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Extent of and factors associated with pain among older residents in nursing homes in South Korea: A nationwide survey study

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Aim: Pain can have a critical negative impact on the quality of life of institutionalized older people. This study aimed to examine the characteristics of pain and associated factors among older people at nursing homes in Korea.

Methods: A nationwide survey was carried out on the functional status of 1444 older residents at 91 nursing homes using the interRAI Long-Term Care Facilities instrument. The frequency, intensity, severity and consistency of pain were assessed, and data on potential attributes at the resident and facility levels were collected. Multivariate and multilevel regression analysis models were developed.

Results: More than one-third (36.7%) of older residents had pain. Pain prevalence differed by several sociodemographic and clinical factors, including sex, depressive symptoms, cognition, or whether or not the resident was a Medical Aid beneficiary. Pain prevalence also varied according to nursing home size and location. In the multivariate, multilevel regression analyses, both having severe pain and having consistent pain were positively associated with depressive symptoms, and the pain experience was significantly lower among older residents in nursing homes that met the nursing staffing standard.

Conclusions: This is the most comprehensive study on pain assessment in long-term care facilities in Korea using a representative sample so far. Pain is prevalent among nursing home residents in Korea. Besides individual factors, facility characteristics – in particular, meeting the staffing standard – were important to pain control, which implies there is room for improving pain assessment and management through advancing quality of care policies. **Geriatr Gerontol Int 2020; 20: 118–124**.

Keywords: Asia, long-term care, pain assessment, quality of care, staffing standard.

Introduction

Pain, often called the fifth vital sign, is an indicator of quality of care and quality of life.[1–3] Pain among older nursing home residents is prevalent, but it is often underreported and untreated.[3–5] This is because pain is a subjective experience, and older nursing home residents are likely to have challenges in reporting their pain to caregivers properly due to decreases in cognitive and/or communication function.[4] Besides individual factors, organizational factors, such as a lack of care workers with the relevant skill levels and skill-mix, can be barriers for appropriate pain management in nursing homes.[6,7] Uncontrolled pain has negative impacts on older residents' daily activities and participation in social activities.[1]

The prevalence of pain and its management among nursing home residents have been actively studied in North American and European countries with longer histories of formal institutional long-term care. Although the prevalence of pain among nursing home residents varies across studies, a recent large European study reported that approximately half of residents in nursing homes experienced pain, and one-quarter of those with pain did not have any pain medication.[2,8] Another study also reported that approximately 48% of residents suffered from pain, and many suffered from high pain intensities.[9] In the USA and Canada, the proportion of residents with pain is used as a quality indicator of nursing homes, and is monitored regularly using standardized resident assessment tools.[10]

Korea, an East Asian country, is one of the most rapidly aging countries in the world. It took just 18 years for the population aged ≥65 years to transition from 7% to 14% in Korea compared with 69 years in the USA and 115 years in France.[11] The introduction of a public long-term care insurance (LTCI) in July 2008 was a major policy reform to respond to rapid population aging;

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this reform has opened a new era in the provision of formal long-term care services in the country.[12] Approximately one-tenth of older people are currently eligible for the public LTCI, which is expected to increase.[12]

Nursing homes in Korea are characterized by the provision of a room and board, and 24-h ADL support for the physically and cognitively impaired, with limited medical or rehabilitation services.[13–15] Details on the long-term care systems in Korea have been written about elsewhere.[16,17] The number of nursing homes in Korea rapidly increased from 693 in 2008 to 5304 in 2017, and 34.6% of LTCI beneficiaries with relatively high care needs resided in nursing homes in 2017.[12] Although the expansion of access to institutional long-term care was a focus of the early stages of the LTCI policy implementation, the quality of care provided and quality of life of older residents received more attention. Facility-level quality monitoring programs operated by the National Health Insurance System, the single public insurer, were introduced in 2009 and use a wide range of quality indicators, although pain is not an officially monitored indicator yet.[18]

The purpose of the present study was to examine the prevalence and characteristics of pain, and also the resident and organizational factors associated with pain among nursing home residents in Korea using a nationwide survey including standardized functional assessment tools used in other studies.[6–9,19] In particular, the relationship between nursing staffing and pain is the key interest of this study, as we have not found any published studies that have examined this relationship with a nationally representative nursing home sample in Korea, although the important role of nursing staff in pain management has been reported in existing studies in other countries.[6,7,19]

Methods

Databases and study population

The present study was a secondary analysis of a large national survey study in Korea in 2013.[16] A nationally representative sample of nursing homes was selected by a two-stage stratified random sampling method using geographic region and facility size as strata. Random sampling of 20% of older residents in each nursing home was then carried out using the resident roster. Nursing homes that were newly opened within 1 year and/or had a number of beds of up to nine were excluded. The final sample consisted of 1444 residents aged ≥65 years in 91 nursing homes; residents who had stayed at the nursing home <30 days or who had not answered regarding their pain were excluded. This study was approved by the institutional review board of the institution with which the corresponding author is affiliated.

Instruments and procedure

The interRAI long-term care facility (LTCF), a comprehensive geriatric assessment system, was used in the present study.[16] The interRAI LTCF can measure the multidimensional functional status of older adults, including activities of daily living (ADL), comorbidities and services provided. The Korean version of the interRAI LTCF was developed through a translation and back-translation procedure, and a psychometric test was carried out.[20] The function of older residents including pain was assessed by staff nurses who provided care to these residents after attending a training session provided by the research team. For pain assessment, the assessors were told to review residents' records, and/or consult relevant other staff, as well as to interview and observe residents directly based on standardized assessment protocols. Institutional-level variables including the number of beds and staffing level were collected from nursing home administrators.

Variables

Pain of nursing home residents

The pain of the residents was assessed in several different ways, including frequency, intensity, severity and consistency of pain. These pain characteristics were measured on a 4-point scale, as shown in Table 1, and residents were identified as having pain if they answered, at a minimum, the pain was "present but not in last 3 days" in the pain frequency question.[8] Pain intensity was measured and categorized into four groups, with higher scores meaning greater pain. Pain severity was measured with the pain severity scale in the interRAI LTCF,[4,21] which combines pain frequency and intensity to assess severity, categorized into four groups: (i) no pain; (ii) less than daily pain; (iii) daily pain, but not severe; and (iv) daily severe pain.[4] Consistency of pain was measured and categorized into four groups: (i) no pain; (ii) single episode; (iii) intermittent; and (iv) constant pain.[8]

Characteristics of nursing home residents

The general characteristics taken into account for nursing home residents included age, sex, being a Medical Aid beneficiary (yes/no) and marital status (yes/no). The care needs of the residents were assessed using the interRAI scales for depressive symptoms, cognitive function and ADL.[20] The score for depressive symptoms, measured with the depressive rating scale, ranges from 0 to 14, with higher numbers meaning more depressive symptoms. Cognitive function also ranges from 0 to 6, with higher scores meaning more severe impairment. The score for the ADL hierarchy scale ranges from 0, which means no limitations, to 6, which means total dependence.[20] The case-mix for the residents was assessed with resource utilization groups (RUG); originally, residents were divided into seven groups according to their RUG, and we re-categorized six groups into four groups for the stability of the analytic model.[22]

Nursing home characteristics

The general characteristics of nursing homes in our analysis included size (small 10–29 beds, medium 30–99 beds, large ≥100 or more beds), ownership (private or public), year of foundation (before July 2008, which means it was established before the LTCI was introduced, or after July 2008) and location of the nursing homes (rural or urban). Regarding nursing staffing, we included skill-mix and nursing staffing levels. The Korean Elderly Welfare Act 22 requires nursing homes to hire one nursing staff per 25 residents (although nursing homes with <30 beds are permitted to have only 1 nursing staff total), and one personal care assistant (PCA) per 2.5 residents.[13] The act allows nursing homes to hire either a registered nurse (RN) or nurse aid (NA) to meet the nursing staffing standard.[22] Based on the standards, two binary variables for staffing standard – meeting the nursing staffing standard and meeting the PCA staffing standard – were calculated. The nursing skill-mix variable was calculated by dividing the number of RN and NA by the total number of staff (RN, NA and PCA).

Statistical analysis

Descriptive analysis was carried out using χ^2-tests and analysis of variance to summarize the pain characteristics, as well as the resident and nursing home characteristics of the sample. Multivariate,

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Table 1 Characteristics of residents and nursing homes

Resident characteristics		*n* (mean)	% (SD)
Total		1444	100
Sex	Male	324	22.44
	Female	1120	77.56
Age (years)	65–74	220	15.24
	75–84	612	42.38
	≥85	612	42.38
Medical Aid beneficiary	No	1068	73.96
	Yes	376	26.04
Marital status	Married	272	18.84
	No partner	1172	81.16
CHF	Yes	46	3.19
Stroke	Yes	411	28.46
Diabetes	Yes	235	16.27
Dementia	Yes	869	60.18
RUG			
1	Rehabilitation	288	19.94
2	Extensive care	19	1.32
3	Special care	43	2.98
4	Clinically complex	164	11.36
5	Cognitive impairment	137	9.49
6	Behavior problems	67	4.64
7	Reduced physical function	726	50.28
Depressive symptoms	0–14 range	2.64	2.84
Cognitive function	0–6 range	3.08	1.7
Activities of daily living	0–6 range	3.65	1.91
Pain			
Frequency of pain	0 – No pain	912	63.16
	1 – Pain present, but not in the past 3 days	245	16.97
	2 – Pain present on 1–2 of the past 3 days	167	11.57
	3 – Pain present daily in the past 3 days	120	8.31
Intensity of pain	0 – No pain	922	63.85
	1 – Mild pain	296	20.5
	2 – Moderate pain	186	12.88
	3 – Horrible or excruciating	40	2.77
Severity of pain (pain scale)	0 – No pain	912	63.16
	1 – Less than daily pain	412	28.53
	2 – Daily pain but not severe	93	6.44
	3 – Daily severe pain	27	1.87
Consistency of pain	0 – No pain	936	64.64
	1 – Single episode (in last 3 days)	81	5.59
	2 – Intermittent	340	23.55
	3 – Constant	87	6.02
Nursing home characteristics			
		n (mean)	% (SD)
Total		91	100
Size[†]	Small	35	38.46
	Medium	43	47.25
	Large	13	14.29
Type of foundation	Public	6	6.59
	Private	85	93.41
Year of foundation	Before 1 July 2008	42	46.15
	After 2008.07.01	49	53.85
Region	Urban	47	51.65
	Rural	44	48.35
Nursing staff ratio	RN + NA/RN + NA + PCA	11.4	4.24
Meeting nursing staffing standard	Yes	77	84.62

(*Continues*)

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Table 1 Continued

Resident characteristics		*n* (mean)	% (SD)
	No	14	15.38
Meeting PCA staffing standard	Yes	34	37.36
	No	57	62.64

†Nursing home size by bed number: small (10–29), medium (30–99) and large (≥100 or more). CHF, congestive heart failure; NA, nurse aid; PCA, personal care assistant; RN, registered nurse; RUG resource utilization group.

multilevel analysis was carried out to examine the resident and nursing home factors associated with severity and consistency of pain among older residents. All statistical analyses were carried out using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

General characteristics of residents and nursing homes

General characteristics of the residents and the nursing homes are shown in Table 1. The majority of residents were women (77.6%) and aged ≥75 years (84.8%). Approximately 26.0% of the residents were Medical Aid beneficiaries. Dementia was the most prevalent chronic condition (60.2%). In terms of the RUG, approximately half (50.3%) of the residents were in the "reduced physical function" group, and those belonging to "extensive care" or "special care" were <5%. The mean depression score of the residents was 2.64, where a score of <2 indicates a low risk of depression, and >3 indicates a high risk of depression. They had moderate or severe cognitive impairment (score 3.08), and required extensive assistance for daily living (score 3.65). As for pain prevalence, approximately 36.8% of the residents had pain in the past 3 days. For pain severity and consistency, approximately 8.31% of the residents had daily pain, either not severe or severe, and 6.02% had constant pain.

As for nursing home characteristics, the majority were medium sized (47.3%), followed by small homes (38.5%). Most of the nursing homes were private (93.4%), and approximately half (53.9%) of the homes were established after 2008, when the LTCI was introduced. The average nursing staffing mix (RN and NA *vs* total ratio) was 11.4. The majority of nursing homes (84.6%) met the nursing (RN and NA) staffing standard level, and 37.4% of homes met the PCA standard level.

Presence of pain by general characteristics of residents and nursing homes

Pain prevalence by resident and nursing home characteristic is presented in Table 2. Pain experience was significantly higher for those who were female, older, married or had Medical Aid. There was no significant difference in pain experience according to comorbid diseases, except for dementia; those with dementia had less pain ($P = 0.0025$) than those without dementia. Pain experience was positively associated with depressive symptoms and negatively associated with cognitive function ($P < 0.0001$). Pain experience was also significantly different by nursing home size and location. Residents in large nursing homes ($P = 0.006$) and those in homes located in an urban area ($P < 0.0001$) were more likely to have pain. Residents in nursing homes that met the PCA staffing standard were more likely to have pain ($P = 0.0057$).

Multivariate, multilevel logistic regressions

Finally, we examined the factors associated with residents' experience of the severity and consistency of pain using multivariate, multilevel analyses (Table 3). Regarding pain severity, the cognitively impaired and behavioral problems groups (RUG 5 & 6) were less likely to experience daily or daily severe pain (OR 0.432, $P = 0.045$). Depressive symptoms (OR 1.233, $P < 0.0001$) and limitations in ADL (OR 1.161, $P = 0.037$) were positively associated with the likelihood of having severe pain. Among institutional factors, meeting the nursing staffing standard was significantly negatively associated with the residents' likelihood of having severe pain (OR 0.514, $P = 0.049$).

In terms of pain consistency, depressive symptoms and cognitive function were contributing resident factors. People with depressive symptoms tended to have constant pain (OR 1.206, $P < 0.0001$), and residents with impaired cognitive function were less likely to experience constant pain (OR 0.732, $P = 0.001$). As for nursing home factors, residents in the nursing homes that were more recently established (after the introduction of the LTCI) had a higher possibility of having constant pain (OR 2.228, $P = 0.011$). In contrast, meeting the nursing staffing standard was negatively associated with consistency of pain (OR 0.420, $P = 0.024$).

Discussion

This is the most comprehensive study on pain assessment in long-term care facilities in Korea using a representative sample so far. Pain is one of the most important quality of life indicators, and more than one-third (36.7%) of nursing home residents in Korea experienced pain to some degree.[8] Lukas *et al*. reported the average prevalence of pain among nursing home residents in seven European countries was 48.4% (ranging from 19.8% [Israel] to 73% [Finland]) using the same interRAI LTCF instrument.[8] The somewhat lower prevalence of pain in Korean nursing homes could be because nursing homes under the LTCI law 13 are social welfare institutions with limited healthcare services, unlike nursing homes in other countries, such as the USA and Japan.[15,16] Thus, older people with higher medical needs who are more likely to have frequent and severe pain would not reside in nursing homes.

Regarding individual factors, depressive symptoms, cognitive function, and ADL had significant relationships with the severity and consistency of pain. Residents with greater depressive symptoms reported a greater severity and consistency of pain. Similar results were found in a previous study.[9] This finding supports the idea that residents with depressive symptoms are a high-risk group for pain assessment and management. The relationship between depression and pain should be examined further. The reverse relationship between cognitive function and severity of pain was also consistent with the results of existing studies.[8] This finding suggests potential under-assessment and reporting issues in pain management among the cognitively impaired group, for which

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Table 2 Presence of pain by general characteristics of residents and nursing homes

		Presence of pain						
		Total		No		Yes		
		n (mean)	% (SD)	*n* (mean)	% (SD)	*n* (mean)	% (SD)	*P*-value
Resident characteristics	Total	1444	100	912	63.16	532	36.85	
Sex	Male	324	22.44	231	71.3	93	28.7	0.0006
	Female	1120	77.56	681	60.8	439	39.2	
Age (years)	65–74	220	15.24	161	73.18	59	26.82	0.0005
	75–84	612	42.38	392	64.05	220	35.95	
	≥85	612	42.38	359	58.66	253	41.34	
Medical Aid beneficiary	No	1068	73.96	697	65.26	371	34.74	0.0052
	Yes	376	26.04	215	57.18	161	42.82	
Marital status	Married	272	18.84	715	61.01	457	38.99	0.0004
	No partner	1172	81.16	197	72.43	75	27.57	
CHF	No	1398	96.81	889	63.59	509	36.41	0.0601
	Yes	46	3.19	23	50.00	23	50.00	
Stroke	No	1033	71.54	662	64.09	371	35.91	0.2468
	Yes	164	11.36	250	60.83	161	39.17	
Diabetes	No	1209	83.73	766	63.36	443	36.64	0.7205
	Yes	235	16.27	146	62.13	89	37.87	
Dementia	No	575	39.82	336	58.43	239	41.57	0.0025
	Yes	869	60.18	576	66.28	293	33.72	
RUG 1[†]		289	19.96	170	59.03	118	40.97	0.1634
RUG 2, 3, 4		227	15.68	139	61.5	87	38.5	
RUG 5, 6		204	14.09	140	68.63	64	31.37	
RUG 7		728	50.28	463	63.77	263	36.23	
Depressive symptoms	0–14 range	2.64	2.84	2.03	2.58	3.67	2.94	<0.0001
Cognitive function	0–6 range	3.08	1.70	3.25	1.73	2.80	1.61	<0.0001
Activities of daily living	0–6 range	3.65	1.91	3.67	1.93	3.62	1.88	0.6613
Nursing home characteristics	Total	91	100	912	63.16	532	36.85	
Size[‡]	Small	35	38.46	250	67.75	119	32.25	0.006
	Medium	43	47.25	437	64.26	243	35.74	
	Large	13	14.29	225	56.96	170	43.04	
Type of foundation	Public	6	6.59	39	55.71	31	44.29	0.1857
	Private	85	93.41	873	63.54	501	36.46	
Year of foundation	Before 1 July 2008	42	46.15	504	61.69	313	38.31	0.1866
	After 1 July 2008	49	53.85	408	65.07	219	34.93	
Region	Urban	47	51.65	427	56.86	324	43.14	<0.0001
	Rural	44	48.35	485	69.99	208	30.01	
Nursing staff ratio	RN + NA/RN + NA + PCA	11.4	4.24	11.18	3.81	11.25	3.19	0.7378
Meeting nursing staffing standard	Yes	77	84.62	760	62.76	451	37.24	0.4727
	No	14	15.38	152	65.24	81	34.76	
Meeting PCA staffing level standard	Yes	34	37.36	249	57.77	182	42.23	0.0057
	No	57	62.64	663	65.45	350	34.55	

[†]Resource utilization group (RUG) categories: 1, rehabilitation; 2, extensive care, special care, clinically complex; 3, cognitive impairment, behavioral problems; and 4, reduced physical function. [‡]Nursing home size by bed number: small (10–29), medium (30–99) and large (≥100). CHF, congestive heart failure; NA, nurse aid; PCA, personal care assistant; RN, registered nurse.

further studies are necessary. Severe pain can reduce daily activities and quality of life.[23,24] This finding provides specific characteristics of residents who are vulnerable to pain. To avoid reducing ADL and quality of life for these vulnerable groups, better staff training and policies promoting pain management are important and required in nursing homes in Korea.

Regarding institutional factors, meeting the nursing staffing standard was related to a lower likelihood of both the severity and consistency of pain. Unlike nursing homes in many Western countries, nursing homes in Korea are mainly social care organizations whose main service is to provide daily living assistance.[16] Korean dependent older patients with medical need are cared for in either acute care hospitals or long-term care hospitals.[16] For this reason, the staffing requirements of nursing homes by law are different from those of other countries. The workforce of nursing homes mainly consists of personal care assistants.[14] Specifically,

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Table 3 Factors associated with severity and consistency of pain: Multivariate, multilevel logistic regressions

		Having severe pain (yes = 1)				Having consistent pain (yes = 1)			
		OR	CI		*P*-value	OR	CI		*P*-value
Resident characteristics									
Sex	Male								
	Female	1.706	0.939	3.100	0.080	0.904	0.492	1.660	0.744
Age (years)	65–74								
	75–84	1.34	0.666	2.697	0.413	2.098	0.871	5.054	0.099
	≥85 years	1.412	0.69	2.889	0.346	2.084	0.846	5.130	0.110
Medical Aid beneficiary	No								
	Yes	1.277	0.806	2.022	0.297	1.280	0.744	2.202	0.373
Marital status	Married								
	No partner	1.087	0.578	2.043	0.796	1.111	0.536	2.303	0.776
Case mix (RUG[†])	1	0.899	0.467	1.731	0.749	0.817	0.355	1.881	0.635
	2, 3, 4								
	5, 6	0.432	0.19	0.983	0.045	0.893	0.356	2.242	0.810
	7	0.649	0.378	1.115	0.118	1.022	0.507	2.061	0.951
Depressive symptoms	0–14 range	1.233	1.159	1.312	<0.0001	1.206	1.123	1.295	<0.0001
Cognitive function	0–6 range	0.872	0.754	1.008	0.065	0.732	0.610	0.878	0.001
Activities of daily living	0–6 range	1.161	1.009	1.337	0.037	1.053	0.907	1.222	0.501
Nursing home characteristics									
Size[‡]	Small								
	Medium	1.095	0.588	2.037	0.776	1.324	0.666	2.633	0.424
	Large	1.113	0.527	2.353	0.779	0.596	0.25	1.419	0.242
Type of foundation	Public								
	Private	1.236	0.448	3.412	0.683	1.084	0.368	3.195	0.884
Year of foundation	Before 1 July 2008								
	After 1 July 2008	1.256	0.723	2.182	0.418	2.228	1.204	4.125	0.011
Region	Rural								
	Urban	0.703	0.438	1.128	0.144	0.713	0.420	1.209	0.210
Nursing staff ratio	RN + NA/RN + NA + PCA	0.980	0.908	1.057	0.597	1.068	1.000	1.141	0.051
Nursing staff level									
RN + NA level	Meeting the standard	0.514	0.265	0.996	0.049	0.420	0.197	0.893	0.024
PCA level	Meeting the standard	1.484	0.856	2.572	0.160	1.233	0.668	2.277	0.503
Fit statistics	–2 Res log pseudo-likelihood	8101.23				8704.50			
	Generalized χ	1196.93				1170.67			

Total n = 1444. [†]Resource utilization group (RUG) categories: 1, rehabilitation; 2, extensive care, special care, clinically complex; 3, cognitive impairment, behavioral problems; and 4, reduced physical function. [‡]Nursing home size by bed number: small (10–29), medium (30–99) and large (≥100). NA, nurse aid; PCA, personal care assistant; RN, registered nurses.

nursing homes in Korea are required to hire just one nursing staff member (either RN or NA) per 25 residents, and one PCA per 2.5 residents according to the Elderly Welfare Act 22.[13] Despite the low nursing staffing standard under the policy, nursing staff (meeting the nursing staffing standard) was significantly associated with the severity and consistency of pain, which can support the importance of enacting and implementing this nurse staffing standard.

Several countries have adopted staffing standards for nursing homes. For example, the USA federal staffing standards for all certified nursing homes require one RN for one shift (8 consecutive hours), 7 days a week. For the two remaining shifts, one RN and one licensed nurse (either an RN or a licensed vocational nurse/licensed practical nurse) are required.[25] Several states in the USA have set higher licensed nurse requirements than federal law mandates. In Canada, provincial governments are responsible for setting staffing standards for Canadian nursing homes (residential care facilities). Most provinces require an RN on duty 24 h a day, whereas several provinces, including Alberta and Newfoundland, require nursing homes to provide a certain number of care-hours per patient day.[25] The staffing standards of all countries focus on providing sufficient staff with qualifications to meet residents' care needs. Excessive demands on nursing care (e.g. inadequate nurse staffing) increase the workload and adversely affect performance.[26] Thus, proper levels of nursing staff and meeting staffing standard are important to reduce the severity and consistency of pain.

There were potential measurement errors in assessing the pain of highly frail older nursing home residents, which might be a limitation of the present study. However, the interRAI LTCF is the most widely tested and used tools specializing in assessing such a vulnerable population. Nurses with training assessed the residents who they have taken care of in the homes to ensure quality pain measurement.

As a rapidly aging country, the expansion of long-term care services and facilities, including nursing homes, is unavoidable in Korea. Quality of care and quality of life for nursing home residents continue to be important outcomes. Pain management is one of them. In the present study, we examined the prevalence of pain, and assessed the characteristics of pain, and significant individual and institutional (nursing home) factors associated with

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pain management. These findings provide insight into the population whose pain we should carefully assess and manage, and suggest managerial strategies to improve pain management; that is, meeting standards for nursing staff. For future studies, other quality of life outcomes and associated factors should also be examined in nursing home settings.

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Disclosure statement

The authors declare no conflict of interest.

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