

근로자 근골격계 통증의 자가평가에  
관한 연구

연세대학교 보건대학원

산업보건학과

김 정 애

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관한 연구

지도 원    종    욱    교수

이 논문을 보건학석사 학위논문으로 제출함


2001년    6월    일


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산업보건학과

김    정    애

# 김정애의 보건학석사 학위논문을 인준함

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연세대학교 보건대학원

2001년 6월 일

가

가

	.....		
.	.....	1	
.	.....	5	
.	.....	15	
1.	.....	15	
2.	.....	15	
3.	.....	16	
.	.....	17	
1.	.....	17	
2.	가	.....	20
3.	가 가	.....	24
.	.....	27	
.	.....	30	
	.....	31	
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가

365 rating score)                      1991                      (PRS : Pain  
 (Visual analog scale)                      가

Kappa

가                      가                      가

Kappa                      0.88,                      0.84,

0.89,                      0.89                      0.89

, 0.975(P 0.001) .  
,  
Pearson 0.603(P 0.01) .  
가 가  
, 가

---

: , PRS, VAS



•

1992

가 가 .  
4 ,

(OSHA, 1992)( , 1995).

, 95% .

1996 ,

.

가 1994 20 1996

120 ( , 1996).

가 가

.

(work-related musculoskeletal disorder,

WRMSD)

가 ,

(Maeda, 1977)

1 , ) , ,

, , ) (Hales ,

1994).

1990  
50% (Chaffin, 1973;  
Hagberg, 1992; Rempel, 1992).

(NIOSH, 1988).

1989  
(, 1989, 1990; , 1989, 1990)  
(, 1992), VDT (, 1995),  
(, 1995), (, 1996),  
(, 1996), (, 1997),  
(, 1997)

(, 1992;  
, 1996).

가

가

( , 1997), ( 1997; , 1997; , 1999) ( , 1999)

(1997) 가 가 , , (American National Standard Institute, ANSI) 가 . 가 , (discomfort) , (disability) . 가 . 가 가 (Elton, 1979). 가 (Agnew, 1976). 가 가 (Simple Descriptive Scale), (VAS), (Verbal Rating

Scale)

McGill (McGill Pain Questionnaire), Dallas (Dallas  
Pain Questionnaire) 가 가  
가 가

(1991)

가 가 , 가 가  
가 ,  
가 가 ,  
가 가  
가

( 1991)

가 가 가 ,  
가 ,  
가 ,

•

. Blix(1884)

가

, Von Frey(1894)

.

1939 Lewis

, Hardy(1940)

.

Mountcastle(1974)

“

”

Mersky(1973)

“

”

.

가

(response)

(somatic reflex reaction),

(automatic

nervous system reaction),

(reaction due to CNS

processing)

. somatic reflex reaction, automatic nervous system

reaction

reaction due to CNS processing

가 가

.

가 (pain threshold)

가 가

(klepac, 1981;posner, 1984)

가 가

(Huskisson, 1974;Reading, 1984)

Dana(1976), Titchener(1976)

, Kinnier-wilson(1976)

(pain language) . Keele(1948)

(Simple Descriptive) Young(1955) , Dowine(1978)

(Verbal Rating Scale) Huskisson(1974)

(Visual Analogue Scale) . 가

가 가

가 가

Guyatt(1985) Dich(1983) 가

(practicality) , 가

(comprehensiveness) (reproducibility)

(validity), (responsiveness) .

, Melzack(1987)

McGill (McGill Pain Questionnaire)

가 .

Diller(1980), Fordyce(1984), Pollard(1984)

가 , 가  
, 가  
가  
(1983) (Korean Pain Rating Scale) , 1991  
, 가  
가 가  
, 1998). 가 가 ( 가  
가 가 가  
가 가 가  
가 가  
(1991) 가  
가 , ,  
, McGill

(1991) PRS  
가 .  
1998 PRS  
PRS ,  
가 PRS VAS 가

1.

1)

(1) (acute pain) :

(2) (chronic pain) :

(3) 가

( pain threshold) :

가 .

(4) (suffering) :

(5) (pain tolerance level) : 가



2)

(1)

Somatic reflex reaction

Automatic nervous system reaction

(2)

Reaction due to CNS processing

2. 가

1) Visual Analog Scale (VAS)

가 0 1  
가 .  
가  
.

2) Verbal Rating Scale (VRS)

, , , ,  
가  
가 가 .

가

### 3) McGill Pain uestionnaire(MPQ)

Melzack(1987) Gate control Theory ,  
Sensory discriminative demension, Motivational affective dimension,  
Cognitive evaluative demension

. MPQ (McGill Pain Questionnaire) 4 , Sensory  
discriminative demension, Motivational affective dimension, Cognitive  
evaluative demension, miscellaneous(many sided)

0-10 , 2-6 가

가

pain rating index

VRS 0

5 present pain intensity .

MPQ internal consistency가 Test-retest

. (Dubuisson, Melzack, 1976) MPQ

( 1983) , , , , ,  
 ,  
 , 가 .

**4) (Pain Rating score : PRS)**

VAS, VRS, MPQ (1998)  
가 . (Pain Rating score : PRS)  
0-10 , 0 - 10 ,  
0 - 5 , 0 - 5 .

(1)

0 - 5

(2)

10

5 -10

(15 )

0-5 .

(3)

0-5

(4)

가

0-5

(5)

= A × B (A= , B = + +

) .

= A × B (A= , B = + + )

### 3. Kirshner Guyatt Deyo Dichl 가 가

1) (practicality)

가

가

. 가 가 , ,

McGill 가 (10-20 ) , Graham (1980) 가

2) (comprehensiveness)

가 (Elton, Burrows, Stanly, 1979) (factor structure) 가

3) (reproducibility)

가 (test-retest correlation) (internal consistency)

4) (validity) (responsiveness)

가 가 가 가 가  
, 가 가

( , 1991)

, , ,



· · ·  
VAS 5 .

**3.**

SAS ver 6.12

· · ·  
Kappa  
· 가  
·



•

# 1.

155 가 145 (94.77%), 가 8 (5.23%)  
, 40.06 , 5 (3.65%),  
30 (21.90%), 78 (56.93%),  
24 (17.52%) , 108 (72.97%) ,  
26 (17.57%) , 가 가  
14 (9.46%) . 1 가  
71 (48.30%) , 2-3 50 (34.01%) ,  
26 (17.69%) .  
10 , 15  
(16.67%) 가 , 13 (14.44 %), 11  
(12.22%) .  
10 (7.09%) 131  
(91.91%) , 109 .

Table 1. General characteristics of the subjects

Characteristics	Classification	Frequency (%)
Gender	male	145(94.77)
	female	8( 5.23)
Age		40.06 ± 9.47*
Education	elementary	5( 3.65)
	middle	30(21.90)
	high	78(56.93)
	college	24(17.52)
Smoking	yes	108(72.97)
	no	26(17.57)
	experienced	14( 9.46)
Alcohol	1time week	71(48.30)
	2-3times month	50(34.01)
	not drinking	26(17.69)

\*;mean ± S.D

Table 2. Work related characteristics of the subjects

Characteristics	Classification	Frequency (%)
Job	metal	11(12.22)
	electric	13(14.44)
	machine	4(4.44)
	plasterer	1(1.11)
	landscap	15(16.67)
	ironworker	9(10.00)
	supervision	7(7.78)
	office work	2(2.22)
	pipe	2(2.22)
	ceiling	1(1.11)
	stonecutter	2(2.22)
	coating	4(4.44)
	carpenter	6(6.67)
	architect	2(2.22)
the others	11(12.22)	
Career(years)		10.05 ± 7.77*
Industrial accident	yes	10(7.09)
	no	131(92.91)
Industrial accident's duration(day)		109.6 ± 139.84*

\*,mean ± S.D

## 2. 가

1)

가 46 (25.70%) 가  
, 33 (18.44%) . 가 가  
34 (32.38%) 가 .  
48 (44.04%) 가  
, 93 (63.70%)  
가 ,  
97 (64.67%) 가 (Table 3).

Table 3. Symptomatic characteristics of the subjects

Characteristics	Classification	Frequency (%)	
Location ‡	hand	7(3.91)	
	wrist	21(11.73)	
	elbow	5(2.79)	
	shoulder	33(18.44)	
	foot	4(2.23)	
	ankle	13(7.26)	
	knee	33(18.44)	
	waist	46(25.70)	
	arm	2(1.12)	
	leg	6(3.35)	
	neck	9(5.03)	
	Chief location	hand	4(3.81)
		wrist	7(6.67)
elbow		3(2.86)	
shoulder		15(14.29)	
foot		3(2.86)	
ankle		9(8.57)	
knee		21(20.00)	
waist		34(32.38)	
arm		1(0.95)	
leg		3(2.86)	
neck		5(4.76)	
Treatment type		not treatment	48(44.04)
		clinic	20(18.35)
	drug	21(19.27)	
	chinese medicine	19(17.43)	
	the others	1(0.92)	
Labor rest by Pain	yes	45(30.82)	
	no	93(63.70)	
Clinic Visit by pain	want being	8(5.48)	
	yes	45(30.00)	
	no	97(64.67)	
	want being	8(5.33)	

\*,mean  $\pm$  S.D ; ‡,mutiple response

2) 가

가 28  
(21.71%) 가 , ' 가 26 (20.16%)  
(15 ) 가 49 (38.58%)  
가 . 1 1 2 3  
가 60 (47.62%) 가 '  
'가 29 (23.02%) .  
38 (30.40%)  
, 35  
(28.00%)  
27 (21.60%) . 3.47  
± 2.34 0.00 9.00 .

Table 4. Characteristics of self assessment of pain

Characteristics	classification	Frequency (%)
Intensity	not at all	26(20.16)
	sometimes	28(21.71)
	can forgotten	15(11.63)
	a little	20(15.50)
	nervous	13(10.08)
	endure	8( 6.20)
	severe	9( 6.98)
	can't work	9( 6.98)
	can't move	1( 0.78)
	restless	0
	need immediate Tx	0
	Duration	not at all
under15min		49(38.58)
15min-2hrs		21(16.54)
2-5hrs		17(13.39)
5-10hrs		7( 5.51)
over10hrs		4( 3.15)
Frequency	not at all	29(23.02)
	1/ wk 2-3/ month	60(47.62)
	2-3/ wk	13(10.32)
	over1/ day	16(12.70)
	over2/ day	7( 5.51)
	all the day	4( 3.15)
Aggravating activity	not at all	35(28.00)
	at heavy move	38(30.40)
	at common move	27(21.60)
	at ADL ‡	13(10.40)
	at little move	11( 8.80)
	at resting	1( 0.80)
VAS	range(1 10)	3.47 ± 2.34*

\*mean ± S.D ; ‡, Activity daily living, VAS, visual analog scale

### 3. 가 가

1)

2	가	가	Kappa
	0.8835	,	0.8423
,	0.8951	,	
0.8989	.		0.8961
		0.975	.

Table 5. Reproducibility of self pain assessment

Variables	Coefficient of concordance	95% confidence interval
Intensity	0.8835	0.8198 - 0.9472
Continuity	0.8423	0.7543 - 0.9303
Frequency	0.8951	0.8310 - 0.9590
Aggravating activity	0.8989	0.8398 - 0.9326
VAS	0.8961	0.8426 - 0.9495



Table 6. Correlation of pain rating scale

Varibales	1st - PRS	2nd - PRS
1st - PRS	1.000	
2nd - PRS	0.975 *	1.000

\*P 0.01 PRS : pain rating scale

2)

가

0.61, 0.58, 0.54, 0.63  
 , 0.60  
 (P 0.01)(Table 7).

Table 7. Correlation of self pain assessment variables

Variables	Intensity	Continuity	Frequency	Aggravating activity	PRS	VAS
Intensity	1.00000					
Continuity	0.68731 *	1.00000				
Frequency	0.66688 *	0.63328 *	0.00000			
Aggravating activity	0.72162 *	0.65161 *	0.52980 *	1.00000		
PRS	0.90302 *	0.75564 *	0.71913 *	0.78573 *	1.00000	
VAS	0.61439 *	0.58663 *	0.54698 *	0.63831 *	0.60341 *	1.00000

\*P 0.01

.

,

가

.

.

( , 1997)

( , 1999)

,

가

가

가

가

,

가

가

(Elton, 1979).

가

가 가

가

가

2

가 가

. 가 가 1998

가 가 가 가  
, 가 가

가 가 .

. 가

가 가 .

가

(15 )

가 가

가

가 1 2-3

가 가 . ,

가 가 .

3.47 0 10 ,

가 가 , , ,

, VAS Kappa ,  
 , × ( + + )  
 . Kappa  
 가 0.8835 , 0.8423 ,  
 0.8951 , 0.8989  
 1 0.8961 . 가 가  
 0.61, 0.58, 0.54, 0.63  
 . 0.60 .  
 . 가 ( . 1999)  
 가 . ,  
 1 295 155  
 . ,  
 가 가

•

가

Kappa

,	Kappa	0.88,	0.84,
0.89,	0.89		0.89
,		0.975(P 0.01)	
,		0.603(P 0.001)	

가

. 2000  
 , .  
 ( )- - 1995;7(2):306-319  
 , , . 가 가  
 1998;22(2):305-311  
 , , , . 가  
 , 1991, 15:101-110  
 .  
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 , , , .  
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 , , , , .  
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 , , , . VDT  
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 . 가  
 . 1997  
 , , , , . (VDT )  
 .  
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 , , . 1992;25(1):26-33  
 , , . 가  
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 . 1997  
 . 가  
 . 2000  
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 1996  
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=====

1. : 2. :
3. ( , , , ) :
4. : 5. : ( ), ( )
6. : ( ) ( ) ( ) ( )
7. ? \_\_\_\_\_
8. ? . .
- 8-1. ?
9. ( , , ) ? ( )  
가 가 .
10. ( , ) ? ( )
11. ( ), ( ), ( )  
가 .
12. ( ), 2 3 ( )  
. ( )

1 . 1 .

13.

( ) ( ) ( ) ( )  
( ) ( ) ( ) ( )  
( ) ( ) ( )

14.

가

( ) ( ) ( ) ( )  
( ) ( ) ( ) ( )  
( ) ( ) ( )

15.

?

( ) / ( )  
( ) ( )  
( )

가

(1)

?

0.

1.

2.

3.

4.

5.

6.

7.

8.

9. 가

10.

(2). ?

0.

1. (15 )

2. 15 2

3. 2 5

4. 5 10

5. 10

(3). ?

0.

1. 1 2 3

2. 2 3

3. 1

4. 2

5. .

(4).

0. .

1. .

2. .

3. 가 .

4. .

5. 가 .

(5) 가 10 ,

0 ?

0	1	2	3	4	5	6	7	8	9	10
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## ABSTRACT

### Self Assessment Method of Worker's Musculoskeletal Symptoms.

#### -Application to Conctructor's workers

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(Directed by Professor Jongwook Won, MD, Dr PH.)

The assessment of pain, an essentially subjective experience is an elusive and complex undertaking but is one of main symptoms in musculoskeletal disorders. It is important to measure quality and quantity of pain for accurate diagnosis to prevent chronic and advanced musculoskeletal disorder. Kim et al made Pain Raring Scale(PRS) which ideal form of korean pain scale in 1991.

This study was undertaken to estimate the PRS' reproducibility to development a more adjustable method for subjective pain assessment through constructor' workers. I carried out the modified PRS and VAS mesurment protocols on 155 constructors' workers. PRS was contained questionnaire of pain intensity, continuity, frequency and aggravated moving pain.

The purpose of this study was to obtain validity (coefficient) about PRS protocol through paired test by various subjective pain assessment (PRS). It was already had been applied and validated in 1998 by Kim et al in clinical area. And this survey results also showed that reliability of modified PRS was very high.

A summary of results of modified PRS (pain rating score) application is as follows:

In pain description, subjective musculoskeletal symptoms in back are very high and self intensity was low, continuity was under 15min, frequency was one time per day or two to three times per month, aggravated moving was at heavy action.

In pain statistics analysis, Kappa analysis and correlation analysis, modified PRS' coefficient of concordance is very high by 0.975 ( $P < 0.01$ ). And the correlation modified PRS between VAS was also high by 0.603 ( $P < 0.01$ ).

Based on the above results we have concluded that, the self pain assessment method, pain rating score (PRS), is valuable and useful in occupational musculoskeletal symptoms. So it is necessary to apply this modified PRS protocol in other's occupational fields.

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Key words : constructor's workers, musculoskeletal disorder, PRS, VAS