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Disaster and Psychology: An Investigation of Psychological Distress and Symptoms of rescue workers

– An literature review

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Disaster and Psychology: An Investigation of Psychological Distress and Symptoms of rescue workers

The aim of this study was to investigate the psychological distress and symptoms among disaster rescue workers who involved in the rescue effort in the aftermath of Sichuan earthquake, 2008.

The study was based on literature review on previous conducted researches, after the establishment of literature selecting principle, a number of researches was considered to be qualified and thus a thorough scanning and analysis carried out. The findings was analysed and categorized into different themes.

The findings of this paper suggested the psychological stress from the disaster scene was multi-dimensional, not only the difficult rescue work stresses the rescue crew, but also the stressors raised from the physical environment as well as individuals' own life statues. The symptoms experienced from sampled rescue workers was summarized into 4 categories: psychosomatic symptoms, conceptual symptoms, emotional symptoms and behavioural symptoms.

The implication of this paper were seen to be needed to heighten public's arousal of these potential secondary victims of disaster, and to assist the establish of psychological early stage recognization and intervention for the rescue workers.

This study has certain limitations, that is well discussed in the conclusion chapter, and some unanswered questions were suggested for future studies.

KEYWORDS: Disaster, Psychology, Rescue worker, Secondary victim, Post-trauma Distress.

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1 INTRODUCTION AND THE AIM OF STUDY

1.1 Background of the study

The worst earthquake in China's history happened in Sichuan province, with an amplitude of 8.0 on the Richter scale, the earthquake left widespread destruction that, affected many surrounding areas, among which Shifang, Mianyang, Wenchuan were the worst destroyed cities. This catastrophe caused 70,000 death, injured over 300,000 people, 18,000 people were declared as disappeared, countless people were left without shelters, thehe extent of the earthquake was unprecedented in China's history.

People can barely remove the horrible scene from their memory-- dark and gloomy sky with weird flash, people struggling from the rubble of collapsed buildings, shaking off the dust and wiping off the blood, seeing the home that themselves and their families spend many years of painstaking efforts on, the neighbourhood they have lived in for years, turned into shambles, etc, could not figure out what just happened. Their previous life and their established future plans, vanished in a split second.

The international literatures already had confirmed the entity that mass disasters bring psychological impact onto the affected victims, well this concept of disaster psychology was not well recognized in China until recent years. Around thirty years ago there was also a tremendous earthquake happened in Tangshan scored 6.9 on Richter scale, but at that moment the rescue effort was purely focused on the physical care and community reconstruction, the psychological influence of disaster did not receive enough attention, up to the present, little research can be found toward psychological responses of victims from Tangshan earthquake.

Though an increased attention has paid to the mental health impact after the strike of Sichuan earthquake, the disaster psychology was still a fangle for most of people, moreover, the focus was mainly paid on the primary victims, a majority of the public was not conscious of the existence of secondary victims.

The secondary victims referred to the workers in all types of agency that succumb to occupational stress and fatigue during the course of their post-disaster assignments (Taylor, AJW. 15.5.2010). They are recognized as emergency medical staffs, journalists, firemen, polices, and other military forces, etc.

As the author herself being a health care worker, the initial motivation to conduct this study was her interest of the risks, hazards, and detriments for rescue personnels who engaged in disaster rescue work.

1.2 Aim of the study

The primary aim of the study was to investigate how rescue workers experience the effect of disaster rescue work thus provide a better understanding of their psychopathology and a good evidence for establish effective psychological intervention in the future for the studied groups.

For this purpose, two research questions was formatted:

a. What are the stressors and risk factors for rescue worker to develop psychological distress?

b. What symptoms did the rescue workers experience during the implementing of rescue effort?

The secondary purpose was to produce essential knowledge toward disaster psychology.

1.3 Content of the thesis

1.3.1 Knowledge of mental health and disaster

For a better understanding of the concept of disaster psychology, chapter two produced relevant knowledge toward the disaster types, the development or phases of psychological reactions and common post-traumatic stress disorders in the aftermath of disaster.

1.3.2 Research design, methods of data collection and data analysis

Chapter three described the research objective and research questions, the method of data collection and data analysis was also detailed explained. By the end of the chapter, a thorough consideration of the validity and reliability of the research method was acquired.

1.3.3 Research findings

After a systemic review of selected materials, the information which answered research questions was then picked and summarized, the psychological stressors and discovered symptoms were presented into categorized themes.

1.3.4 Discussion of research findings

The research findings were further analyzed in the discussion chapter, in where the practical condition and environment of disaster rescue was considered in order to explain the possible psychopathology.

1.3.5 Conclusion

The sixth chapter of this study concluded the research limitation and suggested the possible improvement for future studies, some additional research questions and directions for future studies were recommended.

1.4 Summary

The concept of disaster psychology is still a not well-known and well-understood subject in China, the availability of previous quotable experience is rare. This study produced

essential knowledge toward disaster psychology, and an in-depth investigation of its influences for rescue crews.

2 KNOWLEDGE OF MENTAL HEALTH AND DISASTER

2.1 Introduction

This chapter outlines some definitions and concepts of disaster and its correlation with psychology.

The author first defined the meaning of disaster according to the purpose of this paper, then the correlation between disaster and mental health was discussed generally. Next, the potential disaster psychological victims was identified, and the phases of psychological response in the aftermath of disaster was described in detail, from the phase of immediate aftermath to reconstruction. Some common trauma-induced psychological disorders was introduced in the last part of this chapter, include post-traumatic stress disorder, acute stress disorder, generalized anxiety disorder, etc.

2.2 Definition of disaster

A disaster is generally understood as "events forced by the physical environment which are harmful and greatly exceeds the coping capacity of the affected community" (Juan José 2005, 1-2).

A disaster can be either caused by pure natural forces-- volcano eruption, earthquake, tsunami, etc; or human activities-- war, terrorism attack, airplane crashes, rape, etc; but these days, the interaction of natural forces and human activities seems to be the contributor of the majority cases of disaster events, for instance, flooding caused by the improper modification of stream channel, deforestation of mountains had led to more incidence of mudslide, the misuse of lands had enlarged the area of desertification, which is also associated with the increased frequency of sandstorms, etc.

A consensus on a precisely definition of disaster has not yet uniformed in academia, there are probably more than 10 definitions of the term among international literatures. Nonetheless, in order to define the term, Juan José (2005, 1-2) has proposed 5 main elements that are needed to be taken into consideration, which were:

A. Human losses
B. Number of injured persons
C. Material and economic losses
D. The harm produced to the environment
E. Threat to the social structure that is beyond the management ability of usual social mechanisms

However, a disaster is a very complex, multi-dimensional phenomenen, the divergences of attitude is greatly influenced by the interest and the role of the organization dealing with the event, be it in medicine, sociology, political science or ecology. (WHO 1993)

For the purpose of this study, we focused on only the mass disasters, and the psychological consequence was emphasized. Thus the disaster in this document is defined as:
"A potential traumatic event that has a large-scale collective impact on the stricken community with no anticipation, caused severe loss and disruption both at the community and individual levels, the exposed victims (either directly or indirectly) experienced an extent of horror or any other adverse mental outcomes induced by the event."

2.3 Disaster and mental health

Traumatic events considerably challenges people's ability of tolerance and adaption, it is suggested in JAMES H. SHORE and his colleagues' study that, in any disaster, exposed individuals are expected to suffer emotional stress and potentially detrimental physical and mental health consequences (James S. ym.1986, 1), not surprisingly, a large number of disaster victims will eventually develop some psychological symptoms.

A good instance can be the earthquake happened in China in the year 2008, one study implemented two weeks after the event, the result suggested a large-scale incidence of

psychological impact among affected population with a ratio of 55.28%, based on 984 victims, in which 9.35% of them had significant psychological disorders that needs immediate intervention (Kai, R.ym. 2008, 244); a similar result was indicated in another study conducted in Iran after an earthquake that measuring 6.3 on the Richter scale, that 58% of their respondents were suffering from adverse mental outcomes which was 3 times higher than reported psychological distress among the general population (Ali, M.ym. 2005, 2-4).

Whereas, there is an assumption that human-made disasters (either technological or violent) have even greater mental health impact than do natural disasters, people find it more difficult to tolerate because of the meaning imparted to the event, but this notion has not withstood empirical test. (Alexander, M. And Fran, N. 2006, 10; Sandro, G. Ym. 2005, 78-91)

While in despite of the type of disasters, the psychological trauma they cause is invisible, and the mechanism is much more complex than the physical injuries. Its pathology can be extended from the physical injuries; the loss of family members, or the loss of a loved/ close one can be unbearable for victims; some of them may feel difficulty adaption of the new environment, etc.

Thus, though the studies of disaster psychology commenced as early as early twentieth,, when Eduard Stierlin investigated the mental impact on the survivors from mining disaster in Zurich, and the survivors in Italy after two months of earthquake (WHO1993), the psychological nature of some trauma-related disorders are still not well-understood to date. Even though, the increased amount of relative international literatures still brought us a broadened insight of this subject.

2.4 Psychological consequences of disaster

2.4.1 Potential victims of disasters

In the light of previous studies, it is not hard to acknowledge that there are some particular stressors make individual more vulnerable of developing psychological problems, the destruction of house or other forms of possession losses (James, S. Ym. 1986, 3; Jonathan,

D. And Alexander, M. 2006,1), the physical injuries (Jonathan, D. And Alexander, M. 2006,1), the bereavement (Ronald, W. and Michael, K. 1978, 7; Jonathan, D. And Alexander, M. 2006,1; James, S. Ym. 1986, 3), and the pre-existing mental conditions (James, S. Ym. 1986, 3; Fran, N. Ym. 2002,207) can all trigger a negative mental health of disaster victims.

Saari and Salli summarized the three epitomes of people as the significant potential trauma-related psychological victims:

1. Those involved in the incident, either or not do they or their families are injured;
2. Those who have experienced the loss of a loved one or a close one;
3. Rescue personnel, includes police, doctors, nurses, social workers and other various of crisis workers who involved in the rescue effort.

(Saari, S. And Silver, A. 2005, 30)

One pretty constructive notion was brought up in their document, which was, when identify the psychological victims after a disaster event, it is important to note that, we do not react only to what really happened, but also a mental image of what might have happened. (Saari, S. And Silver, A. 2005, 29)

This viewpoint broadened the range of the conception of psychological victims. One could still be mentally affected even some traumatic event did not happen on themselves, for instance, knowing the flight they have have missed or cancelled had an air crash; or some violent attempts which did not succeed eventually, but the threatened individuals are likely to create a stressful picture of what might have happened.

Based on this perspective, the eyewitness and bystanders, the people who might have been involved in the incident are also the potential victims, since they all possess the possibility of developing the thought that "it could quite easily have happened to me" (Saari, S. And Silver, A. 2005, 33).

Apart from the significant potential victims, there are some particular personal characters may imply the different degree of individuals' vulnerabilities. Literatures suggested that being youth, elderly, and female gender are good prediction for psychological outcomes. Moreover, the people with lower education background, the unemployments, the people with lower socioeconomic status was considered to suffer from greater post-traumatic distress. The victims who have injury to self or another family member, who have lost family

members, who have extensive loss of property, who are relocated or displaced because of the disaster are prone to develop negative mental health. (Fran, N. Ym. 2002, 20; James, S. Ym. 1986, 3; Jonathan, D. And Alexander, M. 2006, 1; Fran, N. 2001, 5-9; Chian-jue, K. Ym. 2003, 250; Ali, M. Ym. 2005, 2-4;Kai, R. Ym. 2008, 244)

2.4.2 Phases of psychological response to disaster

Generally the phases of psychological response are referred to as "the immediate experience", "after effects", and the "reconstruction", they emerges overtime in the aftermath of a disaster (James, S. Ym. 1986, 2; Saari, S. And Silver, A. 2005; Juan José, L. 2005; John, H. 2010, 8;).

Whereas, human responses can be highly flexible, these phases are not rigid, there is much variation at each stage and the stages overlap (John, H. 2010, 15), the intensity and duration vary depends on individuals (James, S. Ym. 1986,2).

2.4.2.1 The immediate experience

This stage refers to the period of immediate hours or days following disaster, during which acute reactions emerge. The immediate reactions reflect the most horrifying dimensions of disaster related to severe physical injury, exposure to extreme danger, witnessing death of close ones or mass deaths and injuries, traumatic experiences of helplessness, hopelessness, separations, and the need to choose between helping others or fighting for one's own survival (WHO 1993). It is a highly instable stage, that many different types of emotional responses may appear.

1) Psychological shock

Psychological shock has been reported as the very first reaction in the immediate aftermath of disaster (Juan José, L. 2005, 128&138), it usually lasts from few hours to 24 hours, while in case of some extreme events it may last longer (Saari, S. And Silver, A. 2005, 42).

Symptomatically, individual in psychological shock may seem "numb, stunned, confused, dazed, apathetic, with no emotions present" (Juan José, L. 2005, 27; John, H. 2010, 15). In the studies that conducted to investigate the acute response after major disasters, victims explained their emotional statement as "felt out of touch with reality", "could not feel sadness"(Juan José, L. 2005, 128).

Though these symptoms may look quite negative, but the psychological shock is actually "a case of our minds protecting us from knowledge and experience that it cannot take in and endure"(Saari, S. And Silver, A. 2005, 40), so we are temporary kept away from overwhelming of pain, since the disaster happened so sudden and unpredictable. The decision-making can be difficult because the shock state may impair one's sensitivity. (Saari, S. And Silver, A. 2005, 40)

The term "disassociation" is very much related with the shock situation. In disassociation, "oneself is removed outside the person, so that events happening to one may be as if observed from the outside"(Saari, S. And Silver, A. 2005, 43), this more or less explained their numb and confused appearance. The disassociation is also a path to protect oneself, but in the other hand, the healing process will be impeded until the person is capable of facing the reality and the fears.

2) The reaction stage

Psychological shock gradually transits into the reaction stage, which is characterized by the heightened arousal, that individuals are no longer protected from the outside information, they became conscious of what had happened.

Two or three days after the event, the majority of victims may engaged into a "honeymoon" period, they became talkative and experience certain degree of positive feelings about being survived and being safe, feeling of relived, elated and joyful (WHO 1993; Juan José, L. 2005, 128). Notwithstanding, the joy is transient, it is usually followed by an intense feelings of fear, which can be seen from victims' physical responses: muscle tension, increased heart rate, gastrointestinal disturbances, etc. (John, H. 2010, 15)

Emotions come along with the arousal. Excessive weeping, anxiety, fear, sadness, survivor guilt, suspicious are typical during this period (John, H. 2010, 15;Saari, S. And Silver, A. 2005,

44; Juan José, L. 2005, 129). Usually these symptoms are not long-lasting, and will eventually pass with the time. Some victims may turn to blame outside person or organizations (Saari, S. And Silver, A. 2005, 44). For instance, in Wenchuan earthquake, a group of people blamed the house-builders for the substandard quality of buildings. As the feeling of anger, rage, agitation took place, other typical emotions (fear, sadness, etc.) thus might be compromised.

The reaction stage generally lasts couple of days. Even though many of the above behaviours and emotions seem unfamiliar or socially abnormal for general population, but they should be perceived as normal reactions in response to abnormal events, as long as they "remain relatively temporary in nature and do not persist beyond the initial period" (Ronald, W. and Michael, K. 1978, 9). Since their existence have irreplaceable psychological purpose.

2.4.2.2 The after effect

As victims began to process the information, they started to be aroused of the reality and the consequences of the disaster: that they might have lost their loved ones permanently, that they might not be able to return to work due to physical impairment from disaster, that they are uncertain about the future they are confronting of, etc.

This period of time is also referred to as "the working through and processing stage" (Saari, S. And Silver, A. 2005, 51), lasts up to a year. Instead of willing to talk about their experience, the victims now turn to be more silence, a good explanation is that their minds are now occupied to process the challenging information. The individual may seem psychologically absent though physically present, impaired memory and poor concentration, prone to withdraw from social activities (Saari, S. And Silver, A. 2005,51-54).

PTSD, major depression, generalized anxiety disorder have the most prevalence during this stage (Juan José, L. 2005, 141), along with the increased suicidal ideation(Juan José, L. 2005, 129) Almost all of the survivors will experience some symptoms of PTSD and depression (Jonathan, D. And Alexander, M. 2006,2), and the anxiety-related reactions are extremely common (WHO 1993).

Grief is also one normal reaction early in this stage (Richard, B. 2006,2), and the victims will continued to experience other strong emotions, anything can remind them of their losses, triggers the eruption of sadness and grief (Saari, S. And Silver, A. 2005, 51). Moreover, a series of behaviour problems among victims like excessive alcohol consumption may became troublesome (Juan José, L. 2005, 130).

Virtually all the post-traumatic stress symptoms will show an elevated incidence during the initial weeks, while the good news is that a majority of them will find their way to adapt within 3 to 6 months, only small proportion of them will develop long-term psychiatric disorders (Richard, B. 2006,1).

2.4.2.3 Reconstruction

This stage starts from a year or more after the disaster. Once the situation is stabled, people's attention will turn to the rebuilding of community, and the resuming to normal life. Though majority of victims have recovered from psychological distress, but the psychological sequelae can be long-term for some patients (Susan, B. Ym. 1996,5), there will be still few of them remain symptomatic, and a number of people who were asymptomatic before may start to exhibit serious problems (John, H. 2010,2).

This phenomenon was also discovered by one study conducted in China after Tangshan earthquake, discovered that though there is a significant downtrend of psychological symptoms several months after the event, but a remarkable resilience arises one year after. (Hui-juan, D. Ym. 2007, 3) An acceptable reason could be that one year after the disaster, the harmful effects on one's socioeconomic status or family structure probably became evident.

A series of behavioural problems arises in this stage too, for example the alcohol consumption and suicide, the rate of divorce and domestic violence is considerably higher than it is before the disaster. (Juan José, L. 2005,143)

The survivors from prolonged, repeated or intense trauma were assumed to suffer from more complex syndromes. Those incidents of trauma are more likely to be human-made, for instance, the repeated exposure to physical or sexual abuse, the long-term exposure to

civil war, etc. The term of "survivor syndrome" has been used to describe these victims: chronic depression, anxiety and survivor guilt; or alternately, chronic aggression and an "addiction to hate"; the joy of life is vanished, replaced by a "pervasive pattern of sluggish despair". (John, H. 2010, 22)

2.4.3 Psychiatric disorders related to trauma and disasters

Based on the previous researches of trauma-induced psychological distress, the findings were pretty much similar from one to another. PTSD, depression, generalized anxiety were found to be significantly associated with disaster events (Fran, N. Ym. 2002, 216; James,S. Ym. 1986,5), while panic disorder and specific phobias were rare.(Fran, N. 2001, 2)

2.4.3.1 Post-traumatic Stress Disorder

PTSD is common seen in the immediate aftermath of a traumatic event (Shawn, C. And Edna, F. 2007) and among those who were directly exposed to the threaten.

The terrible disaster event had pretty much violated individual's pre-existing perception toward safety and self-competence, victims tend to be despair, hopeless, suspicious (John, H. 2010, 17), suicidal ideation or attempts or self-harm behaviours alter in a upward trend.

For victims who suffer from symptoms of PTSD at the early aftermath of disaster, most of them experience a rapid recovery within 3 months, while a minority of others will remain symptomatic in the long run, and develop a chronic state of post-traumatic stress disorder. (Shawn, C. And Edna, F. 2007)

Table 1: The diagnostic criteria of Post-traumatic stress disorder according to DSM-IV (American Psychiatric Association. 1994, 424-429)

The diagnostic criteria of PTSD according to DSM-IV

A	The person has been exposed to a traumatic event in which both of the following were present: 1. The person experienced witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of others; 2. The person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior.
B	The traumatic event is persistently reexperienced in one or more of the following ways: 1. Recurrent and distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed. 2. Recurrent distressing dreams of the event. Note: in children, there may be frightening dreams without recognizable content. 3. Acting or feeling if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur. 4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event. 5. Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
C	Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three or more of the following: 1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma 2. Efforts to avoid activities, places, or people that arouse recollections of the trauma 3. Inability to recall an important aspect of the trauma 4. Markedly diminished interest or participation in significant activities 5. Feeling of detachment or estrangement from others 6. Restricted range of affect. (e.g., unable to have loving feelings) 7. Sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
D	Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:

	1. Difficulty falling or staying asleep 2. Irritability or outbursts of anger 3. Difficulty concentrating 4. Hypervigilance 5. Exaggerated startle response
E	Duration of the disturbance (symptoms in Criteria B, C, and D) is more than one month.
F	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

2.4.3.2 Acute stress disorder (ASD)

The acute stress disorder is conceptually similar with PTSD, since people diagnosed with ASD generally has similar symptoms with the one with PTSD (Juan José, L. 2005, 18). A good indication to distinguish ASD from PTSD is that acute stress disorder is defined to have shorter lasting, from a minimum of 2 days to maximum of 4 weeks within the initial 4 weeks of the traumatic event (Juan José, L. 2005, 18). If the symptoms persist for longer than 4 weeks and meet criteria for PTSD, is diagnosis is then changed to Posttraumatic Stress Disorder. (American Psychiatric Association. 1994, 424-429)

Though acute stress disorder is a good prediction of succedent incident of PTSD, people who eventually develop PTSD are not necessarily have suffered from ASD initially. (Richard, B. 2006, 2)

Table 2: Diagnostic criteria for Acute Stress Disorder according to DMS-IV (American Psychiatric Association 1994)

Diagnostic criteria for Acute Stress Disorder according to DMS-IV	
A	The person has been exposed to a traumatic event in which both of the following were present: 1 . The person experienced, witnessed, or was confronted with an event or events that

	involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others 2 . The person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behaviour.
B	Either while experiencing or after experiencing the distressing event, the individual has three or more of the following dissociative symptoms: 1 . A subjective sense of numbing, detachment, or absence of emotional responsiveness 2 . A reduction in awareness of his or her surroundings (e.g., "being in a daze") 3 . Derealization 4 . Depersonalization 5 . Dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
C	The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
D	Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
E	Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated. startle response, motor restlessness).
F	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or in:; the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling f..:. members about the traumatic experience.
G	The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
H	The disturbance is not due to the direct physiological effects substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

2.4.3.3 Generalized anxiety disorder

Disaster victims with generalize anxiety disorder show persistent and excessive anxiety about a variety of events or activities, including the disaster and its consequences, which is far beyond the reality. The condition is associated with symptoms such as restlessness, easily fatigue, difficult concentrating or the mind going blank, irritability, muscle tension, sleep problems (John, H. 2010, 18).

Table 3: Diagnostic criteria for Generalized Anxiety Disorder according to DSM-IV (American Psychiatric Association. 1994)

Diagnostic criteria for Generalized Anxiety Disorder according to DSM-IV	
A	For more than half the days in at least 6 months, the patient experiences excessive anxiety and worry about several events or activities.
B	The person has trouble controlling these feelings.
C	Associated with this anxiety and worry, the patient has 3 or more of the following symptoms, some of which are present for over half the days in the past 6 months: 1. Feels restless, edgy, keyed up. 2. Tires easily. 3. Trouble concentrating. 4. Irritability. 5. Increased muscle tension. 6. Trouble sleeping (initial insomnia or restless, unrefreshing sleep).
D	The symptoms cause clinically important distress or impair work, social or personal functioning.
E	The disorder is not directly caused by a general medical condition or by substance use, including medications and drugs of abuse.
F	It does not occur only during a Mood Disorder, Psychotic Disorder, Posttraumatic Stress Disorder or Pervasive Developmental Disorder.

2.4.3.4 Other trauma-related psychological disorders

The post-traumatic depression occurs usually in combination with PTSD, with the common symptoms of sadness, slowness of movement, insomnia or hypersomnia, fatigue, diminished or excessive appetite, difficulties with concentration, apathy and feelings of helplessness, anhedonia, social withdrawal, guilty ruminations, feelings of hopelessness, abandonment, irrevocable life change, preoccupations with loss, irritability. (John, H. 2010, 20)

The other trauma-related psychological disorders such as substance abuse, somatization have been less often studied than PTSD and ASD, but available data suggested that these disorders also occur at higher than average rates (Juan José, L. 2005, 23-24).

2.5 Summary

The potential victims of disaster-induced psychological disorder were not only the one who directly involved in the trauma, the people who engaged into disaster rescue effort were also potential victims, that were recognized as secondary victims.

The psychological impact caused by disasters is much more complex than the physical injuries, its severity on the survivors depends on varies of factors: the degree of exposure, the physical injuries, the loss of possessions, the loss of loved ones, the pre-disaster mental condition, etc.

The understanding of the developing process of victims' psychological responses is essential for the immediate mental relief, early recognization of possible psychological disorders. Therefore, an effective psychological intervention can be established and conducted in the early stage, decrease the incidence of sequent psychological illness.

3 RESEARCH DESIGN, METHODS OF DATA COLLECTION AND DATA ANALYSIS

3.1 Introduction

Four aims are achieved in this chapter. First, a detailed introduction of research question was expatiated. Then, the method of data collection and data analysis used in the present paper was explained. Last, the reliability and validity in regard of research method was considered and discussed.

3.2 Research question

The objective of this study was to identify the risk factors and psychological symptoms among the participants of the disaster rescue team after the earthquake in Sichuan province.

For this purpose, two research questions was formatted:

a. What are the stressors and risk factors for rescue worker to develop psychological distress?

b. What symptoms did the rescue workers experience during the implementing of rescue effort?

3.3 Data collection

This study is based on systematic literature review, the previous researches which related to the topic of "analysis of psychological distress of Sichuan earthquake rescue workers" were identified through databases like Ilib and Doc88. The focus was stressed on two aspects: the psychological stressors and the induced psychological distress symptoms.

The articles were screened by the words "earthquake", "Sichuan", "psychology distress", "PTSD", "rescue team"/ "rescue worker"/ "relief worker"/ "rescuers" in their titles, abstracts or key words, with the limitation of only full-texts.

At first, a total of 998 articles from Ilib and 286,948 articles from Doc88 were identified. The same searching words were used in databases like EBSCO and PUBMED, but none of the relative article was found.

Because the amount of the identified articles was substantial, a further filtration was established, the exclusion criterions were:

a. The studies without English abstracts;
b. The studies did not answer relative study questions;
c. Unpublished manuscripts and dissertations;
d. Conference papers, the prefaces and other unprofessional journals;
e. The reviews of previous studies;
f. The studies relied solely on archival data but did not involve the actual victims as study sample;
g. The studies solely focused on the psychological preparation or intervention before or in the aftermath of disaster for rescuers.

Because of the topicality of the studied event, the year of publication was not specified during the searching process, eventually all the eligible articles were produced during the year of 2008 to 2009.

As a result, 14 papers yielded as qualified, in which a total of 3591 rescue workers was sampled, ranges from military soldiers (paratroop soldiers, armed police offices and soldiers, etc), medical and surgical staffs (doctors and nurses), to firefighters who have been working either in the front line or as logistics at the disaster site.

3.4 Data analysis

Among the fourteen articles, three of them used self-manufactured questionnaires; one used pure interview; six used tested valid professional instruments like Symptom checklist 90(SCL-90), PTSD-SS , TCSQ, Eysenck Personality Questionnaire Short Scale (EPQ-R), Posttraumatic stress disorder checklist (PCL), Simple Coping Styles Questionnaire (SCSQ); the other four of them investigated the research question with the method of proved instruments combined with either interviews or other kinds of observations.

The demographic features were addressed in every article by means of age, gender, education background, previous medical conditions, residence, whether or not he/she is the only-child, whether or not he/she had lost a family member in the disaster. While not every elements mentioned above was addressed in each article.

After a preliminary review of the selected studies, the validity and reliability of the research findings were carefully evaluated by the author. The contents that are correlated with our study questions were also identified, with a detailed systematic scanning, the useful information then was synthesized and categoried into themes according to the guiding concept of the thesis.

The first part of the research findings identified the stressors that were likely to influence the rescue workers, the stressors was divided into five themes:

a. Demographic feature of rescuers (gender, age, education background, etc)
b. The work type
c. The length of rescue days
d. Pressure from the rescue effort
e. Pressure from the physical environment and rescue resources

The second part of the research findings summarized the discovered psychological symptoms rescuers developed during the rescue effort:

a. Somatic symptoms

b. Conceptual symptoms
c. Emotional symptoms
d. Behavioural symptoms

3.5 Validity and reliability

This research was conducted based on literature review, thus the reliability is largely lay on the character and quality of reviewed articles.

First, the included studies have notable differences in sampling and measurements methods, the result may vary according to the character of samples, the external environmental conditions when the studies were implemented, and the instrument they used for assessment, since the "different test items may elicit different responses" (2002, 42), according to George and Marla.

Moreover, the studies used have different levels of qualities, some of them was based on pure interviews, open questionnaires, and other kinds of behavioural observations, these works are thought to have the risk of developing conclusions affected by author's subjective opinion during analysis. Thus, the capability of drawing a zero error conclusion in this research is limited.

3.6 Summary

A meta-analysis method design was used in order to investigate the stressors and psychological symptoms of the concerned subjects, without putting emphasis on the incidence and psychological diagnostics. A systematic literature review enabled the author to discover the relevant knowledge, generalize findings, and at last a detailed analysis report which answers the research questions.

4 RESEARCH FINDINGS

4.1 Introduction

The aim of this chapter is to answer the research questions by means of a systemic review of the selected previous literatures.

The research findings then divided into two parts according to research questions.

The first part is the discovered stressors and risk factors for development of psychological distress among studied population. The findings was analysed and categorized into five themes: the demographic factors, work type, the number of working days, rescue pressure, environmental pressure.

The findings of psychological symptoms are presented in the second part, which were categorized into somatic symptoms, conceptual symptoms, emotional symptoms and behavioural symptoms.

4.2 Psychological distress associated factors and stressors of rescuer

4.2.1 Demographic factors

a) Age

The age of earthquake rescue personnels was studied in three of the articles. Two of them was conducted among rescue soldiers and a team of rescue surgical staffs suggested that compare with the younger ones, rescuer members with an older age developed more

adverse symptoms and a higher incidence of decreased interest to work (Qiang, M. Ym. 2008, 36-37; Yun-ge, L. Ym. 2009, 76). Inconsistently, a team of orthopedic surgical and medical staffs who engaged into the rescue effort was examed in another research, the result did not indicate any statistical significance influence of age factor on the mental well-being of the studied personnels (Ning, N. Ym. 2008, 772).

b) Gender

Though the gender of sampled rescue workers was frequently recorded in the studies, only one of them particularly examed its influence on individuals' psychological outcomes, while no evident correlation was detected. (Yun-ge, L. Ym. 2009, 76-77)

c) Marriage state

Among the three articles which examed the effect of marriage state on the mental health of sampled rescue staffs, two of them did not find particular correlation (Ning, N. Ym. 2008, 772; Yun-ge, L. Ym. 2009, 77), while one research discovered a positive association between marriage state and subjects' agitated feelings (Qiang, M. Ym. 2008, 36).

d) Educational background

The educational level was consistently considered to be an important influencing factor of psychological response among rescuers (Qiang, M. Ym. 2008, 36; Kang-xing, S. Ym. 2008, 2982), the higher educational level individual possesses, the likely individual suffers from adverse psychological distress (Kang-xing, S. Ym. 2008, 2982).

e) Being the only child

One study indicated being the only-child can negatively influences rescue worker's mental well-being, the only-child tend to show more somatization, depression and anxiety symptoms. (Wen-jun, C. Ym. 2008, 40)

4.2.2 Work type

The correlation between psychological stress and work type was revealed by various of studies.

Based on the selected literatures, giving the precondition of same working days and the same working area (which implies the same working and living condition), nurses were found to suffer more psychological symptoms than doctors from the same team (Yun-ge, L. Ym. 2009, 75-78); the officers were more vulnerable of psychological impairment than the other soldiers and recruits from the same military force (Wen-jun, C. Ym. 2008, 40); the work tasks involved corpse-digging or corpse-carrying were substantiated to be an psychological stimuli to rescuers, evidently increased their prevalence of somatization, depression and other mental distresses symptoms (Wen-jun, C. Ym. 2008, 40; Quan-chao, L. Ym. 2009, 253; Wen-jun, C. 2008, 727).

4.2.3 Number of working days

There was a consensus on the positive association between working days and rescuers' mental health.

Studies had confirmed the incidence of somatization, obsessive-compulsive symptoms, the work interests, and the agitated feelings were related with the number of working days in rescue crew (Qiang, M. Ym. 2008, 35-38; Kang-xing, S. Ym. 2008, 2982).

As the number of working days increases, the psychological stress symptoms decreases. This research finding was supported by two studies. Professor Wang Jinli and his colleagues surveyed 190 rescue servicemen, the result demonstrated that 85.2% of them (162 rescuers) experienced a significant relief of psychological stress in 10 days (Jin-li, W. Ym. 2009, 212). A similar phenomenon was revealed in another study. With the same group of study samples, the negative psychological symptoms dropped considerably in the third week than of the first week (Quan-chao, L. Ym. 2009, 253).

4.2.4 The rescue pressure

The irregular daily schedule, round-the-clock succor was frequently complained by the rescue crew, which eventually result in extreme physical fatigue and indirectly impact the psychological well-being (Quan-chao, L. Ym. 2009, 253).

The guilty feeling or self-blaming was also reported to be prevalent. The sampled rescue workers expressed it as "i think i could do better and more", "i doubt if i have tried my best", "i should have worked more efficiently to save those people", or "knowing there is someone under the rubble but i could not help him/her". (Quan-chao, L. Ym. 2009, 253; Jin-li, W. Ym. 2009, 212; Yong-sheng, W. And Jun, X. 2009, 44)

The unavailability of rescue facilities and other medical essentials was also found to be a stressor for rescue members, since the quality and efficacy of their effort was compromised and the difficulty of tasks were increased. (Quan-chao, L. Ym. 2009, 253; Xin, L. Ym. 2008, 1072)

4.2.5 The environment

The prevalent of psychological distress and certain symptoms was thought to be correlated with working zones. (Kang-xing, S. Ym. 2008, 2982) One study suggested a higher incidence of agitated feeling and lower work interest among rescuers in Wenchuan than those in Pengzhou and Qingchuan. (Qiang, M. Ym. 2008, 35-38)

The safety at the working site was also of concern for many rescue workers. The worriness of the earthquake may occur again was frequently voted (Yong-sheng, W. And Jun, X. 2009, 44).

In one interview-based study, two rescue nurses described their feelings as the disaster scene:

"We took a small boat to cross an over 200-meter deep dam, the boat had limitation of maximum 10 person but we had 14 people fitted in, each of us has got a 10-kilo weight backbag, the majority of the boat body was under the water. We saw the land slides off from a mountain, we could feel the water waves into our boat. Our hearts were racing, our hands were trembling..." (Xin, L. Ym. 2008, 1072)

"The aftershock still happens off and on, but we had to rush into the rubble to search and save the wounded ones, i could not help myself from thinking if someday I moved a bit slower, the next corpse they carry out will be me." (Xin, L. Ym. 2008, 1072)

The abominable living condition-- poor shelter, the shortage of basic daily commodity along with the insufficient water and food supply intensified the negative feelings of rescue workers. (Xin, L. Ym. 2008, 1072)

4.3 Psychological symotoms

4.3.1 Somatization

The existence of somatization among rescue crew was confirmed by studies, an evidence of higher prevalence among rescue personnel than of Chinese norm was identified, especially of those who involved in corpse dealing tasks and the only-child (Wen-jun, C. Ym. 2008, 40; Ning, N. Ym. 2008, 772). The theory was further supported by Wang Jinli and his colleagues, who selected and surveyed a sample of 190 servicemen during and after their stress reaction phase, confirmed a notable upswing of somatization during the reaction phase (Jin-li, W. Ym. 2009, 212).

The somatization was mainly manifested as sleeping problems, the affected rescuers may experience nightmares (Xin, L. Ym. 2008, 1072; Yong-sheng, W. And Jun, X. 2009, 44; Quan-chao, L. Ym. 2009, 253), a difficulty falling asleep, or a restless sleep(Yong-sheng, W. And Jun, X. 2009, 44). Apart from the sleep disturbance, the other psychosomatic symptoms like "fatigue", "lack of energy", "giddiness", "stomach discomfort", "muscle ache", "lumbago", "atony" were most frequently brought out by the research participants. (Kang-xing, S. Ym. 2008, 2982; Yong-sheng, W. And Jun, X. 2009, 44)

4.3.2 Conceptual symptoms

Acknowledged from the studies, a sense of guilty or self-blame and absent mind were the leitmotives of this theme.

The sense of guilty had as high as over 50% percentage among sampled rescue workers in both two studies, the induced reason was "knowing someone is under the rubble but could not help" and " i could have worked more efficiently".(Quan-chao, L. Ym. 2009, 253; Jin-li, W. Ym. 2009, 212) The absent mind was mainly manifested by the poor concentration, impaired memory, difficulty in decision-making according to the participants. (Qing-feng,L. Ym. 2009, 485-486; Kang-xing, S. Ym. 2008, 2982)

4.3.3 Emotional symptoms

The symptoms of depression, anxiety and fear were consistently more prevalence in the rescue workers than of the Chinese norm (Quan-chao, L. Ym. 2009, 253; Wen-jun, C. 2008, 727; Qiang, M. Ym. 2008, 35-38; Ning, N. Ym. 2008, 772; Jin-li, W. Ym. 2009, 212; Jin-liang,L. Ym. 2009, 514). The feeling of fear involves the safety concern of participants themselves and their families, toward the re-occurrence of earthquake and the consequences of frequent aftershocks. (Qiang, M. Ym. 2008, 35-38; Jin-li, W. Ym. 2009, 212)

Unstable personality was also discussed in a study, among the 206 sampled rescuers, over thirty percent of them have reported the experiences of impatience and easily loss of temper. (Qing-feng,L. Ym. 2009, 485-486)

4.3.4 Behavioural symptoms

The re-experiencing and avoidance of stimuli were the main subjects. The re-experiencing was described as the "involuntarily recalling of the disaster scene", "Repeated mounting of relevant memories, thought or pictures in one's mind", "feeling oneself placed into the disaster scene" and "the nightmares related to the disaster" (Xin, L. Ym. 2008, 1072; Jin-li, W. Ym. 2009, 212; Qing-feng,L. Ym. 2009, 485-486). The avoidance of stimuli associated with the trauma was described as the attempt to avoid any pictures, news, TV programs and topics about the disaster event (Xin, L. Ym. 2008, 1072).

The obsessive-compulsive symptoms was mentioned in a study, behaviourally the affected one tend to be excessive worried about the dresses or manners and repeated examination on things (Kang-xing, S. Ym. 2008, 2982).

Seemingly some rescuers may experience a difficult inter-personal relationship to some extent, one study discovered a significant difference on the score of inter-personal sensitivity between examed rescue crew and Chinese norm (Wen-jun, C. 2008, 727; Jin-li, W. Ym. 2009, 212).

4.4 Summary

The research findings show that rescue workers experienced varieties of stressors, and their mental health was negatively impacted by the stressors, some of them are more vulnerable because of their individual characters. The symptoms of psychological distress showed a multi-dimensional feature, varies from somatic symptoms to behavioural symptoms.

These findings may be used as an evidence for future psychological intervention under disaster situations.

5 DISCUSSION OF THE RESEARCH FINDINGS

5.1 Introduction

In this section, the research findings are discussed with the consideration of the actual situation of the disaster site and rescue work. The possible correlation between some psychological symptoms and certain stressors was assumed and discussed, the actual situation at the disaster zones also brought into consideration. At the end of discussion, some special groups was further discussed about their vulnerability.

5.2 Discussion

The worst earthquake in China's history happened in Sichuan province, with an amplitude of 8.0 on the Richter scale, the earthquake left widespread destruction that, affected many surrounding areas, among which Shifang, Mianyang, Wenchuan were the worst destroyed cities. This catastrophe caused 70,000 death, injured over 300,000 people, 18,000 people were declared as disappeared, countless people were left without shelters, the extent of the earthquake was unprecedented in China's history.

Immediately after the news of earthquake spread out, groups of volunteers and other organizations started to swarm into the stricken areas. Though most of these support workers did not directly experience the traumatic event, they were also considered as one of the certain groups that are at increased risk for psychiatric sequelae along with the primary victims and first responders (Juan José, L. 2005,15), as they were exposed to various aspects of the disaster effects: they witnessed the miserable scene the earthquake brought

onto the place, batches of houses wrecked down, people was crying for help, the survived ones weeping themselves out and mourning for their losses, an immense array of gruesome and ghastly dead bodies, etc as soon as they arrived at the disaster site.

While the rescue workers usually ignored their own psychological reactions and needs but focusing on the caring of primary victims. Thus they are usually affected subconsciously. They may evidence anger, rage, despair, feelings of powerlessness, guilt, terror or longing for a safe haven in addition to the post-traumatic responses of the primary victims (John, H. 2010,33).

As the rescue work carrying out, some rescue workers may soon find themselves overwhelmed by these strong emotions, as they started to have contact with victims, witnessed their agony, listened their harrowing ordeals, some rescuers tend to share the survivor's bereavement along with their grief, the phenomenon was explained by some rescue workers from examed studies as out from the sense of sympathy.

This psychopathology is called vicarious traumatization, it is thought to be the causation of various of psychological impairment when the stress is beyond one's coping ability, typically the affected individuals exhibit symptoms of depression, cynicism, boredom, confusion, loss of sympathy and empathy, dejection, isolation from friends and relatives(Christian, P. 2006, 2). The symptoms of vicarious traumatization must be recognized at early stages, since the development of symptoms may greatly impair rescue workers' mental well-being, the worse consequence is that they will in turn negatively affect the traumatized victims.

Consistent with international studies, the rescuers who had direct contact with victims are prone to develop psychological disorders, an example from this document was the higher incidence of psychological symptoms among nurses than of doctors from the same team (Yun-ge, L. Ym. 2009, 75-78; 4), the conclusion was supported by the study conducted after tsunami in Asia, that among 36 sampled rescue members, five of the nurses, three of the doctors and none of the logistic worker were diagnosed with PTSD (Erol, A. Ym. 2006, 3).

Thus the rescue crews who had repeatedly direct contact with victims and their families were presumed to be more vulnerable of vicarious traumatization, since they are frequently

exposed to the powerful harrowing emotions and stories, they have greater potential to identify themselves with the victims. Moreover, some victims may tend to be angry and apparently lack of gratitude (John, H. 2010,32), while because of the imposed psychological burdens on rescuers, their toleration for others failings was reduced, thus the anger of the victims may feel like a personal attack to them (John, H. 2010,33), negatively influenced their mental health.

The massive workload was thought to cause a large incidence of burnout among rescue crew, the large scale of death and injuries earthquake has brought along with the unstable geographic environment, made the rescue work highly urgent, difficult, exhausting and dangerous.

First, the round-the-clock rescue effort had left workers little time for recharging, not to mention that some work tasks are fairly physically difficult, while sometimes they also need to engage into other work tasks in addition to their owns, for instance, helping to comfort the survivors, helping the casualties to find their families, etc. The intense and long-lasting work drains the rescuers physically, the lack of sleep may eventually cause chronic fatigue and burnout.

The reason for a higher prevalence of decreased work zeal and somatic symptoms among older aged members was thought to be their decreased flexibility and energy reserves, thus they may require longer period to adapt the new environment, and their quality of sleeping was more likely to be disturbed by the workload and environment, hense for them, it might not be as easy as it is for the younger ones, to maintain a good shape both physically and psychologically during the difficult and long-lasing rescue effort.

The psychological drainage probably came from the difficulty of rescue work. The feelings of guilty was frequently brought up in this subject, it can be triggered by the perceived inability to ever do "enough" even if the limits of what they can do are imposed by reality or by organizational or bureaucratic constraints beyond their control, (e.g., lack of essential supplies, lack of manpower), they may blame themselves (John, H. 2010,32); and they may feel guilty over the need to triage their efforts and those of others or may blame themselves when rescue efforts have failed (John, H. 2010,32).

Link to the environment of referred earthquake scene, where due to the huge damage and dangerous geographic condition, as well as the unavailability of necessary searching detector and other essentials, the rescue result was highly difficult, unpredictable and poor satisfactory. Sometimes the prime time for rescue was missed because of the unavailability or limitation of equipment; sometimes the hope was quenched off by accident when the rescue attempt was almost succeed; sometimes the victims was too damaged to survive even after got rescued, etc. These inability to save victims triggers the thought of self-doubt and self-blaming, lead to varieties of post-traumatic stress symptoms, e.g., re-experience relevant plot in their dreams, depressed mood, feeling of wroth, etc.

However, the number of working days was discovered to be positively affect rescue workers by reduce the prevalence and severity of their psychological symptoms. An good explanation for this might be, the desensitization of rescue crew due to the improved adaption and the increased rescue skills.

When the rescue work was carrying through, the geographic condition was still unstable, the aftershocks rock the ground from time to time, a series of other calamities was induced by earthquake, putting not only the disaster survivors but also the rescue workers under a great danger of the threaten mountain landslip, the mud-rock flow and the aftershocks. This circumstance might have something to do with certain psychological symptoms like anxiety and fear, since the safety of rescue workers themselves and their families was to be worried.

Apart from the dangerous working environment, the awful living condition probably also had a negative contribution to rescuers' physical and psychological well-being.

In some badly damaged areas in Sichuan, the transportation, communication, power transmission and water supply was basically destructed, the rescue teams was sheltered with temporary tents, with very limited food and water supply. The terrible weather was interfering with the rescue process, making the time span of rescue work unpredicted, plus the threaten of breakout of epidemic situation. Under such circumstances, rescue staffs may show numerous of physical discomfort due to the weather exposure, hunger, sleep

deprivation; psychological along with psychosomatic symptoms like depression, anxiety and fear due to the exposure of danger and contamination, the loss of communication and support from close relations.

Among the rescue crew, there were some special groups that needed additional concern. First of all it was the rescue workers who came from the stricken areas, who themselves were also primary victims, possessed the same psychological burdens with the other victims. This group of rescuers were not specifically studied for psychological assessment, but the author suggests a higher incidence of post-traumatic distress among this population.

Second, the rescuers with better education background was discovered to suffer from more negative emotions. This is probably because they are capable to receive and process more disaster-related informations than the others, thus they are more aware of what consequences the disaster created. Hence, in the face of such tremendous event, they were prone to develop the sense of helpless and disappointment of themselves.

Whether individual's marriage statue influences their psychological performance during rescue effort was argued in the studied researches, while only one study suggested a positive correlation. The agitated feeling may be induced by the witnessing of the horror aftermath and the agony of bereaved victims, the rescue staff may subconsciously start to worry about their own families, the incidence is assumed to be higher among those rescuers who came from the stricken areas. Moreover, encountering such demanding rescue work, the members had to work day and night, they usually spend quite a long period of time at the disaster site, as the occupational role waxes, their family role wanes. The time they used to be with the families was occupied by the rescue work, the feeling of guilty to their families may arise since they could not support their families.

During this rescue effort, the recruits made up of majority of the military rescue team, indeed there were also a large number of fresh graduate volunteers, while most of them are the only-child in the family that were born after 1980 and 1990, who have been called as the "spoiled generation" or "little emperors". For most of them it was probably their fist time to be faced with such a tragic and painful event, not surprisingly there was a consensus

finding on their vulnerability of psychological distress during rescue period from the previous study results. They appeared to be more anxious and agitated than the not only-child ones. The easy living condition, the better material wealth at home and the over-protecting parenting style was thought to be the contributor.

5.3 Summary

The rescue workers engaged into the disaster rescue effort are significant secondary victims, since they were also exposed to various impacts of the disaster. But for the most of time the rescue workers do not realize their vulnerability since they were quite focusing on the carrying of primary victims, thus the negative psychological distress usually developed subconsciously.

The vicarious traumatization is very common among rescue workers, mostly because they received many harrowing stories of victims and witness the agony, some of them may identify themselves with the victims. It is thought to be the causation of various of psychological impairment once the affected one is over-whelmed. The incidence was assumed to be more prevalence among the workers who have more "hand on" interactions with victims.

The rescue pressure which has been identified in this study as a psychological stressor, was thought to be a good interpretation for many identified symptoms. For example, the difficult and heavy loaded work may cause physical and psychological fatigue, the failure of rescue attempts may triggers numerous negative emotions, etc.

The effect of physical environment should not be ignored, the safety threatening and limitation of resources due to the unstable geographic environment can directly impact one's mental health.

The rescue workers who came from the stricken areas, who are the only-child and who have already married were paid special concern, though the incidence and symptoms were not specifically studies in this paper, but the special needs of these groups of people should be recognized and necessary intervention should be implemented.

6 CONCLUSION

6.1 Introduction

This chapter exams the study as a whole and introduces the study limitations and future implications. Some possible improvement for the future studies and further research questions were suggested.

6.2 Study limitations and future implications

The research findings only indicates the psychological statues in the immediate aftermath of earthquake among rescue crews, but as they complete the tasks and return to regular life, the long-term psychological impairment on their marital and social life may be more profound. (John, H. 2010,32; Mowadat, R. Ym. 2007, 460) Future studies on the long-term psychological distress symptoms and intervention thus is needed.

When selecting the study materials, some studies related to the topic were excluded due to the language and research method concern, also the articles from other databases like Pubmed or Ebsco that did not available as free-access were not included, thus it is likely that the author did not find all the relevant researches.

In addition, the population of earthquake rescue workers was large, this research only examed the articles that covers thousands of them in total, the psychopathology could be under- or over-estimated. Plus the studied sample in the examed articles were mainly well-organized professional teams, either from hospitals or military forces, which means that the work they perform in the rescue effort are quite relevant with their own jobs. While

there were also a large number of volunteers who engaged themselves into the rescue effort, they made up a high percentage of the total rescue population. These volunteers may come from varieties of professions that possess little medical or rescue knowledge, for example, teachers, computer engineers, colleague students, the fresh graduates, musicians, etc. These people are lack of necessary knowledge and preparedness toward rescue effort, thus their psychological vulnerability should be considered specially apart from the other rescue professionals. But no specific attention was paid to this population in this research.

Another problem should be considered is that the military soldiers made up of large proportion of total sampled population in the studied materials, such as policemen, firemen and other armed forces. Their professional identity may depend on a self-image of strong and resilient, hence, allowing themselves to “feel” their emotions about the situations to which they are exposed may challenge their self respect or make them feel like they are letting down co-workers or make them feel they are risking the ridicule of other workers (John, H. 2001, 32). There is a possibility that they tend to report their psychological stress less than the real fact.

Therefore, the generalizability of findings in this research needs a further confirmation in larger study groups, this review may not reflect the full range of psychological consequences of disaster among the whole rescue population.

Moreover, the research methodology used in this document may itself have some disadvantages. Using the studies that did not conducted with a unitive research instrument, plus some of their findings were purely based on self-report questionnaires, may impact the reliability of the drawn conclusion, thus, a need of obtaining direct access to the study population is highlighted for a future study.

Another consideration toward the limitation of this study can be the use of language. The articles selected were in Chinese though with English abstracts, the research findings drawn in the present study were then translated by the author, there might be some misunderstanding with the translation since English is a second language for the author.

The present study also left a number of other important questions unanswered, that need to be addressed in future researches.

There were two categories of rescuers: the non-professional and the professional. The stress upon the non-professional rescuers may resemble that on the victims, inasmuch as they may be caught up in the impact of the disaster, they may suffer the terrible trauma of not being able to achieve success in their rescue attempt. Those who were providing mental health services to disaster victims and those who investigating disasters (e.g., journalists, human rights workers, officials of humanitarian organizations doing assessments) may also face special stresses (John, H. 2010, 32). A different psychopathology of these groups of people needs to be studied specifically in the future studies.

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APPENDIX

Table 1

The diagnostic criteria of PTSD according to DSM-IV	
A	The person has been exposed to a traumatic event in which both of the following were present: 3. The person experienced witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of others; 4. The person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behavior.
B	The traumatic event is persistently reexperienced in one or more of the following ways: 6. Recurrent and distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed. 7. Recurrent distressing dreams of the event. Note: in children, there may be frightening dreams without recognizable content. 8. Acting or feeling if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific reenactment may occur. 9. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event. 10. Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
C	Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three or more of the following: 8. Efforts to avoid thoughts, feelings, or conversations associated with the trauma 9. Efforts to avoid activities, places, or people that arouse recollections of the trauma 10. Inability to recall an important aspect of the trauma 11. Markedly diminished interest or participation in significant activities 12. Feeling of detachment or estrangement from others 13. Restricted range of affect. (e.g., unable to have loving feelings) 14. Sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
D	Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following: 6. Difficulty falling or staying asleep 7. Irritability or outbursts of anger 8. Difficulty concentrating 9. Hypervigilance 10. Exaggerated startle response

E	Duration of the disturbance (symptoms in Criteria B, C, and D) is more than one month.
F	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

This table was made according to the diagnostic criteria of PTSD from DSM-IV, the purpose was to produce a material knowledge of PTSD and its main features.

Table 2

Diagnostic criteria for Acute Stress Disorder according to DMS-IV	
A	The person has been exposed to a traumatic event in which both of the following were present: 3 . The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others 4 . The person's response involved intense fear, helplessness, or horror. Note: In children, this may be expressed instead by disorganized or agitated behaviour.
B	Either while experiencing or after experiencing the distressing event, the individual has three or more of the following dissociative symptoms: 6 . A subjective sense of numbing, detachment, or absence of emotional responsiveness 7 . A reduction in awareness of his or her surroundings (e.g., "being in a daze") 8 . Derealization 9 . Depersonalization 10 . Dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
C	The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience; or distress on exposure to reminders of the traumatic event.
D	Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
E	Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated. startle response, motor restlessness).
F	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or in:; the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling f..:. members about the traumatic experience.
G	The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.
H	The disturbance is not due to the direct physiological effects substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

This table was made according to the diagnostic criteria of Acute Stress Disorder from DSM-IV, the purpose was to produce a detailed picture of ASD and an easy comparison with the features of PTSD.

Table 3

Diagnostic criteria for Generalized Anxiety Disorder according to DSM-IV	
A	For more than half the days in at least 6 months, the patient experiences excessive anxiety and worry about several events or activities.
B	The person has trouble controlling these feelings.
C	Associated with this anxiety and worry, the patient has 3 or more of the following symptoms, some of which are present for over half the days in the past 6 months: 7. Feels restless, edgy, keyed up. 8. Tires easily. 9. Trouble concentrating. 10. Irritability. 11. Increased muscle tension. 12. Trouble sleeping (initial insomnia or restless, unrefreshing sleep).
D	The symptoms cause clinically important distress or impair work, social or personal functioning.
E	The disorder is not directly caused by a general medical condition or by substance use, including medications and drugs of abuse.
F	It does not occur only during a Mood Disorder, Psychotic Disorder, Posttraumatic Stress Disorder or Pervasive Developmental Disorder.

This table was made according to the diagnostic criteria of Generalized Anxiety Disorder from DSM-IV, in order to create a better recognization of the disorder.