combined quantitatively in several measures. The quantitative data are summed to form the pain rating index (PRI) which includes PRI-Total (PRI-T, score 0-78), PRI-Sensory (PRI-S, score 0-42), PRI-Affective (PRI-A, score 0-14), PRI-Evaluative (PRI-E, score 0-5), and PRI-Miscellaneous (PRI-M, score 0-17) (Katz & Melzack, 1999). In addition, the qualitative data include 78 descriptors of pain quality that describe pain characteristics in three dimensions of pain: 1) sensory qualities (word groups 1-10, 17-19) described in terms of temporal, spatial, pressure, thermal, and other properties; 2) affective qualities (word groups 11-15, 20) described in terms of tension, fear, and autonomic properties; and 3) cognitive qualities or evaluative words (word groups 16, 20) that describe the overall appraisal of the pain (Katz & Melzack, 1999). Finally, the number of words chosen (NWC, range 0-20) is the sum score of the total number of descriptors that the participant chooses.

4. *Pain pattern (sensory dimension)*. Participants respond to the question, "How does your pain change with time?" by selecting from nine words (continuous, steady, constant, rhythmic, periodic, intermittent, brief, momentary, and transient). These nine words are categorized into three main pain patterns: continuous, intermittent, and transient.
5. *Alleviating and aggravating factors (behavioral dimension)*. Participants respond to two open-ended questions, "What kinds of things decrease your pain?" and "What kinds of things increase your pain?" Responses are qualitative and commonly are organized in themes with frequency distributions reported.

Since 1975, only two literature reviews of the MPQ were found, but one review focused on the normative scores obtained with the MPQ when used in a variety of pain populations (Wilkie, Savedra, Holzemer, Tesler, and Paul, 1990) and the other review focused on cross-cultural adaptation of the MPQ (Menezes Costa Lda, Maher, McAuley, & Costa, 2009). No published review of the empirical studies in which the English version of the MPQ was used to measure pain in cancer populations was found. From studies in which the MPQ was used to measure pain in people with cancer, the specific objective of the present study was to critically analyze: 1) the knowledge generated about the multiple dimensions of pain; and 2) the psychometric properties of the MPQ.

METHODS

A systematic search of three databases (Ovid, Medline, and Ebsco) was conducted using these key words and combinations: "cancer pain," "cancer-related pain," "McGill Pain Questionnaire," "pain pattern" and "temporal pain aspect" (Fig. 1). The search was limited to

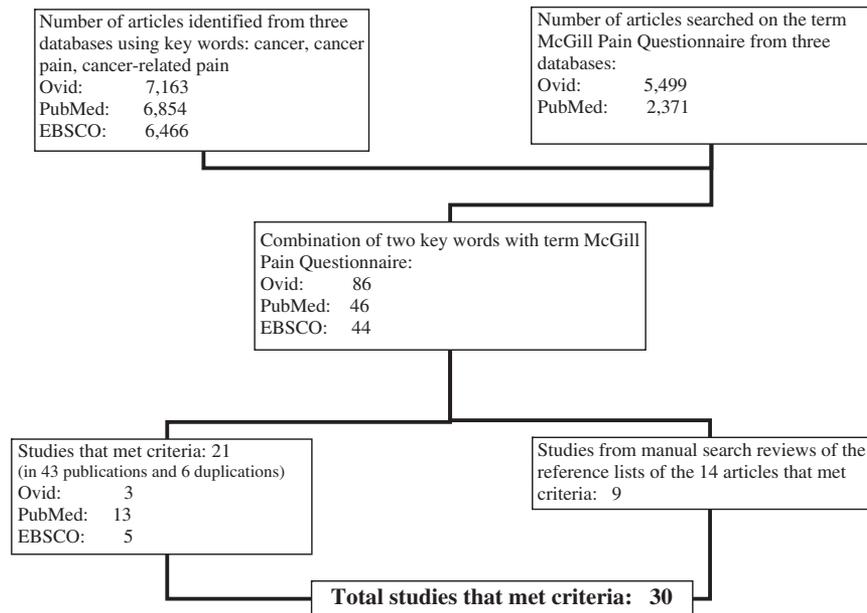


FIGURE 1. ■ Method to identify articles for review.

research studies in humans published in English from 1975 (when the MPQ was published) to 2009.

Article Selection

Initially, there were a considerable number of studies found with the key words “cancer,” “cancer pain,” and “cancer-related pain.” Then, the key words were combined with the term “McGill Pain Questionnaire,” and the search was limited to the adult population. The studies were limited to those in which the investigators used the MPQ to measure pain and published in English. Twenty-one unique articles met the inclusion criteria and were retrieved from the Ovid, Medline, and Ebsco databases. Manual searches of the reference lists of the 21 studies produced an additional nine studies. The 30 articles were read to confirm that they met the inclusion criteria. One article was identified with the minimum age < 18 years, but it was retained because most of the sample was adults.

RESULTS

An overview of each of the 30 studies is presented in Table 1. Various study designs were used; samples were either convenience or purposive sampling; and settings included oncology centers, pain clinics, acute care, ambulatory care, surgery unit, hospice care, and home. Most studies were conducted in the United States and the rest in Canada (Epstein & Stewart, 1993; Melzack, 1975), Australia (Heim & Oei, 1993),

Taiwan (Huang, Wilkie, Chapman, & Ting, 2003), United Kingdom (Macdonald, Bruce, Scott, Smith, & Chambers, 2005; Twycross & Fairfield, 1982), Austria (Peintinger, Reitsamer, Stranzl, & Ralph, 2003), and Israel (Talmi, Waller, Bercovici, Horowitz, Pfeffer, Adunski, and Kronenberg, 1997).

Demographic Characteristics

Across all studies, ages ranged from 15 years (Sist, Florio, Miner, Lema, & Zevon, 1998) to 92 years (Zimmerman, Story, Gaston-Johansson, & Rowles, 1996), and the average age across the studies was 59 years. Both female and male subjects were included in 23 studies. The distribution of race/ethnicity in 11 studies was more caucasians than others. A few studies were conducted in all-caucasian samples (Beck, 1991; Samuelsson & Hedner, 1991; Zimmerman, Pozehl, Duncan, & Schmitz, 1989). There were six studies in which the investigators reanalyzed data from the same sample (Dobratz, 2001, 2008; Wilkie & Keefe, 1991; Wilkie, Keefe, Dodd, & Copp, 1992) or had some of the same participants (Berry, Wilkie, Huang, & Blumenstein, 1999; Fischer, Villines, Kim, Epstein, & Wilkie, 2009; Wilkie, Huang, Reilly, & Cain, 2001).

Cancer Characteristics

Overall, the maximum time period since participants had been diagnosed with cancer was 84 months (McGuire, 1984). The four most common cancers studied were head and neck (Epstein & Stewart, 1993; Epstein, Wilkie, Fischer, Kim, & Villines, 2009;

TABLE 1.
Authors/Years, Objective, Design/Method, Sample/Setting/Country, Gender/Age, Race/Ethnicity, Cancer and Pain Characteristic (n = 30)

Author(s)/Year	Objective	Design/Method	Sample/Setting/Country	Gender/Age	Race/Ethnicity	Cancer Characteristic	Pain Characteristic	Reliability	Validity
Ahles <i>et al.</i> 1983	<ul style="list-style-type: none"> To assess each component of the pain experience To provide support for multidimensional model 	<ul style="list-style-type: none"> Comparison control group Purposive sampling for matching 	<ul style="list-style-type: none"> 40 pts w/pain 37 pts pain free Oncology, medical college United States 	No report	No report	<ul style="list-style-type: none"> 23% lung, 30% breast, 47% others 82.5% mets, 12.5% local 5.0% regional disease 	Pts (50%) had chronic pain	No report	Criterion (concurrent): $r = 0.37-0.55$ (STAI) $r = 0.51$ (BDI) $r = 0.37-0.47$ (SCL-90) $r = 0.48$ (VAS Depression) $r = 0.32-0.33$ (VAS, MPQ sensory, evaluative)
Beck 1991	To evaluate the extent to which the therapeutic use of music decreased pain in CA pt receiving analgesic	<ul style="list-style-type: none"> Experimental crossover study Random assignment to groups 	<ul style="list-style-type: none"> 15 CA pts Hospitals and home care United States 	<ul style="list-style-type: none"> 20% M 80% F Age 20-87 	100% W	<ul style="list-style-type: none"> 47% breast 27% MM 40% spine, 80% from bone metastasis 	Pain related to CA (100%), treatment (27%)	No report	<ul style="list-style-type: none"> Criterion (concurrent): $r = 0.61-0.96$ Music decreased pain intensity
Berry <i>et al.</i> 1999	To compare present and worst CA-related pain intensity to recalled intensity of several commonly experienced types of pain	<ul style="list-style-type: none"> Descriptive, design Secondary data analysis 	<ul style="list-style-type: none"> 125 Lung CA pts Tertiary-care facilities or pt home. United States 	<ul style="list-style-type: none"> 62% M 38% F Mean age 60 	<ul style="list-style-type: none"> 81% W 19% B, 2% H, 3% As 4% Other 	<ul style="list-style-type: none"> 8% stage I 4% stage II 31% stage III 57% stage IV Pts w/stage I-III all had lung CA; pts w/stage IV had lung, breast, prostate, nasal, bladder, or thyroid CA 	—	Relied on previous literature	Relied on previous literature
Burrows <i>et al.</i> 1998	To determine differences in pain characteristics, mood states, and QOL.	<ul style="list-style-type: none"> Descriptive, comparative study Convenience sampling 	<ul style="list-style-type: none"> 298 outpts 16 outpts Oncology nursing research network United States 	<ul style="list-style-type: none"> 44% M 56% F Age 19-80 	88% W	<ul style="list-style-type: none"> 23% breast 13% colorectal 13% lung 	50% somatic, 30% neuropathic, 20% visceral pain	No report	No report
Coward <i>et al.</i> 2000	To depict possible gender difference in meaning of pain in the context of pain self-report and self-management decision making	<ul style="list-style-type: none"> Mixed method descriptive study Convenience sampling 	<ul style="list-style-type: none"> 20 pts. w/CA & bone metastasis. Large urban city in Pacific Northwest United States 	<ul style="list-style-type: none"> 50% M 50% F Age 26-73 (F) Age 41-80 (M) 	95% W	<ul style="list-style-type: none"> Diagnosed 1-9 y (F); 1-13 y (M) Primary site: breast (F), prostate (M); Spine most common site of mets (F, M) 	—	Relied on previous literature	<ul style="list-style-type: none"> Content Relied on previous literature
Dobratz 2008	To determine if nociceptive and/or neuropathic pain in advanced CA	<ul style="list-style-type: none"> Descriptive, secondary analysis study 	<ul style="list-style-type: none"> 76 pts w/CA Hospice pts United States 	<ul style="list-style-type: none"> 58% M 42% F 	No report	<ul style="list-style-type: none"> Primary site: lung, colon, breast, prostate, gastric, pancreas, and other 	—	No report	<ul style="list-style-type: none"> Content Theoretical description of pain types

Dobratz 2001	pts could be identified by word selections To provide a description of advanced CA pain in pts at home	<ul style="list-style-type: none"> Descriptive, secondary data analysis. 	<ul style="list-style-type: none"> 76 CA pts Terminally ill at home United States 	<ul style="list-style-type: none"> 58% M 42% F 	No report	<ul style="list-style-type: none"> 43% had ≥ 1 mets from primary site Primary site: lung, colon, breast, prostate, gastric, pancreas, and other. 43% had ≥ 1 mets from primary site 	—	No report	No report
Epstein et al. 2009	To describe the experience and trajectory sensory pain	<ul style="list-style-type: none"> 3-month repeated-measures study Secondary data analysis 	<ul style="list-style-type: none"> 124 HNC CA clinic United States 	<ul style="list-style-type: none"> 76% M 24% F Mean age 55 	<ul style="list-style-type: none"> 88% W 3% Hispanic 2% B 2% Asian 4% Other 	<ul style="list-style-type: none"> 46% oral cavity, 23% salivary gland, 12% maxillary sinus, 11% larynx, 8% unknown 17% stage I, 14% stage II, 14% stage III, 46% stage IV 	Pts had pain 0-6 mo (77%), 7-12 (5.6%), 13-23 (4%), ≥ 2 years (12.9%)	Relied on previous literature	Relied on previous literature
Epstein et al. 1993	To develop pain questionnaire applicable to head and neck and oral pain in CA	<ul style="list-style-type: none"> Time series study Purposive sampling 	<ul style="list-style-type: none"> 34 HNC. CA agency Canada 	<ul style="list-style-type: none"> 26 M 15 F Age 41-86 	No report	<ul style="list-style-type: none"> 91% squamous cell carcinoma 9% malignant salivary gland. 	<ul style="list-style-type: none"> Pts (82%) had pain at diagnosis Pain duration 3.6 mo 	No report	Pain analgesics decreased pain intensity
Fischer et al. 2009	To explore differences in pain, anxiety, and depression by type of primary CA	<ul style="list-style-type: none"> Cross-sectional, secondary data analysis 	<ul style="list-style-type: none"> 302 Lung, H/N, and Prostate pts Radiation oncology clinic United States 	<ul style="list-style-type: none"> 77% M 23% F Mean age 60 	<ul style="list-style-type: none"> 89% W 11% other 	<ul style="list-style-type: none"> 146 lung 93 H/N 63 prostate 43% stage III Lung 41% stage IV H/N 36% stage II prostate 	Pain was related to tumor and treatment	No report	<ul style="list-style-type: none"> Criterion (concurrent): NWC predicted by state anxiety ($\beta = 0.06$), depression ($\beta = 0.07$), female gender ($\beta = 0.27$), using more coping strategies ($\beta = 0.16$), and having lung CA ($\beta = 1.19$) PRI-T predicted by state anxiety ($\beta = 0.19$), depression ($\beta = 0.20$), using more coping strategies ($\beta = 0.04$), and having lung CA ($\beta = 2.99$)

(Continued)

TABLE 1.
Continued

Author(s)/Year	Objective	Design/Method	Sample/Setting/Country	Gender/Age	Race/Ethnicity	Cancer Characteristic	Pain Characteristic	Reliability	Validity
Graham <i>et al.</i> 1980	<ul style="list-style-type: none"> To compare and contrast findings w/ those reported earlier To present additional data regarding mode of administration 	<ul style="list-style-type: none"> Convenience sampling 	<ul style="list-style-type: none"> 36 CA pts Outpatient oncology clinic United States 	<ul style="list-style-type: none"> 33% M 67% F 	No report	Average diagnosed w/CA 23 months	Average pain duration 17 months	Consistency 66%-80%	Pain intensity predicted by the use of more coping strategies ($\beta = 0.02$) and being unable to decrease the pain ($\beta = -0.62$) <ul style="list-style-type: none"> Analgesic score associated w/ decreased pain intensity
Greenwald 1991	To clarify the place of ethnicity in determining individual expression of pain	<ul style="list-style-type: none"> Descriptive study Population based tumor registry (purposive sampling) 	<ul style="list-style-type: none"> 536 CA pts CA research center in Seattle United States 	No report	Various race	CA (lung, pancreatic, prostate, and cervical) associated w/pain	—	No report	No report
Heim <i>et al.</i> 1993	To measure pain, depression, and anxiety in pts w/ prostate CA	<ul style="list-style-type: none"> Descriptive study Convenience sampling 	<ul style="list-style-type: none"> 47 pts w/prostate CA Outpatient clinic at the Repatriation General Hospital Australia 	<ul style="list-style-type: none"> 100% M Mean age 72 	No report	<ul style="list-style-type: none"> 87% w/non-mets 13% w/mets 	<ul style="list-style-type: none"> Average pain duration 13.5 months Pts (57%) reported no pain associated w/ CA 	No report	No report
Huang <i>et al.</i> 2003	To describe the prevalence, characteristics, and probable etiology of pain; the adequacy of pain management; and the degree to which pain interfered w/ daily activities	<ul style="list-style-type: none"> Prospective, longitudinal study Purposive sampling 	<ul style="list-style-type: none"> 40 pts w/nasopharyngeal carcinoma (NPC) Radiation oncology clinic, Hospital Taiwan 	<ul style="list-style-type: none"> 73% M 27% F Age 22-72 	No report	<ul style="list-style-type: none"> 75% stage IV 48% w/advanced nodule involvement 	Pts (52.5%) had pain before radiation therapy	<ul style="list-style-type: none"> Interrater reliability 92% for the cause of pain and 90% for the underlying pain mechanism 	Analgesic score associated w/ decreased pain intensity
Kremer <i>et al.</i> 1982	To examine the affective dimension of	<ul style="list-style-type: none"> Experiment I Experiment II 	<ul style="list-style-type: none"> 20 CA pts 	<ul style="list-style-type: none"> 50% M 50% F 	No report	Primary site: breast (F) and prostate (M)	Pain duration ≥ 3 mo	No report	<ul style="list-style-type: none"> Construct High and low score groups

	pain in pt whose pain was secondary to malignancy	<ul style="list-style-type: none"> • Random assignment 	<ul style="list-style-type: none"> • Oncology clinic and pain clinic, medical clinic • United States 						<ul style="list-style-type: none"> • Pts w/CA reported a reliably higher affective pain descriptors than those w/nonmalignant pain.
Macdonald et al. 2005	To investigate the long-term outcome in the 175 women who had PMP syndrome (PMPS)	<ul style="list-style-type: none"> • Cohort study • Secondary analysis 	<ul style="list-style-type: none"> • 113 pts • Grampian University Hospital • United Kingdom 	<ul style="list-style-type: none"> • 100% F • Mean age 49.5 • Age 30-69 	No report	No report	Pts (52%) had PMPS since 1996; 38% pain had resolved; 37% had PMPS on survey day (2002)	No report	Analgesics decreased pain intensity
McGuire 1984	<ul style="list-style-type: none"> • To assess the feasibility of using the MPQ in CA pts • To compare the results w/those of published studies 	<ul style="list-style-type: none"> • Descriptive study • Convenience sample 	<ul style="list-style-type: none"> • 24 CA pts • Oncology unit/general surgery unit • United States 	<ul style="list-style-type: none"> • 42% M • 58% F, • Age 31-71 	No report	<ul style="list-style-type: none"> • Primary sites: head and neck, lung, breast, and myeloma • 50% metastasis • Average 84 mo diagnosed w/CA • 7% diagnosed CA 	—	No report	Construct: PRI-T (NWC $r = 0.89$; $S = 0.87$; $As = 0.80$, $E = 0.53$; $M = 0.83$) NWC ($S = 0.80$; $As = 0.71$; $E = 0.43$; $M = 0.67$)
Melzack 1975	To indicate that the MPQ provides quantitative information	<ul style="list-style-type: none"> • Experimental study • Convenience sampling 	<ul style="list-style-type: none"> • 297 pts • 23 CA pts • Canada 	No report	No report	—	—	Stability test-retest 70.3%	<ul style="list-style-type: none"> • Construct $S = 0.94$; $As = 0.92$; $E = 0.93$; $M = 0.91$; $T = 0.95$; • NWC and PRI ($S = 0.97$; $R = 0.89$) • Correlation: PPI (NWC = 0.32; PRI (R): $S = 0.29$; $As = 0.42$; $E = 0.49$; $M = 0.18$; $T = 0.42$)
Nicholson et al. 1988	To describe and compare to other research findings the perception of and response to pain in head and neck CA outpts	<ul style="list-style-type: none"> • Descriptive study • Purposive sampling 	<ul style="list-style-type: none"> • 20 HNC • Tumor clinic • United States 	<ul style="list-style-type: none"> • 65% M • 35% F 	<ul style="list-style-type: none"> • 25% W • 65% B • 10% H 	<ul style="list-style-type: none"> • Common site: oropharynx and oral cavity • Major treatment: surgery and radiation therapy. 	—	No report	No report
Peintinger et al. 2003	<ul style="list-style-type: none"> • To evaluate QOL • To determine the impact of SLNB on global QOL • To compare morbidity 	<ul style="list-style-type: none"> • Prospective study • Purposive sampling 	<ul style="list-style-type: none"> • 56 breast CA pts • Austria 	<ul style="list-style-type: none"> • 100% F • Age 18-80 	No report	<ul style="list-style-type: none"> • Breast CA at stage I-II • 62% invasive ductal • 52% right axilla surgery 	—	No report	Analgesics decreased pain intensity

(Continued)

TABLE 1.
Continued

Author(s)/Year	Objective	Design/Method	Sample/Setting/Country	Gender/Age	Race/Ethnicity	Cancer Characteristic	Pain Characteristic	Reliability	Validity
Sist <i>et al.</i> 1998	<ul style="list-style-type: none"> To clarify the influence of depression on the use of sensory and affective MPQ pain descriptors. To determine if the relationships between depression and MPQ pain report 	<ul style="list-style-type: none"> Descriptive study. Convenience sampling 	<ul style="list-style-type: none"> 312 pts Pain clinic United States 	<ul style="list-style-type: none"> 51% M 49% F Age 15-90 	No report	<ul style="list-style-type: none"> 61% CA related to pain Most common tumor: lung, alimentary canal, urogenital, and digestive glands 	Pts (39%) had chronic, nonmalignant pain: musculoskeletal pain (nonCA condition)	No report	<ul style="list-style-type: none"> Construct (discriminant): BDI-PRIS ($r = 0.12$), PWCS ($r = 0.14$) Criterion (concurrent): BDI-PRIA ($r = 0.40$), PWCA ($r = 0.32$)
Stevens <i>et al.</i> 1995	To provide prevalence data on PMP in an outpts; describe the characteristics of pain associated w/ syndrome; identify its impact on the lives of women	<ul style="list-style-type: none"> Cross-sectional descriptive study Convenience sampling 	<ul style="list-style-type: none"> 95 breast CA w/ surgery 16 ambulatory care setting outpatients United States 	100% F	No report	<ul style="list-style-type: none"> Breast CA had surgery 	Pts (65%) reported CA not related to pain: 15% somatic, visceral pain, 20% PMP pain	No report	No report
Talmi <i>et al.</i> 1997	To investigate prospectively the incidence, severity, and duration of HNC pain	<ul style="list-style-type: none"> Prospective study Purposive sampling 	<ul style="list-style-type: none"> 62 terminal HNC Medical center, hospice, or hospital Israel 	<ul style="list-style-type: none"> 74% M 26% F Age 30-87 	No report	<ul style="list-style-type: none"> Primary site: 22 oral cavity; 16 larynx, 5 nasopharynx, 5 maxilla 13 local recurrence, 6 regional, 33 locoregional 45% distant mets 80% radiation, 66% surgery, 47% chemotherapy 	—	No report	Analgesics decreased pain intensity
Twycross <i>et al.</i> 1982	To clarify the pattern of pain in far-advanced CA	<ul style="list-style-type: none"> Retrospective study Convenience sampling 	<ul style="list-style-type: none"> 100 CA Doctors' clinic United Kingdoms 	<ul style="list-style-type: none"> 47% M 53% F Age 26-89 	No report	<ul style="list-style-type: none"> Most common primary sites: 15 breast, 15 colon-rectum, 14 bronchus, 7 prostate, 5 pancreas 	—	No report	No report
Wilkie <i>et al.</i> 2001	To explore differences in the words used to describe nociceptive and neuropathic pain	<ul style="list-style-type: none"> Descriptive design Secondary analysis Convenience sampling 	<ul style="list-style-type: none"> 123 lung CA pts United States 	<ul style="list-style-type: none"> 65% M 35% F Age 39-85 	<ul style="list-style-type: none"> 81% W 19% B 	<ul style="list-style-type: none"> 82% diagnosed within 1 y 75% stage I, 7% stage II, 35% stage III, 50% stage IV 	—	No report	<ul style="list-style-type: none"> Criterion (predictive): Ten descriptors predicted 78% of the sites

Wilkie et al. 1991	To examine relationships between selected pain and psychological variables and the use of pain coping strategies	<ul style="list-style-type: none"> • Cross-sectional, correlational study • Secondary analysis • Convenience sampling 	<ul style="list-style-type: none"> • 45 lung CA pts • Two Western states including large metropolitan area, mid-sized city, and small city • United States 	<ul style="list-style-type: none"> • 62% M • 38% F • Age 40-80 	71% W	<ul style="list-style-type: none"> • 41% local and regional • 45% distant • 15% nonmets • 89% radiation • 34% surgery • 45% chemotherapy • Average 16.4 mo diagnosed CA • 54% stage IV • 43% local or regional, • 36% distant, • 21% no mets 	pts reported pain was related to CA Average pain duration 15.2 months	Test-retest: PRI -S 0.82 PRI-A 0.31 PRI-E 0.60 PRI-M 0.47 PRI-T 0.71 NWC 0.62	<ul style="list-style-type: none"> • 81% sensitivity to nociceptive pain and 59% to neuropathic pain 	Relied on previous literature
Wilkie et al. 1992	<ul style="list-style-type: none"> • To identify pain behaviors • To examine relationships between behaviors and selected variables 	<ul style="list-style-type: none"> • Observational method • Convenience sampling 	<ul style="list-style-type: none"> • 45 lung CA pts • Two western states including large metropolitan area, mid-sized city, and small city • United States 	<ul style="list-style-type: none"> • 62% M • 38% F • Age 40-80 	71% W	<ul style="list-style-type: none"> • Lung CA diagnosed mean 8 mo • 43% local or regional, 36% distant, 21% no mets • 9% stage I, 12% stage II, 26% stage III, 54% stage IV • 96% treated w/ radiation, chemotherapy, or surgery 	—	Relied on previous literature	Relied on previous literature	
Wilkie et al. 1995	<ul style="list-style-type: none"> • To examine the feasibility of implementing a randomized clinical trial • To estimate the effect of Coaching on nurse's knowledge of pt's pain location, intensity, quality, and pattern 	<ul style="list-style-type: none"> • Randomized pretest/post-test clinical trial (pilot study) • Coaching intervention • Randomly assigned 	<ul style="list-style-type: none"> • 18 lung CA pts. • United States 	<ul style="list-style-type: none"> • 61% M • 39% F 	No report	<ul style="list-style-type: none"> • 17% radiation, • 44% chemotherapy • 6% combined both • 33% not receiving antitumor therapy 	Pain was associated w/ primary CA	Relied on previous literature	Relied on previous literature	
Zimmerman et al. 1989	To determine the effect of listening to relaxing music w/positive suggestion of pain reduction on self-reported pain in CA	<ul style="list-style-type: none"> • Experimental study • Convenience sampling 	<ul style="list-style-type: none"> • 40 CA pts • Acute care Midwestern hospital • United States 	<ul style="list-style-type: none"> • 40% M • 60% F • Age 34-79 	100% W	<ul style="list-style-type: none"> • Primary sites: 23 breast, 18 bone, 15 lung, 15 prostate. • 70% bone mets • 83% radiation • 75% chemotherapy • 68% surgery 	Pts (78%) had pain ≥6 mo	No report	Music decreased pain intensity	

(Continued)

TABLE 1.
Continued

Author(s)/Year	Objective	Design/Method	Sample/Setting/Country	Gender/Age	Race/Ethnicity	Cancer Characteristic	Pain Characteristic	Reliability	Validity
Zimmerman et al., 1996	To describe the relationships among the multidimensional components of pain, focusing on the affective, cognitive, and behavioral parameters	<ul style="list-style-type: none"> • Descriptive comparative, nonexperimental design • Convenience sampling 	<ul style="list-style-type: none"> • 60 CA pts. (w/ pain 30, w/o pain 30) • Midwestern university medical center hospital • United States 	<ul style="list-style-type: none"> • 55% M • 45% F • Aged 19-92 	No report	<ul style="list-style-type: none"> • 55% solid tumors • 45% leukemia • 40% lymphomas • 30% oral and gastrointestinal tract • Mets: 27% breast, 17% lung, 13% liver, 12% bone, 23% other 	No report	No report	No report

A = Affective; A = Asian; B = black; BDI = Beck Depression Inventory; CA = cancer; E = Evaluation; H = Hispanic; HNC = head and neck cancer; M = Miscellaneous; mets = metastasis/metastatic; MPQ = McGill Pain Questionnaire; NWC = number of words chosen; PMP = postmastectomy pain; PRI = pain rating index; pt = patient; QOL = quality of life; (R) = Rank; (S) = Scale; S = Sensory; SLNB = sentinel lymph node biopsy; T = Total; VAS = visual analog scale; W = white.

Huang, Wilkie, Chapman, et al., 2003; Nicholson, McGuire, & Maurer, 1988; Talmi et al., 1997), lung (Wilkie, Huang, Reilly, and Cain, 2001; Wilkie & Keefe, 1991; Wilkie, Keefe, Dodd, and Copp, 1992; Wilkie, Williams, Grevstad, & Mekwa, 1995), breast (Macdonald, Bruce, Scott, Smith, and Chambers, 2005; Peintinger, Reitsamer, Stranzl, and Ralph, 2003; Stevens, Dibble, & Miaskowski, 1995), and prostate (Heim & Oei, 1993). Participants across the studies were diagnosed with stage IV (41%-75%), stage III (14%-35%), stage II (4%-36%), and stage I (7%-17%) cancer. More than 50% of the participants reported that the main source of pain was bone metastasis (Beck, 1991; Berry, Wilkie, Huang, and Blumenstein, 1999; Coward & Wilkie, 2000; Greenwald, 1991; Sist, Florio, Miner, Lema, and Zevon, 1998; Stevens et al., 1995; Wilkie et al., 1995; Zimmerman et al., 1989). In general, the most frequent cancer treatments were radiotherapy, chemotherapy, surgery, and combinations of those treatments.

Pain Characteristics

The maximum range of time that participants had been living with cancer pain before participating in the study was >24 months (Epstein et al., 2009). Researchers reported pain related to cancer (Beck, 1991; Fischer et al., 2009; Heim & Oei, 1993; Wilkie & Keefe, 1991; Wilkie et al., 1995) or specified the categories of cancer pain, such as: somatic, visceral, neuropathic, and radiating pain (Burrows, Dibble, & Miaskowski, 1998; Stevens et al., 1995), nociceptive, neuropathic; and a mix of both nociceptive and neuropathic pain (Epstein et al., 2009; Huang, Wilkie, Chapman et al., 2003; Wilkie et al., 2001; Wilkie et al., 1992).

Pain Parameters Measured

Table 2 presents the pain measures and pain parameter findings. Researchers reported findings for all pain parameters; location (18 studies), intensity (29 studies), quality (27 studies), pattern (15 studies), and behavior (17 studies).

Pain Location. The maximum number of pain sites across the studies was 16 sites (Epstein et al., 2009). Participants (93%) reported their pain distribution was internal (Beck, 1991), external, or both internal and external (McGuire, 1984; Wilkie et al., 1992). Pain location was reported from the primary cancer pain site (Dobratz, 2001, 2008; Epstein & Stewart, 1993; Fischer et al., 2009; Greenwald, 1991; Peintinger et al., 2003; Talmi et al., 1997) and was consistent with the disease sites (McGuire, 1984) or the metastatic sites of the cancer (Talmi et al., 1997). Women reported more pain locations (mean 4, SD

1.4) than men (mean 3, SD 1.7), but their cancers were not the same (Coward & Wilkie, 2000). The number of pain sites was associated with coping self-statements ($r = 0.34$) (Wilkie & Keefe, 1991). When comparing 15 participants with breast and colon cancer, participants with breast cancer reported a total of 60 distinct anatomic pain sites, whereas participants with colon cancer reported 40 pain sites (Twycross & Fairfield, 1982).

Pain Intensity. Most participants reported that current pain intensity was discomforting (Graham, Bond, Gerkovich, & Cook, 1980; Heim & Oei, 1993; Nicholson et al., 1988) to distressing (McGuire, 1984). Mean intensity scores of pain caused by somatic etiologies was higher than pain caused by nerve and visceral etiologies (Burrows et al., 1998). Researchers combined the MPQ with other measures, such as the visual analog scale (VAS), numerically-anchored VAS, numerical pain intensity scale, and graphic rating scales.

When comparing cancer pain and other common pains (headache, toothache, and stomachache) and primary cancer site, participants with cancer pain had a lower mean score of worst pain intensity than worst ever toothache, but higher than worst ever headache and stomachache (Berry et al., 1999). Participants with head and neck cancer reported a higher mean score of pain intensity (mean 1.5, SD 1.0) than those with lung (mean 1.3, SD 1.0) and prostate (mean 1.0, SD 0.9) cancer (Fischer et al., 2009). For the worst pain intensity, participants with lung cancer reported higher mean scores (mean 3.4, SD 1.2) than those with head and neck (mean 3.0, SD 1.3) and prostate (mean 2.7, SD 1.3) cancer (Fischer et al., 2009). Participants with head and neck cancer had more intense pain (distressing) during and after the course of radiotherapy (Epstein & Stewart, 1993) whereas participants with nasopharyngeal carcinoma had the severest pain in the second week (Epstein et al., 2009) and the fifth week during the course of radiotherapy (Huang, Wilkie, Chapman et al., 2003). Participants with axillary lymph node dissection surgery reported higher pain intensity than those with sentinel lymph node biopsy (Peintinger et al., 2003). After the operation, participants with breast cancer surgery still reported pain intensity from 1 day to 1 week (Stevens et al., 1995) and up to 9 years (Macdonald et al., 2005). Two intervention studies (Beck, 1991; Zimmerman et al., 1989) showed that music affects pain intensity but not mood.

Pain Quality. Participants with neuropathic pain reported higher mean scores on the PRI-S, PRI-M, PRI-T, and NWC than those with visceral and somatic pain, whereas participants with visceral pain reported higher mean scores on the PRI-A and PRI-E than those with neuropathic and somatic pain (Burrows et al.,

1998). Participants with mixed both nociceptive/neuropathic pain had higher mean scores on all PRI and NWC subscales than those with neuropathic pain and with nociceptive pain (Wilkie et al., 2001). Participants with lung cancer had higher mean scores for the PRI and NWC than those with head and neck and prostate cancer (Fischer et al., 2009). Men reported higher mean scores on all PRI and NWC subscales than women (Coward & Wilkie, 2000). With visual comparison of the normative mean scores (NMS) in cancer (Wilkie et al., 1990), the mean scores of all pain quality of those studies were higher than the NMS in four studies (Graham et al., 1980; McGuire, 1984; Melzack, 1975; Zimmerman et al., 1996), but lower than the NMS in 11 studies (Berry et al., 1999; Burrows et al., 1998; Coward & Wilkie, 2000; Dobratz, 2001; Epstein et al., 2009; Fischer et al., 2009; Nicholson et al., 1988; Wilkie et al., 2001; Wilkie & Keefe, 1991; Wilkie et al., 1992; Zimmerman et al., 1989).

Investigators in ten studies reported that the pain quality affective scores were primarily used to study psychologic factors (depression, trait anxiety, and state anxiety) associated with pain (Ahles et al., 1983; Beck, 1991; Burrows et al., 1998; Fischer et al., 2009; Greenwald, 1991; Kremer, Atkinson, & Igelzi, 1982; Sist et al., 1998; Wilkie & Keefe, 1991; Zimmerman et al., 1989; Zimmerman et al., 1996). Participants with depression reported higher PRI-A scores and selected more affective descriptors than those without depression (Sist et al., 1998). At a statistically significant level ($p < .05$), participants with lung cancer had higher mean scores on all PRI and NWC subscales than those with head and neck and prostate cancer (Fischer et al., 2009). Similarly, all PRI scores of pain quality among participants with lung cancer were correlated ($r = 0.43-0.50$) with the catastrophizing subscale of the pain Coping Strategies Questionnaire (Wilkie & Keefe, 1991). In two studies (Beck, 1991; Zimmerman et al., 1989), investigators reported that using music therapy decreased all PRI scores. Pain quality descriptors predicted pain types (Wilkie et al., 2001), and catastrophizing was significantly associated with the evaluative pain quality of the MPQ ($r = 0.44$) (Wilkie & Keefe, 1991).

Pain Pattern. The frequency of pain patterns was reported in 12 studies (Beck, 1991; Coward & Wilkie, 2000; Epstein & Stewart, 1993; Epstein et al., 2009; Fischer et al., 2009; Huang, Wilkie, Chapman et al., 2003; McGuire, 1984; Nicholson et al., 1988; Twycross & Fairfield, 1982; Wilkie et al., 2001; Wilkie & Keefe, 1991; Wilkie et al., 1992). Investigators of only one study reported the pain pattern mean score, which could range from 0 to 6: as 2.9 ± 1.4 (median

TABLE 2.
Authors/Year, Measures, and Findings by Pain Parameters Reported in 30 Research Studies

Author(s) Year	Measures	Findings				
		Location	Intensity	Quality	Pattern	Behavior
Ahles <i>et al.</i> 1983	MPQ VAS BDI STAI SCL-90	Pts (30%) had multiple sites	Pts (61%) stated that they were afraid that their pain related to deteriorating condition	Pts w/pain reported elevated scores on measure of depression and anxiety	Pts (75%) reported constant pain	<ul style="list-style-type: none"> Pain pts spent significantly less time engaged in activities than nonpain group Medication intake was significantly correlated w/all three components of pain, sensory, affective, and evaluative Activity level was negatively correlated w/affective and evaluative
Beck 1991	MPQ VAS	Pts (74%) reported ≥ 3 sites of pain; number of pain sites ranged from 1-5 sites (mean = 3); 93% of pts selected "internal"	<ul style="list-style-type: none"> At baseline, pts reported pain intensity was less than that reported in previous studies Overall treatment phase (music) effect for pain but not for mood 	—	Two-thirds of pts reported constant pain, one-third reported periodic pain	<ul style="list-style-type: none"> Pts were on scheduled medication, 47% were taking methadone, two-thirds of pts identified using ≥ 1 type of nonpharmacologic intervention
Berry <i>et al.</i> 1999	MPQ VAS	Mean number of pain sites was 3.6 ± 2.3 , range 0-13.	<ul style="list-style-type: none"> Pts reported mild or discomforting pain. The mean of VAS intensity score was 18.6 ± 21 PPI score of worst toothache was higher than worst CA, headache, and stomachache 	PRI mean scores were PRI-S (12.2 ± 7.2), PRI-A (2.2 ± 2.5), PRI-E (2.0 ± 1.6), PRI-M (3.4 ± 3.3), PRI-T (19.7 ± 12.5), NWC (8.0 ± 4.5). PRI mean score and NWC were lower than the Normative Mean Score (NMS) in CA	—	22% step 1 nonopioids or adjuvants, 45% step 2 opioid analgesics, 21% step 3 opioid analgesics
Burrows <i>et al.</i> 1998	MPQ CPQ MQOLS-CA2 POM	—	Pts w/somatic pain had higher mean score of pain intensity than neuropathic and visceral pain	PRI mean scores were PRI-S (10.9 ± 7.4), PRI-A (2.1 ± 2.3), PRI-E (1.9 ± 1.5), PRI-M (2.7 ± 2.9), PRI-T (17.6 ± 11.8), NWC (7.5 ± 4.4). PRI-S, -M, -T, and NWC mean score in pts w/neuropathic pain were higher than pts w/visceral and somatic pain; the PRI-A, -E in pts w/visceral pain were higher than neuropathic and somatic pain. pts w/somatic pain had higher mean score of mood disturbance than visceral, neuropathic, and pain free	—	—
Coward <i>et al.</i> 2000	MPQ VAS	Mean number of pain site was 4 in women and 3 in men	PPI of pain intensity of women and men were mild (44%, 40%)	PRI mean scores of women were PRI-S (11.8 ± 8.3), PRI-A (1.9 ± 2.5), PRI-E (0.9 ± 1.4), PRI-M (3.9 ± 4.3), PRI-T	Women had combination of all three pain pattern, whereas men had mostly intermittent pain pattern	Pain interfered w/work, social activities, and relationship.

Dobratz 2008	MPQ	—	—	(18.4 ± 15.8), NWC (7.0 ± 5.4). PRI mean scores of men were PRI-S (12.8 ± 7.3), PRI-A (2.7 ± 2.3), PRI-E (2.2 ± 1.6), PRI-M (4.1 ± 3.2), PRI-T (21.8 ± 11.9), NWC (8.8 ± 4.7).	—	—
				Pts w/different CA sites and pain type selected different words; pts w/ lung CA selected descriptors described both NC and NU; pts w/ colon and liver selected words described 2 types of nociceptive (visceral, somatic) pain; pts w/ prostate CA noted somatic pain		
Dobratz 2001	MPQ	—	PPI mean score was 1.66	<ul style="list-style-type: none"> • Pts w/CA selected tiring and exhausting (11.5%, affective), troublesome and annoying (8.8%, evaluation), dull and aching (7.7%, sensory), nauseating and sickening (6.8%, miscellaneous) • Affective and miscellaneous are better descriptors in pts w/the end stage CA 	—	—
Epstein et al. 2009	MPQ	Mean number of pain sites was 2.1 ± 2.2; ranged from 0 to 16	PPI was highest at 2-weeks follow-up and declining toward the end of treatment. Worst pain was 3.0 ± 1.3	<ul style="list-style-type: none"> • PRI mean scores were PRI-S (9.1 ± 7.3), PRI-A (1.0 ± 1.7), PRI-E (1.2 ± 1.5), PRI-M (2.1 ± 2.9), PRI-T (13.5 ± 11.3) • The most common of NU descriptors chosen were aching (20%), burning (27%); NC descriptors dull (22%), sore (32%), tender (35%), throbbing (23%); affective: tiring (25%) and evaluative: annoying (41%) 	Pts reported continuous (33%), intermittent (15%), transient (2%), and combined all three pain patterns (44%)	10.5% were taking step 1 analgesics, 21% adjuvants, 8.1% step 2 opioids, and 20.2% step 3 opioids and combination of analgesics and adjuvants
Epstein et al. 1993	MPQ VAS	Pts described the pain location involving the oral cavity (55%), head (29%), and both (6%)	VAS of pain intensity at pretreatment was 23, mid 38, and post 45	—	<ul style="list-style-type: none"> • At baseline, pts reported continuous (32%), intermittent (43%), transient (25%) pain patterns • Pts presented the majority of pain pattern as intermittent pain at pretreatment (35%) and midtreatment (41%), then continuous pain at mid (44%) and post-treatment (56%) 	Some pts used 2 nonnarcotics, 11 narcotic-nonnarcotic, and 2 oral narcotic analgesics

(Continued)

TABLE 2.
Continued

Author(s) Year	Measures	Findings				
		Location	Intensity	Quality	Pattern	Behavior
Fischer et al. 2009	MPQ STAI CES-D CSQ	Pain location was located in primary CA sites: lung, head/neck, C, A, and prostate	<ul style="list-style-type: none"> • Present pain intensity mean score was greatest in pts w/HNC (1.5 ± 1.0), LC (1.3 ± 1.0) and PC (1.0 ± 0.9) • Worst pain intensity mean score, pts w/lung CA reported higher scores (3.4 ± 1.2) than those w/head and neck (3.0 ± 1.3) and prostate CA (2.7 ± 1.3) • Ability to decrease pain was predicted by pain intensity • Pain intensity was predicted by coping strategies. NWC was predicted by gender, other PRI scores were not 	<ul style="list-style-type: none"> • PRI mean score of lung CA were PRI-S (10.4 ± 7.8), PRI-A (1.5 ± 2.1), PRI-E (1.6 ± 1.7), PRI-M (2.7 ± 2.9), PRI-T (16.1 ± 12.4). • PRI mean score of HNC were PRI-S (8.7 ± 6.9), PRI-A (0.9 ± 1.6), PRI-E (1.2 ± 1.4), PRI-M (1.9 ± 2.7), PRI-T (12.6 ± 10.5) • PRI mean score of prostate CA were PRI-S (7.7 ± 6.6), PRI-A (0.8 ± 1.7), PRI-E (1.2 ± 1.4), PRI-M (2.2 ± 3.2), PRI-T (11.8 ± 11) • Pain quality was significantly greater in lung compared to HNC and prostate • Pain quality ratings were partially predicted by having lung • Depression levels were significantly greater for pt w/lung • Catastrophizing was correlated w/high level w/depression and anxiety • The ability to control pain were reinterpreting (HNC), praying/hoping (LC). • NWC, PRI-T, pain intensity was predicted by coping strategies. NWC was predicted by gender 	<ul style="list-style-type: none"> • Pain pattern (range 0-6) mean score was 2.9 ± 1.4 (median = 3.0) • Pts w/lung CA reported continuous (50%), intermittent (67%), transient (39%) pain pattern • Pts w/HNC reported continuous (58%), intermittent (61%), transient (32%) pain pattern • Pts w/prostate CA reported continuous (38%), intermittent (71%), transient (37%) pain pattern 	Most pts (70%-86%) received adequate analgesics
Graham et al. 1980	MPQ	Pain location was in area of primary CA	PPI mean score was 2.0 ± 1.0	Pain intensity was correlated w/affective ($r = 0.40$) and evaluative ($r = 0.36$). Approximately, one-third of pts selected 5 of 7 words (shooting, sharp, gnawing, burning, heavy,	Only three MPQ pain patterns did not fit pts' pain experiences	—

Greenwald 1991	MPQ GRS	—	Pts w/cervix CA reported significantly worst pain in past day, week, and 2 mo	<ul style="list-style-type: none"> • Sensory score was significant in cervix site, sex, and age • Affective scores varied among ethnicities (England, Germany, Scandinavia, Italy) and stage of disease; all four countries had a lower affective score than Ireland, France, Eastern Europe, and Jewish 	—	—
Heim et al. 1993	MPQ VAS NRS BDI STAI	—	PPI of pain intensity as mild or discomforting (28%) while only 15% chose distressing, horrible, or excruciating. The average intensity pain on NRS was 18.3 ± 11.05 .	Pts w/prostate CA pain were significantly more depressed and anxious the than pts w/o pain	—	Pts w/prostate CA pain took more prescribed analgesic (48%)
Huang et al. 2003	MPQ BPI	Pts reported the most common pain sites were head and face as treatment progressed pain sites were mouth and throat; maximum 7 pain sites	Pre-RT, pts reported worst pain intensity was 2, and pain intensity scores escalated and peaked at wk 5	Before RT, pts reported pain quality: stabbing, gnawing, splitting, cramping, sickening, or fearful. During RT, pain quality words were tight, stabbing, splitting, and hot-burning	Pre-RT, pain pattern was intermittent (20%), brief (18%), continuous (15%), then pain pattern changed to continuous pain at wk 2 (23%), wk 3 (35%), wk 6 (46%)	<ul style="list-style-type: none"> • Pre-RT, pts were prescribed nonopioid step 1 analgesic. During RT, more pts were prescribed stronger analgesic, and only one at wk 5 needed opioid step 3 • Pain increasingly interfered w/chewing, swallowing, drinking, and talking.
Kremer et al. 1982	MPQ BSI SIP NPS	—	<ul style="list-style-type: none"> • Pts w/CA reported high pain intensity had reliably greater quality dimension (S, A, E) scores than pts w/nonmalignant and low pain intensity. • Gender showed significant main effect for numeric pain intensity 	<ul style="list-style-type: none"> • Pts w/CA pain reported a reliably higher affective loading to their pain • Men somatized to a significantly greater extent than women; women were reliably more depressed than men (BSI). Gender showed significant main effect for NWC, PRI-T, PRI-S 	—	—

(Continued)

TABLE 2.
Continued

Author(s) Year	Measures	Findings				
		Location	Intensity	Quality	Pattern	Behavior
Macdonald et al. 2005	MPQ SF-36	—	The pain intensity improved by sitting (n = 9), and for some women lying down (n = 11)	<ul style="list-style-type: none"> • NWC was significantly lower in 2002 compared to 1996 • Sensory descriptors were chosen more frequently than affective, evaluative or miscellaneous terms • Most frequent words were stabbing, shooting, aching, gnawing, nagging, annoying, numb, tiring, and tight 	—	<ul style="list-style-type: none"> • Sleep was unaffected for most women (n = 30), but others reported sleep was interrupted 1-2 night per wk (n = 11), or for >3 nights per wk (n = 10) • Pain was predominantly aggravated by straining (n = 42), lying down (n = 11), cold weather (n = 8), clothes rubbing against the scar (n = 8), and getting out of bed (n = 8) • Activities such as lifting, carrying, and general housework caused problems. Stretch movements were described as exacerbating the pain • Some women used conventional analgesia; others used nonpharmaceutical treatments or a combination of therapies, such as physiotherapy, homeopathy, reflexology, reiki, acupuncture, massage, and counseling
McGuire 1984	MPQ	Pts (74%) indicated internal pain, 9% external pain, and 17% both	PPI mean score was 2.7 ± 1.3 . Sample had mean PPI score higher than Graham's and Melzack's studies.	Mean scores: PRI-S (17.3 ± 8.2), PRI-A (6.4 ± 3.8), PRI-E (3.4 ± 1.6), PRI-M (6.6 ± 4.0), PRI-T (33.4 ± 14.4), NWC (12.4 ± 4.0). S descriptors were stabbing, heavy, shooting, tender, exhausting, sickening, terrify, tiring (A), intense, unbearable (E), torturing. And tight (M); sample had mean pain quality scores higher than Graham's and Melzack's studies	Pts (87%) reported continuous pain pattern; some were intermittent and transient	Things decreasing pain were analgesics, lying down, position affected part, consuming food or drink and other whereas things increased pain were moving, eating or swallowing, getting cold, and other
Melzack 1975	MPQ	—	Mean score of PPI was 2.8 ± 1.2	Pts w/CA showed highest PRI-S and PRI-E scores;	—	—

Nicholson et al. 1988	MPQ	Pts reported sites were oropharynx (35%), oral cavity (30%), larynx (20%), and others (15%)	Mean PPI score was 1.9 ± 1.1	<p>mean scores: PRI-S (17.3 ± 6.6), PRI-A (2.3 ± 2.1), PRI-E (4.1 ± 1.2), PRI-M (2.3 ± 5), PRI-T (26 ± 10), NWC (8.8 ± 3.2); PRI, NWC, and PPI were correlated</p> <ul style="list-style-type: none"> • Mean scores: PRI-S (11.1 ± 6.8), PRI-A (2.4 ± 2.9), PRI-E (2.1 ± 1.2), PRI-M (2.9 ± 2.6), PRI-T (18.5 ± 13.5), NWC (8.8 ± 3.2) • Pts selected words in all dimensions: sharp, miserable (60%), tender (50%), itchy, aching, and throbbing (40%) 	55% selected intermittent, 45% continuous, 25% transient; 25% identified more than one pain pattern	Activities increasing pain were eating, drinking, chewing, and swallowing; and things relieving pain were analgesics
Peintinger et al. 2003	MPQ VAS EORTC QLQ-C30, BR23 KPS	—	Pts w/breast CA w/axillary lymph node dissection had more severe pain intensity (VAS) than pts w/sentinel lymph node biopsy at 1 week after discharge	Pts showed significantly more sensory pain problems at 9-12 mo after surgery (MPQ and VAS) in pts w/dissection than those w/biopsy	—	—
Sist et al. 1998	MPQ BDI NAVAS	—	Pts w/and w/o CA did not report different MPQ intensity scores	<ul style="list-style-type: none"> • No significant differences in the percentage of affective and sensory pain descriptors chosen by these pts • Depressed pts w/pain scored higher on the affective score than pts not-depressed • No differences in the sensory pain index or the percentage of sensory pain descriptors based on depression • Pts w/and w/o CA did not report different affective or sensory scores 	—	—
Stevens et al. 1995	MPQ	Pain was localized to more than one pain area	Pts (52%) reported mild to moderate pain intensity; 48% reported severe to excruciating pain	Pts chose words like shooting, sharp, stabbing, pinching, piercing, aching, burning, hot, searing, pulling, tight, tenderness, numbness, tingling, stinging, and itching	Pts (52%) reported intermittent pain, 48% reported continuous pain	All cases reported pain was exacerbated by movement of the affected areas
Talmi et al. 1997	MPQ VAS	Pain was in these distributions: 21% local recurrence, 10% regional, and 53% locoregional disease	<ul style="list-style-type: none"> • Mean score was 4.7 ± 2.0 at first evaluation, then 72 hours later was 1.9 ± 1.1 • Mild discomfort was experienced by 16% of pts 	Burning sensations were experienced by 16% of pts	—	—

(Continued)

TABLE 2.
Continued

Author(s) Year	Measures	Findings				
		Location	Intensity	Quality	Pattern	Behavior
Twycross et al. 1982	MPQ	<ul style="list-style-type: none"> • Pts reported 1-8 pain sites • Number of pains experienced differed w/different primary sites 	77% of 73 pts reported pain was severe, very severe or excruciating, 7% reported pain was excruciating	—	Both constant and intermittent pain patterns were caused from musculoskeletal, postoperative, CA (bone, visceral, abdominal mass)	Pts (51%) had good night, 15% fair, 34% bad nights; 70% had limitation of activities
Wilkie et al. 2001	MPQ	Ten words correctly predicted 78% of the site w/81% sensitive to NC and 59% sensitive to NU	PPI was reported as discomforting (33%) in pts w/lung CA	Mean scores: PRI-S (12 ± 7), PRI-A (2 ± 2), PRI-E (2 ± 2), PRI-M (3 ± 3), PRI-T (19 ± 12), NWC (8 ± 4); mean scores of all pain quality (PRI-S, -A, -E, -M, -T, and NWC) in patient w/mixed NC/NU higher than those w/NU or NC respectively; 75% were classified as NC, 25% were as NU. NC was lacerating, stinging, heavy, and suffocating. NU were throbbing, aching, numb, tender, punishing, pulling, tugging, pricking, penetrating, miserable, and nagging; six words (burning, shooting, flashing, tingling, itching, and cold) previously associated w/NU did not distinguish between NC and NU	Pts reported continuous (54%), intermittent (41%), transient (5%) pain pattern	—
Wilkie et al. 1991	MPQ VAS STAI CSQ	Number of pain sites was correlated w/coping self-statement ($r = 0.34$).	Pain intensity (VAS) was correlated w/castrophizing ($r = 0.46$).	<ul style="list-style-type: none"> • Mean scores: PRI-S (13.7 ± 7.4), PRI-A (2.5 ± 2.5), PRI-E (2.2 ± 1.7), PRI-M (3.9 ± 3.6), PRI-T (22.2 ± 12.9), NWC (8.9 ± 4.6) • Pts w/lung (42%) did not tell about their pain to others, 40% indicated that they told others • Preferences for not telling others were associated w/more frequent pain coping attempts for all CSQ subscales 	—	Pain intensity (VAS) was correlated w/ability to control pain ($r = -0.45$), and ability to decrease pain ($r = -0.56$)

Wilkie et al. 1992	MPQ VAS	<ul style="list-style-type: none"> • Pts (67%) had internal pain site and 33% had both internal and external • Most pts reported multiple pain sites (1-9 sites, mean 4, SD 1.9) 	Pain intensity mean score (VAS) = 25.5, SD 28.3	<ul style="list-style-type: none"> • State anxiety demonstrated positive correlation w/catastrophizing coping strategies ($r = 0.48$), and negative correlation w/ability to control ($r = -0.50$), and decrease pain ($r = -0.50$) • Most pain quality scores showed moderate-strong correlation ($r = 0.40-0.44$) w/total coping score 	Mean scores: PRI-S (13.7 ± 7.4), PRI-A (2.5 ± 2.5), PRI-E (2.2 ± 1.7), PRI-M (3.9 ± 3.6), PRI-T (22.2 ± 12.9), NWC (8.9 ± 4.6)	Pts reported continuous (53%), intermittent (40%), transient (7%) pain pattern	<ul style="list-style-type: none"> • Pts reported that pain was controlled by 42 behaviors; the number of different pain reduction behaviors was correlated w/pain intensity ($r = 0.44$) and pain quality ($r = 0.64$) • Length of time pain experienced, number of pain sites, pain quality, and pain intensity accounted for 41% of variance in the number of pain control behaviors • None of taped behaviors was reported as pain expression and few as pain prevention
Wilkie et al. 1995	MPQ	Coaching improved agreement between pts self-report and nurse assessment of location	Coaching improved agreement between pts self-report and nurse assessment of intensity	Coaching improved agreement between pts self-report and nurse assessment of quality	Coaching improved agreement between pts self-report and nurse assessment of pattern	—	—
Zimmerman et al. 1989	MPQ VAS	—	Mean PPI score was 1.6. pts who received music w/ positive suggestion of pain reduction had significantly lower scores on the MPQ as compared who those did not	<ul style="list-style-type: none"> • Mean scores: PRI-S (12.8), PRI-A (3.2), PRI-E (2.1), PRI-M (4.8), PRI-T (22.6), NWC (9.9) • Statistically significant lower scores in music group than control group for each of the MPQ pain indices (S, A, E, M, T NWC) except for PPI • Significant interaction between the two groups by time on scores from the VAS and affective component of the MPQ • Follow-up of the simple main effect indicated significance for the music group 	—	—	—

(Continued)

TABLE 2.
Continued

Author(s) Year	Measures	Findings				
		Location	Intensity	Quality	Pattern	Behavior
Zimmerman et al. 1996	MPQ BSI VAS	—	Mean VAS score were in the mild to moderate range (3.05 ± 1.56)	<ul style="list-style-type: none"> • Mean scores: PRI-S (15.4 ± 7.2), PRI-A (3.1 ± 3.3), PRI-E (2.2 ± 1.2), PRI-M (30.5 ± 15.6), PRI-T (25.1 ± 13.5) • Pts reported pain descriptors such as tender, throbbing, pressing, sore, aching, hurting, cramping, sharp, boring, stabbing, tugging, dull (S), annoying, tiring, cruel (A), miserable (E), troublesome, nagging, nauseating (M) • Statistically significant relationships were found between all psychological variables in pts w/ pain 	—	Pts perceived that pain associated w/the greater interference w/sleep (5.4 ± 3.0), activities (5.5 ± 2.8), enjoyment of life (5.5 ± 3.0), and belief that CA was worsening (7.2 ± 3.2).

LC = lung cancer; PC = prostate cancer; PPI = present pain intensity; CSQ = Coping Strategies Questionnaire; STAI = State-Trait Anxiety Inventory; SCL-90 = Symptom Checklist—90; GRS = graphic rating scales; BSI = Brief Symptom Inventory; CPQ = Cancer Pain Questionnaire; MQOLS-CA2 = Multidimensional Quality of Life Scales—Cancer 2; POMS = short form of the Profile of Mood States; NAVAS = numerically-anchored visual analog scale; EORTC QLQ-C30 = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire—Cancer version 3; EORTC QLQ-BR23 = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire—Breast Cancer version 23; KPS = Karnofsky Performance Status Scale; NU = neuropathic pain; NC = nociceptive pain; RT = radiation therapy.

3.0) (Fischer et al., 2009). Participants with an intermittent pain pattern had mild to moderate pain intensity, whereas participants with a continuous pain pattern had severe to excruciating pain intensity. In addition, participants with an intermittent pain pattern reported fewer pain locations, lower quality, and fewer behaviors than those with a continuous pain pattern (Stevens et al., 1995). In three studies, a larger proportion of participants had continuous pain than other patterns (McGuire, 1984; Wilkie et al., 2001; Wilkie et al., 1992). Intermittent pain patterns were more reported by participants with head and neck (Nicholson et al., 1988), lung, and prostate (Fischer et al., 2009) cancer than other patterns. Participants selected more than one word to describe their pain patterns (Coward & Wilkie, 2000; McGuire, 1984; Nicholson et al., 1988).

Pain Behavior. Taking analgesic drugs was the most common behavior to alleviate pain (Beck, 1991; McGuire, 1984; Melzack, 1975; Nicholson et al., 1988; Stevens et al., 1995; Wilkie et al., 1992), and movement was the most common behavior to aggravate pain (Ahles et al., 1983; McGuire, 1984; Nicholson et al., 1988; Stevens et al., 1995; Twycross & Fairfield, 1982; Wilkie et al., 1992). Participants with continuous pain patterns reported that movement, fatigue, and emotion increased pain intensity whereas only movement increased pain intensity for participants with intermittent pain pattern (Stevens et al., 1995). Medication intake was significantly correlated with all three components of pain (sensory, affective, and evaluative). Activity level was negatively correlated with affective and evaluative scores (Ahles et al., 1983). In one study, investigators developed a video observational method in participants with lung cancer and found that 42 behaviors controlled pain (Wilkie et al., 1992) and that these behaviors differed from the pain-related behaviors reported as MPQ pain alleviation behaviors. For example, pain control behaviors included repositioning, passive and active pressure manipulation, guarding, bracing, and immobilization.

Validity and Reliability

Investigators reported either the validity (16 studies) or reliability (four studies) of the MPQ. In only one study (Twycross & Fairfield, 1982) investigators did not report either validity and reliability.

Validity. Four groups of investigators reported the construct validity (Kremer et al., 1982; McGuire, 1984; Melzack, 1975; Sist et al., 1998). Five studies supported the strength of the content validity by a theoretical framework (Wilkie et al., 1992), conceptual framework (Beck, 1991), and theoretical definition

(Coward & Wilkie, 2000; Dobratz, 2008; Macdonald et al., 2005). Five investigative groups reported criterion validity (Ahles et al., 1983; Beck, 1991; Fischer et al., 2009; Sist et al., 1998; Wilkie et al., 2001).

Reliability. The reliability of the MPQ was reported as a test-retest reliability of 0.70 (Melzack, 1975), and the effects of four repeated measures in a cancer population supported the reliability (66%-80.4%) of the MPQ (Graham et al., 1980). Test-retest reliability was presented over an interval of 3 days for pain intensity ($r = 0.57$) and all PRI scores of pain quality ($r = 0.31-0.82$) (Wilkie & Keefe, 1991). In two studies, investigators reported the interrater reliability for agreement of coders: agreement for the cause of pain (85%-92%) (Huang, Wilkie, Chapman et al., 2003; Wilkie et al., 2001) and pain mechanism (90%) (Huang, Wilkie, Chapman et al., 2003).

Sensitivity. Investigators reported the sensitivity to the effect of the intervention (Beck, 1991; Zimmerman et al., 1989) and found that music therapy decreased pain intensity. Six studies reported the sensitivity to the effect of the treatment (Epstein & Stewart, 1993; Epstein et al., 2009; Huang, Wilkie, Chapman et al., 2003; Macdonald et al., 2005; Peintinger et al., 2003; Talmi et al., 1997).

Usability Issue

Two sets of investigators reported issues related to participants' ability to use the MPQ (McGuire, 1984; Talmi et al., 1997). McGuire (1984) reported that hospitalized participants with cancer took ~24 minutes to complete the paper version of the MPQ (range 12-45 minutes). Also participants (number not reported) with cancer felt that it was difficult to describe their pain appropriately by selecting from 78 pain adjective descriptors. Talmi et al. (1997) found that seven out of 62 participants were not able to complete the MPQ. In neither study did investigators report reasons why the participants had difficulty or were not able to complete the MPQ. Recently, the MPQ has been developed as a computerized version (Painreportit) that participants ($n = 213$) completed within an average 16 (SD 6.7) minutes (Wilkie et al., 2003).

DISCUSSION

These integrative review findings provide a portrait of the MPQ as a multidimensional measure of pain in people with cancer. Across the 30 studies were participants with cancer who typically had three pain sites and discomforting pain intensity. Of 78 pain descriptors, participants with cancer selected descriptors representative of all three dimensions (sensory, affective, and cognitive). Participants' reports of pain patterns

were inconsistent, depending on differences in cancer type and treatments. Taking analgesic drugs was the main method to alleviate participants' pain, whereas participants' movement that affected the disease area was the key cause of aggravating their pain.

The sensory pain dimension was the most frequently reported pain dimension in all of the studies. Pain location based on an anatomic distinction was related to the primary source (cancer diagnosis) and secondary sources of pain, including metastases, surgical location, complications of chemotherapy and/or radiotherapy, and referred pain. Mostly, participants with cancer indicated more than one pain site that was usually an internal site, which means that the pain occurred from deep somatic, visceral, or neuronal tissue damage rather than an external pain caused by superficial tissue damage. Pain location of the MPQ was validated in participants with cancer (McGuire, 1984). Therefore, monitoring body outline may be useful in clinical practice, because it provides an empirical documentation of pain location for the medical record and, with repeated measures, reflects the progression of the spatial distribution of the pain.

Participants with cancer overall evaluate cancer pain as moderate pain, compared with reports of intense pain when subjects had indicators of nervous tissue damage (neuropathic pain) (Wilkie et al., 2001), during radiotherapy treatment, or after the course of radiotherapy (Epstein & Stewart, 1993; Huang, Wilkie, Chapman, et al., 2003). And participants' pain pattern varied when they were receiving radiotherapy (Epstein & Stewart, 1993; Huang, Wilkie, Chapman, et al., 2003). However, because pain is a dynamic sensation that changes over time, frequent pain measurement provides clinicians with accurate pain information (Jensen & McFarland, 1993) to determine and provide the pain medications for pain control.

It was noted that the emotional status of participants was associated with sensory pain when investigators combined the MPQ and other instruments (VAS and other intensity scales, Coping Strategies Questionnaire, State-Trait Anxiety Inventory, and Center for Epidemiologic Studies Depression Scale). Participants with cancer who were depressed reported higher pain intensity (Kremer et al., 1982) than those who were not depressed (Sist et al., 1998). Interestingly, it was noted in the present review that coping strategies were associated with pain intensity and quality as measured by the MPQ (Wilkie & Keefe, 1991), but only the catastrophizing subscale score from the Coping Strategies Questionnaire was correlated with other psychologic factors, including depression level and state and trait anxieties (Fischer et al., 2009). Focusing on decreasing catastrophizing could be an im-

portant factor to decrease participants' pain, which is a hypothesis that deserves additional research. The combination of the MPQ with other tools provides additional validity and important clinical information about participants with cancer and pain who also are affected by physiologic and psychologic conditions.

Pain-related behavior is associated with pain location in a weight-bearing structure, such as shoulders, arms, and legs, and is exacerbated by movement (Ahles & Martin, 1992). For example, participants with head and neck cancer aggravated their pain when eating, drinking, and swallowing (Huang, Wilkie, Chapman et al., 2003; Nicholson et al., 1988). Taking pain medication was the most common means of alleviating participants' pain. Therefore, providing pain medication before a patient's activity can help him or her to maintain pain relief. Observation of pain behaviors by videotaping (Wilkie et al., 1992) may be an effective method for clinicians to record participants' pain control behaviors, because it provides additional information not obtained with the MPQ.

These results support the MPQ as a valid, reliable, and sensitive multidimensional measure to measure pain in people with cancer. Because cancer pain is a dynamic phenomenon, the reliability of pain measures is typically less strong in measuring pain over time than when measures are in close proximity. As a result, the validity of pain measures becomes more crucial (Jensen, Karoly, O'Riordan, Bland, & Burns, 1989). Up to now, pain measurement has tended to recognize sensitivity to treatment effect and the assessment of treatment outcomes (Caraceni, 2001). The present results also support that the MPQ detects changes induced by the treatments and interventions and changes associated with pain outcome predictors. Interestingly, the review findings documented that pain was less in the more recent studies (1999-2009) than in studies from the 1980s and early 1990s. Whether this finding is an artifact of investigators' inability to recruit participants with more pain or an indication of improvements in cancer pain management requires additional study. Given the extensive focus on educating health professionals about cancer pain management, the finding may be an outcome of the World Health Organization's (1996) efforts and those of other professional organizations (Mercadante, 2007).

Strengths and Weaknesses of the MPQ for Cancer Pain

There are four strengths of the MPQ. First, the MPQ is a measure of the multiple components (sensory, affective, cognitive, behavioral) of cancer pain (Ahles et al., 1983; Melzack, 1975), including the nociceptive and neuropathic components of the sensory pain

dimension (Wilkie et al., 2001). Second, it allows investigators to collect both quantitative and qualitative data for analysis. Third, the MPQ has good construct, content, and criterion validity (Ahles et al., 1983; Fischer et al., 2009; Heim & Oei, 1993; Kremer et al., 1982; Melzack, 1975; Sist et al., 1998; Wilkie et al., 2001; Wilkie & Keefe, 1991; Wilkie et al., 1992; Zimmerman et al., 1996), strong reliability for measuring cancer pain (Graham et al., 1980; Wilkie & Keefe, 1991), sensitivity to treatment effect (Epstein & Stewart, 1993; Epstein et al., 2009; Huang, Wilkie, Chapman et al., 2003; Macdonald et al., 2005; Peintinger et al., 2003; Samuelsson & Hedner, 1991; Talmi et al., 1997), and sensitivity to intervention effect (Beck, 1991; Zimmerman et al., 1989). And fourth, the MPQ can be used in many cultures and languages to which it has been translated (Menezes Costa Lda et al., 2009).

However, the MPQ also has three weaknesses. First, the MPQ takes a long time to complete, especially compared with measures of only one part of the sensory dimension, such as the pain intensity. Second, there are concerns about readability issues for some descriptors. And third, three pain patterns of the MPQ are not adequate to account for changes in pain experienced by cancer participants (Graham et al., 1980).

Limitations

The present review provides a broad review of the use of the MPQ as a multidimensional tool to measure cancer pain. This systematic review is limited by focusing on adults (>15 years old) living with cancer, not pediatric participants, because pain measurement by the MPQ requires knowledge of the language to describe pain. Another limitation is that the search strategy may not have identified all relevant studies.

Suggestions and Further Studies

Further studies are needed to improve the MPQ. First, studies should be conducted with improvements in research methods and inclusion of a large number of participants living with cancer pain so that the results can be more generalizable. Second, measuring cancer pain in a sample of participants with various stages of disease and from different sociocultural backgrounds would help to ascertain if the MPQ can be used appropriately for those purposes. Third, additional longitudinal studies are needed to characterize cancer pain over the disease trajectory. Fourth, the use of sensory pain, especially pattern and location and the affective, cognitive, and behavior pain requires more study to confirm that the MPQ is an appropriate measure for these aspects of cancer pain. Finally, additional research is needed regarding quantification of the aggravating

and alleviating behaviors/factors to expand knowledge about their relationships with other sensory pain parameters and disease progression.

Nursing Implications

There are several important points that investigators and clinicians need to consider as they select pain measurement tools. First, clinicians must know the purposes for measuring the pain dimensions so that they can select valid and reliable tools that are most suitable for the clinical settings and participants' physical and mental conditions. Second, one needs to know when pain should be measured; participants who took pain medications may affect their pain reports. Third, it should be kept in mind that there are different patient characteristics, including age, nonmalignant or malignant disease, nociceptive or neuropathic pain, and physical or cognitive impairments, all of which may affect the participant's pain and pain description. Finally, although participants took more time to complete the long form of the MPQ, that may not be appropriate for all clinics, and the MPQ is also available as a short form (Melzack, 1987) and a computerized software program (Huang, Wilkie, Zong et al., 2003; Wilkie et al., 2003) that is easy to use and takes less time. Therefore, these latter methods can be considered in clinical practice for better documentation of pain and to guide pain treatments.

CONCLUSIONS

This integrative review provided a broad review of the MPQ as a multidimensional tool. Thirty studies were identified and evaluated to support that the MPQ is a valid and reliable measure of the sensory, affective, cognitive, and behavioral dimensions of cancer pain. All four dimensions were related to each other, but not so strongly as to be redundant. In spite of cancer pain being a complex phenomenon, it is very difficult to measure and manage cancer pain. Further extensive research is needed on measuring simultaneously the multiple dimensions of cancer pain and doing so longitudinally over the cancer trajectory. No single instrument is a gold standard pain tool for clinical pain research and practice; however, the combination of the MPQ and other instruments can be an efficient method for clinically assessing cancer pain as a patient-reported outcome (PRO) and for obtaining adequate data in clinical research.

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