

Musculoskeletal Disorders among Staff in South Korea's Largest Nursing Home

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Abstract

Objectives: Although musculoskeletal disorders (MSD) represent a significant occupational issue for most nursing home staff, few epidemiological studies have been conducted in Korea.

Methods: We investigated the prevalence of, and risk factors for, MSD within South Korea's largest nursing home using a previously validated, self-reporting questionnaire.

Results: From a total of 130 registered employees, 91 (70.0%) successfully completed questionnaires were obtained. The majority were female (80.2%, n=73), with an age range of 27 to 62 years and an average age of 47.0 years (SD 8.0). MSD occurred in varying amounts and was classified into distinct categories depending on body site. The most commonly affected region was the shoulder (reported by 35.2%), followed by the arm (22.0%), knee (20.9%) and lower back (19.8%). Three statistically significant risk factors were consistently identified among all 4 MSD sites: manually handling patients (OR 5.1 to 20.8), changing a patient's clothes (OR 6.7 to 30.1) and working as a nursing aide (OR 3.7 to 74.3).

Conclusions: Overall, the present results suggest that employment within a South Korean nursing home incurs certain hazards depending on job description and daily work tasks. The MSD prevalence differed from other occupations within South Korea and previous nursing home studies.

Key words: musculoskeletal disorders, nursing home, Korea, low back pain, self-reported

Introduction

Musculoskeletal disorders (MSD) are a significant concern for health care workers (HCW), particularly in situations where the regular physical handling of patients is required (1). Caring for incapacitated, elderly people may be especially hazardous as most nursing home patients depend heavily on nursing care for almost all their daily activities. Studies have shown that the more dependent the patient, the higher the prevalence of musculoskeletal disorders among their caring staff (2). Employment within a nursing home usually involves repetitive work, working fast and expending significant amounts of energy (3–6). Staff caring for the elderly are often fatigued after work and may

have high strain complaint rates (7, 8). Their activities are known to alternate rapidly and be of short duration (9). Working under time pressures with limited ability to take rest breaks are also common features among this demographic (10). Physical stress from providing round-the-clock assistance to nursing home patients may be a causal factor in workplace injury and illness (11). Nursing home employees may be at higher risk of musculoskeletal injury compared with HCW in other specialities (12). Some studies have also shown that more injuries are reported by home care and nursing home workers than by other occupations (13, 14).

Among industrialised societies, the percentage of elderly citizens is continually rising due to improved standards of public health and general living conditions. South Korea is no exception in this regard, with the proportion of elderly citizens doubling between 1970 and the year 2000. At the present time, around 7% of South Korea's 47 million total population are aged over 65 years and this is expected to double again within the next 20 years. Among them, at least 8% currently require some degree of nursing care for senile dementia, representing a

Received Apr. 18 2002/Accepted Nov. 25 2002

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subgroup of around 280,000 citizens (15). Although caring for elderly South Koreans was traditionally a woman's responsibility, significant societal and familial changes throughout the late 20th century have made them less available for this role (16). As such, nursing homes are emerging as an increasingly important palliative care provider and employer within modern South Korean society. Although the exact number of nursing home employees is unclear, in 2001 there were at least 229 registered institutions throughout the country (15).

MSD appears to be significant and widespread among Korean workers, with various investigations reporting prevalence rates between 11.8 and 65.5% (17–20). Similarly, a previous hospital study revealed MSD among 60% of nursing staff (21). Despite the finding that many South Korean nursing home workers are potentially at risk of MSD, few studies have investigated ergonomic issues within such settings. Therefore, we considered it appropriate to conduct one of the first ergonomic investigations within a typical South Korean nursing home using a methodology previously established in other countries (22, 23). It was also necessary to investigate potential risk factors for the development of MSD within this specific setting.

Subjects and Methods

The validity of questionnaire-based data collection for MSD studies has been previously demonstrated in both English (24–26) and Korean studies (17, 18). Our survey instrument was adapted from the Standardised Nordic Questionnaire for Musculoskeletal Symptoms (25) and a questionnaire which had been previously used for nursing home studies in Australia (22) and Taiwan (23). To maximise feasibility, we selected what is currently South Korea's largest nursing home and obtained ethical clearance to conduct the study. Located in metropolitan Seoul, this facility cares for 278 patients with varying levels of disability ranging from bedridden to fully mobile. Although half the nursing home residents were ambulant, most staff undertook at least some kind of patient assistance during their daily activities. Moving patients and assisting with activities of daily living constituted the majority of work undertaken. Where possible, manual workloads were ameliorated by the use of various load-reduction devices such as trolley-beds, stretchers and wheelchairs. As we required an entire cross-sectional cohort for this study, all workers in each sub-section of the facility were recruited and asked to complete and return our anonymous questionnaire. The survey instrument included questions such as age, gender, height, weight, shiftwork details, duration of current employment, nature of current employment and the occurrence of MSD within the past 12 months. Sick leave details arising from MSD were also obtained. Surveys were collected approximately 2 days after distribution and staff interviewed when further clarification was required.

Data was entered into a spreadsheet program before undergoing statistical analysis, which included descriptive statistics for the prevalence of MSD in conjunction with multiple logistic regression of staff variables to determine potential workplace risk factors. Variables were chosen using the stepwise selection method. As the expected frequencies were small, gender differences in MSD prevalence were investigated using Fisher's

exact test. Risk factors were expressed as odds ratios (OR) and 95% confidence intervals (95%CI), with *p* values above 0.05 considered statistically insignificant throughout. Odds ratios were adjusted for age, gender and duration of employment where appropriate.

Results

From a total of 130 registered employees, 91 (70.0%) successfully completed questionnaires were obtained. As indicated in Table 1, the majority were female (80.2%) and nonsmokers (85.7%). Slightly more than one-third reported drinking alcohol regularly (35.2%). Their age ranged from 27 to 62 years with an average age of 47.0 years (SD 8.0). With a mean age of 47.0 years (SD 7.5), the females (*n*=73) were slightly older than the males (*n*=18) within this study (mean 46.4 years, SD 10.0). The average height of staff was 160.4 cm (SD 6.8), weight 58.6 kg (SD 10.5) and Body Mass Index (BMI) 22.7 kg/m² (SD 3.5). Around half were employed on a full-time basis (52.7%) and most worked day shifts (92.3%). Their working week ranged from 8 to 65 hours with an average of 42.1 hours (SD 13.4). Employment duration at the nursing home ranged from 0.08 to 12.1 years, averaging 4.4 years (SD 3.7).

As shown in Table 2, the predominant employment category of these nursing home workers was as nursing aide, comprising almost half the total (45.1%). Since they had no contact with patients and were not office workers we grouped kitchen, laundry and technical staff together. This miscellaneous category comprised 30.7% of staff. Other significant job descriptions included registered nurses (12.1%) and administrative officers (12.1%). Education levels varied from primary school to university training; however, the majority had completed high school (58.2%), which requires 12 years of schooling in South Korea. University was the next highest category (22.0%), followed by primary school (11.0%) and technical college (8.8%). Manual handling was regularly undertaken by 62.6% of all staff, with an average of 6.0 hours spent working beside the patient's bed each day (SD 3.2). These tasks were

Table 1 Demographic items

Demographics	n	(%) ^a
Female gender	73	(80.2)
Male gender	18	(19.8)
Tobacco smoker	13	(14.3)
Alcohol drinker	32	(35.2)
Full-time worker	48	(52.7)
Day shift worker	84	(92.3)
Characteristics	mean	SD
Age (yrs)	47.0	8.0
Height (cm)	160.4	6.8
Weight (kg)	58.6	10.5
BMI (kg/m ²)	22.7	3.5
Working week (hrs)	42.1	13.4
Duration (yrs) ^b	4.4	3.7

^a percentage of all staff (N=91).

^b duration of employment in current job.

Table 2 Workplace factors

Job description	n	(%) ^a
Nursing aide	41	(45.1)
Other ^b	28	(30.7)
Registered nurse	11	(12.1)
Administration	11	(12.1)
Education level		
High school	53	(58.2)
University	20	(22.0)
Primary school	10	(11.0)
Technical college	8	(8.8)
Patient handling		
Move patients	53	(58.2)
Change clothes	46	(50.5)
Wash patients	40	(44.0)
Change bed	38	(41.8)

^a percentage of all staff (N=91).

^b includes kitchen, laundry and technical staff.

divided into four major categories, with moving the patient (58.2%) being slightly more common than changing the patient's clothes (50.5%), washing the patient (44.0%) and changing their bed (41.8%). Moving the patient included manually transferring residents between their beds, wheelchairs, bath and so on. It also included any tasks directly related to physical patient handling.

MSD occurred in varying amounts and was classified into distinct categories depending on body site. As indicated in Table 3, the most common region was the shoulder (affecting 35.2% of questionnaire respondents), followed by the arm (22.0%), knee (20.9%) and lower back (19.8%). There were only 2 categories where gender differences in MSD prevalence were statistically significant (females>males): arm pain (p=0.009) and wrist pain (p=0.019). However, female staff accounted for the entire burden of arm, elbow, wrist, hand and leg pain; with males reporting no MSD in these sites. Only 1 staff member (1.1%) reported taking sick leave because of an MSD (6 days off work). Statistical analysis of staff MSD and workplace issues revealed various risk factors, with odds ratios ranging from 3.7 to 74.3. Demographic items such as height, weight, age, marital status, smoking and cumulative length of employment showed no correlation with MSD. As shoulder, arm, knee and lower back were the most commonly reported MSD categories, regression analysis focused on these key areas. Three statistically significant risk factors were consistently identified among all 4 MSD sites: moving the patients around, changing the patients clothes and working as a nursing aide. The presence of shoulder pain was significantly related to moving the patient (OR 5.1), changing their clothes (OR 6.7) and working as a nursing aide (OR 3.7). Arm pain was also related to the above categories with odds ratios of 20.8, 30.1 and 11.2, respectively. Moving patients (OR 13.1), changing their clothes (OR 15.6) and being a nursing aide (OR 74.3) closely correlated with knee pain during this study. Lower back pain was similarly related to the aforementioned categories with odds ratios of 10.3, 7.6 and 7.0, respectively. Detailed results of this risk factor analysis can be seen in Table 4. Although the present results were experi-

Table 3 Prevalence of self-reported musculoskeletal disorders by gender

	All		Male		Female		p value ^b
	n	(%) ^a	n	(%)	n	(%)	
Trunk							
Neck	12	(13.2)	2	(11.1)	10	(13.7)	0.738
Upper back	16	(17.6)	2	(11.1)	14	(19.2)	0.729
Shoulder	32	(35.2)	4	(22.2)	28	(38.4)	0.944
Lower back	18	(19.8)	3	(16.7)	15	(20.5)	0.750
Arms							
Arm	20	(22.0)	0	(0.0)	20	(27.4)	0.009
Elbow	8	(8.8)	0	(0.0)	8	(11.0)	0.348
Wrist	17	(18.7)	0	(0.0)	17	(23.3)	0.019
Hand	9	(9.9)	0	(0.0)	9	(12.3)	0.196
Legs							
Leg	11	(12.1)	0	(0.0)	11	(15.1)	0.112
Knee	19	(20.9)	2	(11.1)	17	(23.3)	0.343
Ankle	10	(11.0)	1	(5.6)	9	(12.3)	0.368
Foot	10	(11.0)	2	(11.1)	8	(11.0)	0.688

^a percentages of each group are shown in parentheses (n=91,18 and 73, respectively).

^b gender differences in MSD prevalence investigated using Fisher's exact test.

Table 4 Statistical associations with self-reported musculoskeletal disorders

	Risk factor ^a	(%) ^b	OR ^c	(95% CI)	p value
Shoulder	Moving patients	(28.6)	5.1	(1.7–17.3)	0.004
	Changing clothes	(26.4)	6.7	(1.9–28.8)	0.004
	Nursing aide work	(28.6)	3.7	(1.9–13.2)	0.029
Arm	Moving patients	(20.9)	20.8	(3.9–388.3)	0.004
	Changing clothes	(20.9)	30.1	(5.5–564.0)	0.001
	Nursing aide work	(18.7)	11.2	(3.1–58.5)	<0.001
Knee	Moving patients	(18.7)	13.1	(2.6–138.9)	0.008
	Changing clothes	(18.7)	15.6	(3.6–120.0)	0.002
	Nursing aide work	(16.5)	74.3	(7.0–3892.2)	0.005
Lower back	Moving patients	(17.6)	10.3	(2.3–81.0)	0.008
	Changing clothes	(15.4)	7.6	(1.6–59.0)	0.022
	Nursing aide work	(13.2)	7.0	(1.5–52.8)	0.027

^a calculated using the logical reference category (e.g. moving patients/not moving patients), ^b percentage of staff in each subcategory (N=91), ^c calculated using logistic regression and expressed as odds ratios with 95% confidence intervals (adjusted for age, gender and duration of employment in current workplace).

mentally adjusted for other job descriptions, no additional risk factors were identified for other MSD sites or workplace factors.

Discussion

The 12-month MSD period prevalence reported by our

South Korean nursing home staff highest in the shoulder (35.2%), arm (22.0%), knee (20.9%) and lower back (19.8%). In the shoulder region, this result was lower than previous investigations of South Korean hairdressers (61.0%) (19), Australian palliative care workers (60%) (12), South Korean bank tellers (51.4%) (20) and Japanese nurses (42.8%) (1). In contrast, it was higher than other research conducted among Australian nursing home employees (20.7%) (22), South Korean foundry workers (13.7%) (17) and Taiwanese palliative care staff (8.0%) (23). The prevalence of arm localised MSD reported during the present research was lower than 2 previous nursing home studies conducted in Holland (30.4 and 35%) (10, 9) in addition to the aforementioned South Korean hairdresser study (28.5%) (19). However, it was higher than that of Japanese hospital nurses (18.6%) (1) and South Korean foundry workers (13.7%) (17). The present MSD rates in the knee region were also variable when compared with previous research conducted by Park et al. (36.7%) (19), Lusted et al. (30%) (12) and Ha et al. (21.6%) (17); all of whom identified higher prevalence rates in their subjects.

In contrast, Engels et al. (9), Smith et al. (22) and Smith et al. (23) all documented a significantly lower prevalence of knee MSD among their nursing home staff (13%, 15.0% and 3.2%, respectively). The prevalence of lower back pain during the current study (19.8%) was significantly lower than previous nursing home investigations conducted in Australia (23.6 and 63%) (22, 12), in addition to Holland (33.8 and 38%) (10, 9). It was also significantly lower than for Japanese and South Korean hospital nurses (54.7% and 59.9%, respectively) (1, 21); South Korean foundry workers (29.4%) (17), bank tellers (38.3%) (20), hairdressers (53.2%) (19) and welders (65.5%) (18). The etiology behind these differences is difficult to accurately ascertain, however, because many studies utilised slightly different methodologies and research subjects. Only 2 previous nursing home investigations conducted in Australia (22) and Taiwan (23) followed a similar format as the current study, although neither of their results were similar to those revealed by the present investigation. The present study nonetheless suggests that MSD does occur at reasonably high rates among South Korean nursing home workers and is no doubt an important cause of occupational morbidity in South Korea as it is throughout the world. The prevalence among nursing home staff also appears to be significantly different to that of other occupations within South Korea.

The main factor contributing to MSD among aged care staff is probably the manual handling of patients who require assistance for all their activities of daily living. More than half the employees surveyed during this study were involved in regular manual handling tasks, with moving patients being their most frequent, strenuous activity (undertaken by 58.2% of all staff). This category included many tasks such as manually transferring residents between their beds, wheelchairs, bath and any activities directly related to physical patient handling. Nevertheless, previous studies have suggested a significantly higher rate of patient moving tasks among American (70.0%) (27) and Japanese (66.2%) (1) HCW. Nursing home studies in Australia and Taiwan on the other hand reported lower rates of patient moving tasks (37.9 and 56.0% respectively) (22, 23). In Japan,

Ando et al. (1) reported the percentage of their staff undertaking strenuous manual tasks to be higher than that of the present study (changing the patient's bed: 87.1 vs. 41.8% and washing the patient: 79.3 vs. 44.0%). In contrast, a lower proportion of their Japanese workers were involved in changing the patient's clothes compared with the current study (43.7 vs. 50.5%). It is suggested the differing rates of manual handling tasks documented during previous studies relate to the finer targeting of only those staff involved in regular patient contact. On the other hand, the present research targeted all staff within the study facility regardless of their expected patient contact frequency; a factor which may have reduced the overall MSD prevalence to a certain extent. The existence of various load-reduction strategies such as mechanical aids and lifting techniques might also have varied between the present research group and those within other studies.

Statistical associations for MSD are known to include age, duration of employment (28), manual handling (29), work postures, work control, work organisation (1) and patient care needs (1, 2). Female gender, smoking and uncomfortable work positions have also been reported as intrinsic risk factors (30). Despite these findings, statistical analysis of the present data revealed no significant correlation between any demographic item and the presence of MSD. There were significant gender differences in the prevalence of arm and wrist pain; although when adjusted for age and duration of employment during regression analysis these differences disappeared. It is possible, therefore, that the present sample sizes were simply too small to detect any significant gender differences when confounding variables were introduced. Certain manual handling tasks were found, however, to be consistent risk factors for all 4 major MSD categories during regression analysis. Moving patients as a daily work task consistently elevated the risk of MSD in the shoulder (OR 5.1), arm (OR 20.8), knee (OR 13.1) and lower back (OR 10.3). Changing the patients clothes every day was another important factor, incorporating a risk among the aforementioned MSD categories of 6.7, 30.1, 15.6 and 7.6, respectively. It was previously reported that nursing aides within nursing homes may have high rates of MSD (2), particularly when compared with other occupational groups (14). Therefore, we conducted an additional regression analysis with respect to employment description and found a statistically significant association between nursing aide work and MSD at all 4 body sites. The odds ratios varied between 3.7 and 74.3, even when adjusted for age, gender and duration of employment. All were statistically significant with many p values below 0.01. To our knowledge, these results represent some of the highest odds ratios related to manual handling tasks and employment descriptions ever documented among HCW.

Conclusions

Overall, the present results suggest that employment within a nursing home incurs certain hazards depending on job description and daily work tasks. We have shown that MSD occurs at reasonably high rates among South Korean nursing home staff and is no doubt an important cause of morbidity in South Korea as it is throughout the world. The prevalence

among nursing home staff also differs from other occupations within South Korea and other countries. While the authors acknowledge that this study suffered from certain limitations, it has documented many important ergonomic and demographic factors associated with nursing home work in South Korea for what we believe is the first time. Further research is required to elucidate some of these emerging issues and confirm the present findings.

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Acknowledgements

We are most grateful to Chun-hwa Oh and Ji-young Oh (Korea University, South Korea) and Jeong-ah Kim (Queensland University of Technology, Australia) for their assistance in co-ordinating this project.

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