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**Abstract**

**Increasing Risk of Mental Health Problems  
Among Subway Drivers Experiencing Accidents on the Track**

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**Objectives:** This study examined the prevalence of Post traumatic stress disorder(PTSD) and the comorbidity with panic disorder in subway drivers who experienced accidents on the track. In addition, this study examined the differences in panic disorder, stress levels, work-related problems, and sleep disturbances between drivers with and without an accident-experience.

**Methods:** 628 Seoul metropolitan subway drivers were participated in this study. We assessed mental health status of the subjects using the Clinician-administered PTSD scale (CAPS), panic disorder scale based on the DSM-IV criteria, Worker 's Stress Response Inventory, and Sleep Questionnaire.

**Results:** The prevalence of PTSD and comorbid panic disorder was significantly higher among those drivers who had experienced accidents than in those who had not. Drivers with an accident experience showed significantly higher somatic, depressive, anger symptoms in the stress measures, and more sleep problems than those drivers without an accident experience.

**Conclusions:** The experience of an accident on the track threatens both the work efficiency and the mental health of drivers. In order to reduce the negative effect of an extremely stressful event related to accidents, intervention programs for PTSD and panic disorder need to be developed and utilized.

**Key Words:** Subway drivers, PTSD, Panic disorder, Stress, Sleep

(Person Under Train, PUT)' 가  
(Thorell et al, 1994).

. 2003  
가 48 2002 24 , ' (Critical Incidence  
가 , 가 Stress, CIS) 가 ( ( , 2004).  
34 24 1.4 , 2004. 4. 4). 가

가 . , 466 (38.9%)  
가 , 26 (2.3%)  
가 , 674 (58.8%)  
가 ( , 2004).

(train drivers) (subway drivers)  
(Post traumatic stress disorder, PTSD) 가 CIS가  
76 PTSD ,  
1 (Tranah & Farmer, 1994), 17.1%(13 )가 PTSD 가  
31.6%(24 )가 (neurotic depression) 가  
(phobia)  
101  
(Malt et al, 1993) , 1.  
PTSD

(intrusive distress) - 가 50%  
1/3  
가 (arousal) . 359 , 641 , 13  
Theorell (1994) 628  
PUT 39.70±6.27  
가 3 , 130.49± 67.88 ( 10 A  
1 가 . 11 )  
가 170 (27.1%), B 304  
가 (48.4%), C 154 (24.5%)  
가 375 (59.7%)  
PTSD (panic disorder) , 253 (40.3%)  
, PTSD가

(anxiety sensitivity) (Taylor et al, 1992). 가 PUT , PUT  
(David et al, 1995; Falsetti et al, 1995; Silove, 1987). 가 , PTSD

(Markowitz et al, 1989). (Kaplan & Sadock, 1997).

2.  
1) (Clinician-Administered PTSD Scale: CAPS)  
CAPS 가  
Blake (1990) , DSM-III-R  
PTSD

(Psychosocial Well-being Index, PWI)



1), A 가 170 104 (61.2%), B 가 304 74.7%(280 )  
191 (62.8%), C 가 154 80 (52.0%)  
. 22 (3.5%) , PTSD 32  
. 628 376 (59.9%) (5.1%) , PTSD  
. 30 가 93 9 (1.4%,  
(59.2%), 40 가 44 (28.0%) , 2.4%) , PTSD  
30 가 104 (47.5%), 40 가 102 (46.6%) 10 (1.6%,  
. 30 40 2.7%)  
가 가 PTSD  
. ,  
34 (13.9%), 211 (86.1%) , 22  
42 (11.5%), 321 8 (36.4%) 14  
(88.2%) (63.6%) PTSD  
40 10 (25.0%)  
. 10 30 (75.0%)  
74 (36.2%) 가 ,  
10 139 (42.9%) 가 .  
3.  
2. PTSD  
628 515 (82.0%) PTSD 1) WSRI  
. (Table 2), t- ,  
92.9%(235 )가 가 (Table 3). WSRI

**Table 1.** General characteristic of participants by accident-experience on the track

		Non-accident-experience	Accident-experience	Total
		Number (%)	Number (%)	Number (%)
Company	A	66 (26.1)	104 (27.7)	170 (27.1)
	B	113 (44.7)	191 (50.9)	304 (48.4)
	C	74 (29.3)	80 (21.3)	154 (24.5)
Age	29	5 ( 3.2)	4 ( 1.8)	9 ( 2.4)
	30~39	93 (59.2)	104 (47.5)	197 (52.4)
	40~49	44 (28.0)	102 (46.6)	146 (38.8)
	50	15 ( 9.6)	9 ( 4.1)	24 ( 6.4)
Marriage	single	34 (13.9)	42 (11.5)	76 (12.5)
	married	211 (86.1)	321 (88.2)	532 (87.4)
	divorce/separation	0 ( 0.0)	1 ( 0.3)	1 ( 0.2)
No. of crewmen riding	1	139 (56.1)	179 (49.2)	318 (52.0)
	2	109 (44.0)	185 (50.8)	294 (48.0)
Job duration (year)	1	7 ( 3.4)	3 ( 0.9)	10 ( 1.9)
	1~2	9 ( 4.4)	21 ( 6.5)	30 ( 5.7)
	3~5	45 (21.7)	65 (20.1)	110 (20.7)
	6~9	71 (34.3)	96 (29.6)	167 (31.6)
	10	75 (36.2)	139 (42.9)	214 (40.3)



5.

(p=0.00).

가 PTSD 가 가 가 5.0 가 (Table 6). 가 (1, 2),

**Table 4.** Distribution of stress response level by accident experience

	Non-accident-experience	Accident-experience	Total
	Number (%)	Number (%)	Number (%)
Normal	174 (69.6)	215 (57.8)	389 (62.5)
Risk group	49 (19.6)	111 (29.8)	160 (25.7)
Patient level	27 (10.8)	46 (12.4)	73 (11.7)
Total	250 (100.0)	600.0)	622 (100.0)

$\chi^2=9.74, p=0.01$

**Table 5.** Comparison of sleep problem by accident-experience

	Non-accident-experience	Accident-experience	t	p
	Mean (SD)	Mean (SD)		
Sleep hour	392.29 (57.10)	401.87 (68.47)	-1.86	0.06
Awakening after daytime work	2.33 (0.98)	2.46 (0.89)	-1.61	0.11
Awakening after nighttime work	2.59 (1.07)	2.83 (1.01)	-2.78	0.01
Hypnotic frequency	1.45 (0.89)	1.60 (0.84)	-2.14	0.03
Sleep Habit	2.53 (0.68)	2.59 (0.70)	-1.14	0.25
Depth of sleep	2.69 (1.08)	2.74 (1.06)	-0.50	0.62
Lack of sleep	2.55 (1.11)	2.46 (1.07)	1.07	0.28
Quality of sleep	3.27 (1.10)	3.23 (1.11)	0.39	0.70
Early awakening	2.48 (1.19)	2.58 (1.17)	-0.99	0.32
Sleepiness	2.94 (1.06)	3.06 (1.11)	-1.37	0.17
Snoring	2.26 (1.18)	2.34 (1.12)	-0.94	0.35
Sleep apnea	1.49 (0.91)	1.69 (1.04)	-2.58	0.01
Re-sleep latency	2.55 (1.16)	2.68 (1.17)	-1.43	0.15

**Table 6.** Logistic regression by general characteristics

reference group	Regression coefficient	Standard error	Odds ratio	95% Confidence interval
Job duration*	-0.001	0.04	0.999	0.992 ~ 1.007
Single	-0.287	0.776	0.751	0.164 ~ 3.437
1 crewman riding	0.700	0.513	2.014	0.738 ~ 5.501
Accident-experience	1.6151	0.504	5.030	1.872 ~ 13.516
Age*	0.092	0.039	1.096	1.016 ~ 1.182

\* Job duration Age

가 , PUT 가 , ,

52.4% , 가 30 가 , 가 ,

(2003) (2003) 30 가 , ,

62.2% 50.2% 가 , ,

(2003) , 가

40.3% 가 , 10 가 ,

가 가 (1998) 가 , 가

가 , , , , , ,

PTSD

2 1 , 가 .

가 가 가 , 1 , 1~3

( , 2002) 가 가 (Cothreau et al, 2004).

5~75%, ,

1~3% PTSD , 가 ,

6.1%가 ,

10.7% , 1 : ,

2.3%, 3.5% (Kessler , PTSD

1994, , 2004 ) .

가 ,

: 2004 4 ~5 , 628

가 PTSD , , ,

(Mitchell, 1998) : PTSD

(Critical Incident PTSD

Stress Management, CISM)가 ,

가 . 가 .

2004.

가 2004; 25:193-204.

. 1998.

. 2002. pp318

. THI

2003;13(2):119-25.

2 2004

2004:127-45.

2003;15(1):37-51.

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