

Table 1 *Continued*

Authors, (published year), country	Sample and settings	Pain types/ causes	Design	Frameworks/ interventional approach	Intervention	Pain intensity scales	Results: pain intensity	Results: other variables
Price, McBride, Hyerle, and Kivlahan (2007), USA	Female veterans at a women's clinic, n = 14	Chronic pain	Two group, randomized, repeated-measures design	Mindful Awareness in Body-oriented Therapy	A mind-body approach that incorporates massage, mindfulness, and the emotional processing of psychotherapy	Physical Well-being – The Medical Symptoms Checklist	NA	Study participants adhered to study procedures, and 100% attended at least 7 of 8 sessions; all completed in-person post-treatment assessment
Hager and Brockopp (2007), USA	Patients in a 130 bed not-for-profit facility, n = 21	NA	Pre-experimental design using a one group pretest and post-test method	NA	Chronic pain diary was used for 2 weeks	Pain diary including NRS	Following diary implementation, pain levels, pain-related nursing entries, and use of as-needed medication increased (but not statistically significant)	There was a statistically significant increase in the number of scheduled medications
Goeppinger <i>et al.</i> (2007), USA	Participants were recruited from churches, senior centers, n = 416	Any type of arthritis or persistent chronic joint pain	Pretest and post-test control group study	Efficacy-enhancing strategies	Community-based disease self-management interventions using efficacy-enhancing strategies of skill mastery, modeling, symptom reinterpretation, problem solving, and social persuasion	NRS	At 4 months, all participants had statistically significant improvements in pain. Statistically significant differences between the 2 programs at 4 months were seen in pain and disability in both groups	At 4 months, all participants had significant improvements in self-efficacy, stretching and strengthening exercises, aerobic exercises, and general health

Yip <i>et al.</i> (2007), China	Patients with OA of the knee were recruited from the specialist or general outpatient clinic and wellness clinic, IG = 67, CG = 53	OA pain	RCT	Bandura's concept of self-efficacy and behavior change	Six 2 h classes held once a week, with 10–15 participants, led by Registered Nurses, focused on teaching participants how to cope with and manage common knee OA consequence, using stretching exercises, walking, and Tai Chi types of movement: fluid, gentle, relaxed and slow in tempo movements	VAS	Reduction of current arthritis pain (effect size, 0.613; $P = 0.0001$)	At 16 weeks, statistically significant improvement; arthritis self-efficacy level, self-management skills, the duration of light exercise practice, reduction of current arthritis pain and in the ability to perform daily activities among the IG but not for the CG
Elliott, Chapman, and Clark (2007), USA	Patients in the primary pain clinic, n = 36	Persistent pain	Prospective, descriptive, quantitative, exploratory design	Behavioral therapy	Patients were evaluated for activity levels, analgesia, side-effects of medication, adverse behaviors, medication use, and follow-through on previously placed consults in the distance-clinic, behavioral therapy implemented as appropriate		NA	Results showed the use of videoconferencing for this group of patients is useable and satisfactory for both patients and staff, that the patients save time and money

CHAMP, The Calgary Headache Assessment and Management Program; CBT, cognitive-behavior therapy; CG, control group; CWP, chronic widespread pain; FMS, fibromyalgia syndrome; HRQL, health-related quality of life; IG, intervention group; NA, not applicable/available; NRS, Numeric Rating Scale; OA, osteoarthritis; PPI, present pain intensity; RCT, randomized controlled trials; VAS, visual analog scale.

Table 2 Perception on effective pain management among people with chronic pain from qualitative or descriptive research

Authors (published year), country	Data collection methods	Participants	Pain type or causes	Findings
Kawi (2014), USA	Interview	Patients at two pain centers, n = 110	Chronic Low back pain	Perceptions of self-management: taking medications, maintaining physical activity, making wise decisions and changes in lifestyle, using heat and cold applications, rest and relaxation, using other physical and alternative modalities
Stinson <i>et al.</i> (2013), Canada	Semistructured group interview	Young adults aged 18–29 years from two adult tertiary care multidisciplinary chronic pain clinics, n = 17	Chronic pain	Psychological, physical, and pharmacological approaches and development of support systems, particularly highlighted physical and pharmacological strategies and support systems
Bourbonnais and Tousignant (2012), Canada	Semistructured interview	Dialysis patients from a large tertiary care hospital, n = 25	Not specific	Analgesics, exercise, keeping a positive attitude
West <i>et al.</i> (2012), Australia	In-depth interview	As part of the larger study, n = 10	Chronic pain	The meaning of resilience to persons with chronic pain; e.g. recognizing individual strength, looking for the positives in life, not giving in to the pain, developing tolerance to pain, understanding how to manage your pain
Kengen Traska <i>et al.</i> (2012), USA	Group interview	Women with fibromyalgia, n = 8	Fibromyalgia	Main strategies included: pacing/planning, distraction techniques, coping with touch sensitivity, putting on the mask and medications. Social support from others with fibromyalgia and from family members was reported to be very important
Tsai <i>et al.</i> (2010), Taiwan [†]	Questionnaire	Elderly persons from outpatient clinics, n = 1054	Not specific	The three most highly effective self-care strategies for managing pain, excluding having an injection and operation, were acupuncture, changing diet, and meditation
Crowe <i>et al.</i> (2010), New Zealand	Semistructured interview	Participants were recruited via two different avenues, n = 64	Chronic low back pain	The most common strategies used by participants to manage their chronic low back pain were medication, exercise, and application of heat. The nominated healthcare professionals were predominantly physiotherapists and GPs. Most participants recognized exercise as effective, were generally resistant to taking medication regularly, and found that application of heat relieved the pain

Gudmannsdottir and Halldorsdottir (2009), Iceland	Interview	Residents in the three nursing homes, n = 12	Chronic pain	Sources of strength and joy in the lives and being able to keep their health considerably good; visits or phone calls from loved ones and a token of being cared for, taking part in physical exercises alone or in a group, going out in the sun and staying there
Chiou <i>et al.</i> (2009), Taiwan [†]	Interview and questionnaire	Older persons diagnosed with either rheumatoid arthritis or osteoarthritis from two medical centers, n = 151	OA	The most effective methods included taking prescribed medications, using assistive devices and self-talking. (the three least effective techniques were ignoring the pain, alternative medical therapies, and over-the-counter medications)
Meghani and Cho (2009), USA [†]	Telephone survey	Nationwide telephone survey, n = 902	Any type of pain	There was an inverse relationship between age and perception that complementary and alternative medicine (CAM) was effective for pain. Individuals with higher average daily pain were also less likely to perceive CAM as effective
Tsai <i>et al.</i> (2008), Taiwan [†]	Questionnaire	Elderly participants were recruited by convenience sampling from three outpatient clinics at a medical center, n = 205	OA	Taking a rest, do not move, lying down on a bed, going to sleep, massaging the pain site, using a heating pad. The most effective strategies were stopping one's activity (e.g. take a rest, go to sleep, lie down) and massage (e.g. use a heating pad)
Chung and Wong (2007), Hong Kong [†]	Questionnaire	Subjects were recruited by random digit dialing sampling, n = 1,853	Not specific	Pain relief methods: seeking medical advice was the most common relief measure taken to alleviate pain. Both traditional Chinese medicine and alternative methods were popular

[†]Cross-sectional study. OA, osteoarthritis.

Goeppinger *et al.* (2007) reported that statistically significant differences in pain intensity were not maintained at 12 months.

The chronic pain management strategies mentioned above were adapted on the basis of several theoretical frameworks or approaches, including cognitive-behavioral therapy (CBT), mind-body (Menzies & Kim, 2008) or mindful awareness approaches (Kristjánssdóttir *et al.*, 2011), acceptance and commitment therapy (Barrett, Heller, Stone, & Murase, 2013; Kristjánssdóttir *et al.*, 2013; Nes *et al.*, 2013), concept of self-efficacy and behavior change (Davis & White, 2008; McGillion *et al.*, 2008; Wu, Kao, Wu, Tsai, & Chang, 2011; Yip *et al.*, 2007), and Roger's theory of science of unitary human beings (Onieva-Zafra *et al.*, 2013).

Perspectives of pain management strategies among patient with chronic pain from qualitative and descriptive research

Twelve studies reported the perceptions of effective pain management strategies from individuals with a chronic condition of pain. For example, people perceived that pharmacotherapy, physical activity, support from friends and family members, acupuncture, heating, rest, diets, and lifestyle changes were effective for chronic pain management (Bourbonnais & Tousignant, 2012; Chiou, Lin, & Huang, 2009; Chung & Wong, 2007; Crowe, Whitehead, Jo Gagan, Baxter, & Panckhurst, 2010; Gudmannsdóttir & Halldorsdóttir, 2009; Kawi, 2014; Kengen Traska, Rutledge, Mouttapa, Weiss, & Aquino, 2012; Meghani & Cho, 2009; Stinson *et al.*, 2013; Tsai, Chu, Lai, & Chen, 2008; Tsai, Liu, & Chung, 2010). An interpretive qualitative study reported that people with chronic pain explained that "recognizing individual strength", "accepting pain", "looking for the positive aspects of life", and "learning to accept help" were frequently used coping strategies for living with chronic pain (West, Stewart, Foster, & Usher, 2012). Kawi (2014) reported that medication and maintaining physical activity were predominant strategies for self-management. A content analysis of experience among women with fibromyalgia revealed that the primary strategies for coping with pain were "pacing or planning", "distraction techniques", "coping with touch sensitivity", "putting on a mask", and "medications" (Kengen Traska *et al.*, 2012).

Individuals with chronic pain reported that they sought social supports for their pain management. For example, participants stated their family members and friends offered support and made them feel stronger, although they were facing adversity (West *et al.*, 2012).

Another study reported that individuals with fibromyalgia found that talking to a friend and participating in support groups for fibromyalgia were useful for pain management (Kengen Traska *et al.*, 2012).

DISCUSSION

Herein, we reviewed strategies for pain management in individuals with chronic pain and examined the effectiveness of these strategies; therefore, nurses and researchers could consider and adopt these as chronic pain management strategies. Several studies used multidisciplinary and multimodal interventions as pain management strategies for people with chronic pain and reported effective pain relief. For example, education for individuals with chronic pain was used in conjunction with pain relief strategies such as pharmacological therapy, relaxation, and physical activity that were often provided by a multidisciplinary team. Because chronic pain is intractable, persistent, and has physical and psychosocial effects, the multimodal and interprofessional teamwork approaches were exceedingly important (AGS Panel on Persistent Pain in Older Persons, 2002). The long-term effectiveness of pain relief was not satisfactory and should be explored further in research.

According to qualitative studies, individuals with chronic pain perceived that social supports were effective for their pain management. For example, talking with their family or friends and participation in patient groups were effective in managing pain (Kengen Traska *et al.*, 2012; West *et al.*, 2012). However, the effectiveness of social supports was not examined in trials. The social resources that remain close to individuals with chronic pain may work over long periods with minimal costs. In contrast, Dysvik, Natvig, Eikeland, and Lindstrøm (2005) found that the most predominant stressors among people with chronic pain were family life and social activities. Social interactions with family members or friends for individuals experiencing pain, as well as the impact of these interactions, are complex. However, supporting families to help them cope with pain and to protect against future crises could be a worthwhile approach for nurses (Lewandowski, Morris, Draucker, & Risko, 2007; West *et al.*, 2011); this area should be examined further.

Although a high prevalence of pain among people living in nursing homes (Takai, Yamamoto-Mitani, Okamoto, Koyama, & Honda, 2010) was reported, we found little research that focused on individuals living in nursing homes or those with dementia or mental illness. Eight studies excluded people with cognitive impairment

or diagnoses of mental disease. Pain often has psychological consequences, such as depression, anxiety, or behavioral and psychological symptoms of dementia (Husebo, Ballard, & Aarsland, 2011; Smalbrugge, Jongenelis, Pot, Beekman, & Eefsting, 2007). A systematic review described only three studies that supported the notion that pain management reduced agitation (Husebo *et al.*, 2011). However, intervention for vulnerable individuals should be explored; further studies are important.

Limitations

There are some limitations to this review. This review examined recent studies; therefore, long-term trends in pain management were not identified. Furthermore, studies in this review were identified by searching databases. Thus, it is possible that not all studies related to chronic pain management were identified.

Implications in daily practice

Pain management provided through multidisciplinary and multimodal approaches that used CBT concepts and self-efficacy to manage pain were effective for individuals with chronic pain. Because many people suffer from pain in our Japanese society, these strategies should be provided by general healthcare specialists, as well as those in pain clinics, and target individuals in the community through outpatient facilities, community centers, and long-term care facilities. Individuals with chronic pain also stated that they accepted pain and were committed to valued behaviors that included pacing themselves and optimism, which are important concepts in CBT. However, among nurses, a lack of education or training in CBT principles have been identified (Richardson *et al.*, 2006). Continuous education for nurses and the development of systematic approaches to pain management should be explored further.

CONCLUSIONS

This review aimed to identify strategies for pain management in individuals with chronic pain and to explore the effectiveness of pain relief. Multidisciplinary and multimodal approaches were often used in chronic pain interventions. Chronic pain management strategies were adapted on the basis of several theoretical frameworks, such as CBT, mind-body approaches, and concepts of self-efficacy. Individuals with chronic pain perceived that social supports were effective for their pain man-

agement. Further studies regarding the intervention of individuals with cognitive impairment or mental illness were facilitated.

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CONFLICT OF INTEREST

None of the authors have any known conflicts of interest.

AUTHOR CONTRIBUTION

Conception and design of the study: Y. T., N. Y. M., Y. A., and S. M.; acquisition of data: Y. T., N. Y. M., Y. A., and S. M.; analysis and interpretation of data: Y. T., N. Y. M., Y. A., and S. M.; drafting the article: Y. T. and N. Y. M.; critical revision for important intellectual content: Y. T.; final approval of the manuscript: Y. T., N. Y. M., Y. A., and S. M.

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Differences between Nurses' and Care Workers' Estimations of Pain Prevalence among Older Residents

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■ ABSTRACT:

A high prevalence of pain and difficulties with pain assessment has been widely reported among residents of long-term-care facilities. We explored nurses' and care workers' estimations of residents' pain (both general and chronic) and the number of residents with unknown pain status. We also examined the relationship between the prevalence of pain and assessment strategies undertaken by nurses and care workers. A cross-sectional design was used. Nurses and care workers across 750 long-term care facilities in four Japanese prefectures were asked to participate. Questionnaires were administered to one nurse and care worker at each facility. The questionnaires assessed the estimated numbers of residents who had pain in general, chronic pain, or unknown pain status on the day of data collection, and pain assessment strategies use by the health care professionals. In all, 263 (17.5%) questionnaires were returned from 147 nurses (55.9%) and 116 care workers (44.1%). The nurses' and care workers' median estimations of pain and chronic pain prevalence among residents were 11.6 and 9.4 and 29.4 and 15.5, respectively ($p < .001$). Estimations of pain prevalence were significantly higher among nurses who had observed signs of pain among residents in the previous month ($p = .04$) and who applied a multidisciplinary approach to pain assessment and management ($p = .007$) than among nurses who did not do either. Nurses and care workers had relatively low estimations of the prevalence of pain among their residents. Staff should undertake appropriate and sufficient pain assessments in order to improve their understanding of residents' pain.

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INTRODUCTION

Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (International Association for the Study of Pain, 2011). Pain is primarily conceptualized as a subjective experience. Therefore, obtaining self-reports regarding pain is an important way of facilitating information sharing regarding health problems between health care professionals and individuals suffering from pain.

Older people often have problems with pain. They are more likely to suffer from pain due to chronic illness and age-related changes, such as osteoarthritis, postherpetic neuralgia, trigeminal neuralgia, and central pain after stroke (AGS Panel on Persistent Pain in Older Persons, 2002). These conditions often cause considerable pain among older residents of aged care facilities. Previous studies have demonstrated that 50% to 70% of nursing home residents report being in pain (Boerlage, van Dijk, Stronks, de Wit, & van der Rijt, 2008; Cadogan et al., 2008; Smalbrugge, Jongenelis, Pot, Beekman, & Eefsting, 2007). Other studies have reported that approximately 50% of residents have suffered from chronic pain lasting for more than 3 months (Leong & Nuo, 2007; Won et al., 2004). Pain often causes negative effects for older residents, such as depression, reduced physical ability, and poor sleep quality (Anzai, Shiba, & Haga, 2012; Boerlage et al., 2008; Zanolchi et al., 2007). Therefore, health care professionals must be able to detect problems related to pain and manage them appropriately.

Some issues related to pain among residents at aged care facilities have been raised. Older residents are sometimes reluctant to report their pain to health care staff as a result of stoicism (Hadjistavropoulos, Fitzgerald, & Marchildon, 2010). Japanese older residents have noted that they did not always report their pain to staff; they also believed the pain to be a part of the aging process (Takai, Yamamoto-Mitani, & Ko, 2013). Furthermore, older residents often are unable to report their pain to staff due to physical disability or cognitive impairment (AGS Panel on Persistent Pain in Older Persons, 2002; Takai et al., 2010). In Japan, more than 90% of residents in aged care facilities have some form of cognitive impairment (Ministry of Health Labour and Welfare, 2009). In such circumstances, it is important that health care staff have the necessary skills to appropriately identify and assess pain among their residents.

Residential aged care facilities in Japan play an important role in providing rehabilitation and extended-care services to older adults who have been discharged from the hospital under a long-term care

insurance system. The system was established for the systematic provision of health care services that allow these individuals to stay in their homes for as long as possible. At these facilities, a high prevalence of pain has been reported among older residents (Takai et al., 2013), and pain could lead to negative consequences for their rehabilitation. Therefore, staff there must be able to identify and manage pain and its associated problems among residents, which would then facilitate the rehabilitation of these patients.

The importance of pain assessment performed by staff for residents at aged care facilities and the difficulties nurses and care workers encounter in assessing residents' pain have frequently been documented in previous studies (e.g., Takai & Uchida, 2009). Nurses' negative beliefs about the use of pain assessment tools (Young, Horton, & Davidhizar, 2006), lack of recognition of pain, and insufficient education and training (McAuliffe, Nay, O'Donnell, & Fetherstonhaugh, 2009), as well as the importance of observing pain behaviors among residents (Mentes, Teer, & Cadogan, 2004) have been reported. Another Japanese study reported that, compared with care workers, nurses tend to misunderstand the behaviors and perceptions of pain among aged care residents. For example, nurses tend to believe older residents have no pain when they do not complain of it (Takai & Uchida, 2009). This may be due to the fact that there are fewer nurses than care workers at aged care facilities, and nurses are more likely to deal with medical procedures in Japan. Care workers handle the day-to-day care of residents, and thus are more likely to encounter residents' pain. Furthermore, only 4.3% of Japanese aged care facilities provide in-service education for staff on pain management (Takai, Yamamoto-Mitani, Fukahori, Kobayashi, & Chiba, 2013). Both groups of health professionals have responsibilities in the appropriate assessment and management of residents' pain. However, studies exploring the number of residents with pain identified by care workers and nurses working at these facilities, or how such identification is associated with assessment strategies employed by health care personnel to ascertain residents' pain status have been few. To better understand how nurses and care workers identify pain in their residents, it is important to detect problems in the assessment strategies of pain in aged care.

Aims

The purpose of this study was to explore estimations by nurses and care workers of the prevalence of pain in general, chronic pain, and the number of residents whose pain status is unknown among residents of Japanese long-term care facilities. A second purpose was to examine the relationship between estimated pain

prevalence and the pain assessment strategies used by both nurses and care workers.

MATERIALS AND METHODS

Design, Settings, and Participants

A cross-sectional design was employed. The study sample consisted of nurses and care workers across all long-term aged care facilities in four Japanese prefectures in the Kanto region ($N = 750$, including two types of facilities, denoted in Japanese as *kaigorojin-bokenshisetsu* [$n = 593$] and *kaigoryoyogata-iryoshisetsu* [$n = 157$]). Prefectures that were affected by the Great East Japan Earthquake in 2011 were excluded from this study.

Questionnaires with accompanying letters requesting participation in the study were sent to the facilities' nursing managers or administrators. If they agreed to participate, they were asked to choose a residential ward and distribute the questionnaires to a full-time nurse and a full-time care worker (i.e., two employees from each facility were included in the sample).

Data Collection Items

The questionnaire consisted of four parts: 1) the characteristics of the participants, and their wards and facilities; 2) the number of residents in each selected ward who suffered from pain in general, chronic pain, and whose pain status was unknown; 3) perceptions of nurses and care workers regarding pain and pain care; and 4) implementation of pain assessments for residents during the previous month.

First, we explored participants' backgrounds by recording their types of licenses, age, sex, and years of experience as a nurse or care worker. We also evaluated the characteristics of the wards in which they worked, recording ward type, number of residents, number of residents receiving respite care, and number of full- and part-time nurses. Finally, we asked about the characteristics of the participants' facilities, including the age of the facility (in years), the availability of policies regarding pain management, and any in-service education on pain within the past year.

Second, participants estimated the number of residents in their ward who suffered from pain in general, the number who suffered from chronic pain, and the number whose pain status was unknown. The questions were as follows: "At your ward, how many residents complain of pain or may be suffering from pain?" "At your ward, how many residents complain of chronic pain or may be suffering from chronic pain?" and "At your ward, how many residents do you not know the pain status of?" The definition of chronic pain in this

study, for example, pain lasting for longer than 1 month, was based on previous studies in Japan (Akamine & Masaki, 2002; Kasai & Tajita, 2001). This was because the average length of stay among aged care facility residents was 98.8 days (Welfare and Medical Service Agency, 2011), we decided that a period of more than 1 month would be appropriate for determining chronic pain in residents among staff there.

Third, we assessed participants' perceptions of pain and pain care. We devised the following items via literature reviews of studies related to pain management in nursing homes (Kaasalainen, 2007; Takai & Uchida, 2009): "Older adults feel less pain than do younger people"; "I do not have enough time to provide care for residents in pain"; "I am satisfied with the pain care strategies that are provided to residents in my facility"; "I think that residents at my ward need chronic pain management strategies"; "I have enough knowledge and skills to assess and manage residents' pain"; and "I have doctors, nurses, or other health professionals whom I could ask about pain management strategies for residents when necessary." The participants were asked to what extent they agreed with each statement by choosing responses from a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

Finally, we asked participants to provide information on the implementation of pain assessment strategies for residents during the past month, using the assessment portion of a set of guidelines on recommendations for pain and chronic pain management at residential aged care facilities. This set of guidelines was developed by the authors of this study by integrating the contents of 16 guidelines on pain management (e.g., AGS Panel on Persistent Pain in Older Persons, 2002; British Pain Society and British Geriatrics Society, 2007; Hadjistavropoulos et al., 2007). In these guidelines, 42 strategies—including 19 assessment strategies and 23 interventional strategies selected by consensus among pain medicine and aged care experts—were recommended for nurses and care workers. In this study, only the 19 assessment strategies were covered. We asked whether pain assessment strategies for residents were implemented within the past month (answer options were "yes" or "no").

Data Collection Procedure

Questionnaires with enclosed letters explaining the purpose of the study were sent in May 2013 to nursing managers or administrators of the 750 aged care facilities we surveyed. After the nurses or care workers agreed to participate, they were asked to complete the questionnaire within 2 weeks, place the completed questionnaire in an envelope without revealing their name, and return it to the researchers.

Ethical Considerations

Each facility's nursing managers, administrators, and participating nurses and care workers were provided with a written letter stating the purpose and methods of the study; the risks, benefits, and voluntary nature of participation; and their right to refuse participation. Nurses and care workers were regarded as having consented to participate in the study when they completed and returned the questionnaire, which was anonymous, to the researchers. The study was approved by the research ethics committee of Gunma University.

Data Analysis

Because a majority of the data were not normally distributed, data analysis was conducted via nonparametric statistical methods. The nurses' and care workers' characteristics and assessment strategies were compared using the Mann-Whitney U test or χ^2 test. The prevalence of pain in general, chronic pain, and unknown pain status was calculated via the estimated numbers of residents with pain in general, chronic pain, or unknown pain status divided by the total number of residents in the wards, and multiplied by 100. Spearman's rank correlation coefficient or the Mann-Whitney U test was used to assess the associations between nurses' and care workers' estimations of pain and their characteristics, perceptions regarding pain and pain care, and implementation of pain assessment strategies. All data were analyzed using IBM SPSS Statistics 22.

RESULTS

In all, 263 (17.5%) questionnaires were returned; 147 (55.9%) were from nurses and 116 (44.1%) were from care workers. Table 1 displays the nurses' and care workers' demographic information, as well as the characteristics of their wards and facilities. A majority of the nurses were women ($n = 136$, 92.5%), whereas just over half of the care workers were women ($n = 68$, 58.6%). Median years of experience as a nurse or care worker were 23 years and 11 years, respectively. Statistically significant differences between nurses and care workers were observed in terms of their age and work experience ($p < .001$). A policy or guidelines regarding pain management were available at 27 (10.7%) facilities, while in-service pain education within the past year was provided at 26 (10.3%) facilities. The median numbers of residents and residents receiving respite care were 49 and 1 for nurses and 47 and 1 for care workers, respectively.

Care workers' estimations of pain prevalence among residents in their ward (median: 29.4%) were significantly higher than those of nurses (11.6%, $p <$

.001). Furthermore, care workers' estimations of the prevalence of chronic pain among residents in their wards (median: 26.7%) were significantly higher than those of nurses (15.8%, $p < .001$). However, there was no significant difference between nurses and care workers ($p = .626$) in their estimations of the number of residents whose pain status was unknown.

Assessment Strategies Employed by Nurses and Care Workers

Implementation of pain assessment strategies among nurses and care workers was examined (Table 2). "Using a pain map to identify the location of pain," "considering the use of screening tools to detect neuropathic pain," "identifying validated assessment tools that the resident can easily use," and "considering the levels of residents' physical functions, and using scales under good lighting with large printed letters" were used less frequently by both nurses and care workers compared with other strategies.

Perceptions Regarding Pain and Pain Care

Eighty-two (57.0%) nurses and 72 (63.2%) care workers strongly disagreed or disagreed with the statement, "older adults feel less pain than do younger people" (Table 3). Sixty-six nurses (45.5%) and 28 care workers (24.6%) agreed or strongly agreed with the statement, "I have enough knowledge and skills to assess and manage residents' pain."

Relationship Between Estimated Pain Prevalence and Relevant Pain Assessment Strategies

The nurses who observed signs of pain among their residents during the previous month, who considered various explanations for the pain experienced by older adults, and who used a multidisciplinary teamwork approach in assessing and managing pain had significantly higher estimations of the prevalence of pain than those who did not ($p = .042$, .007, and .007, respectively; Table 4). For care workers, those who considered various explanations for the pain had a significantly higher estimation of the prevalence of pain than those who did not ($p = .043$).

Relationship Between Estimated Chronic Pain Prevalence and Relevant Pain Assessment Strategies

The nurses who searched for nonverbal and behavioral signs of pain among their residents during the previous month, who considered various explanations for pain among older people, and who applied a multidisciplinary approach to pain assessment and management had significantly higher estimations of the prevalence

TABLE 1.
Characteristics of participants, facilities and wards

	Nurses (n = 147)				Care Workers (n = 116)				p*
	n	%	Medi	Interquartile Range	n	%	Medi	Interquartile Range	
Participants									
Age (y)	147		49.0	41.0-57.0	115		37.0	32.0-45.5	<.001
Work experience as a nurse or care worker (y)	147		23.0	15.0-30.0	116		11.0	8.0-15.0	<.001
Sex									
Female	136	92.5			68	58.6			
Male	11	7.5			48	41.4			
License[†]									
Registered nurse	124	84.4			-				
Assistant nurse	47	32.0			-				
Certified care worker	2	1.4			111	95.7			
Home helper	-				75	64.7			
Care manager	38	25.9			-				
Facilities									
Existence of the facility (y)	139		12.0	7.0-16.0	110		13.0	9.0-16.0	.355
Policies regarding pain management									
Not available	130	90.9			95	87.2			
Available	13	9.1			14	12.8			
In-service pain education within a year									
No	132	91.0			130	90.9			
Yes	13	9.0			13	9.1			
Wards									
Types of ward									
General	95	64.6			87	75.0			
Dementia care	24	16.3			12	10.3			
Small unit [‡]	13	8.8			8	6.9			
Other/No answer	15	10.2			9	7.8			
Number of nurses									
Full time	144		5.0	3.0-8.0	110		4.5	3.0-7.0	.037
Part time	136		2.0	1.0-4.0	102		1.0	1.0-4.0	.200
Number of residents	146		49.0	39.0-60.0	116		47.0	37.0-52.0	.055
Number of residents receiving respite care	140		1.0	0-4.0	108		1.0	0-3.0	.887
Estimated prevalence of residents with pain	141		11.6	6.1-28.8	109		29.4	16.5-56.8	<.001
Estimated prevalence of residents with chronic pain	139		9.4	4.0-20.6	108		15.5	7.5-35.1	<.001
Estimated rate of the residents whose pain status was unknown	133		14.0	5.3-37.9	98		16.5	6.1-37.5	.626

*The two groups of nurses and care-workers were compared using Mann-Whitney *U* test.

[†]Multiple answer questions.

[‡]A small unit often consists of <10 residents and provides their own kitchen and day room in the units.

of chronic pain than did other nurses ($p = .027, .010$, and $.035$, respectively; Table 5). For care workers, those who directly asked residents about their pain had a significantly higher estimation of the prevalence of chronic pain than did those who did not use this strategy ($p = .027$).

Relationship Between the Number of Residents with Unknown Pain Status and Relevant Pain Assessment Strategies

Overall, a statistically significant but weak negative correlation between the number of residents receiving respite services and the number of residents with

TABLE 2.
Implementation of Assessment Strategies among Nurses and Care Workers

	Nurse				Care Workers				<i>p</i> *	
	Implemented within Last Month				Implemented within Last Month					
	No		Yes		No		Yes			
	n	%	n	%	n	%	n	%		
1	Using a two-part approach: observation techniques and residents' pain self-reports.	10	6.9	135	93.1	10	8.8	103	91.2	.641
2	Searching for nonverbal and behavioral signs of pain.	5	3.4	140	96.6	5	4.4	108	95.6	.752
3	Conducting regular pain assessments such as upon admission, during periodic scheduled assessments, and whenever a change occurs in residents' conditions.	40	27.6	105	72.4	45	39.8	68	60.2	.045
4	Considering various pain explanations by older people.	18	12.5	126	87.5	31	27.4	82	72.6	.004
5	Asking residents directly about pain because they might not report their pain.	9	6.3	135	93.8	13	11.5	100	88.5	.178
6	Attempting to assess pain by directly querying the patients who have cognitive impairments.	3	2.1	141	97.9	10	8.8	103	91.2	.020
7	Evaluating pain characteristics, location, duration, and precipitating and relieving factors.	16	11.0	129	89.0	31	27.9	80	72.1	.001
8	Conducting pain assessment despite reporting slight pain.	49	33.8	96	66.2	57	51.8	53	48.2	.005
9	Using a pain map to identify the location of the pain.	123	84.8	22	15.2	101	90.2	11	9.8	.260
10	Assessing biological types of pain and contributing factors and barriers to treatment.	71	49.7	72	50.3	84	75.7	27	24.3	<.001
11	Considering the use of screening tools to detect neuropathic pain.	131	92.9	10	7.1	105	94.6	6	5.4	.796
12	Identifying validated self-assessment tools that the residents can easily use.	126	88.1	17	11.9	103	92.0	9	8.0	.405
13	Considering the levels of residents' physical functions, and using scales under good lighting and with large printed letters.	119	82.6	25	17.4	88	79.3	23	20.7	.521
14	Repeating instructions and giving adequate time to respond when residents have cognitive impairments.	58	40.0	87	60.0	51	45.5	61	54.5	.377
15	Offering additional assistance via self-reports using suitably adapted scales and facilitation by skilled professionals when residents have moderate to severe communication problems.	81	55.9	64	44.1	70	61.9	43	38.1	.373
16	Monitoring various factors related to chronic pain on an ongoing basis.	35	24.1	110	75.9	45	39.8	68	60.2	.010
17	Including the evaluation of effectiveness of past pain-relieving treatments.	72	49.7	73	50.3	75	66.4	38	33.6	.008
18	Identifying concerns regarding current pain treatment and health of residents.	35	24.6	107	75.4	28	25.5	82	74.5	.885
19	Using multidisciplinary teamwork for pain assessment and management.	45	31.3	99	68.8	23	21.1	86	78.9	.086

* χ^2 tests.

TABLE 3.
Participants' Perception Regarding Pain and Pain Care

	Nurses						Care Workers									
	Strongly Disagree		Disagree		Agree		Strongly Agree		Disagree		Agree		Strongly Agree			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Older adults feel less pain than younger people	22	15.3	60	41.7	41	28.5	21	14.6	32	28.1	40	35.1	30	26.3	12	10.5
I do not have enough time to provide care for residents in pain	9	6.2	45	30.8	68	46.6	24	16.4	6	5.2	20	17.4	60	52.2	29	25.2
I am satisfied with the pain care strategies that were provided to residents in my facility	34	23.3	70	47.9	35	24.0	7	4.8	30	26.3	65	57.0	17	14.9	2	1.8
I think that residents in my ward need chronic pain management strategies.	4	2.8	36	25.0	70	48.6	34	23.6	2	1.8	20	17.7	50	44.2	41	36.3
I have enough knowledge and skills to assess and manage residents' pain	18	12.4	61	42.1	59	40.7	7	4.8	39	34.2	47	41.2	26	22.8	2	1.8
I have the doctors, nurses, or other health professionals whom I could ask about pain management strategies for residents when I need	6	4.1	23	15.8	37	25.3	80	54.8	2	1.7	9	7.8	41	35.7	63	54.8

unknown pain status was observed ($r = -0.23$; $p < .05$; Table 6). Among care workers, those who received in-service pain education ($n = 10$) had a significantly higher estimation of the number of residents whose pain status was unknown than did those who did not use this strategy ($p = .044$). Care workers who considered various explanations for residents' pain had a significantly lower estimation of the number of residents whose pain status was unknown than those who did not use this strategy ($p = .046$). However, no significant relationship was observed between nurses' estimations of the prevalence of unknown pain status and pain assessment strategies they employed.

DISCUSSION

The results of this study indicated that nurses and care workers tended to estimate the prevalence of pain in general as well as chronic pain to be as low as 10% to 30% among residents of aged care facilities. However, care workers' estimations of the prevalence of pain and chronic pain among residents were significantly higher than those of nurses. The prevalence of residents' self-reported pain has been found to be 60% to 80% in previous studies of long-term care residents (van Herk et al., 2009), while proxy reports place the prevalence at around 50% (Takai et al., 2013; Zwakhalen, Koopmans, Geels, Berger, & Hamers, 2009); thus, care workers' estimations might be relatively closer to residents' self-reported pain prevalence, despite the low estimations found in the current study. Both nurses and care workers in this study generally did not use tools or scales to support their pain assessment, which potentially caused these low estimations. Improvements in assessments should be undertaken to comprehend pain problems among residents.

A lower estimation of the prevalence of pain in general and that of chronic pain by nurses, as compared with care workers, was found in this study, although nurses reported more frequently performing most of the assessment strategies. One potential explanation might be that the nurses were older and thus had worked with slightly more residents than did the care workers. Additionally, the nurses might have been in a supervisory position in the ward, which would have made it difficult for them to directly assess and comprehend the residents' pain status. Care workers are normally involved with direct care related to residents' daily living, and thus may have been more likely to encounter residents complaining of pain. Although the nurses may have had limited accessibility to the residents, they were responsible for providing medical treatment support, the administration of medication, monitoring residents' health status, and ensuring

TABLE 4.
Relationship between Estimated Prevalence of Pain in General among Nurses and Care Workers and Factors Related to It

	Nurses					Care Workers				
	Prevalence (%)					Prevalence (%)				
	n	Medi	Interquartile range	r*	p	n	Medi	Interquartile range	r*	p
Assessment strategies										
Searching for nonverbal and behavioral signs of pain.										
No	5	2.8	0.0-6.7			5	35.3	20.0-37.1		.947 [†]
Yes	134	12.7	6.3-28.8		.042 [†]	102	29.2	16.4-56.8		
Considering various pain explanations by older people.										
No	18	7.4	3.3-15.4			30	23.5	11.7-38.5		.043 [†]
Yes	120	14.4	6.4-29.9		.007 [†]	77	33.3	17.9-62.7		
Using multidisciplinary teamwork for pain assessment and management.										
No	42	7.7	4.0-19.6			21	24.5	12.5-50.0		.181 [†]
Yes	96	15.9	6.8-29.9		.007 [†]	81	33.3	17.2-57.7		
Facilities										
Policies regarding pain management										
No	125	13.3	6.7-28.8			91	29.2	16.6-52.1		.943 [†]
Yes	12	6.2	5.5-9.3		.051 [†]	12	26.7	10.5-78.4		
In-service education within a year										
No	127	11.6	6.6-28.1			90	29.2	16.4-51.7		.905 [†]
Yes	12	12.7	5.5-30.0		.822 [†]	11	23.8	12.3-57.2		
Number of										
Total residents	141			-0.17	.042	109			-0.22	.024
Respite care residents	136			0.04	.661	104			-0.07	.490
Full-time nurses	139			-0.28	<.001	106			-0.16	.100
Experience as a nurse or a care worker (y)	141			-0.08	.348	109			-0.07	.463
Perceptions regarding pain and pain care [‡]										
Older adults feel less pain than younger people	138			-0.12	.151	108			-0.13	.172
I do not have enough time to provide care for residents in pain	140			0.19	.022	109			0.10	.294
I am satisfied with pain care strategies that were provided to residents in my facility	140			-0.16	.058	109			-0.09	.361
I think that residents in my ward need chronic pain management strategies.	138			0.27	.002	107			-0.11	.262
I have enough knowledge and skills to assess and manage residents' pain	139			-0.05	.582	109			0.04	.683
I have the doctors, nurses, or other health professionals whom I could ask about pain management strategies for residents when I need	140			-0.13	.115	109			-0.10	.283

*Spearman's rank correlation coefficient.

[†]The two groups of yes and no were compared using Mann-Whitney *U* test.

[‡]Perceptions regarding pain and pain care were entered as an ordinal variable, *strongly disagree* (1) to *strongly agree* (4).

TABLE 5.
Relationship between Estimated Chronic Pain Prevalence among Nurses and Care Workers and Factors Related to It

	Nurses					Care Workers					
	Prevalence (%)					Prevalence (%)					
	n	Medi	Interquartile range	r^*	p	n	Medi	Interquartile range	r^*	p	
Assessment strategies											
Searching for nonverbal and behavioral signs of pain.											
No	5	0.0	0.0-0.0		.027 [†]	5	10.0	7.1-35.3		.623 [†]	
Yes	132	10.0	4.2-21.2			101	15.6	7.5-33.3			
Considering various pain explanations by older people.											
No	18	5.2	0.0-12.6		.010 [†]	30	12.7	5.6-29.2		.158 [†]	
Yes	118	10.6	4.3-22.2			76	20.0	7.5-39.2			
Asking residents directly about pain because they might not report their pain.											
No	9	19.4	9.1-20.8		.333 [†]	13	12.2	2.6-20.0		.027 [†]	
Yes	127	8.8	4.0-21.0			93	17.2	7.5-37.1			
Using multidisciplinary teamwork for pain assessment and management.											
No	41	6.6	2.0-15.0		.035 [†]	21	12.2	7.5-20.0		.065 [†]	
Yes	95	11.1	5.2-21.7			80	20.0	7.6-37.8			
Facilities											
Policies regarding pain management											
No	123	10.0	4.1-20.6		.210 [†]	90	15.2	7.5-33.3		.860 [†]	
Yes	12	5.6	3.8-8.3			12	16.1	3.2-64.6			
In-service education											
No	126	9.5	4.1-20.8		.544 [†]	90	15.5	7.5-33.3		.421 [†]	
Yes	11	7.7	3.8-15.3			10	10.0	7.1-38.5			
Number of											
Total residents	139				-0.18	.036	108			-0.14	.139
Respite care residents	135				0.03	.702	103			-0.06	.561
Full-time nurses	137				-0.27	.002	105			-0.06	.518
Experience as a nurse or care worker (y)	139				-0.02	.832	108			-0.09	.374
Perceptions regarding pain and pain care [‡]											
Older adults feel less pain than younger people	136				-0.16	.071	107			-0.12	.234
I do not have enough time to provide care for residents in pain	138				0.18	.033	108			0.16	.103
I am satisfied with pain care strategies that were provided to residents in my facility	138				-0.13	.132	108			-0.11	.274
I think that residents in my ward need chronic pain management strategies.	136				0.26	.003	106			-0.02	.830
I have enough knowledge and skills to assess and manage residents' pain	137				-0.03	.737	108			-0.01	.958
I have the doctors, nurses, or other health professionals whom I could ask about pain management strategies for residents when I need	138				-0.16	.059	108			-0.01	0.887

*Spearman's rank correlation coefficient.

[†]The two groups of yes and no were compared using Mann-Whitney U test.

[‡]Perceptions regarding pain and pain care were entered as an ordinal variable, *strongly disagree* (1) to *strongly agree* (4).

TABLE 6.
Relationship between Percentages of the Residents Whose Pain Status was Unknown, among Nurses and Care Workers and Factors Related to It

	Nurses					Care Workers				
	Prevalence (%)					Prevalence (%)				
	n	Medi	Interquartile Range	<i>r</i> *	<i>p</i>	n	Medi	Interquartile Range	<i>r</i> *	<i>p</i>
Assessment strategies										
Conducting regular pain assessments such as upon admission, during periodic scheduled assessments, and whenever a change occurs in residents' conditions.										
No	36	25.0	7.7-56.0		0.147 [†]	37	25.0	9.3-47.6		.039 [†]
Yes	95	13.7	3.4-30.8			59	12.8	5.5-25.5		
Considering various pain explanations by older people.										
No	16	34.6	1.4-86.1		0.254 [†]	30	25.0	11.8-45.8		.046 [†]
Yes	114	12.4	5.3-34.0			66	12.4	5.7-31.3		
Evaluating pain characteristics, location, duration, and precipitating and relieving factors.										
No	16	30.4	10.2-75.0		0.082 [†]	26	28.9	11.4-50.0		.005 [†]
Yes	115	11.5	4.6-35.1			70	12.6	5.5-29.4		
Repeating instructions and giving adequate time to respond when residents have cognitive impairments.										
No	53	14.0	4.1-37.9		0.864 [†]	43	20.8	11.0-44.5		.018 [†]
Yes	78	12.9	5.9-38.0			54	11.6	4.6-25.0		
Monitoring various factors related to chronic pain on an ongoing basis.										
No	31	21.9	1.4-47.2		0.696 [†]	38	25.3	11.1-48.3		.005 [†]
Yes	100	11.3	5.6-36.8			59	12.2	4.4-24.4		
Including the evaluation of effectiveness of past pain relieving treatments.										
No	62	15.7	6.0-40.8		0.300 [†]	64	20.0	9.1-42.8		.033 [†]
Yes	69	11.5	2.7-37.5			33	11.1	4.6-22.2		
Facilities										
Policies regarding pain management										
No	117	14.3	5.9-37.9		0.264 [†]	80	16.5	7.9-36.3		.711 [†]
Yes	12	9.9	0.0-32.1			12	27.2	4.0-55.0		
In-service education										
No	120	13.5	5.0-38.0		0.730 [†]	82	14.6	6.1-34.0		.044 [†]
Yes	11	23.5	10.6-25.3			10	34.4	25.0-43.2		
Number of										
Total residents	133			-0.07	0.420	98			0.08	.454
Respite care residents	129			-0.23	0.008	95			-0.23	.024
Full-time nurses	131			0.16	0.073	95			0.24	.020
Experience as a nurse or care worker (y)	133			-0.02	0.802	98			-0.18	.074
Perceptions regarding pain and pain care [‡]										
Older adults feel less pain than younger people	130			-0.08	0.360	98			-0.12	.238
I do not have enough time to provide care for residents in pain	132			0.10	0.246	98			-0.17	.100

I am satisfied with the pain care strategies that were provided to residents in my facility	132	-0.07	0.421	98	-0.06	.532
I think that residents at my ward need chronic pain management strategies.	130	0.27	0.002	96	0.01	.901
I have enough knowledge and skills to assess and manage residents' pain	131	-0.06	0.525	98	-0.17	.102
I have the doctors, nurses, or other health professionals whom I could ask about pain management strategies for residents when I need	132	-0.13	0.130	98	0.05	.617

*Spearman's rank correlation coefficient.

[†]The two groups of yes and no were compared using Mann-Whitney U test.

[‡]Perceptions regarding pain and pain care was entered as an ordinal variable, strongly disagree (1) to strongly agree (4).

appropriate documentation (Takemura, Kanda, Matsumoto, & Yamagishi, 2002). Thus, it is important for nurses to appropriately comprehend and efficiently assess residents' pain status. Additionally, those nurses who employed a multidisciplinary approach, considered to be relatively important to aged care (Takemura et al., 2002), had a higher estimation of the prevalence of pain than did nurses who did not. Collaboration between nurses and care workers at aged care facilities may be necessary, as this would allow sufficient sharing and discussion of residents' pain status.

We noted that different assessment strategies between nurses and care workers were associated with the estimated prevalence of pain in residents. Care workers' estimations of the prevalence of pain in general and chronic pain were associated with directly asking residents about their pain. By contrast, nurses' estimations were associated with observations of residents' behaviors and performing multidisciplinary teamwork. Although both strategies are important, self-reports should be considered the gold standard for identifying pain because pain is a subjective experience (AGS Panel on Persistent Pain in Older Persons, 2002; Pautex & Gold, 2006). However, because most residents of long-term care facilities in Japan have some degree of cognitive impairment, careful observations of residents' behaviors also should be used to assess their pain (Wheeler, 2006). Thus, nurses and care workers may need to perform more comprehensive pain assessments by using information from both self-reports and direct observations, and by sharing that information with each other.

The number of residents with unknown pain status estimated by care workers was associated with the assessment strategies of monitoring various factors related to chronic pain, evaluating pain characteristics, and evaluating the effectiveness of pain relief treatments. These assessment strategies are important in determining the types of pain residents' may experience and appropriate pain care (Institute for Clinical Systems Improvement, 2011), and thus should be implemented further by care workers. However, in this study, we noted that few of the facilities provided in-service education related to pain care or had policies regarding pain management. Thus, appropriate in-service education and policies regarding pain at long-term care facilities need to be implemented.

This study had several limitations. First, the response rate was relatively low, reducing the generalizability of the study. Second, we asked nursing managers or administrators from the target facilities to consider participation in this study and to choose the nurses and care workers who would answer the questionnaires. This procedure might have caused bias insofar as the participants chosen might have been

more aware of pain management strategies than their unchosen co-workers. Third, we asked participants to estimate the prevalence of pain in general and chronic pain among their residents. However, it may be hard to detect chronic pain in residents with cognitive impairment. The estimates of prevalence in this study should therefore be carefully interpreted.

Implications for Nursing Education, Practice, and Research

Nurses' and care workers' estimations of pain prevalence were relatively low, and may underrepresent the actual numbers of residents in pain or chronic pain. The current results indicate that nurses and care workers would benefit from education on performing proper and efficient pain assessment for their residents. The use of tools and scales to assess pain status and disabilities related to pain should be facilitated, including observational pain assessment scales, such as the Abbey Pain Scale (Abbey et al., 2004; Takai et al., 2010) and the Modified Resident Verbal Brief Pain Inventory (Auret et al., 2008), which also evaluates the extent to which pain interferes with daily living.

The pain assessment strategies we included were from a pain management guideline developed through the amalgamation of 16 guidelines and based on evidence from previous studies. However, evidence for

the efficacy of these pain assessment strategies is limited (Hadjistavropoulos et al., 2007). It is possible that some effective assessment strategies might have been inadvertently excluded from this study. Assessment strategies that could improve the detection of pain in older residents should be explored further in future research.

CONCLUSIONS

This study explored differences between nurses' and care workers' estimations of the prevalence of pain in general and chronic pain among residents in the wards in Japanese long-term care facilities. We found that these prevalence estimates, according to both nurses and care workers, were low. Additionally, pain assessment strategies, such as nurses' multidisciplinary approaches to pain management, influenced estimations of the prevalence of pain. Improvements in current pain assessment procedures are necessary to better comprehend residents' pain and needs for care.

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