

16 1 (2004 3)
Korean J Occup Environ Med, 2004;16(1):37-47

가

1), 2), 3), 4), 5), 6), 7), 8), 1), 1), 2), 2), 2), 3), 4), 4), 5), 6), 7), 8)

— Abstract —

Surveillance of Work-related Carpal Tunnel Syndrome in Korea

Woo Chul Jeong, Ho-Jang Kwon¹⁾, Mina Ha¹, Sang Chul Roh, Beom Seon Kwon²⁾,
Jeong Gun Hyun²⁾, Seong Jae Lee²⁾, Jong Min Lee³⁾, Jeong Yi Kwon⁴⁾, Jun Seong Kim⁴⁾,
Nam Jong Baek⁵⁾, Ho Lee⁶⁾, Kyng Woo Lee⁷⁾, Sam Kyu Lee⁸⁾

*Department of Occupational Medicine, Preventive Medicine¹⁾, Rehabilitation Medicine²⁾,
College of Medicine, Dankook University*

Department of Rehabilitation Medicine, College of Medicine, Dongkook University³⁾

Department of Rehabilitation Medicine, College of Medicine, The Catholic University of Korea⁴⁾

Department of Rehabilitation Medicine, College of Medicine, Seoul National University⁵⁾

Department of Rehabilitation Medicine, College of Medicine, Soonchunhyang University⁶⁾

Department of Rehabilitation Medicine, College of Medicine, Donga University⁷⁾

Department of Rehabilitation Medicine, College of Medicine, Jeonnam National University⁸⁾

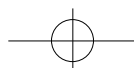
Objectives: Carpal tunnel syndrome (CTS) is one of the most important work related musculo-skeletal diseases in Korea. However, there are few epidemiologic studies on the work-related CTS (WR-CTS). This study aimed to investigate the epidemiologic characteristics of WR-CTS in Korea.

Methods: Data obtained from the " CTS Surveillance System ". Physician case-reports in the surveillance were used to document patterns of WR-CTS by age, gender, occupation, sign, symptom, working history.

Results: Six hundred and seventy-two cases of WR-CTS were ascertained of which 314 with complete information on occupational history were analyzed. It has been estimated that as many as 72% of all CTS cases are work-related. The highest proportion of WR-CTS was observed in ' elementary occupation workers ', followed by ' skilled agricultural, forestry and fishery workers '. The distributions of WR-CTS cases were similar with respect to age, obesity, and past

< : 2003 12 2 , : 2004 1 19 >
: (Tel: 041-550-3879) E-mail: hojang@dku.edu

* 2002



16 1 2004

medical history. The proportion of WR-CTS was higher in females. There was no significant difference in physical examination findings between WR-CTS and non WR-CTS cases. Repetitive work and the inappropriate hand posture seemed to be the risks for WR-CTS.

Conclusion: WR-CTS is a significant public health problem. The CTS surveillance system is quite useful to elucidate the characteristics of WR-CTS, but it remains of limited use in targeting specific industries and occupations for intervention.

Key Words: Work relatedness, Carpal tunnel syndrome, Surveillance

5.1%가 (BLS, 2003). (2002)

1999 1 4.1%(17 / 410)

가

2003

2002

2001 768 1167 가 가

가 4456 (Diaz, 2001), 가

4190 ,

(2003). 가 8.3 (Osorio et al., 1994).

가 (Kutluhan et al., 2001), 가 (Anton et al., 2002).

(, 2001; Davis et al., 2001). 가 (Cosgrove et al., 2002).

가 가

26.09% 29.41% 가 (

75 35 . 2001),

(, 2003), (. 1992, 1996).

31% (, 2003).

2001

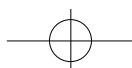
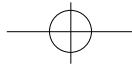


Table 1. General characteristics of 672 carpal tunnel syndrome patients by region

		Regional group				Total
		Capital region	Chung-Cheong region	Young-Nam region	Honam region	
		No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
Job* Category	Professionals	0 (0)	0 (0)	0 (0)	2 (0.8)	2 (0.3)
	Technicians and professionals	5 (2.9)	3 (2.1)	1 (1.0)	3 (1.2)	12 (1.8)
	Clerks	7 (4.1)	3 (2.1)	3 (3.0)	3 (1.2)	16 (2.4)
	Service workers	30 (17.4)	24 (16.7)	16 (16.0)	18 (7.0)	88 (13.1)
	Sale workers	3 (1.7)	1 (0.7)	1 (1.0)	1 (0.4)	6 (0.9)
	Skilled agricultural, forestry and fishery workers	15 (8.7)	57 (39.6)	10 (10.0)	26 (10.2)	108 (16.1)
	Craft and related trades workers	7 (4.1)	6 (4.2)	2 (2.0)	4 (1.6)	19 (2.8)
	Plant, machine operators and assemblers	5 (2.9)	5 (3.5)	5 (5.0)	6 (2.3)	21 (3.1)
	Elementary occupations	23 (13.4)	18 (12.5)	13 (13.0)	3 (1.2)	57 (8.5)
	Housewives	71 (41.3)	25 (17.4)	38 (38)	62 (24.2)	196 (29.2)
	Unknown	6 (3.5)	2 (1.4)	11 (11.0)	128 (50.0)	147 (21.9)
Age	<25	0 (0.0)	3 (2.1)	1 (1.0)	10 (3.2)	14 (2.1)
	25~34	8 (4.7)	7 (4.9)	4 (4.0)	21 (8.2)	40 (6.0)
	35~44	22 (12.8)	21 (14.6)	20 (20.0)	28 (10.9)	91 (13.5)
	45~54	57 (33.1)	61 (42.4)	43 (43.0)	58 (22.7)	219 (32.6)
	55~64	62 (36.0)	31 (21.5)	21 (21.0)	90 (35.2)	204 (30.4)
	>65	17 (9.9)	11 (7.6)	3 (3.0)	49 (19.1)	80 (11.9)
	Unknown	6 (3.5)	10 (6.9)	8 (8.0)	0	24 (3.6)
Gender	Male	24 (14.0)	23 (16.0)	12 (12.0)	71 (27.7)	130 (19.3)
	Female	147 (85.5)	109 (75.7)	82 (82.0)	185 (72.3)	523 (77.8)
	Unknown	1 (0.5)	12 (8.3)	6 (6.0)	0 (0.0)	19 (2.8)
Total		172 (100.0)	144 (100.0)	100 (100.0)	256 (100.0)	672 (100)

* Classification of occupations by Korean National Statistical Office (2000)

Job category

Table 2. Characteristics of 314 carpal tunnel syndrome patients with information on job, by the Korean standard job class

	Job category									
	Professionals		Technicians and professionals		Clerks		Service workers		Sale workers	
	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
Age			Skilled agricultural, forestry and fishery workers		Craft and related trades workers		Plant, machine operators and assemblers		Elementary occupations	
			No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
			No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
			No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
			No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
<25	1 (50)	0	0	0	0	0	1 (16.7)	1 (1.0)	1 (4.8)	6 (1.9)
25~34	0	3 (25)	3 (18.8)	3 (3.7)	0	0	1 (5.3)	0	4 (7.5)	14 (4.5)
35~44	0	3 (25)	6 (37.5)	10 (12.2)	2 (33.3)	6 (5.8)	4 (21.1)	8 (38.1)	17 (32.1)	56 (17.8)
45~54	1 (50)	3 (25)	1 (6.3)	42 (51.2)	0	34 (33.0)	8 (42.2)	9 (42.9)	21 (39.6)	119 (37.9)
55~64	0	1 (8.3)	4 (25.0)	20 (24.4)	2 (33.3)	44 (42.7)	4 (21.1)	2 (9.5)	6 (11.3)	83 (26.4)
>65	0	2 (16.7)	1 (6.3)	4 (4.9)	1 (16.7)	12 (11.7)	1 (5.3)	0	2 (3.8)	23 (7.3)
Unknown	0	0	1 (6.3)	2 (2.4)	0	6 (5.8)	1 (5.3)	1 (4.8)	2 (3.8)	13 (4.1)
Gender										
Male	1 (50)	4 (33.3)	8 (50.0)	4 (4.9)	2 (33.3)	17 (16.5)	10 (52.6)	18 (85.7)	12 (22.6)	76 (24.2)
Female	1 (50)	8 (66.7)	7 (43.7)	78 (95.1)	4 (66.7)	79 (76.7)	8 (42.1)	3 (14.3)	39 (73.6)	227 (72.3)
Unknown	0	0	1 (6.3)	0	0	7 (6.8)	1 (5.3)	0	2 (3.8)	11 (3.5)
Total	2 (0.6)	12 (3.8)	16 (5.1)	82 (26.1)	6 (1.9)	103 (32.8)	19 (6.1)	21 (6.7)	53 (16.9)	314 (100)

16 1 2004

45 64 가

2. 가
가

672

가 70%

314

Table 3. Prevalence of work-relatedness by different characteristics

		Work-related carpal tunnel syndrome No.(%)
Job* category	Professionals	0 (0)
	Technicians and professionals	5 (41.7)
	Clerks	6 (37.5)
	Service workers	61 (74.4)
	Sale workers	3 (50.0)
	Skilled agricultural, forestry and fishery workers	81 (78.6)
	Craft and related trades workers	14 (73.7)
	Plant, machine operators and assemblers	14 (66.7)
	Elementary occupations	44 (83.0)
Age	<25	4 (66.7)
	25~34	11 (78.6)
	35~44	34 (60.7)
	45~54	93 (78.2)
	55~64	59 (71.1)
	>65	15 (65.2)
	Unknown	12
Gender*	Male	46 (60.5)
	Female	173 (76.2)
	Unknown	9
Obesity [†] index	<80	2 (40.0)
	80~100	84 (70.6)
	100~120	80 (68.4)
	>120	30 (76.9)
	Unknown	32
Past medical history	No	165 (75.3)
	Yes	63 (66.3)
Total		228 (72.6)

* P <0.01 (by Chi-square test)

[†]Obesity index = Body weight *100/ (Height-100)

(Table 2).

(72.6%)

3.

76.2% (60.5%)

(p<0.05).

314 가 228 (72.6%)

75.3% ,

. 228

66.3%

75.8%(173 /228) , 20.2%(46 /228)

가 35.53% 가

4.

가 26.7% (61 /228) ,

19.3%(44 /228)

가

45 54 55 64 107가

가 40.8%(93 /228) 25.9%(59

/228)

26.3%, ‘

가

56.6%, ‘

28.1%

53

44

11.6%, 39.5%, 15.1%

83% 가

가

(p<0.05).

78.6%

81

가

74.4% 73.7%

(Table 4).

Table 4. Prevalence of exposure to ergonomic risk factors by work-relatedness

Ergonomic risk factors No.(%)	Work-relatedness	
	No No.(%) [†]	Yes
Computer use > 4 hrs / day	5 (5.8)	6 (2.6)
Repetitive work*	10 (11.6)	60 (26.3)
Work with excessive reach	41 (47.7)	153 (67.1)
Work above shoulder level	3 (3.5)	15 (6.6)
Repetitive use of wrist	23 (26.7)	62 (27.2)
Inappropriate posture of hand and wrist*	34 (39.5)	129 (56.6)
Use of vibration tool	10 (11.6)	31 (13.6)
Overweight work*	13 (15.1)	64 (28.1)
Overpressure work	25 (29.1)	64 (28.1)
Others	5 (5.8)	12 (5.3)
Total	86 (100)	228 (100)

* P <0.01 (by Chi-square test)

16 1 2004

(2003)

5.

가
6

가

가 가
' 가2001
(Davis et al., 2001).

41 ,

7:3(:)

77.2% 60.5%
(58.1%, 47.7%)

6가

가
(hyperesthesia)

가

1.4%

32%

Phalen

Tinel sign

72.6%

50%

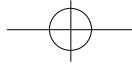
(Table 5).

(Cummings et al., 1989; Tanaka et al., 1995)

Table 5. Prevalence of the clinical symptoms and physical signs by work relatedness

Symptom & sign	Work-relatedness	
	No No.(%)	Yes No.(%)
Tingling sensation	76 (88.4)	205 (89.9)
Night pain	56 (65.1)	167 (73.2)
Mitigation of pain after shaking hands*	41 (47.7)	138 (60.5)
Aggravation of pain after overuse*	50 (58.1)	176 (77.2)
Trouble in gripping something	41 (47.7)	106 (46.5)
Radiating pain to upper extremity	29 (33.7)	64 (28.1)
Abductor pollicis brevis (APB) weakness	39 (45.3)	94 (41.2)
APB atrophy	34 (39.5)	82 (36.0)
Hypoesthesia	57 (66.3)	130 (57.0)
Tinel sign	48 (55.8)	118 (51.8)
Phalen sign	47 (54.7)	125 (54.8)
Positive median nerve compression test	22 (25.6)	48 (21.1)
Total	86 (100)	228 (100)

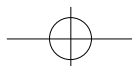
* P <0.01 (by Chi-square test)

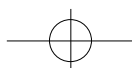
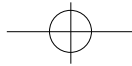


(1999) 가
가
34.7% 가
가 가
가 가 (McDiarmid et al.,
2000) 가
, ‘
, ‘
, ‘
, ‘
가 가 가
(1999)
, ‘ 가 가
가
가 147 4
가

672
19.3%
228 20.2%
가
(1999)
21.8%
25.5% 가
(Viikari-Juntura & Silverstein, 1999).
가
가 32.8%

(Andersen et al., 2003).
60.5% 76.2%
, ‘
, ‘
, ‘
, ‘





- 1996;29(3):507-19.
- 1998;10(4):505-23.
110. 2003;15(1):95-110.
- : , 2003.
- 2001;13(3):209-19.
- 2002;14(2):154-68.
- 2001;13(4):360-8.
- 1992;25:26-33.
- 2001;13(2):101-15.
- 1999;11(3):313-22.
- 2002;27(3):361-8.
- : , 2003.
- 2000-2, : [http:// www.nso.go.kr/new-cms/standard/occupations/occupations.html](http://www.nso.go.kr/new-cms/standard/occupations/occupations.html)
- Andersen JH, Thomsen JF, Overgaard E, Lassen CF, Brandt LP et al. Computer use and carpal tunnel syndrome: a 1-year follow-up study. JAMA 2003;289(22):2963-9.
- Anton D, Rosecrance J, Merlino L, Cook T. Prevalence of musculoskeletal symptoms and carpal tunnel syndrome among dental hygienists. Am J Ind Med 2002;42:248-57
- Bureau of Labor Statistics. Occupational injuries and illness in the United States by industry, 2002. United States Government Printing Office Bulletin. US department of Labor , 2003.
- Cosgrove JL, Chase PM, Mast NJ, Reeves R. Carpal tunnel syndrome in railroad workers. Am J Phys Med Rehabil 2002;81:101-7.
- Cummings H, Maizlish N, Rudolph L, Dervin K, Ervin A. Occupational disease surveillance: carpal tunnel syndrome. Morbidity and Mortality Weekly Report 1989;38; 485-489.
- Davis L, Wellman H, Punnett L. Surveillance of work-related carpal tunnel syndrome in Massachusetts, 1992-1997: A report from the Massachusetts Sentinel Event Notification System for Occupational Risks (SENSOR). Am J Ind Med 2001;39:58-71.
- Diaz JH. Carpal tunnel syndrome in female nurse anesthetists versus operating room nurses: prevalence, laterality and impact of handedness. Anesth Analg 2001;93:975-80.
- Kutluhan S, Akhan G, Demirci S, Duru S, Koyuncuoglu HR et al. Carpal tunnel syndrome in carpet workers. Int Arch Occup Environ Health 2001;74:454-7.
- McDiarmid M, Oliver M, Ruser J, Gucer P. Male and Female rate differences in carpal tunnel syndrome injuries: Personal attributes or job tasks?. Environ Res 2000;83:23-32.
- Osorio AM, Ames RG, Jones J, Castorina J, Rempel D et al. Carpal tunnel syndrome among grocery store workers. Am J Ind Med 1994;25:229-45.
- Tanaka S, Wild DK, Seligman PJ, Halperin WE, Behrens VJ, Putz-Anderson V. Prevalence and work-relatedness of self reported carpal tunnel syndrome among U.S. workers : analysis of the occupational health supplement data of 1988 national health interview survey. Am J Ind Med 1995;27:451-70.
- Viikari-Juntura E, Silverstein B. Role of physical load factors in carpal tunnel syndrome. Scand J Work Environ Health 1999;25(3):163-85.