

16 1 (2004 3)
Korean J Occup Environ Med, 2003;16(1):92-102

, 가 1)

. 1) . 1) . 1)

Abstract

Musculoskeletal Symptoms and Related Factors of Golf Caddies

Kyung-Hwa Heo, Young-Sun Han¹⁾, Hye-Sun Jung¹⁾, Jung-Wan Koo¹⁾

*Industrial Safety & Health Research Institute, KOSHA
Department of Preventive Medicine, College of Medicine, The Catholic University of Korea¹⁾*

Objectives: This study evaluated the complaint rates of musculoskeletal symptoms and investigated the related factors of musculoskeletal symptoms in the caddies.

Methods: For 316 caddies working at 6 regular golf courses, we used the self-recording questionnaires to examine general characteristics, job stress factors, subjective musculoskeletal symptoms designed by NIOSH, working environments, and working contents.

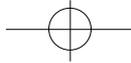
Results: The complaint rates of musculoskeletal symptoms according to the musculoskeletal criteria of NIOSH were 41.8% in the leg/knee/ankle/foot, 35.8% in the shoulder, 35.8% in the upper back/lower back, 28.8% in the neck, and 28.5% in the arm/wrist/fingers. Important factors affecting musculoskeletal symptoms were daily working hours during the high-demand season in all anatomical sites except the arm/wrist/fingers. Other related factors were degrees of winding and inclined in the golf courses, violent language and violence of customers, inability to regulate the velocity and work load control, heavy physical burden, instability of employment, and possibility of unemployment according to the specialty of caddies. As a results of multivariate logistic regression analysis, musculoskeletal symptoms of the neck, shoulders, back/lower back and leg/knee/ankle/foot were significantly influenced by working time over 12 hours in the high-demand season, and symptoms of the arm/wrist/fingers by low decision latitude ($P<0.05$).

Conclusions: The complaint rates of musculoskeletal symptoms in the caddies were affected by working time over 12 hours and low decision latitude against excessively high psychological job demand.

Key Words: Musculoskeletal Symptoms, Golf caddies, Related factors

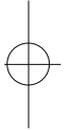
< : 2003 12 15 , : 2004 3 8 >
: (Tel: 02-3779-1402) E-mail: jwkoo@catholic.ac.kr



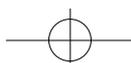


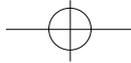
1997), (, 1998),
 (, 1999);
 , 2001), (, 1997);
 , 2000), (, 2000), (,
 가 , 2002) 가
 가
 ,
 , , ,
 가
 ,
 (OSHA, 1996;
 ANSI, 1996; Hurrell Murphy, 1998).
 (National Institute of
 Occupational Safety and Health)

(calcaneus)
 (Hoshino , 1996)
 2001 7
 가 79
 가



가
 25,000
 가
 (NIOSH, 1988).
 ,
 가
 (Bigos ,
 1986; Gamperiene Stigum, 1999).
 가
 가 1980
 가 IMF
 가
 (1998. 2. 28. 2098-
 15, 2001. 1. 4. 2000-72)
 1.
 () (2002. 11. 12) 2003 7
 (, 2003). 6
 1980 376
 60
 (, 1989; , 1997), 316
 (, 1992), VDT (,
 1997; , 1998), (,





16 1 2004

2.

2003 4 9 4 30 SAS(ver 8.1)

3

6

(NIOSH, 1993)

(NIOSH,

(χ^2 -test),

(, 1997)

(,),

1.

, / / 가 , / , / / /

5

31.1±6.1

20 49

246

NIOSH

(78.9%),

54 (17.2%),

12

1

1

(3.9%)

6

13 (4.1%), 6 ~12

20 (6.3%),

(, , , , ,)

12~24

34 (10.8%), 24~36

34 (10.8%), 36

208 (65.8%)

3 (1.0%),

251 (79.6%),

61 (19.4%)

(Social sup-

150

16 (5.1%), 150~200

port; 8),

(Psychological

244 (77.7%), 200~250

49

job demand; 5),

(Decision lati-

(15.6%), 250

5 (1.6%)

. 가

tude; 9) 3가

1

23 (8.9%), 1 ~3

151 (58.5%), 3 ~6

67

(26.0%), 6

17 (6.6%)

가

2 16

(Table 1).

(Karasek , 1998).

Karasek(1994)

(4 ~11)

8

60

(19.5%), 8 ~12

75 (24.3%), 12

가 (,

173 (56.2%)

2000).

10.7

. 18 1

4

6

29 (9.3%),

Karasek(1994)

7 107 (34.2%), 8

177 (56.5%)

가 8~36 ,

가

가 12~48 ,

가

206

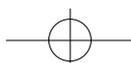
가 24~96

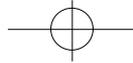
(65.2%)

가 230 (72.8%)

()

35



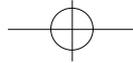


(11.1%) , 가 가 160 (50.6%)
 151 (47.8%), 130 (41.1%) (Table 2).
 가 가 206 가 19.7 , 39.4 ,
 (65.2%) 가 가 27.6 (Table 3).
 가 174 (55.1%) 가 2.
 가 135 NIOSH
 (42.7%), 99 (31.3%) .
 2 가 316 142 (44.9%)

Table 1. General characteristics of the subjects.

Characteristics	N	%
Age(yrs)		
<24	43	13.6
25 ~ 29	102	32.3
30 ~ 34	72	22.8
35 ~ 39	71	22.5
40 ~ 49	28	8.8
Work duration(month)		
<6	13	4.1
6 ~ <12	20	6.3
12 ~ <24	34	10.8
24 ~ <36	34	10.8
36	208	65.8
Marital status		
Single	246	78.9
Married	54	17.2
Divorced	12	3.9
Education level		
Middle school	3	1.0
High school	251	79.6
College	61	19.4
Income(10,000 won/month)		
< 150	16	5.1
150 ~ <200	244	77.7
200 ~ <250	49	15.6
250	5	1.6
Housework hours		
< 1	23	8.9
1 ~ <3	151	58.5
3 ~ <6	67	26.0
6	17	6.6





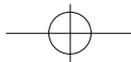
16 1 2004

. / / / 가 113
/ 132 (41.8%) 가 (35.8%), 91 (28.8%), / / 가 90

Table 2. Occupational characteristics of the subjects.

Characteristics	N	%
Working hours(high demand season)		
< 8	60	19.5
8 ~ <12	75	24.3
12	173	56.2
Working hours(low demand season)		
< 8	303	99.0
8 ~ <12	4	1.0
Frequency of rounding per week		
6	29	9.3
7	107	34.2
8	177	56.5
Winding & inclined in golf course		
Yes	206	65.2
No	110	34.8
Confliction(violent language, violence)		
Yes	230	72.8
No	86	27.2
Income satisfaction		
Satisfaction	35	11.1
Moderate	151	47.8
Dissatisfaction	130	41.1
Velocity & work-load control		
Uncontrollable	206	65.2
Moderate	87	27.5
Controllable	23	7.3
Employment stability		
Severely unstable	174	55.1
Unstable	124	39.2
Stable	16	5.1
Very stable	2	0.6
Physical burden		
None	5	1.6
Light	77	24.4
Heavy	99	31.3
Too heavy	135	42.7
Unemployment possibility		
None	59	18.7
Moderate	97	30.7
High	160	50.6





(28.5%) (Table 4). / / 1 ,

3. (p<0.05)(Table 5).

4.

1 ,

, , , 가 / / / , , /

(p<0.01).

12 , / / 가

1 ,

(Table 6).

가

(p<0.05). / / 가

(Work-related

(p<0.05). /

Musculoskeletal Disorders)

1 ,

, / / 가 , / , / / /

가

(p<0.05). /

Table 3. Mean score of job stress.

Variables	Mean ± SD (Range)
Social Support	19.7 ± 3.3 (8-32)
Supervisor support	7.5 ± 3.2 (4-16)
Coworker support	12.2 ± 1.8 (4-16)
Psychological job demand	39.4 ± 6.8 (26-48)
Decision latitude	27.6 ± 5.3 (18-44)
Skill discretion	16.6 ± 2.1 (10-22)
Decision authority	11.0 ± 5.0 (6-23)

Table 4. Complaint rate of musculoskeletal symptoms.

Site	N	Complaint rate	
			%
Neck	91		28.8
Shoulder	113		35.8
Arm/wrist/finger	90		28.5
Upper back/lower back	113		35.8
Leg/knee/ankle/foot	132		41.8
Total (At least one site)	142		44.9

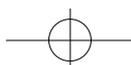
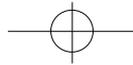


Table 5. Complaint rate in musculoskeletal symptoms by type of work

Variables	Neck		Shoulder		Arm/wrist /finger		Upper back/ lower back		Leg/knee/ankle foot	
	N(%)	χ^2	N(%)	χ^2	N(%)	χ^2	N(%)	χ^2	N(%)	χ^2
Working hours(high demand season)										
< 8	6 (6.6)	0.001	16 (14.2)	0.004	14 (15.6)	0.102	11 (9.7)	0.031	23 (17.4)	0.031
8 ~ 12	12 (13.2)		17 (15.0)		17 (18.9)		21 (18.6)		24 (18.2)	
> 12	73 (80.2)		80 (70.8)		59 (65.5)		81 (71.7)		85 (64.4)	
Frequency of rounding per week										
6	6 (6.6)	0.230	10 (8.6)	0.815	7 (7.8)	0.669	8 (7.1)	0.376	12 (9.1)	0.858
7	28 (30.8)		40 (35.4)		32 (35.5)		38 (33.6)		46 (34.8)	
8	57 (62.6)		63 (55.8)		51 (56.7)		67 (59.3)		74 (56.1)	
Winding & inclined in golf course										
Yes	75 (82.4)	0.001	87 (77.0)	0.001	66 (73.3)	0.055	88 (77.9)	0.004	95 (72.0)	0.032
No	16 (17.6)		26 (23.0)		24 (26.7)		25 (22.1)		37 (28.0)	
Conflition(violent language, violence)										
Yes	78 (85.7)	0.001	92 (81.4)	0.010	70 (77.8)	0.208	93 (82.3)	0.004	103 (78.0)	0.076
No	13 (14.3)		21 (18.6)		20 (22.2)		20 (17.7)		29 (22.0)	
Income satisfaction										
Satisfaction	3 (3.3)	0.001	10 (8.8)	0.119	8 (8.9)	0.127	11 (9.7)	0.768	12 (9.1)	0.631
Moderate	39 (42.9)		48 (42.5)		37 (41.1)		53 (46.9)		64 (48.5)	
Dissatisfaction	49 (53.8)		55 (48.7)		45 (50.0)		49 (43.4)		56 (42.4)	
Velocity & work load control										
Uncontrollable	73 (80.2)	0.001	87 (77.0)	0.002	68 (75.6)	0.020	85 (75.2)	0.003	93 (70.4)	0.148
Moderate	16 (17.6)		23 (20.4)		20 (22.2)		26 (23.0)		33 (25.0)	
Controllable	2 (2.2)		3 (2.6)		2 (2.2)		2 (1.8)		6 (4.6)	
Physical burden										
None	0 (0.0)	0.003	0 (0.0)	0.020	0 (0.0)	0.011	1 (0.9)	0.037	1 (0.8)	0.226
Light	11 (12.1)		20 (17.7)		12 (13.3)		19 (16.8)		26 (19.7)	
Heavy	31 (34.1)		34 (30.1)		33 (36.7)		34 (30.1)		42 (31.8)	
Too heavy	49 (53.8)		59 (52.2)		45 (50.0)		59 (52.2)		63 (47.7)	
Employment stability										
Severely unstable	63 (69.2)	0.019	74 (65.5)	0.015	58 (64.4)	0.075	76 (67.3)	0.006	81 (61.4)	0.107
Unstable	24 (26.4)		32 (28.3)		26 (28.9)		31 (27.4)		43 (32.6)	
Stable	4 (4.4)		7 (6.2)		6 (6.7)		6 (5.3)		8 (6.1)	
Unemployment possibility										
None	6 (6.6)	0.001	11(9.7)	0.003	13 (14.4)	0.126	15 (13.3)	0.005	20 (15.2)	0.140
Moderate	20 (22.0)		27(23.9)		23 (25.6)		26 (23.0)		35 (26.5)	
High	65 (71.4)		75(66.4)		54 (60.0)		72 (63.7)		77 (58.3)	



2

(NIOSH, 1993),
가 / / / (41.8%)
가
가

6
NIOSH 가

316 가
NIOSH

/ / / 1
41.8% 35.8%, / 35.8%, 28.8%, 12
/ / 가 28.5% ,
(1997)

KOSHA CODE
가)

H-28-2002(가 가 가
(40.6%) (23.9%), (19.3%),
(16.3%) , (2000) 가 가 가

(61.0%), (59.9%), (53.2%), / 8
(41.6%), / (36.7%), / (34.8%) 가 1 12
(2002)

/
(87.2%), (86.6%), / / /
(84.1%), (76.2%), / / 가 (61.1%)
가 가 가

가 6 (15 ~ 55),
6 (15 ~ 55), 6 (5
~ 15)
가 5~6 18

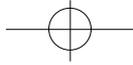
Table 6. Odds ratio of related factors for musculoskeletal complaint rate*(multivariate analysis)

Variables(indicator)	Odds ratio (95% Confidence interval)				
	Neck	Shoulder	Arm/wrist /finger	Upper back/ lower back	Leg/knee/ ankle/foot
Working hours (high-demand season)**	4.74 (2.51-8.96)	2.84 (1.63-4.95)	-	2.91 (1.67-5.10)	1.79 (1.07-2.99)
Decision latitude	-	-	1.08 (1.02-1.14)	-	-

*, It was adjusted by age, marital status, education level, income, housework hours.

** , reference category: less than 12 hours





16 1 2004

가

가

가

(),
()

(2002)

, Karasek(1979)

가

가

4

(
)
group)

(low strain

가 가
가

(passive group)

가

(active group)

가

(high

strain group)

4

가

가

(

, 2001)

가

가

가

가

. Bonger (1993)

가

:

가

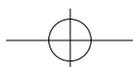
(1996)

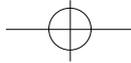
가

가

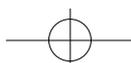
:

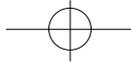
6





316 2003 4 9 2001;13(3):220-31.
 4 30 3 2002;41:131-41.
 (NIOSH, 1993) 1998;31(1)127-38.
 (, 1997) 2002 2003.
 : VDT 가
 / / / 41.8% 1997;30(4):779-90
 가 35.8%,
 / 35.8%, 28.8%, / / 가
 28.5% 1 / 2002.
 / 가 1989
 1(2):141-50.
 가 2000;12(3):395-404.
 가 2000;12(1):48-58.
 가 가 가
 1997.
 / / / 1999;
 12 , / / 가 11(4):439-48.
 (P<0.05). 1992;25(1):26-33.
 : 가
 The Seoul Journal of Nursing 1997;
 11(1):13-23.
 가 1997;9(1):85-98.
 1997;9:
 140-55. VDT
 1998;10(4):463-75.
 2001.
 VDT American National Standards Institute: Control of
 가 work related cumulative trauma disorders. Part
 1996;8(3) 1, Upper extremities(working draft). ANSI N-
 :570-7. 365, 1996.
 Bigos SJ, Spengler DM, Matin NA. Back injuries





16 1 2004

- in industry; a retrospective study. *Spine* 1986; 11:246-51.
- Bonger PM, Winter CR, Kompier MAJ, Hidebrandt VH. Psychosocial factors at work and musculoskeletal disease. *Scand J Work Environ Health* 1993;19:297-312.
- Gamperiene M, Stigum H. Work related risk factors for musculoskeletal complaints in the spinning industry in Lithuania. *Occupational and Environmental Medicine* 1999;6(6):411-6.
- Hoshino H, Kushida K, Yamazaki K, Takahashi M, Ogihara H, Naitoh K, Toyoyama O, Doi S, Tamai H, Inoue T. Effect of physical activity as a caddie on ultrasound measurements of the Os calcis: a cross-sectional comparison. *J Bone Miner Res* 1996;11(3):412-8.
- Hurrell. Jr. JJ, Murphy LR. Psychological Job Stress. In: Rom WN, editors. *Environmental and Occupational Medicine*. 3rd ed. Philadelphia Lippincott - Raven Publishers 1998. pp 905-914, 937-69.
- Karasek R. Job demands, Job decision latitude and mental strain: Implication for job redesign. *Am Sci Q* 1979;24:285-308.
- Karasek R. Job Content Questionnaire and User's Guide(revision 1.12). University of Massachusetts at Lowell. Lowell. 1994.
- Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire(JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* 1998;3:322-55.
- National Institute for Occupational Safety and Health(NIOSH). In Putz-Anderson . *Cummulative trauma disorders: A manual for musculoskeletal disease of the upper limbs*. 1988.
- National Institute for Occupational Safety and Health(NIOSH). NIOSH Health hazard evaluation report, 1993, NIOSH report No. PB 93-188-456.
- Occupational Safety and Health Administration. OSHA Draft Ergonomic standard. 1996.

