

# Prevalence of and Risk Factors for Low Back Pain among Staffs in Schools for Physically and Mentally Handicapped Children

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**Abstract:** The objective of this study is to clarify the prevalence of and risk factors for low back pain (LBP) in schools for physically and mentally handicapped children. This study design is a cross-sectional study. The subjects included were 1,869 staff members from 19 prefectural schools for children in Shizuoka Prefecture, Japan, which included schools for the blind, deaf-mutes, physically handicapped, and mentally retarded children. A total of 975 subjects completed two postal questionnaires which included morbidity, demographic factors, nursing activity, and psychosocial factors. The answer rate was 52%. The one-month prevalence of LBP was 45%. According to the classification of nursing activity, assistance in movement 1.67 (95% CI 1.27–2.14), excretory function 1.45 (1.11–1.88), and feeding 1.44 (1.10–1.90) showed significant increases in the odds ratio. The adjusted odds ratio significantly increased by 2.35 (1.78–3.11) in the group with depression symptoms as well as in the group with job stressors such as quantitative, qualitative, and physical work loads, job control, utilization of technique, interpersonal conflicts, and degree of satisfaction with their work/home life.

**Key words:** Low back pain, Prevalence, Nursing Activity, Teacher, Job stress

## Introduction

Statistics reveal that there are about 80,000 handicapped children in Japan. Staffs in schools for these children are not only teaching but also nursing them.

Low back pain (LBP) showed the highest frequency among occupational diseases occurring in Japan in 2002<sup>1)</sup>. According to the policy guidelines for the prevention of low back pain at Japanese work sites, schools for physically and mentally handicapped children were also included in these guidelines which describe the special management of LBP as having

been deemed necessary in such schools, due to the significant burden on the lower back<sup>2)</sup>.

It is considered that some elements such as demographic<sup>3)</sup>, ergonomic<sup>4–7)</sup>, and psychosocial factors<sup>7–11)</sup> are associated with LBP. Some studies have investigated the association between LBP and its risk factors among nurses and caregivers<sup>5–10)</sup>, but studies on staffs in schools for physically and mentally handicapped children remain few<sup>3,11)</sup>. Almost all such these staff members are teachers, but the risk factors for LBP among teachers may differ from those for nurses or caregivers. Consequently, the objective of this study was to clarify the prevalence of LBP and the risk factors involved among staff members in schools for physically and mentally handicapped children.

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## Methods

### Study design

We conducted a cross-sectional study that investigated the prevalence of LBP and its association with factors relevant at the time of our inquiry.

### Subjects

The subjects of this study included 1,869 staffs from 19 prefectural schools for children in Shizuoka Prefecture, Japan, which included 3 schools for the blind, 3 for deaf-mutes and 13 for physically handicapped and mentally retarded persons. Staffs in these schools including teachers, were not only teaching but also nursing the handicapped children. Nursing included activities such as assistance in movement, excretory function, feeding, skin care, and bathing. Some of the staffs in schools for the blind and deaf-mutes were nursing the children, because some of the blind or deaf-and-dumb children had physical or mental disabilities. Except for teachers, some staffs functioned as nursing assistants, clerks, cooks for school lunches, and school bus drivers and others.

### Questionnaires

We used two postal self-reported questionnaires: a Health Questionnaire, and a novel brief job stress questionnaire<sup>12)</sup>. The Health Questionnaire included questions regarding demographic factors such as age, sex, type of job, type of nursing, and years of job experience, as well as morbidity factors such as LBP and depression symptoms, lack of rest, and others. We investigated LBP during recent one month, and used the CES-D<sup>13)</sup> to investigate depression symptoms. The novel brief job stress questionnaire included items such as quantitative, qualitative, and physical work loads, utilization of technique, fitness for the job, job control, rewards of work, support from one's supervisor and co-workers, degree of satisfaction with their work/home life, and interpersonal conflicts.

The two questionnaires were distributed by the person in charge at each school. All participants gave written informed consent.

### Statistical analysis

We investigated the following demographic factors among both men and women; age distribution of subjects, number of subjects in each type of job, and number of those engaged in nursing activity.

We estimated the one-month prevalence of LBP among men and women in each type of job, in each kind of an age, who was or was not engaged in each kind of nursing activity, and who had experienced depression symptoms.

We estimated the adjusted odds ratio (95% CI) of LBP by logistic regression analysis for each of the following:

**Table 1. Distribution of subjects n (%)**

	Male (n=321)	Female (n=654)	Total (n=975)
An age			
–29	51 (15.9)	118 (18.0)	169 (17.3)
30–39	90 (28.0)	221 (33.8)	311 (31.9)
40–49	127 (39.6)	204 (31.2)	331 (33.9)
50–	53 (16.5)	111 (17.0)	164 (16.8)
Type of job			
Teachers	281 (88.0)	550 (84.0)	831 (85.2)
Caregivers	4 (1.2)	23 (3.5)	27 (2.8)
Clerks	15 (4.7)	25 (3.8)	40 (4.1)
Conductors	0 (0.0)	8 (1.2)	8 (0.8)
School servants	9 (2.8)	6 (0.9)	15 (1.5)
Drivers	2 (0.6)	0 (0.0)	2 (0.2)
Guides in dormitory	8 (2.5)	26 (4.0)	34 (3.5)
Nursing assistants	1 (0.3)	4 (0.6)	5 (0.5)
Cooks in school	0 (0.0)	12 (0.6)	12 (1.2)
Unknown	1 (0.3)	0 (0.0)	1 (0.1)
Number of subjects with nursing activity			
Movement	147 (45.8)	345 (52.8)	492 (50.5)
Excretory function	158 (48.6)	344 (52.6)	500 (51.3)
Feeding	196 (61.1)	413 (63.1)	609 (62.5)
Skin care	53 (16.5)	101 (15.4)	154 (15.8)
Bathing	26 (8.1)	37 (5.7)	63 (6.5)

sex, age, type of job, type of nursing activity, level of rest, depression symptoms, and job stress for each. The odds ratios were adjusted for sex and age. We divided the level of job stress into high, moderate and low. Job stress in each case was scored from 1 to 5. We regarded a score of 1 or 2 as high, 3 as moderate, and 4 or 5 as low. We used SPSS for windows Ver. 12.0<sup>14)</sup> for statistical analysis, with the level of statistical significance at 0.05.

## Result

Out of 1,869 subjects, 1,002 responded to both questionnaires, yielding a response rate of 56.3%. Of these, 27 were eliminated from data analysis because many of their responses were incomplete. Consequently, we regarded 975 subjects (321 men, 654 women) to be eligible for data analysis, for an answer rate of 52.2%.

Here are the distributions of those 975 subjects (see Table 1). No significant difference in mean age was found between men and women. As to the distribution by type of job, almost all were teachers.

Table 2 shows the one-month prevalence of LBP among men and women for each item, which was 44.9% among all subjects. Subjects assisting with movement, excretory function, and feeding had a significantly higher prevalence

**Table 2. One-month prevalence of LBP among men and women for each item**

	Male			Female		
	n	case	PR (%)	n	case	PR (%)
Type of job						
Teachers	281	118	42.0	550	262	47.6
Others	40	16	40.0	104	42	40.4
An age						
–29	51	25	49.0	118	53	44.9
30–39	90	39	43.3	221	100	45.2
40–49	127	50	39.4	204	108	52.9
50–	53	20	37.7	111	43	38.7
Movement assistance						
Engaged	147	66	44.9	345	187	54.2**
Not engaged	170	66	38.8	302	115	38.1
Excretory function assistance						
Engaged	156	69	44.2	344	180	52.3*
Not engaged	161	63	39.1	303	122	40.3
Feeding assistance						
Engaged	196	85	43.3	413	211	51.1*
Not engaged	121	47	38.8	234	91	38.9
Skin care assistance						
Engaged	53	26	49.1	101	57	56.4
Not engaged	264	106	40.2	546	245	44.9
Bathing assistance						
Engaged	26	12	46.2	37	18	48.6
Not engaged	291	120	41.2	610	284	26.6
Depression symptoms						
With	98	58	59.2**	202	121	59.9**
Without	223	76	36.8	452	183	40.5

$\chi^2$  test was conducted among men and women for each item.

\* p<0.05, \*\* p<0.01.

among women. Based on the level of CES-D scores, those reporting depression symptoms were more numerous than those who did not, with the prevalence of approximately 60% among both men and women. The mean age of teachers ( $38.8 \pm 9.2SD$ ) was significantly lower than that of others ( $44.8 \pm 10.9SD$ ) ( $p<0.001$ ).

Table 3 and 4 shows the adjusted odds ratio of LBP among men and women for each item. Significantly higher odds ratios of LBP were found in those reporting depression symptoms, and those assisting in movement, excretory functions, feeding, and skin care. Regarding job stressors, adjusted odds ratios significantly increased among those reporting high levels of stress in quantitative, qualitative, and physical work loads, job control, utilization of technique, interpersonal conflicts, and high to moderate levels in the degree of satisfaction with their work/home life.

**Discussion**

In this study, the one-month prevalence of LBP among

**Table 3. Adjusted odds ratios of low back pain for each factor**

	Odds ratio	95% CI
Type of job		
Teacher	1.18	0.81 – 1.71
Sex		
Female	1.23	0.94 – 1.61
An age		
30–39	0.94	0.65 – 1.37
40–49	1.08	0.75 – 1.57
50–	0.73	0.47 – 1.13
CES-D		
16≤*	2.35	1.78 – 3.11
Level of rest		
Moderate	0.88	0.59 – 1.31
Lack*	1.47	1.03 – 2.07
Nursing activity		
Movement assistance		
Engaged*	1.67	1.27 – 2.14
Excretory function assistance		
Engaged*	1.45	1.11 – 1.88
Feeding assistance		
Engaged*	1.44	1.10 – 1.90
Skin care assistance		
Engaged*	1.52	1.07 – 1.90
Bathing assistance		
Engaged	1.15	0.69 – 1.92

The odds ratio was adjusted for age and/or sex. Odds ratios were for the following references: type of job was others, sex was male, an age was ≤29, CES-D score was <16, level of rest was sufficient, and those engaged each nursing activities were those not engaged them.

\*Item shown to be statistically significant.

staffs in schools for physically and mentally handicapped children was approximately 45%. Such a very high prevalence confirmed the need to treat and manage LBP. Furthermore, LBP among staffs in such schools was associated with nursing activities, depression symptoms, lack of rest, and several job stressors. Few previous studies have investigated those associations between job stressors and LBP in such population<sup>11</sup>).

The one-month prevalence in this study yielded results higher than those in many previous studies<sup>4,8,15</sup>). For example, the prevalence of LBP was roughly 20% to 30% among workers in general manufacturing industries<sup>4</sup>) and hospital nurses<sup>8</sup>). Thus the prevalence in this study was found to be exceptionally high. However, the one-month prevalence among nurses in a previous study was very high at approximately<sup>16</sup>).

The prevalence of LBP from nursing activity among women was significantly higher than it would have been without them. Furthermore, such an association with nursing activity was found by logistic regression analysis among

**Table 4. Adjusted odds ratio of low back pain for each job stressor.**

	Odds ratio	95% CI
Stress for quantitative work load		
Moderate	1.10	0.77 – 1.67
High*	1.60	1.10 – 2.33
Stress for qualitative work load		
Moderate	1.18	0.76 – 1.85
High*	1.67	1.09 – 2.57
Stress for physical work load		
Moderate	1.05	0.61 – 1.80
High*	1.65	1.01 – 2.71
Stress for job control		
Moderate	1.29	0.93 – 1.78
High*	1.66	1.18 – 2.33
Stress for utilization of technique		
Moderate	1.12	0.83 – 1.51
High*	1.81	1.23 – 2.64
Stress for fit to the job		
Moderate	1.04	0.76 – 1.43
High	1.35	0.91 – 1.99
Stress for reward to work		
Moderate	1.06	0.81 – 1.39
High	1.09	0.67 – 1.75
Stress for support by supervisors		
Moderate	1.07	0.81 – 1.43
High	1.23	0.87 – 1.74
Stress for support by coworkers		
Moderate	0.81	0.59 – 1.11
High	1.23	0.89 – 1.71
Stress for satisfaction to the work/home life		
Moderate	1.39	1.02 – 1.88
High*	1.85	1.32 – 2.58
Stress for interpersonal conflict		
Moderate	1.04	0.78 – 1.39
High*	1.44	1.02 – 2.05

\*Item shown to be statistically significant. Odds ratio was adjusted for age and sex (odds ratio for low stress in each stressor).

both men and women, Taoda *et al.* showed similar results<sup>3</sup>. Though ours is a cross-sectional study, it suggests that nursing activity might well cause LBP.

The age- and sex-adjusted odds ratio for those short of rest was significantly high. More rest might be necessary for recovery from LBP due to nursing activities<sup>3</sup>. The prevalence of those with depression symptoms was significantly higher than in those without them among both men and women, while the age- and sex-adjusted odds ratio was also high. This result might be associated with the fact that the subjects in this study were almost all teachers<sup>17</sup>. Hurwitz *et al.* showed an association between depression symptoms and LBP<sup>18</sup>, i.e., depression aggravates LBP, and LBP deepens depression. Since this is a cross-sectional study,

the causative factor is not clear.

LBP in our study was associated with several job stressors: quantitative, qualitative, and physical work loads, job control, utilization of technique, interpersonal conflicts and the level of satisfaction with their work/home life. However, we did not consider interaction and confounding between variables. Previous study showed an association with physical load or sustain and LBP at schools for the handicapped<sup>11</sup>.

We used self-reported questionnaires in our investigation. A novel brief job stress questionnaire showed a high degree of reliability and validity<sup>12</sup>. We adopted an one-month prevalence as an indicator of LBP. This indicator had been adopted in the previous study of LBP<sup>3,8,16</sup>. Our prevalence were similar for each school (though this result was not shown), a finding that might suggest its validity.

The present study has several limitations. Since it was a cross-sectional study, it is a poor indicator of causation. The objectivity of our evaluations of morbidity may also be suspect, since we estimated morbidity based entirely on self-reported questionnaires. The response rate was 56% in our study. Thus, the results of almost half of the subjects were not reflected. Though we investigated nursing activity, we did not examine its frequency nor the number and body weights of handicapped children nursed. Thus we were unable to estimate the workload of nursing activity.

Our results, however, may still be generalizable due to the high number of subjects and similarity to the results of the previous study conducted in another prefecture<sup>3</sup>.

## Conclusions

Staff members of 19 schools for physically and mentally handicapped children had a high prevalence of LBP, thus confirming the need for treating and managing that condition in such workers. We confirmed that factors such as nursing activity, depression, lack of rest, and a variety of job stressors were associated with LBP. In a future study, we hope to further clarify risk factors for LBP and to reduce its prevalence among staffs in schools for physically and mentally handicapped children.

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