

# A Review of Korean Mental Health Studies Related to Trauma and Disasters

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## Abstract

This article reviews the findings from the studies on disasters and Posttraumatic stress disorder (PTSD) conducted during the last decade in Korea. Forty-five studies directly related to the psychological impact and stress from various types of disasters were selected through a literature search. We present prevalence/incidence, risk factors and other variables related to disasters, the treatments, and case reports. Most of the studies have not yet systematically examined different types of disaster and trauma, and have strong methodological weaknesses. It is suggested that further systematic studies are greatly needed to understand the comprehensive aspect of disaster and PTSD, especially focusing on the epidemiology, child and adolescent victims, biological aspects, pharmacotherapy, and psychological treatments.

**Key words:** Posttraumatic stress disorder disasters, Korea

[ Psychiatr Invest 2005; 2 (2): 22-30 ]

## Introduction

With rapid development in technology and industry

during the past two decades, Korean society has been more and more accustomed to the convenience and benefits of the modern era. At the same time, the fast and outcome-focused development entailed some serious pitfalls and weaknesses in the political structure<sup>1</sup>. Furthermore, such results led to several tragic accidents and man-made disasters that were probably preventable.

There have been a number of unfortunate large-scale traumas during the last two decades that caused tremendous fatalities and injuries: the Wooam apartment collapse in 1993, the Sungsoo bridge collapse in 1994, the gas explosion the Daegu subway construction area in 1995, the Sampoong department store collapse in 1995, the Sealand resort fire in 1999, and the Daegu subway fire in 2003. In addition to these accidents, motor vehicle accidents are also occurring more frequently in Korea than in any other country. In trying to understand these phenomena, many agreed that at the root of many of these accidents lies a lack of awareness safety, a lack of preventive measures against possible disasters, and a lack of crisis management system in our society<sup>1</sup>.

All kinds of disasters have a profound impact on victims, psychologically as well as physically. However, it is only in recent years that the mental health professionals in Korea, including psychiatrists and psychologists, begun to show interest in the psychological impact of such disasters and Posttraumatic stress disorder (PTSD), the psychiatric disorder most directly related to disasters. Only a small number of studies on

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disasters and PTSD have been published to date in Korea. A literature search came up with about 1,300 articles directly related to the traumatic events. However, there were only about 45 articles concerning psychological impact or stress disasters. Among the articles on the psychological reactions to disasters, five articles on PTSD were published in *Neuropsychiatry* (March, 2005), the journal published by the Korean Neuropsychiatric Association. The Disaster Psychiatry Committee, under the Anxiety Disorder Association of Korea, was established in Oct, 2003 to develop strategies for disaster intervention and to encourage research in disaster-related fields.

The objective of this article is to review the findings of disasters and PTSD-related studies conducted during last decade in Korea. Towards the end of the article, we will discuss some findings from the Daegu subway fire accident that is the most recent disaster that attracted a large amount of public attention and is currently being studied as a part of a long-term research project.

### Classification of studies

Thirty-one empirical studies, five review articles, five master's theses, and four case reports were scrutinized for the purpose of this review. In most of the studies, the subjects were victims of the disaster, and only two papers dealt with the psychological or adjustment problems of the victims' families, and one thesis showed the psychological impact on firefighters. Nearly all the studies were about adult victims and there was just one paper related to the elderly; there were none on children or adolescents.

When the types of events that were related to the psychological impact or stress were grouped, there are combat veterans Korean and Vietnam war (3)<sup>2, 3, 4</sup>, the Sampoong department store collapse (9)<sup>5, 6, 7, 8, 9, 10, 11, 12, 13</sup>, a typhoon (1)<sup>14</sup>, the Kwang-ju civil uprising (2)<sup>15, 16</sup>, traffic accidents (8)<sup>17, 18, 19, 20, 21, 22, 23, 24</sup>, accidents in industrial field (1)<sup>25</sup>, the psychological impact on firefighters (1)<sup>26</sup>, battered wives (2)<sup>27, 28, 29</sup>, the victims of sex (1)<sup>30</sup>, North Korean refugees (2)<sup>31, 32</sup>, Korean sur-

vivors former comfort women for the Japanese army during World War II(2)<sup>33, 34</sup>, the ship crew from maritime accidents (1)<sup>35</sup>, and rape (1)<sup>36</sup>.

Classifying into smaller groups by topics, the following topics were chosen: prevalence, case analysis<sup>1, 6, 15, 16, 37</sup>, clinical features<sup>2, 4, 5, 8, 17, 18, 19, 26, 28, 38</sup>, personality characteristics<sup>9, 21</sup>, psychological tests (MMPI<sup>3, 7, 22, 23, 24, 27, 39, 41, 42</sup> and Rorschach<sup>34, 40</sup>), coping style<sup>10, 21</sup>, the development of assessment tool<sup>31</sup>, sleep<sup>43</sup>, pharmacological treatment<sup>44, 45</sup>, functional MRI (fMRI) study<sup>46</sup>, cognitive functioning<sup>47</sup>, dexamethasone suppression test<sup>48</sup>, treatment<sup>49</sup> with cognitive-behavior group therapy<sup>20</sup>, Eye movement desensitization reprocessing (EMDR)<sup>50, 51, 52</sup>, Transcranial Magnetic stimulation (TMS)<sup>53</sup>, amytal interview<sup>54</sup>, and intervention with families of the victims<sup>1, 15</sup>.

### Prevalence/Incidence

In 2001, Korean Epidemiologic Catchment Area (KECA) study<sup>55</sup> was conducted using the Korean-Composite International Interview version 2.1(K-CIDI)<sup>56</sup> based on the DSM-IV. In a sample of 6,242 general adult population, the lifetime, 1-year and 1-month prevalence of PTSD were 1.5%, 0.6%, and 0.5%, respectively. In a sample of 204 Korean and 100 Vietnam veterans, the prevalence of PTSD was found to be 8.8% and 23%, respectively.

In another epidemiological study carried out with a sample of 850 people living in an urban area, the lifetime and current prevalence of PTSD were 4.7% and 2.1%, respectively. There were no significant gender differences in terms of the prevalence. The lifetime prevalence to any traumatic exposure was 78.8%. Sudden unexpected death of a close person was the most prevalent traumatic event (51.1%). Among the traumatic events, natural disasters, fire and explosions, motor vehicle accidents, serious accidents at work or in the home, physical assaults, assaults with a weapon, combat, life-threatening illnesses, and serious injuries to death for someone else were most commonly associated with the men, while sexual assault was more com-

monly associated with the women.

A study on the Sampoong building collapse reported that the incidence rate of PTSD was 30% and partial PTSD was 44% among 27 survivors 1 month after the crash, and after three months, the PTSD increased to 41% and the partial PTSD to 48%<sup>5</sup>. The findings substantial proportion of partial PTSD found in this study is important because recent research has shown that sub-threshold PTSD symptoms can also be a source of disability<sup>57,58</sup>. The incidence of PTSD in motor vehicle victims was 48.5% within 3 months after the accident and 39.7% about 2 years later<sup>18</sup>. In a sample of 47 undergraduate bus accident victims, the incidence of full PTSD and subsyndromal PTSD at 2 months after the accident were 27.7% and 38.3%, respectively<sup>19</sup>. The North Korean refugee study reported that the prevalence of PTSD was 27.4% in a sample of 20 refugees using the Trauma Scale for North Korean Refugees<sup>3</sup>. In another study of the North Korean refugees, the prevalence rate of PTSD and partial PTSD was 27.2% and 31.8% at the initial assessment, which significantly reduced to 4.0% and 5.3% at the follow-up assessment conducted 3 years later<sup>32</sup>. In a sample of elderly residents from a damaged community after typhoon Rusa, 36.9% had moderate to severe levels of post-traumatic stress on the Impact of Event Scale<sup>14</sup>. Twenty-five percent of 47 occupational accident victims were diagnosed PTSD using Clinician Administered PTSD Scale (CAPS)<sup>25</sup>. A study of the psychiatric problems in 10 rape victims showed that the most common psychiatric diagnosis was PTSD (40%), followed by depression (20%) and schizoaffective disorder (20%). Most of those rape victims reported not knowing the perpetrators<sup>36</sup>. Eighty-one percent of women victims trafficked for illegal sex industry were found to be suffering from PTSD. Many of them reported having experienced repeated sexual assaults, physical injuries and serious threats of death from the sex clients, pimps, and gangsters<sup>30</sup>.

## Risk factors

What leads to develop PTSD after traumatic experiences is still not clear, but some factors seem to contribute to the symptoms. We will introduce the risk factors found in studies on disasters and PTSD.

In a sample of 40 Korean and Vietnam veterans, there was a higher proportion of PTSD in those who began to serve in the military service before they were 20 years-old and had no job after being discharged from the military service<sup>2</sup>. In a sample of elderly victims in a damaged community after typhoon Rusa, higher post-traumatic stress was associated with their spouses being alive, with more relatives living together and with more past traumatic experiences<sup>14</sup>. In a 3-year follow-up study on North Korean defectors, compared to the defectors with partial PTSD and non-PTSD, the defectors with PTSD had experienced more traumatic events throughout their lives before escaping from North Korea and more traumatic events while escaping from North Korea<sup>32</sup>. In a bus-accident victims study, the group diagnosed with PTSD had experienced more past motor vehicle accidents compared to the non-PTSD group. However there were no significant differences in the perception of previous health status, history of psychiatric treatment and motor vehicle accidents their family, motor vehicle victims, compensation disabilities, the return to previous job and financial difficulty were associated with chronic and poor psychological adjustment PTSD. The other motor vehicle studies reported that there were no significant differences in the education level, time of symptom onset after the accident, and gender among non-PTSD, chronic PTSD and recovered PTSD<sup>19</sup>.

In the Sampoong building collapse study, PTSD developed more frequently, and depressed mood and anxiety appeared more often in the group who had experienced the loss of consciousness<sup>5</sup>. However, no significant differences were found the loss of consciousness between PTSD and normal groups in bus accident studies<sup>17</sup>. The degree of perceived danger was related to developing PTSD or chronicity of PTSD. Veterans with a score over 12 on the Combat Exposure

Scale, which measures subjective combat-related stress were more likely to have PTSD<sup>2</sup>. In a sample of 47 undergraduate bus-accident victims, full and subsyndromal PTSD victims were more likely to have experienced a prior motor vehicle accident and to have had a severer perception of danger during the accident compared to the victims without symptoms<sup>19</sup>.

### Other variables related to disasters

For the survivors of the Sampoong building collapse who had acute PTSD, re-experiencing and hyperarousal symptoms reduced considerably three months after the collapse, but nearly most of the avoidance symptoms did not change<sup>5</sup>. PTSD groups among occupational-accident patients showed a higher score of Beck Depression Index (BDI), State and Trait Anxiety Inventory (STAI), STAI-II IES and all other subscales except PAR subscale on Revised Symptom Checklist (SCL-90-R)<sup>25</sup>.

In a sample of 47 undergraduate bus-accident victims, full and sub-syndromal PTSD victims showed more severe depression, anxiety, negligent guilt, derealization and a decrease of awareness compared to normal victims. Also, full and sub-syndromal PTSD victims were significantly evaluated as having a lower possibility of returning to pre-accident functioning and used more passive coping mechanisms than normal victims<sup>19</sup>.

A study on post-traumatic stress in firefighters among rescue workers was carried out to examine the hypothetical model designed to explain post-traumatic stress in firefighters<sup>26</sup>. This hypothetical model was based on the Figley's Secondary Traumatization Model. Five exogenous variables such as career, control, work burden, life events, social support, and two endogenous variables, such as, mobilization impact (impact mobilization frequency mobilization impact level), and the post-traumatic stress level were used for this study. The results showed that only the work burden had a significant effect on mobilization impact ther exogenous variables were not affected. Mobilization impact and social

support were shown to have a significant direct effect on post-traumatic stress. Career, control, life events and work burden had a significant indirect effect on post-traumatic stress through mobilization impact.

### MMPI

MMPI profiles of Korean War veterans with post-traumatic stress disorder were investigated. In both PTSD and control groups, the mean of T scores of each MMPI scale were within the normal range (T less than 70). However, the PTSD group showed significantly higher scores F, 3(Hy), 5(Mf), 8(Sc) than the control group<sup>3</sup>.

A study of the Sampoong Accident Survivors (SAS) was conducted with 610 subjects who wanted to get a psychiatric evaluation for legal compensation. The SAS group was divided into two groups (mild stress group and severe stress group) buried under the debris, the McBride grade of mental symptoms, the length of hospital stay, and their companion's death, and these two groups were compared by the MMPI scales. Finally the discrimination analysis of MMPI scales was conducted between the SAS and normal control groups. The main findings were as follows: F, Hs, D, Hy, Pa, and Pt scales of MMPI in SAS group are prominently higher compared with the normal controls. For the comparison of two groups' MMPI scores, which were divided by the difference stress severity, there were no statistical differences. The percentage of correctly grouped case by MMPI was 89.84%. The effective scales for discriminat between the SAS and normal control were L, F, K, Hs, D, Hy, Pt, Sc and Ma<sup>7</sup>. Several other studies on the relationship between MMPI and PTSD showed a similar pattern, with increased scores on the F, Hs, D, Hy, Pa, Pt, Sc and Sc scales and lower scores on the L, K, and Ma scales for the PTSD subjects.

However, interesting results were found in the comparative study of veterans and accident victims. In the veterans group, the specific code-type was not found, but showed elevated scores of the F, 1, 2, 3, 6, 7, 8, 0

scales over 60 on the T score. On the other hand, the results from the accident group showed that the specific code-type was found 1-7 (Hs-Pt=70.50-69.59). The veterans group scored significantly higher than the group of normal people on all scales except the K scale, while the accident victims scored significantly higher than the group of normal people the L, F, Mf, Pa, Pt, Sc, and Ma scales<sup>4</sup>.

### Biological study

Dexamethasone suppression test (DST) was conducted to investigate the possibility of enhanced negative feedback sensitivity in 12 male PTSD combat patients. Their plasma cortisol levels in the morning and in the afternoon were significantly lower than the normal control group. The relative value of change was significantly higher in the patient group than in the control group. These findings suggest that the alteration of DST may be related to the enhanced HPA axis in PTSD<sup>48</sup>. Event-related functional magnetic resonance imaging in motor vehicle victims with PTSD showed activations in both occipital cortex, both fusiform gyri, the left parietal lobule, both insula, right cerebellar tonsil, and right putamen, right claustrum, but deactivations in both prefrontal gyri. These findings suggest that the insula, limbic lobe and cerebellum may play a role in mediating fear response in PTSD<sup>46</sup>.

### Treatment study

**1) Pharmacotherapy:** A randomized open label trial was conducted to compare mirtazapine with sertraline efficacy and tolerability in Korean veterans diagnosed with PTSD. Both drugs showed similar improvements of PTSD and depressive symptoms, but mirtazapine showed a quicker response than sertraline and good tolerability<sup>45</sup>.

**2) Psychological treatment :** Thirty-one undergraduate bus-accident victims with PTSD and partial PTSD underwent cognitive-behavioral group therapy for ten weekly sessions. In the first five sessions, depression, state anxiety and measures related to PTSD (Impact of

Event Scale, CAPS, negligent guilt and derealization) significantly improved in treatment groups, but driving/riding behaviors did not improve. In the last five sessions, there were no significant differences in all of the measures related to PTSD between the treatment and the control group, except a significant improvement of 'avoidance of certain roads', 'avoidance of accident area', and 'sensitivity speed of driving/riding behaviors' in the treatment group. Such results could be interpreted as improvement of accident phobic symptoms<sup>20</sup>.

EMDR treatment was provided to a young female a multiple-trauma survivor whose previous treatment with psychotropic medication and supportive psychotherapy was unsuccessful. She was given a series of consecutive six-week sessions of EMDR. After EMDR, she improved on all measures of SCL-90-R, Dissociative Experiences Scale, STAI, BDI, IES-R. These gains were maintained for six months after the termination of treatment<sup>49</sup>.

### Case reports

Two cases of PTSD in survivors of enforced sexual labor who were the former comfort women for the Japanese army during World War II have been reported. They were found to suffer from psychiatric sequelae as well as physical illnesses related to past experiences of enforced systemic rape and physical and mental abuse by the Japanese army. They expressed strong anger towards Japan, showed chronic depression and shame, and complained of hwabyung (Korean culture related anger syndrome) and of han (Korean culture related emotional mixed reaction of anger and depression). On Rorschach test, they revealed anger and fear related to past experiences of being raped violently. These findings suggest that a systemic study on PTSD and other medical sequelae of these women should be done before all other survivors die<sup>33</sup>.

### Daegu subway fire accident

The fire on the Daegu subway, which happened on

**TABLE 1.** The distribution of 129 survivors by gender.

gender	Frequency (person)	Percent (%)
Male	58	45
Female	71	55
Total	129	100.0

**TABLE 2.** The distribution of 129 survivors by age.

Age	Frequency (person)	Percent (%)
0~9	3	2.3
10~19	19	14.7
20~29	34	26.4
30~39	30	23.3
40~49	23	17.8
50~59	9	7.0
60~69	11	8.5
Total	129	100.0

**TABLE 3.** The distribution of 129 survivors by education level.

Education level	Frequency (person)	Percent (%)
No education	1	0.8
Elementary school graduation	9	7.0
Middle school graduation	17	13.2
High school graduation	34	26.4
University graduation and upper education	35	27.1
No response	33	25.6
Total	129	100.0

**TABLE 4.** The distribution of 129 survivors by marriage.

Marriage	Frequency (person)	Percent (%)
Unmarried (single)	51	39.5
Married	65	50.4
Divorced	3	2.3
Separation by death	2	1.6
No response	8	6.3
Total	129	100.0

**TABLE 5.** The distribution of 129 survivors by loss of consciousness.

Loss of consciousness	Frequency (person)	Percent (%)
No	62	48.1
Yes	61	47.3
No response	6	4.7
Total	129	100.0

**TABLE 6.** The distribution of 129 survivors by the duration of rescue.

Duration of rescue (minutes)	Frequency (person)	Percent (%)
Below 5	5	3.9
6~10	26	20.2
11~30	66	51.2
No response	32	24.8
Total	129	100.0

**TABLE 7.** The distribution of 129 survivors by psychiatric diagnosis.

Psychiatric diagnosis	Frequency (person)	Percent (%)
Normal	17	13.2
Some symptoms of PTSD	34	26.4
PTSD	64	49.6
MDD	2	1.6
Adjustment disorder	9	7.0
Dementia and delirium	2	1.6
Amnesic disorder	1	0.8
Total	129	100.0

MDD: major depressive disorder, PTSD: Posttraumatic stress disorder

**TABLE 8.** The distribution of 129 survivors by severity.

Severity	Frequency (person)	Percent (%)
Normal	16	12.4
Borderline	37	28.7
Mild	45	34.9
Moderate	22	17.1
Severe	9	7.0
Total	129	100.0

February 18, 2003, resulted in 192 deaths, 148 injuries and an economic loss estimated at 4,700,000,000 won (about 4,600,000 dollars) for the property damage and 51,600,000,000 won (about 50,400,000 dollars) in recovery expenses. As mentioned in the prologue, this accident became the most critical opportunity to take a serious interest in disasters and PTSD in Korea.

The first psychiatric evaluation was carried out for 129 survivors two months after the disaster using semi-structured interviews by the first author. The also the MMPI, SCL-90-R, BDI, BAI, STAI-I and II, IES, PCL-C. The descriptive data on, age, education level, marriage, loss of consciousness, time necessary for rescue, psychiatric diagnosis and severity level is presented in Table 1 though 8. In this study, the incidence of PTSD was estimated at 49.6%, which is above the average incidence rate of 20~40% in Koreans. This implies that the fire on the Daegu subway was a serious accident enough to affect many survivors. When the survivors with PTSD from this disaster (PTSD group) were compared with other psychological symptoms (ther other Sx group), the results showed that the former had higher levels of problems compared with latter. That is, the PTSD group was more depressed, anxious, confused, suspicious and generally unstable. After inputting as a covariable in the analysis, since there were more females who had PTSD, Catell's personality factors were examined. The results were that PTSD group was more virtuous (47.9 versus 42.95), tender-mindedness (51.13 versus 44.70), autia (49.63 versus 44.26), prone to guilt (59.37 versus 53.93), anxious (66.08 versus 57.95), and had weaker ego-strength than other Sx group.

## Conclusions

Unfortunately, Koreans encountered a number of mass traumas, especially during the last two decades that caused tremendous fatalities and injuries. However, psychological and psychiatric sequelae of disaster and trauma have only recently attracted attention from the community and society. Disaster-related

and PTSD studies in Korea are still the beginning stage. Most of the studies have not yet examined different types of disaster and trauma systematically, and have methodological weaknesses. Thus it is very difficult to compare the results of studies with those investigated in the western countries.

Further systematic studies are certainly needed to understand the broad range of disaster experiences and PTSD, such as studies on epidemiology, child and adolescent victims, biological aspects, pharmacotherapy and psychological treatment. Such research efforts will help guide clinicians to use the evidence-based drugs and psychological therapy to a broad range of victims.

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