
PALLIATIVE AND SUPPORTIVE CARE

Cancer pain management needs and perspectives of patients from Chinese backgrounds: a systematic review of the Chinese and English literature

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Abstract

OBJECTIVES: More than half of all cancer patients experience unrelieved pain. Culture can significantly affect patients' cancer pain-related beliefs and behaviours. Little is known about cultural impact on Chinese cancer patients' pain management. The objective of this review was to describe pain management experiences of cancer patients from Chinese backgrounds and to identify barriers affecting their pain management.

METHODS: A systematic review was conducted adhering to PRISMA guidelines. Studies were included if they reported pain management experiences of adult cancer patients from Chinese backgrounds. Five databases were searched for peer reviewed articles published in English or Chinese journals between 1990-2015. The quality of included studies was assessed using Joanna Briggs Institution's appraisal tools.

RESULTS: Of 3904 identified records, 23 articles met criteria and provided primary data from 6110 patients. Suboptimal analgesics use, delays in receiving treatment, reluctance to report pain and/or poor adherence to prescribed analgesics contributed to the patients' inadequate pain control. Patient related barriers included fatalism, desire to be good, low pain control belief, pain endurance beliefs and negative effect beliefs. Patients and family shared barriers about fear of addiction and concerns on analgesic side effects and disease progression. Health professional related barriers were poor communication, ineffective management of pain and analgesic side effects. Healthcare system related barriers included limited access to analgesics and/or after hour pain services and lack of health insurance.

SIGNIFICANCES OF RESULTS: Chinese cancer patients' misconceptions regarding pain and analgesics may present as the main barriers to optimal pain relief. Findings of this review may inform health interventions to improve cancer pain management outcomes for patients from Chinese backgrounds. Future studies on patients' non-pharmacology interventions related experiences are required to inform multidisciplinary and biopsychosocial approaches for culturally appropriate pain management.

KEYWORDS: cancer pain, Chinese, cultural influence, pain management

INTRODUCTION

Pain is one of the most feared symptoms across cultures for people diagnosed with cancer (Brant, 2014; Paice et al., 2010; Ruzicka, 2001) and it affects half of all cancer patients (Van Den Beuken-Van Everdingen et al., 2007). Inadequate cancer pain management may contribute to physical, psychological, social and spiritual distress (Brant, 2014; Ruseel & Tandon, 2011); and have negative impact on cancer patients' emotional wellbeing (Ruseel & Tandon, 2011; Yates et al., 2002).

Culture is a factor that can significantly influence cancer patients' pain experience, coping behaviours and adherence to a recommended pain management plan (Al-Atiyyat, 2009; Lasch, 2000). Providing culturally appropriate care is an essential element of effective cancer pain management for patients from culturally and linguistically diverse backgrounds (Lasch et al., 2000).

People from Chinese backgrounds are dispersed around the globe and form one of the largest cultural and linguistically diverse communities in their host country (Australian Bureau of Statistics, 2012). The incidence of oversea-born Chinese cancer patients have sharply increased at last two decades (Federation of Ethnic Communities' Councils of Australia, 2010). Prevalence of severe pain and/or undertreated pain were identified in Chinese cancer patients living in China and western countries which substantially affected their quality of life (Deng et al., 2012; Dhingra et al., 2011; Edrington et al., 2007; Liang et al., 2011; Liang et al., 2015; Liu et al., 2013).

Chinese culture may significantly affect cancer patients' communication, ability to cope with the cancer diagnosis and symptoms and adherence to recommended care plans (Dayer-Berenson, 2014a; Yin et al., 2007). The pain perceptions and experiences of cancer patients from a Chinese background may be shaped by their cultural beliefs (Chen et al., 2008). The Chinese cultural beliefs can potentially influence people's interpretation and interaction to their pain treatment (Chung et al., 2000) and become contributing barriers for them to report their pain and use prescribed analgesics to achieve adequate pain control (Chen et al., 2008).

Migrant Chinese cancer patients may experience additional barriers to their pain management. Research with different groups of immigrants suggests that Chinese migrant cancer patients had special needs for their health care compared to other groups (Butow et al., 2010). Due to difficulties in communicating with non-Chinese speaking health professionals and navigating new healthcare systems, Chinese

migrant cancer patients often felt culturally isolated when they were approaching health professionals for their cancer care needs (Butow et al., 2010). They also perceived that Western medications differed from their traditional health practices and failed to meet their needs (Butow et al., 2010).

Improving health professionals' understanding about health perspectives and needs of Chinese cancer patients is required to ensure the development of culturally appropriate pain management interventions. However, no literature review to date has provided information on how Chinese cancer patients perceive their pain management and what barriers might affect their decision making and adherence to the pain management plan.

Cancer Pain Management

Cancer pain is a multidimensional experience (Edrington et al., 2007; Oldenmenger et al., 2009; Peng et al., 2006). Cancer pain management is a complex and ongoing care process, which demands constantly efforts of health professionals across hospitals and home care throughout the process of routine cancer pain screening, assessment on pain intensity and functional impairment, treatment and follow up (Dy et al., 2008).

Effective cancer pain management requires a coordinated multidisciplinary (Brant, 2014; Oldenmenger et al., 2009) and biopsychosocial approach (Van Den Beuken-Van Everdingen et al., 2016). This approach encompasses comprehensive pain assessment, appropriate pharmacological and non-pharmacological interventions to meet individual's physical, psychological, social and spiritual needs (Brant, 2014; Paice et al., 2010).

Patients' self-report of pain is the most important step in cancer pain assessment; and health professionals, especially the nurses, play primary roles in ongoing pain assessment (Brant, 2014). Inadequate knowledge and skills of cancer pain assessment were often found in both the patients and the health professionals and led to poor pain management outcome (Oldenmenger *et al.*, 2009).

Oral analgesics are one of the most effective pharmacological interventions for cancer pain (World Health Organization, 2015). About 30 years ago, World Health Organization (WHO) launched a 3-step cancer pain ladder to promote and guide usage of oral non-opioids and opioids in managing weak, mild and severe cancer pain. It is recommended that cancer pain can be effectively controlled if right does of

oral analgesics are administered on an around-the-clock basis based on the pain assessment and are used in conjunction with adjuvants to control fear and anxiety of patients (World Health Organization, 2015).

Non-pharmacological interventions are an essential but often overlooked component of pain management for cancer patients (Brant, 2014). Non-pharmacological interventions, such as cognitive-behaviour therapy, musical therapy, herb medicines, superficial heating or cooling, have been reported as the effective methods in cancer pain reduction (Brant, 2014; Yarbro et al., 2011). The non-pharmacological interventions might not be able to change the underlying pathology or alter the perception or sensations of pain, but rather help in a variety of ways to decrease patient responses to pain, enable them to deal with the pain positively and proactively (Yarbro et al., 2011).

Despite the multitude of pain management guidelines and strategies, unrelieved cancer pain persists due to patient, family, health professional and/or healthcare system related barriers (Brant, 2014; Oldenmenger et al., 2009; Van Den Beuken-Van Everdingen et al., 2007). The poor outcomes of cancer pain management remain unchanged for decades though constantly efforts and attentions have addressed to this issue (Smith & Saiki, 2015; Van Den Beuken-Van Everdingen et al., 2016).

The barriers affecting appropriate cancer pain management reported in the literatures were different (Jacobsen et al., 2009; Van Den Beuken-Van Everdingen et al., 2016). Identifying and developing adequate interventions to overcome the barriers was the corner stone of effective cancer pain management (Van Den Beuken-Van Everdingen et al., 2016).

Objectives

The purpose of this review is to explore current evidences describing the pain management experiences, beliefs and needs of cancer patients from Chinese backgrounds. Integration of findings from international and Chinese literatures has special potential to understand cultural influences and the barriers affecting cancer pain management in patients from a Chinese background and to inform the development of effective interventions for optimal pain management.

DESIGN

A protocol was developed according to the Joanna Briggs Institution's (JBI) Systematic Review method (The Joanna Briggs Institute, 2015) and the preferred reporting items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009), to guide the systematic review.

Inclusion Criteria and Exclusion Criteria

Articles were eligible if they: 1) were published in peer-reviewed English journals or the Chinese core journals between January 1990 and August 2015; and 2) provided empirical data describing pain management experiences reported by adult cancer patients from Chinese cultures, including Chinese migrants cancer patients living in western countries or Chinese cancer patients living in Hong Kong, Taiwan and mainland of China. For studies evaluating a novel intervention, baseline rather than follow-up data were included to describe experiences during usual care.

Articles were excluded if they did not provide any patient-reported data about pain management, such as studies only reported patients' pain experiences or studies solely used audit data.

Data Sources

Initial search was undertaken via CINAHL and MEDLINE in July 2015 with primary key words such as 'Chinese', 'Chinese migrant', 'cancer patient', "pain" and 'pain management', to identify relevant studies in order to expand key words and phrases for more in-depth search. Then a series of key terms/words were developed for the comprehensive search in August 2015 via CINAHL, MEDLINE, PsycINFO, Cochrane Library and China Academic Journals (CNKI). The search terms/keywords and limits were modified according to the requirement of different English and Chinese databases.

Chinese literatures were mainly searched via CNKI Full-Text Database, under subject of 'Medicine and Public Health' and 'Education and Social Science'. To maximize search scope, the search were carried in two rounds by using different Chinese words with the same meanings. For example, '癌', '癌症' and '肿瘤' have the same meaning of 'cancer'. Both '病人' and '患者' refer to the 'patient' or 'patients'.

Examples of the search terms and limits used for the English and Chinese databases are summarized in Table 1 and 2, respectively.

Study Selection

The titles and abstracts of 10% of the returned articles were screened by two independent reviewers (English articles by XX and TL and Chinese articles by XX and AYW), with an inter-rater agreement of 100% achieved. The remaining articles were screened by one reviewer alone (XX).

Quality Appraisal

The risk of bias within studies of the selected English and Chinese articles were assessed by two independent reviewers (as above) using JBI levels of evidence (The Joanna Briggs Institute, 2014a) and critical appraisal tools (The Joanna Briggs Institute, 2014b). Quantitative studies were appraised using the JBI Critical Appraisal Checklist for Descriptive/Case Series Studies (The Joanna Briggs Institute, 2014b). The qualitative study was appraised using the JBI QARI (Qualitative Assessment and Review Instrument) Critical Appraisal Checklist (The Joanna Briggs Institute, 2014b). Disagreement was resolved by consultation with the third reviewer.

Data Extraction and Synthesis

Data were extracted using an electronic proforma on study aims, population, sample size, setting, study design, outcome measures and main findings. Chinese data were extracted into the table and translated into English (XX). The translation was cross-checked by another reviewer (AYW).

Heterogeneity between study designs prevented a meta-analysis. Thus narrative methods as described by Popay (Arai et al., 2007; Popay et al., 2006) was used for data synthesis and analysis. The narrative synthesis focused on prevalence of cancer pain, type of cancer pain management, and pain management related adherence behaviours, beliefs, needs and experiences.

RESULTS

Study Characteristics

A total of 3,904 articles were retrieved from the searches, of which 23 reporting on 19 primary studies met the inclusion criteria and were selected for the review (Figure 1). The included studies (Table 3) predominately involved adult cancer inpatients (n=6,008) and a smaller proportion of outpatients (n=102) who were living in mainland China (n=3,714 inpatients), Hong Kong (n=86 inpatients) or Taiwan (n=2,208 inpatients and 102 outpatients). Most studies included more men than women though not all studies reported participants' gender.

All studies were conducted in urban hospitals. Most studies (n=15) used an observational descriptive design (cross-sectional survey or case series). The other studies included two observational analytic studies, a pilot randomized controlled trial (RCT) and a qualitative study. No studies reported information on migrant Chinese cancer patients' pain management related perspectives and health needs.

Risk of Bias Within studies

Except for the qualitative study (Level 3.0), most of the studies in this review were rated at levels of evidence between level 4.b and 4.c. Three interventional studies were rated at level 3.e to 2.e based on their study design, but only baseline data at level 4.b were used for this review.

Fourteen studies adopted a convenience sampling technique. All studies used face-to-face surveys and/or interviews to collect their data. Of the eighteen quantitative studies, twelve used validated tools and six used self-developed surveys to examine pain management related beliefs and/or barriers. Most of the validated measures were originally established in Western populations and translated into Chinese; and only one was psychometrically developed in the Chinese population (Chen et al., 2007). The levels of evidence and methodical appraisal results are summarized in supplementary tables (Refer to ST1, ST2 and ST3).

Prevalence of Pain, Type of Pain Management and Adherence Behaviours

Suboptimal analgesics use, delays in receiving pain treatment and/or poor adherence to prescribed analgesics contributed the burden of participants' unrelieved pain. The majority of participants across the studies (83.5% inpatients and 100% outpatients) reported experiencing pain with a duration ranging from a few days to several months.

Across studies, pharmacological rather than non-pharmacological strategies were the main cancer pain management strategy used. Three studies reported using the WHO 3-step ladder to guide the prescription of analgesics (Chen et al., 2007; Hu et al., 2010; Lu et al., 2006). Six studies specifically investigated the barriers of using opioids (Lai et al., 2004; Lai et al., 2002; Liang et al., 2013a; Liang et al., 2013b; Liang et al., 2015; Liang et al., 2008a, 2008b, 2012; Pang et al., 2013); while the remaining thirteen studies explored participants' perspectives on using analgesics.

Only two studies noted that participants used a combination of analgesics (codeine or morphine) and non-steroidal anti-inflammatory drugs (NSAIDs) (Lin, 2000; Song et al., 2014). Another two studies described participants using traditional Chinese medicine (e.g. acupuncture) or physiotherapy alone and/or in combination with analgesics for their pain control (Chen et al., 2007; Huang, 2009).

Following poor analgesic adhering behaviours were reported by the participants: 1) failing to take regular analgesics as prescribed (Lai et al., 2004; Lai et al., 2002; Song et al., 2014; Tse et al., 2012; Wills & Wootton, 1999; Xia, 2015); 2) only taking analgesics when pain occurred rather than around-clock analgesic regimen (Huang, 2009; Lin, 2000, 2001; Song et al., 2014; Tse et al., 2012) or when the pain became unbearable (Lin et al., 2013; Tse et al., 2012); and/or 3) titrating their analgesic doses without medical guidance (Tse et al., 2012; Xia, 2015).

Identified Barriers

The barriers prevented the participants to report their cancer pain, receive pain treatment, adhere to the prescribed analgesics and achieve optimal pain control were identified as following:

Patient related barriers

The patient related barriers mostly arose from the participants' beliefs regarding cancer pain and/or analgesics, including pain related beliefs and analgesics related misconceptions.

Pain related beliefs

Participants' conceptualization of their pain experiences significantly influenced their pain management behaviours (Lai et al., 2002) and decision making (Lai et al., 2004; Liang et al., 2013b; Lin et al., 2013; Wills & Wootton, 1999). 'Fatalism' was identified as a major obstacle to preventing participants from using analgesics to relieve their cancer pain (Lin, 2000, 2001; Wills & Wootton, 1999). Inpatients with higher fatalism scores considered pain as an inevitable experience of hospitalization; hesitated to use analgesics; and often endured pain for months (Lin, 2000; Wills & Wootton, 1999).

Participants with a higher 'desire to be good' score, as measured by the 'Barriers Questionnaire', were more reluctant to talk about their pain, because they did not want to disturb their nurses and/or doctors (Lin, 2000, 2001; Wills & Wootton, 1999). In addition, many participants believed that pain was an indication of 'disease

progression' (Liang et al., 2008a; Lin, 2000, 2001; Lin & Ward, 1995; Tse et al., 2012). This belief discouraged them from accepting pain treatment (Liang et al., 2008b; Lin et al., 2013); made them reluctant to report their pain to health professionals (Lin, 2000, 2001; Lin & Ward, 1995; Tse et al., 2012), and/or failed to adhere an around-clock analgesic regimen (Liang et al., 2013a; Liang et al., 2008a).

'Pain endurance belief' refers to "the belief that one should endure as much pain as possible") (Lai et al., 2002 p. 416). 'Pain control belief' is a belief "that one can control his/her pain" (Lai et al., 2002 p. 416). The high scores of 'pain endurance belief' and the lower scores of 'pain control belief' were significant negative predictors of analgesic adherence (Lai et al., 2004; Liang et al., 2013b).

In several studies, participants described the need to 'be brave' (Chen et al., 2007; Pang et al., 2013) and/or to 'bear the pain' (Lin et al., 2013). In fact, some participants did not realize that their pain could be relieved (Lin et al., 2013; Lu et al., 2006; Pang et al., 2013).

Analgesics related misconceptions

Cancer patients with lower education levels (Chen et al., 2007; Xia, 2015) and an older age (Xia, 2015) or misconceptions to analgesics had greater difficulty adhering to analgesics.

In the studies investigating participants' perspectives on opioid use, participants commonly held 'negative effect beliefs' (Lai et al., 2004; Lai et al., 2002; Liang et al., 2013a; Liang et al., 2013b; Liang et al., 2015; Liang et al., 2008a, 2008b, 2012). The 'negative effect beliefs' is "a belief that opioids have negative effects on the body" (Lai et al., 2002 p.416). Participants with a high opioid 'negative effect belief' ($r=-.30$, $p<0.01$) were less likely to adhere to an around-clock analgesic regimen (Liang et al., 2013b; Liang et al., 2008a). Concerns about side effects and addictions were also reported as barriers of using opioids (Pang et al., 2013) . In contrast, the patients' belief that medications could be effective in treating pain (Lai et al., 2002) and high self-efficacy for administering opioids (Liang et al., 2008a, 2008b, 2012) were indicators of high adherence to opioids for cancer pain treatment.

In the studies exploring participants' perspective on analgesics in general, the finding suggested that the poor analgesic adherence was mainly linked to a disproportionate 'fear of addiction' or 'analgesic dependence' (Chen et al., 2007; Huang, 2009 ; Lin, 2000, 2001; Lin & Ward, 1995; Lin et al., 2013; Tse et al., 2012;

Wills & Wootton, 1999; Xia, 2015), and 'concerns about side effects' (Chen et al., 2007; Huang, 2009 ; Lin, 2001; Lin et al., 2013; Tang, 2010; Tse et al., 2012; Wills & Wootton, 1999; Xia, 2015).

Family related barriers

The participants in the qualitative study regarding cancer patients' opioid-taking task and behaviours perceived their family as the 'bridge' between themselves and their health care providers and considered that family support was the central to helping them cope with their pain and pain treatment (Liang et al., 2008b). The family member's perspectives to cancer pain and its management may have an impact on participants' adherence to analgesics.

In few studies involved both patients and their families, some family members perceived pain as an indicator of 'disease progression' and worried that taking analgesics to control the pain would mask warning signs of cancer progression (Lin, 2000; Pang et al., 2013). Analgesic side effects and safety (Lin, 2000, 2001; Pang et al., 2013), addictions and tolerance (Lin, 2000) were also major concerns of the family members.

Congruency between patients' and families' cancer pain management perceptions is essential for analgesic adherence (Lin, 2000, 2001). The perception of barriers among family caregivers was a significant negative predictor of patients' accuracy and aptitude in using analgesics ($p < 0.05$) (Lin, 2000) and a predictor of patients' hesitation to take analgesics ($p < 0.01$) (Lin, 2000). The non-congruent group of patients had significantly higher ($p < 0.01$ or < 0.05) total barrier scores and sub-scores on 'disease progression', 'religious fatalism' and 'tolerance' than those in the congruent group; and were less likely to adhere to their pain treatment (Lin, 2000).

Health professional related barriers

The main health professional related barriers reported by the participants were ineffective management of analgesic side effects (Huang, 2009 ; Lin et al., 2013) or delays in treating side effects (Chen et al., 2007; Hu et al., 2010; Pang et al., 2013). Inefficient pain control also led to participants' dissatisfaction with their pain management (Huang, 2009 ; Lin et al., 2013). Poor communication and/or a lack of information on pain treatment were barriers to optimal pain control (Liang et al., 2008b).

Healthcare system related barriers

Participants had difficulty accessing to opioids after hours (Liang et al., 2008b) and obtaining analgesics to manage unexpected pain exacerbations (Pang et al., 2013). Participants were also dissatisfied with the delays on their cancer pain treatment and/or the limited supply of analgesics which was not commensurate with the dosing regimen required to control their pain (Huang, 2009 ; Lin & Ward, 1995; Tang, 2010; Tang et al., 2010).

Participants with low incomes (Chen et al., 2007; Xia, 2015) and/or those without health insurance (Huang, 2009 ; Liang et al., 2008b; Lu et al., 2006; Xia, 2015) had even more limited access to analgesics due to concerns on the affordability. Even participants with health insurance had limited access to analgesics and quality pain treatment as well, because the amount of insurance funds contributed to the pain treatment was extremely restricted (Song et al., 2014). Participants also worried that community hospitals might not be able to provide analgesics and appropriate treatment for their cancer pain (Hu et al., 2010).

DISCUSSION

This systematic review revealed a range of patient, family, health professional and healthcare system related barriers that contributed to the experience of unrelieved pain, delay in receiving pain treatment and poor adherence to prescribe analgesics in Chinese cancer patients.

The patients' pain beliefs such as 'fatalism' and 'desire to be good', 'pain endurance beliefs', low 'pain control beliefs' and 'concerns about disease progression' have analogies with those reported in the Western literature (Oldenmenger et al., 2009). However, the culture influences underpin these beliefs need to be addressed to help health professionals understand Chinese cancer patients' pain management related behaviours and needs.

Buddhism teaches that "pain is a power, unwanted but existent..." (Chen et al., 2008, p.105). This perspective leads people to view pain as a 'natural thing' which is an indicator of their body reacting to the cancer (Chen et al., 2008, p.105; Im et al., 2008). The fatalism can extend beyond pain to the cancer itself (Chung et al., 2000). Cancer pain is considered both a 'fate' associated with misery and a reminder of life; and what patients can do when they confronted with pain is to wait until death comes (Chung et al., 2000).

The desire to be 'a good patient' may stem from the influence of Confucianism. Confucianism encourages people to strive for a harmonious relationship with nature and others (Dayer-Berenson, 2014b). Chinese patients' desire to maintain harmonious relationships with others may lead to a reluctance to 'bother' health professionals with their health problems (Dayer-Berenson, 2014b; Tjuin et al., 2007).

The "pain endurance belief" is also likely associated with the influence of Confucianism. Chinese people in general are not comfortable expressing feelings in front of others when they experience hardships. This stoicism is seen as important to winning others' respect. Therefore, Chinese often perceive pain as a "trial" that tests their strength and think that pain is part of the sensation of being human (Chen et al., 2008). Whilst cultural beliefs of this kind may help with coping in some instances, they have the potential to generate feelings of helplessness and misery in Chinese cancer patients (Chung et al., 2000). The patients may tend to suffer in silence rather than seek help before their pain becomes severe (Chen et al., 2008).

In addition, Chinese cancer patients perceived pain as an indicator of disease progression (Liang et al., 2008a; Lin, 2000, 2001; Lin & Ward, 1995; Tse et al., 2012). They worried that if their pain was controlled, this could eventually prevent the warning signs of cancer from reoccurring or advancing (Chen et al., 2008). This could also explain why Chinese cancer patients tended to suffer the pain instead of obtain help.

The "negative effect belief" to opioids and 'fear of addiction' among Chinese cancer patients are very likely due to a lack of cancer pain and treatment information (Lai et al., 2004; Lu et al., 2006; Tse et al., 2012); and/or inefficient communication between patients and health professionals (Liang et al., 2008b). Without adequate information, the patients may find that it is difficult to communicate with health professionals about their concerns and to know where to seek for help (Butow et al., 2010; Liang et al., 2008b).

As with patients related barriers, the strong influence of family's beliefs on pain management reported by Chinese cancer patients reflects the cultural importance of family relationships, loyalty, obligation, obedience, cooperation, interdependence and reciprocity in Chinese society (Dayer-Berenson, 2014b). In a traditional Chinese family, health decisions are based on a process of family consensus in which usually the oldest family members or the eldest son has the highest influence. Being able to stay with family helps overcome hardships (Chung et al., 2000). However, this

closeness can change patients' pain perceptions, as they may fear that the cancer will spread to other family members or they may feel shamed in front of their friends (Chung et al., 2000).

The stigma and concern over social networks may prevent Chinese cancer patients from sharing their experiences of pain to their families. This dynamic has implications for how health professionals engage family members in shared decision making regarding pain management. Strategies aiming to empower patients and their families to self-manage pain is essential for optimal pain management (Lockett et al., 2013).

Patients education in relation to reporting pain and use of analgesics was an essential method to improve cancer patients' knowledge's and adherences to analgesics (Oldenmenger et al., 2009). Educational interventions for the families about managing side-effects, disease progression and around-clock analgesics were also important as Chinese cancer patients were heavily depended on their families, especially in palliative care (Lin, 2000).

The health professional related barriers reported by the patients in this study are consistent with those reported by physicians and nurses (Oldenmenger et al., 2009), which may be associated with health professionals' analgesic beliefs (e.g., concerns about addiction and side effects), inadequate knowledge and skills in cancer pain management (Li et al., 2013; Oldenmenger et al., 2009).

The limited reports of using the WHO 3-step Ladder to guide the pain treatment and inadequate prescription of opioids for the cancer patients reflect the importance of increasing health care professionals' awareness of analgesics use in cancer pain management. The outcome of pain treatment can only be improved when routine pain education and appropriate doses of opioids are provided and the treatment are regularly adjusted (Dy et al., 2008). Health policies need to be reinforced to provide training programmes for health professionals, to enhance their knowledge and skills in pain control and to promote opioid usage in Chinese cancer patients (Lin et al., 2016).

The inadequate prescription of opioids and the limited access to opioids reported in the included studies was similar to the findings of Western researchers which opioids related fears have been commonly observed in Western literature (Flemming, 2010); and were likely associated with the government restriction of opioid usage (Open Minds, 2005). Although the understanding of the effectiveness

and safety of opioids in chronic pain management was gradually increasing and the importance of opioids in pain relief had been addressed, opioid use remained restricted because many national laws were focussed on controlling misconduct, abuse and addiction (Open Minds, 2005). The rules and regulations should be updated to eliminate the fear of opioids (Open Minds, 2005).

At the healthcare system level, limited access to analgesic, a lack of after-hours access to opioids and concerns on the quality of pain management services at local community hospitals suggested that health service reforms should focus on increasing affordability and accessibility of analgesic and community based pain services; and supporting pain self-management of the cancer patients and their families at home.

The similarities between the barriers reported in Chinese populations and in the Western literature may partly be because most of the validated measures used in the included studies were developed for non-Chinese speaking populations and only focused on patients' perspectives to pain and analgesics. Evaluating cultural-social influential factors underneath unrelieved cancer pain is urged to inform effective interventions for cancer pain management (Jacobsen et al., 2009). A reliable and valid instrument should be developed to ensure better coverage of barriers that reflect specific Chinese cultural considerations.

LIMITATIONS AND STRENGTHS

The generalizability of findings in this review may be limited due to small numbers of articles identified and several methodological factors. The majority of the studies used a cross-sectional design and a convenience sampling technique. More than half of them were conducted at a single study site. All studies were undertaken in the hospital settings of the metropolitan areas which the participants' demographic data in some studies were unclear, so it was uncertain if the studies included participants from remote areas.

Only small numbers of participants were outpatients which the barriers and needs reported in this review may not be able to reflect patients' barriers and specific needs in cancer pain management when they were discharged home. The fact that the majority of participants in the included studies were males may potentially have led

to bias because of the gender differences in pain and pain management perspectives.

Despite the limitations, the findings of this review has been strengthened by adhering to the review protocol with multiple reviewers involved throughout the process of search, quality appraisal, data extraction and analysis and reporting, to maintain the consistence and rigorousness. The Chinese data translation were cross-checked by a high efficient bilingual-speaking academic to ensure the completeness and accuracy.

Even though the sample size in some studies were small but in total the findings of this review were based on primary data reported by more than 6,000 Chinese cancer patients. It may provide accountable information to health professionals and researchers for future development in clinical practice and research, to improve outcomes of cancer pain management for people from Chinese backgrounds.

CONCLUSION

Adequate cancer pain management for Chinese background cancer patients needs to start with an understanding of patient and family perspectives on pain and analgesics and the barriers preventing them from achieving optimal pain outcomes.

Findings of this review may inform development of health interventions to meet information needs of Chinese cancer patients and their families in relation to the pain and analgesics in order to: 1) encourage patients to report their pain; 2) actively involve in their pain treatment, adhere to around-clock analgesic regimen and increase their use of oral analgesics; and 3) increase their access to after-hour pain services.

Findings of this study may also be used to inform development of educational programs for health professionals to enhance their competences in managing cancer pain for patients from Chinese backgrounds, particularly to increase their awareness regarding importance of using adequate analgesics in cancer pain management and to strengthen their skills in effective communication and management of analgesic side effects.

Cancer patients from Chinese backgrounds are more likely to seek for traditional Chinese medicines and/or to engage with the culture related health practices such as Qigong, acupuncture and transitional Chinese massage for

their pain control. However, this review is not able to provide information about the needs and barriers of Chinese cancer patients in relation to non-pharmacological interventions, because existing literatures have mainly focused on the pharmacological analgesia. Future studies based on the cancer pain management guidelines addressing to this area are needed to inform development of multidisciplinary and biopsychosocial pain management approaches that are culturally appropriate.

Another notable gap in the literature concerns the absences of studies focus on Chinese migrants' cancer pain management related experiences. Further research directing by the cultural care theories or models is required to identify cancer pain management related barriers and cultural influential factors in Chinese migrants living in countries that have different cultures, especially those who have less support after they are discharged home and/or are receiving pain treatment at clinics or community services.

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Table 1. Key Search Terms and Limits Used for English Databases

1	Chinese* OR Chinese people* OR Chinese migrant* OR Chinese immigrant* OR Chinese speaker* OR Chinese immigrant* OR mandarin* OR Shanghai* OR Canton* OR Taiwan* OR Hong Kong* OR Singapore*
2	cancer* OR Neoplasms* OR oncol* OR tumor* OR tumour* OR malignan*
3	experienc* OR Belief* OR Behavior* OR Behavio* OR attitude* OR health need* OR knowledge
4	pain* OR support* care OR symptom*
5	Combine 1, 2, 3, 4, & 5 with AND

Search	1. January 1990 to August 2015
Limits	2. Peer review in CINAHL & PsycINFO

Table 2. Key Words Used to Search in China Academic Journal (CNKI) Full-Text Database

A. Key words used for the first round of the search

1. In the Article Title field: “肿瘤” OR “癌症” (‘zhong liu’ OR ‘ai zheng’, two different Chinese words that may refer to ‘cancer’)
2. In the Abstract field : “疼痛” (‘Teng tong’, a Chinese word referring to ‘pain’)
3. Combine 1 & 2 with “AND”

B. Key words used for the second round of the search

1. In the Article Title field: “肿瘤” OR “癌” (‘zhong liu’ OR ‘ai’, the former is a Chinese word referring to ‘cancer’, whilst “ai” is a Chinese character that may combine with different Chinese characters to form new words, such as ‘zhi chang ai’- colorectal cancer.)
 2. In the Abstract field: “患者” OR “病人”(‘hung zhe’ or ‘bing ren’, two different Chinese words referring to a “patient”)
 3. In the Abstract field: “疼痛” (“Tengtong”, a Chinese word referring to “pain”)
 4. Combine 1, 2, & 3 with “AND”
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Search limits for both rounds:

1. Published from 1994^a to present
 2. Core journals
 3. Excluded cross-language search^b
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^a The China Academic Journals (CNKI) Full-text Database collects articles published from 1994.

^b Duplicates of articles published in Chinese that could be searched by both their Chinese title and their translated English title were excluded.

Authours Copy

Table 3 Overview of Study Characteristics

No. ^a	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
1	Liang <i>et al.</i> (2015) Taiwan	To explore the Relationship between oncology patients' pain experience and quality of life.	Inpatient (n=109) A teaching hospital	Cross-sectional	Medical characteristics (i.e. opioid used and side effects). Methods of pain management. European Organization for research and treatment of Cancer Quality of Life Group Questionnaire (Version 3.0) (EORTC QLQ-C30). Brief Pain Inventory-Chinese Version (BPI-Chinese).	Participants reported moderate levels of pain and duration being in pain from 1-49 months; and among them: 3/5 used analgesics together with other approach to control their pain; 2/5 used analgesics only to treat their pain; and 96.3% of them experienced side effect of opioids.
2	Xia (2015) Mainland China	To evaluate adherence of elderly cancer patients to take oral analgesics and associated factors.	Inpatient with pain (n=115) An oncology teaching hospital	Cross-sectional	Self-designed questionnaire for analgesics adherence assessment: taking by following prescription; time of taking and dosage; and adhering to long term continual using analgesics.	Only about 1/2 of participants adhered to oral analgesics; 2/5 failed to take analgesics as per times of prescriptions; and 1/4 increased the dosage of analgesics without consulting with doctor. Main concerns of the participants: adverse reaction (91.53%) and addiction (84.76%). Significant associated factors of adherence: age, monthly income, status of medical insurance and intensity of pain (p<0.05).
3	Song <i>et al.</i> (2014) Mainland China	To determine pain prevalence and analgesic usage of inpatients; and to explore the factors associated with under-treatment cancer pain.	Inpatients (n=617) A teaching hospital	Cross-sectional	Information using analgesics: category, administration, time and adverse effects of analgesics and economic burden.	286 participants had moderate or severe cancer pain and among them: 92% of participants' medical cost was lease or equal to 1% of their total hospital expenses; and Only 49.7% of participants used analgesic but 1/2 of them only took analgesics when pain occurred.

^aThe number of the studies were listed in a chronological order.

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
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4 ^b	Liang <i>et al.</i> (2013a)	To explore relationship between analgesic beliefs, analgesic adherence and pain experience amongst Taiwanese cancer outpatients.	Outpatients (n=92)	Cross-sectional	Pain Opioid Analgesic Beliefs Scale-Cancer (POABS- CA). Opioid adherence. BPI-Chinese.	Participants had a mean pain intensity score ≥ 3 at last 24 hours; and 33.7% - 68.5% of them had negative beliefs to pain and opioids. Participants with negative effect beliefs about opioids and pain were less likely to adherence to around-clock analgesic regimen (r = -0.30, p < 0.01).
	Taiwan		Two teaching hospitals			
	Liang <i>et al.</i> (2013b)	To describe oncology outpatients' responses to their beliefs regarding pain and prescribed opioids.	Same as above	Same as above	POABS - CA	Participants' beliefs to opioids and pain: Opioids was not good for a person's body (about 2/3); Worried opioid dependence (2/3); if taking opioids at too early a stage, it would have less effect later (2/3); Adults should not take opioids frequently (3/5) and should endure the pain (2/5).
	Liang <i>et al.</i> (2012)	To explore levels of self-efficacy of outpatients in opioid taking for their cancer pain.	Same as above	Same as above	Opioid-taking Self-Efficacy Scale Cancer (OTSES-CA)	Majority participants reported low confidence in the tasks of tailoring medication regimens. Participants with low education were significantly relate to lower score of self-taking opioids (r=0.28, p<0.01). Participants without side-effects significantly had higher total self-efficacy score (p<0.01) and subtotal scores (p between <0.05 and <0.01), compared to those with side-effects.
	Liang <i>et al.</i> (2008a)	To explore relationship between self-efficacy, beliefs, adherence behaviors and pain experience of outpatients in related to opioid-taking for their cancer pain.	Same as above	Same as above	OTSES-CA; POABS-CA; Opioid adherence.	Opioid beliefs and opioid-taking self-efficacy were significant predictors for participants' adherence to around-clock analgesic regimen (F=4.71, P<0.01). Participants with negative opioid beliefs (r=-30, p<0.01) and low level of self-efficacy (r=0.22, p<0.35) were likely to poorly adhere to around-clock analgesic regimen.

^b Four articles were written based on one study.

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
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5	Pang <i>et al.</i> (2013) Mainland China	To investigate and explore existing problems related to pain control and barriers for optimal pain management among cancer participants and their family members; and to explore their attitudes to cancer pain and pain management	Inpatients (n=30); Patients' family (n=29) An oncology teaching hospital.	Case series	Self-designed questionnaire: Patients: effect of pain control; impact of pain on patients' sleep; mood and general activity; and factors that affect patient's satisfaction on pain control. Numeric Rating Scale. Patients and their family members: perceptions to pain; right way using analgesics; perceptions to safety of opioids; and other 5 domains in related to analgesic treatment.	Participants suffered mild to severe pain at the time of survey; and of them: 5/6 had moderate or severe pain within 24 hours prior to survey; and 1/2 only taking analgesics when pain occurred. Participants' and their families' perceptions to pain and analgesics: pain meant end stage of cancer; Analgesics should only be taken on time when pain occurred; Opioids were not safe; worried about addiction to opioids; and Better to suffer the pain and did not use any analgesics.
6	Lin <i>et al.</i> (2013) Mainland China	To explore factors associated with cancer patients' adherence to pain treatment	Inpatients (n=228) A teaching hospital	Cross-sectional	Self-designed Questionnaire: Type of cancer, location and level of pain; patient's goal in relation to pain treatment and knowledge to pain treatment and analgesics. Numeric Rating Scale.	189 participants suffered from mild to severe pain but only 1/3 of them taking analgesics on time. Perceptions to pain treatment: Only needed to reduce pain to the tolerant level; Using opioids may result in permanent dependence; Analgesics should be taken when pain became unbearable; Long term using opioids might result in addiction; Request to increase dosage of analgesics meant addiction; Should stop using opioids if adverse action occurred; and Dosage of morphine was associated with level of severity of the cancer.
7	Tse <i>et al.</i> (2012) Hong Kong	To investigate effectiveness of pain management program on pain intensity, use of PRN drugs and non-pharmacological strategies for pain relief; and to explore barriers of cancer pain management.	Inpatients (n=38) A public hospital	Case-controlled	Numeric Rating Scale. Barriers questionnaire-Taiwan (BQT): Fatalism, addiction, desire to be good, fear distort physician, decreased progress, tolerance, and side effects.	Baseline assessment: All participants took analgesics to relief their pain and at least 2/3 of them used non-pharmacological methods for pain relief. However, They believed analgesics should be only be taken should when nurse gave to them; and had relatively high scores of BQT (>2) in addiction, fear disturbing physician, decreased process, tolerance and side effects.

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
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8	Hu <i>et al.</i> (2010) Mainland China	To explore cancer patients' perceptions and attitudes toward to pain treatment in hospitals; and to explore their attitudes to community medical staff in relation to the treatment	Inpatients (n=120) A tumor hospital	Case series	Self - designed questionnaire: Incident rate and type of treatment for pain; Perceptions and attitudes to analgesics and pain treatment; Perceptions to pain treatment at community hospital (i.e. accessibility to the service, availability of analgesics).	2/5 of participants had cancer pain and among them 2/3 worried about adverse effects; 92.3% wished to receive more information on pain treatment and analgesics; Only 1/3 regularly took analgesics; 1/3 took analgesics when pain occurred; 1/4 refused analgesics due to worrying adverse effects; 3/4 perceived possible inconvenience to get analgesics at community hospitals; and 4/5 thought community hospitals cannot provide satisfactory pain treatment. Type of pain treatment: analgesic (59.6%), physical therapy plus taking rest (26.9%); chemotherapy and radiotherapy (13.5%)
9 ^c	Tang <i>et al.</i> (2010a) Taiwan	To characterize cancer patients' status and satisfaction with pain management.	Terminally ill cancer inpatients (n=1370) 24 hospitals	Cross-sectional	Pain intensity score (0 to 5). Toolkit of Instruments to Measure End-of-life Care. Self-developed questionnaire: Patients' perceptions of clinicians' pain management practice with four questions regarding amount of pain medication received, duration of waiting for pain medication, understanding about pain treatment and pain relief experiences.	All participants experienced pain and about 1/2 of them were not satisfied with pain relief within one week of admission because they received inadequate amount of pain medication and/ or took too long to receive pain medication. Significant correlation factors of participants' satisfaction: age (r=0.05, p=0.05); pain intensity (r= - 0.18, P<0.0001).
	Tang (2010b)	To investigate the diffusion effects of a hospice unit on improvement of terminally ill inpatients perceived quality of cancer pain management.	Same as above	Same as above	Pain relief experiences; duration of waiting for pain medication and amount of pain medication received.	Participants from hospice groups (n=672) were 2.40 times likely to report of unrelieved pain prior to admission. Participants from non-hospice groups (n=698) was significantly more likely to waiting for too long for pain medication (p<0.05). The participants in both groups (n=1370): 1/2 had unrelieved pain prior to admission; 2/5 received inadequate analgesics and 2/5 still had unrelieved pain after 7 days hospital admission.

^c Two articles were written based on one study.

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
10	Huang <i>et al.</i> (2009)	To investigate the characteristics and	Inpatient (n=1131)	Cross-sectional	Intensity visual analogue scale Self-designed questionnaire: pain	Among the participants: Average interval from feeling pain to get treatment: 4.1 months.

	Mainland China	treatment of cancer pain of cancer patient in Shanghai	Level 2 or 3 hospitals or level 1 palliative cancer care hospitals with beds \geq 300		treatment; patients' perceptions to analgesics and satisfaction to pain treatment as well as associated factors.	2/5 only taking analgesics when pain occurred; 2/5 feared addiction; 2/3 could not get treatment when cancer pain occurred; 1/5 had difficulty to get pain treatment; about 1/2 used two or more than two methods for pain treatment; 2/3 accessed the cancer pain clinic for pain control; and Only 5.5 % might get full reimbursement for their pain treatment. The most rated effective treatment: analgesics (79.1%), physical therapy (8.1%) and traditional Chinese medicine (4.7%). 1/6 dissatisfied pain control because of adverse reaction, inefficient of pain control, inadequate dosage of analgesics and limited usage of analgesics due to financial burden.
11	Liang <i>et al.</i> (2008b) Taiwan	To explore outpatients' tasks and behaviors related to opioid-taking for cancer pain and factors affecting their self-efficacy of opioid-taking at home	Outpatients (n=10) with pain Two teaching hospitals	Semi-structured interview	Self-developed interview guide based on theoretical framework of self-efficacy.	Factors associated with participants' opioids-taking self-efficacy: Communication between health professions and the patients in related to pain; Knowledge about effects of opioids, side-effects of opioids and self-monitoring; Capability of adjusting or swabbing their pain medications according to their conditions; Difficulties in adhering to scheduled opioids due to limited access to opioids and after hour pain service; Support from family and doctors; Concerns on accessibility and financial situation, side-effects of opioids and disease progression or worsening.

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study design	Outcome Measures	Main Findings
12	Chen <i>et al.</i> (2007)	To explore pain behaviors of cancer patients in Zhanjiang area; and influence of	Inpatients (n=1197)	Cross-sectional	Modified Questionnaire of National Cancer pain prevalence and associated factors for pain	4/5 of participants experienced mild to severe levels of pain; and among them: Only 1/5 used strong opioids; and

	Mainland China	psychosocial factors to their pain behaviors.	A tertiary hospital		treatment. Pain assessment scale.	About 1/5 used acupuncture, physical therapy or Traditional Chinese medications. Among 303 participants who had pain but never received pain treatment: 4/5 refused analgesics but requested acupuncture, scraping, moxa moxibustion, massage or physical therapy. 1/5 refused any pain treatment because of: Fear of addiction (1/2); side effects (1/3); pain endurance belief (1/5); or due to economic or other reasons (1.65%).
13	Lu <i>et al.</i> (2006) Mainland China	To evaluate effects of educational program on cancer patients' pain control.	Inpatients (n=112) A cancer hospital	Observational study without a control group	Patients' compliance to pain treatment. Level of pain reliefs. Satisfaction with their pain control. Modified BQT.	All participants had pain and received oral analgesic or patch for pain treatment by following WHO 3-step ladder; and among them: Only 2/5 adhered to the around-clock pain treatment; Only 1/5 satisfied to level of pain control. Total scores of the participants' barriers to pain and pain treatment were high at 2.81± 0.54; and all sub-scores ≥ 2. Barriers perceived: addiction; dependence; tolerance and side effect of using opioids; difficulty to get drug as pain getting worsen; feared pain relief interfering cancer treatment; feared disturbing nurse and family; tolerating pain meant strong; economy burden; and uncontrollable pain.
14	Lai <i>et al.</i> (2004) Taiwan	To evaluate effects of a brief structured pain education program on inpatients' cancer pain experience.	Inpatient (n=30) A medical center.	A pilot RCT	BPI-Chinese. POABS-CA. Coping Strategies Questionnaire-Catastrophizing and CSQ sense control over pain measures (CSQ-Cat)	Baseline assessment: All participants were in pain for around 4 months; Had high scores (≥ 2.9) in negative effect beliefs using opioids, pain endurance beliefs and catastrophizing; and Had Low sense of control pain score (1.90 ± 1.58).

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study Design	Outcome Measures	Main Findings
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15	Lai <i>et al.</i> (2002) Taiwan	To explore oncology inpatients' pain beliefs and adherence to prescribed analgesics; To identify predictors of adherence to analgesics	Inpatients (n=194) 4 teaching hospitals	Cross-sectional	Analgesic adherence: patient self-reported prescribed analgesic-taking options. POABS-CA. Survey of Pain Attitude. Pain Numerical Rating Scale.	Duration of experienced pain: 3-7 months with mean intensity of pain at 3.49±1.77 and peak intensity of pain up to 7.26±2.39 at last 7 day. 1/3 of participants failed to adhere to prescribed analgesics. Lower control belief (odds ratio=0.393, p=0.0001) and higher medication belief (odds ratio=2.153, P=0.02) were two significant predictors of participants' analgesic adherence.
16	Lin (2001) Taiwan	To examine congruity between cancer patients' and their families' perceptions to cancer pain; and to determine if the congruity associated with patients' concerns on reporting their pain and using analgesics.	89 dyads of inpatients and family care givers Two teaching hospitals	Cross-sectional	Patients: BQT. BPI-Chinese. Eastern Cooperative Oncology Group (ECOG) performance status scale. Family caregivers: BPI – Chinese	2/3 dyads participants and family care givers did not have congruent in cancer pain intensity. No-congruent group participants significantly had higher scores than those in congruent group at following aspects: disease progression and religious fatalism (p<0.01); tolerance and total BQT scores (p<0.05). The participants in both groups had high scores (>2) in fatalism, addiction, distract physicians, disease progression, tolerance, side effects and p.r.n. (taking analgesics as per need but not on an around-clock scheduled basis).
17	Lin (2000) Taiwan	To compare attitudes between cancer patients and their family towards cancer pain management	159 dyads of inpatients and family care givers (total n=318) A teaching hospitals	Cross-sectional	Patients: BQT. BPI-Chinese. ECOG performance status scale. Pain management Index (PMI). Family caregivers: BQT	The patients had high sub-scores of BQT (≥3) in tolerance, disease progression, p.r.n., addiction and side effects. Only 2/3 of them accurately used of prescribed analgesics which significantly had lower BQT total scores than those who were under- medicated (p<0.05). More than 1/2 hesitated taking analgesics at last months and had significantly higher scores in addiction (p<0.01), p.r.n, tolerance and the total BQT (p<0.001); and the hesitance was significantly associated with their family caregivers' BQT scores (p<0.01). Family caregiver's total BQT scores were significantly predictors of patients' accuracy in using analgesics (p<0.05).

Table 3 Overview of Study Characteristics (Continued)

No.	Authors/ Year/ Location	Aims	Population/ Settings	Study Design	Outcome Measures	Main Findings
18	Wills & Wootton	To identify misconceptions and concerns related to	Inpatients (n=48)	Cross sectional	9 common concerns and misconception about analgesia	35 participants had pain; 1/4 avoided taking analgesics when admitted to hospital;

(1999) Hong Kong	cancer pain management among Hong Kong Chinese patients	A teaching hospitals	divided into five subscales: good patients, fatalism, character building, addiction and side effects by Gordon & Ward (1995); Visual Analog Scale.	4/5 did not want to distract physicians with their pain; 2/5 were not willing to disturb nurses with their pain as they thought nurse were very busy and needed to take care of other participants as well; 4/5 agreed that pain was unavoidable and a part of their admission to the hospital; 2/3 believed pain was uncontrollable based on their previous hospitalizing experience; 1/2 believed that analgesics could early cause addiction and should be the last option for pain management; and 2/3 were unwilling to tolerant the side-effects.		
19	Lin & Ward, 1995 Taiwan	To investigate cancer patients' concerns about reporting and using analgesics; and To explore relationship between patients' concerns and their adequacy of analgesic usages	Inpatients (n=63) Five teaching hospitals	Cross sectional	BQT; BPI-Chinese; Pain management index (PMI); Medication sheet.	The most concerns that strongly held by the participants were tolerance, disease progression, time interval and addiction. 4/5 wanted to save analgesics for the worst pain; More than 1/2 hesitated reporting pain at last month and those participants were found having significant higher scores on fatalism, fear of addiction, distracting physicians, concerns about time interval and total BQT; Among the participants (n=36) reported pain at last 24 hours prior to data collection, 2/3 had negative PMI scores which indicated inadequate amount of using analgesics.

Authours

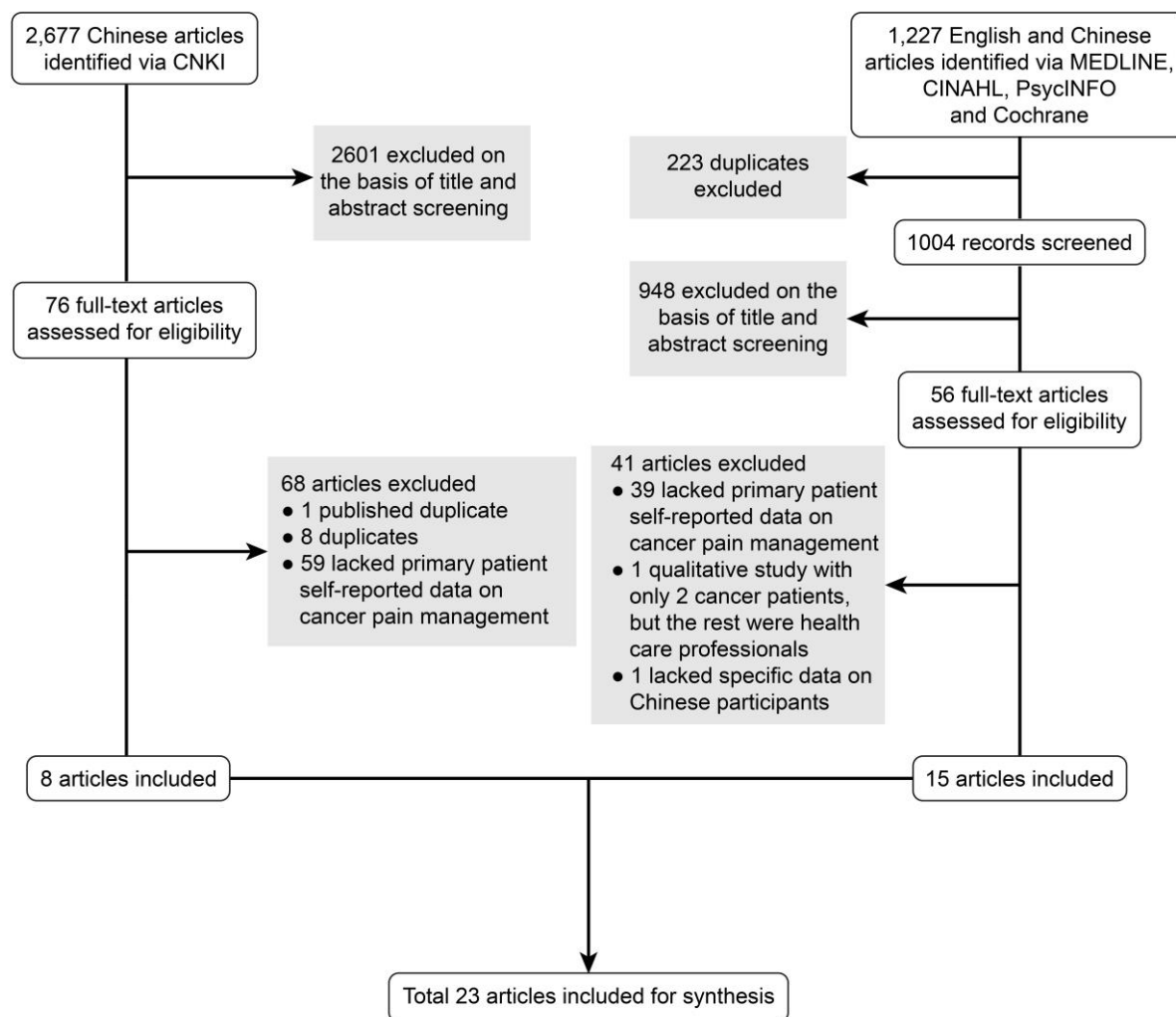


Figure 1. Process and Results of Searching, Screening and Selecting Articles

ST1 Critical Appraisal Results and Level of Evidence for Chinese Studies (Descriptive/Case Series)

No. of study	Critical Appraisal Checklist ^a	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Levels of Evidence ^b
1	Xia (2015)	N	Y	U	U	N/A	N/A	N/A	U	Y	4.b
2	Song (2014)	N	Y	N/A	Y	N/A	N/A	N/A	Y	Y	4.b
3	Pang (2013)	N	N	N/A	Y	N/A	N/A	N/A	Y	Y	4.c
4	Lin (2013)	N	N	N/A	N	N/A	N/A	N/A	U	Y	4.b
5	Hu (2010)	N	N	N/A	N	N/A	N/A	N/A	N	U	4.c
6	Huang (2009)	Y	Y	U	N	Y	N/A	N/A	Y	Y	4.b
7	Chen (2007)	N	Y	Y	Y	Y	N/A	N/A	Y	Y	4.b
8	Lu (2006)	N	N	N/A	N	N/A	Y	N	Y	U	3.e ^d
	Summary^c	N=7, Y=1	N=4, Y=4	N/A=6, Y=1, U=1	N=4, Y=3, U=1	N/A=6, Y=3	N/A=7, Y=1	N/A=7, N=1	Y=5, U=2, N=1	Y=6, U=2	4.b-4.d

^a Joanna Briggs Institute's (2014b, p.181; 187-189) Critical Appraisal Checklist for Descriptive/Case Series Studies:

Q1: Is the study based on a random or pseudo-random sample?

Q2: Are the criteria for inclusion in the sample clearly defined?

Q3: Are confounding factors identified and strategies to deal with them stated?

Q4: Are outcomes assessed using objective criteria?

Q5: If comparisons are being made, is there sufficient description of groups? Q6:

Is follow-up carried out over a sufficient time period?

Q7: Are the outcomes of people who withdraw described and included in the analysis? Q8:

Are outcomes measured in a reliable way? (Include reliability and validity)

Q9: Is appropriate statistical analysis used?

^b Joanna Briggs Institute's (2014a) Levels of Evidences for Effectiveness.

^c Y=Yes, N=No, U=Unclear, N/A=not applicable ^d Baseline data used for the review with level of evidence 4.b.

ST2. Critical Appraisal Results and Level of Evidence for English Studies (Descriptive/Case Series)

No. of study	Critical Appraisal Checklist ^a	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Levels of Evidence ^b
1	Liang et al. (2015)	N	Y	N	N/A	N	N/A	N/A	Y	Y	4.b
2	Liang et al. (2013a)	N	Y	N	N/A	N	N/A	N/A	Y	Y	4.b
	Liang et al. (2013b)	N	Y	N	N/A	N	N/A	N/A	Y	Y	4.b
	Liang et al. (2012)	N	Y	N	N/A	Y	N/A	N/A	Y	Y	4.b
	Liang et al. (2008a)	N	Y	Y	N/A	N	N/A	N/A	N	Y	4.b
3	Tse et al. (2012)	N	Y	Y	N/A	N/A	N/A	N/A	Y	N/A	3.c ^c
4	Tang et al. (2010a)	U	Y	Y	N/A	N	N/A	N/A	N	Y	4.b
	Tang (2010b)	N	Y	Y	N/A	N	N/A	N/A	U	Y	4.b
5	Lai et al. (2004)	U	Y	Y	N/A	N/A	N/A	N/A	U	N/A	2.d ^c
6	Lai et al. (2002)	N	Y	Y	N/A	N	N/A	N/A	Y	U	4.b
7	Lin (2001)	N	Y	N	N/A	Y	N/A	N/A	N	Y	4.b
8	Lin (2000)	N	Y	Y	N/A	N	N/A	N/A	N	U	4.b
9	Wills & Wootton (1999)	N	Y	N	N/A	N/A	N/A	N/A	N	U	4.b
10	Lin & Ward (1995)	N	Y	N	N/A	Y	N/A	N/A	U	U	4.b
	Summary	N=12, U=2	Y=14	Y=7, N=7	14 N/A	Y=3, N=8, N/A=3	N/A=14	N/A=14	Y=6, N=5, U=3	Y=6, N/A=2, U=4	4b-3.c

^a Joanna Briggs Institute's (2014b, p.181, 187-189) Critical Appraisal Checklist for Descriptive/Case Series Studies:

Q1: Is the study based on a random or pseudo-random sample?

Q2: Are the criteria for inclusion in the sample clearly defined?

Q3: Are confounding factors identified and strategies to deal with them stated?

Q4: Are outcomes assessed using objective criteria?

Q5: If comparisons are being made, is there sufficient description of groups? Q6:

Is follow-up carried out over a sufficient time period?

Q7: Are the outcomes of people who withdraw described and included in the analysis? Q8:

Are outcomes measured in a reliable way? (Include reliability and validity)

Q9: Is appropriate statistical analysis used?

^b Joanna Briggs Institute's (2014a) Levels of Evidences for Effectiveness.

^c Y=Yes, N=No, U=Unclear, N/A=not applicable.

^dBaseline data used for the review with level of evidence 4.b.

ST3. Critical Appraisal Results and Level of Evidence for English Study (Qualitative)

No. of study	Critical Appraisal Checklist ^{a,b}	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Level of Evidence ^c
1	Laing et al. (2008b)	U	N	Y	Y	Y	N	Y	Y	Y	Y	3

^aJoana Briggs Institute's (2014b, p.177-179) QARI (Qualitative Assessment and Review Instrument) Critical Appraisal Checklist:

Q1. There is congruity between the stated philosophical perspective and the research methodology. Q2. There is congruity between the research methodology and the research question or objectives. Q3. There is congruity between the research methodology and the methods used to collect data.

Q4. There is congruity between the research methodology and the representation and analysis of data. Q5. There is congruence between the research methodology and the interpretation.

Q6. There is statement locating the researcher culturally or theoretically. Q7. The influence of the researcher on the research, and vice-versa, is addressed. Q8. Participant, and their voice, are adequately represented.

Q9. There is evidence of ethical approval by an appropriate body.

Q10. Conclusion drawn in the research report do appear to flow from the analysis, or interpretation, of the data.

^bY=Yes, N=No, U=Unclear, N/A=not applicable

^cJoana Briggs Institute's (2014a) Levels of Evidence for Meaningfulness.