

## VDT

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### Abstract

#### **Pain Related Factors in Upper Extremities among Hospital Workers Using Video Display Terminals**

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**Objectives:** This study was designed to quantify symptoms in the upper extremities and to identify the pain related factors among hospital workers using video display terminals.

**Methods:** The subject-group consisted of 138 employees working at a hospital using video display terminals. A structured questionnaire was used to estimate the participants' general characteristics, and job contents. Job stress was measured using Karaseks JCQ (Job Content Questionnaire). Pain in the upper extremities was identified according to the NIOSH symptoms survey criteria. Quantification was measured using Kim Chul's method. Pearson's Correlation analysis was used to identify validity in quantification. VAS (visual analog scale) was used to compare with this method. Multiple regression analyses elucidated the relationship between quantified pain and various work factors, such as job stress. Data were analysed with SAS 6.12 program.

**Results:** First, in quantification using Kim Chul's method, the correlation between modified PRS (pain rating score) and VAS was extremely high by 0.60 ( $P < 0.01$ ), indicating the high validity of PRS.

Second, the groups of high job demand, high job control, and females were related to an increased pain level.

**Conclusions:** These results suggest that the self pain assessment method, PRS, is valuable and useful in analyzing occupational musculoskeletal symptoms. High demand, job control and gender may influence the levels of pain. Prospective studies about musculoskeletal disorder are required.

**Key Words:** Quantification, musculoskeletal disorder, Video Display Terminals

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, 2001).

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, VDT(Video Display Terminal)

가

(NIOSH, 1993;

가

Bernard, 1994)

(Hales, 1994),

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(Bergqvist, 1995).

290

60%

가

(, 1989),

89

98.9%,

91.2%

(, 1996).

VDT

65%, 51%

가

(, 1995;

, 1997).

가

VDT

50%

90%

VDT

1.

1500

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(Putz-Anderson, 1992).

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2002 6 27

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(Bonger,

~28

가

(, 1995;

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141

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(1 ) ' ,  
, 가 (4 ) 4 Karasek  
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, 가  
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(National Institute for Occupational Safety and Health; NIOSH) (4 ) , 가

가 , .

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( , , , , , , 가  
10

(1991) 가 (pain rating score, PRS)

3.

(1991)

가  
(visual analog scale, VAS)

가 0 10 , 가

+ = × ( + )

1.

2) Karasek(1979) ' job strain model' 29 21%, 109 79%

33.5 , 73.3%

18% 가 4.4%

1 가

**Table 1.** General characteristics of the subjects

Characteristics	Classification	Male(n=29)	Female(n=109)	Total
Age(years)	20~29	6(20.7)	29(26.6)	35(25.4) <sup>‡</sup>
	30~39	20(69.0)	67(61.5)	87(63.0)
	40	3(10.3)	13(11.9)	16(11.6)
Get married	yes	23(79.3)	78(71.6)	101(73.2)
	no	6(20.7)	31(28.4)	37(26.8)
Smoking*	yes	13(44.8)	5(4.6)	18(13.0)
	no	11(37.9)	103(94.5)	114(82.6)
	experienced	5(17.2)	1(0.9)	6(4.4)
Alcohol*	1time week	7(24.1)	6(5.5)	13(9.4)
	2~3times month	7(24.1)	34(31.2)	41(29.7)
	not drinking	15(51.7)	69(63.3)	84(60.9)

<sup>‡</sup>; frequency(%), \*, p<0.05

**Table 2.** Work environment for computer using of the subjects

Characteristics	Classification	Male(n=29)	Female(n=109)	Total
Comfort for chair	yes	20(69.0) <sup>‡</sup>	68(62.4)	88(63.8)
	no	9(31.0)	41(37.6)	50(36.2)
Size of monitor*	< 17 inches	8(27.6)	57(52.3)	65(47.1)
	17 inches	21(72.4)	52(47.7)	73(52.9)
Distance from monitor to eye	<45 cm	14(48.3)	56(51.4)	70(50.7)
	45 cm	15(51.7)	53(48.6)	68(49.3)
Monitor level from eye*	high	6(20.7)	12(11.0)	18(13.0)
	same	7(24.1)	55(50.5)	62(44.9)
	low	16(55.2)	42(38.5)	58(42.0)
Career		7.8 ± 3.9 <sup>‡†</sup>	8.0 ± 4.7	8.0 ± 4.5

<sup>‡</sup>; frequency(%), <sup>††</sup>; mean ± SD, \*, p<0.05

9.4% , 2~3 가 가 29.7% .  
 45 cm 가 49.3%  
 (Table 1). , 가  
 50.7% .  
 2. 가 가 13% 가  
 8.0 . 17  
 VDT , 가 63.8%  
 17 .  
 가 52.9% 가 (Table 2).

**Table 3.** Psychosocial environment of the subjects

Characteristics	Male(n=29)	Female(n=109)	Total
Psychological demand	33.2 ± 5.4 <sup>†‡</sup>	34.9 ± 6.2	34.6 ± 6.1
Job control	59.8 ± 11.1	55.8 ± 10.7	56.7 ± 10.9
Supervisor support	10.6 ± 2.6	10.2 ± 2.2	10.3 ± 2.3
Colleague support	12.1 ± 1.8	11.5 ± 1.8	11.6 ± 1.8
Household working**	1.9 ± 1.8	3.9 ± 2.3	3.5 ± 2.3

<sup>†‡</sup>; mean ± SD, \*\*; p<0.01

**Table 4.** Symptomatic characteristics of the subjects

Characteristics	Classification	Male(n=29)	Female(n=109)	Total
Location	shoulder	26(89.7) <sup>†</sup>	106(97.3)	132(95.7)
	neck	23(79.3)	89(81.7)	112(81.2)
	back	16(55.2)	68(62.4)	94(68.1)
	hand, wrist, elbow	18(62.0)	76(70.0)	94(68.1)
Chief location	none	3(10.3)	3(2.8)	6(4.3)
	shoulder	19(65.5)	74(67.9)	93(67.4)
	neck	4(13.8)	10(9.2)	14(10.1)
	back	1(3.4)	10(9.2)	11(8.0)
	hand, wrist, elbow	2(6.9)	12(11.0)	14(10.1)

<sup>†</sup>; frequency(%)

3. 가 10.1% .  
 가 , 가 가 .  
 가 , 가 가 .  
 가 (Table 3).  
 가 0.60 가  
 4. 가 (Table 5).  
 가 95.7% ,  
 81.2%, 67.4%, 6.  
 ,  
 68.1% . 가  
 가 67.4%,  
 가 10.1%, 가 8.0% , 가

**Table 5.** Correlation of self pain assessment variables

Variables	Intensity	Continuity	Frequency	Aggravating activity	Pain Rating Score	Visual Analog Score
Intensity	1.00					
Continuity	0.44**	1.00				
Frequency	0.35**	0.38**	1.00			
Aggravating activity	0.41**	0.40**	0.32**	1.00		
Pain Rating Score	0.77**	0.72**	0.66**	0.71**	1.00	
Visual Analog Scale	0.55**	0.38**	0.44**	0.48**	0.60**	1.00

\*\*; p&lt;0.01

**Table 6.** Pain rating score concerning various factors

Characteristics	Classification	Pain rating score
Age	20~29	27.9 ± 22.5 <sup>‡</sup>
	30~39	36.6 ± 20.5
	40	32.8 ± 24.1
Gender**	male	23.5 ± 21.1
	female	36.8 ± 20.9
Married	yes(n=101)	35.4 ± 22.1
	no(n=37)	30.0 ± 19.9
Psychological demand**	high(n=69)	38.2 ± 19.9
	low(n=69)	29.7 ± 22.5
Job control	high(n=70)	35.5 ± 22.6
	low(n=68)	32.4 ± 20.5
Supervisor support	high(n=68)	34.8 ± 22.5
	low(n=70)	33.2 ± 20.8
Colleague support	high(n=88)	35.7 ± 22.2
	low(n=50)	30.9 ± 20.3
Household working	high(n=63)	35.9 ± 20.3
	low(n=75)	31.7 ± 23.0
Comfort for chair	satisfied(n=88)	32.7 ± 22.4
	unsatisfied(n=50)	36.2 ± 20.1
Monitor size	< 17 inches(n=65)	33.0 ± 21.7
	17 inches(n=73)	34.8 ± 21.6
Distance from monitor to eye	<45 cm(n=70)	33.3 ± 21.5
	45 cm(n=68)	34.4 ± 21.7

‡; mean ± SD, \*\*; p&lt;0.01

, 가 가 (Table 6).

**Table 7.** Factors influencing pain scores

Variables	Classification	Parameter estimate	Standard error	P-value
Age	0.04	0.35	0.92	
Married	(no=0)	6.19	4.72	0.19
Gender	(male=0)	14.68	4.70	<0.01
Comfort for chair	(yes=0)	2.16	3.69	0.56
Monitor size	(<17 inches=0)	3.45	3.57	0.34
Distance from monitor to eye	(<45 cm=0)	-0.68	3.58	0.85
Psychological demand		0.79	0.29	<0.01
Job control		0.33	0.18	0.07
Supervisor support		1.18	0.89	0.19
Colleague support		1.89	1.06	0.08
Household working		0.75	0.94	0.43
R2		0.23		

**Table 8.** Factors influencing pain scores in female

Variables	Classification	Parameter estimate	Standard error	P-value
Age	0.18	0.40	0.65	
Married	(no=0)	4.86	5.47	0.38
Comfort for chair	(yes=0)	1.32	4.27	0.76
Monitor size	(<17 inches=0)	3.83	3.99	0.34
Distance from monitor to eye	(<45 cm=0)	-1.32	4.12	0.75
Psychological demand		0.79	0.33	<0.01
Job control		0.47	0.20	<0.05
Supervisor support		0.36	1.00	0.72
Colleague support		1.29	1.18	0.27
Household working		0.75	1.09	0.49
R2		0.15		

7.

가 95.7% (1996)  
 가 가  
 22%가  
 (Table 6).  
 (1991)  
 가 (Table 7).

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(Margaret ,

2000).

(Visual Analog Scale, VAS)

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0.60

(Bongers , 2002).

( , 2001).

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(Bongers , 2002).

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(muscle

tone) 가

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(static position)

(Silverstein

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1991, 15:101-10.

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1989;1(2):141-50.

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1997;9(3):530-42.

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1995;28(2):433-49.

(VDT )

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가

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가 (p<0.01),  
가 (p<0.01).

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