QUALITY OF LIFE AMONG THE NAVIES, THEIR SPOUSES SURVIVORS, SIX MONTHS AFTER THE TSUNAMI DISASTER IN PHANG – NGA NAVAL BASE, PHANG – NGA PROVINCE

THANUCH PUTTHAVARANG

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Thanuch Putthavarang

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ABSTRACT

This descriptive cross–sectional study aimed to identify the consequences for the survivors of the Tsunami disaster on health–related quality of life among members of the Navy or their spouses, 6 months after the disaster and compared these data with the 2006 Thailand normative data for SF – 36 (Bangkok) and to determine the association between quality of life and other related variables. Data was collected from 24 July to 5 August 2005, using a structured questionnaire modified from the Medical Outcome Study Short Form – 36 (MOS SF – 36), which included demographic data, characteristics and amount of loss, social support, health information, and type of Tsunami exposure.

A total of 434 subjects participated in the study. A majority of the sample was male (77%), married (67%) and mean age was 34 years old. The quality of life scores among the navy or their spouses were lower than the 2006 Thailand normative data (Bangkok) in almost all subscales except physical functioning, bodily pain, social functioning subscales. Comparison of the studied QOL scores and the 2006 Thailand normative QOL scores by gender found that the major consequence of the Tsunami was mental health problems. A majority of the survivors who seriously experienced mental problems were female, low education, decreased income, loss of one's family members /loved ones, or property. To improve their quality of life, these people required appropriate social support and physical and mental health care. However, there was a statistically significant association between quality of life and exposure to the Tsunami. Bodily pain was the only an indicator subscale of QOL which was statistically significantly associated with Tsunami exposure.

In addition, the QOL measures provided essential data and information that helped healthcare providers identify survivors' needs and outcomes. A large systemic data set of both domestic and international sections enhance the effectiveness of the health care utilization and resource management for Tsunami victims and therefore, knowledge of the changes in QOL over the time after Tsunami might help guide health programs to efficiently allocate resources at different times.

KEY WORDS: QUALITY OF LIFE / TSUNAMI DISASTER / MOS SF – 36

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คุณภาพชีวิตของทหารเรือประจำการ – คู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิ ๖ เดือน ณ ฐานทัพเรือพังงา จังหวัดพังงา (QUALITY OF LIFE AMONG THE NAVIES, THEIR SPOUSES SURVIVORS, SIX MONTHS AFTER TSUNAMI DISASTER IN PHANG – NGA NAVAL BASE, PHANG – NGA PROVINCE)

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บทคัดย่อ

วัตถุประสงค์ของการศึกษาแบบภาพตัดขวางเชิงพรรณนาครั้งนี้เพื่อศึกษาถึงผลกระทบของภัยพิบัติคลื่นยักษ์สึนามิต่อคุณภาพชีวิตของทหารเรือประจำการหรือคู่สมรสที่รอดชีวิตภายหลังประสบภัยคลื่นยักษ์สึนามิ ๖ เดือนและเปรียบเทียบกับข้อมูลคุณภาพชีวิตกึ่งมาตรฐานของประชากรไทย(กรุงเทพมหานคร) พ.ศ.๒๕๔๙ และเพื่อหาความสัมพันธ์ระหว่างคุณภาพชีวิตและปัจจัยด้านอื่นๆที่เกี่ยวข้อง เก็บรวบรวมข้อมูลต่างๆในช่วงวันที่ ๒๔กรกฎคมถึง ๕ สิงหาคม ๒๕๔๙ โดยใช้แบบประเมินคุณภาพชีวิตฉบับภาษาไทยซึ่งรวมทั้งแบบสัมภาษณ์ข้อมูลทั่วไปและปัจจัยที่เกี่ยวข้อง มีผู้เข้าร่วมในการศึกษา ๔๓๔ คน กลุ่มตัวอย่างส่วนใหญ่เป็นชาย(ร้อยละ ๗๗) มีสถานภาพสมรส (ร้อยละ ๖๗) อายุเฉลี่ยประมาณ ๓๔ ปี ผลการศึกษาพบว่าทหารเรือประจำการหรือคู่สมรสมีคุณภาพชีวิตที่ต่ำกว่าข้อมูลคุณภาพชีวิตกึ่งมาตรฐานของประชากรไทย(กรุงเทพมหานคร) พ.ศ. ๒๕๔๙ ในเกือบทุกด้านยกเว้นด้านสมรรถนะทางร่างกาย,ความเจ็บปวดของร่างกาย,และบทบาททางสังคม และยังพบว่าคลื่นยักษ์สึนามิมีผลกระทบต่อทหารเรือหรือคู่สมรสอย่างมากที่สุดคือปัญหาทางด้านจิตใจ ส่วนใหญ่ของผู้รอดชีวิตที่ประสบกับปัญหาสุขภาพจิตใจอย่างรุนแรงเป็นเพศหญิง มีการศึกษาต่ำ มีรายได้ลดลง มีการสูญเสียของสมาชิกในครอบครัว/คนที่รักหรือทรัพย์สินเพื่อที่จะพัฒนาคุณภาพชีวิต บุคคลเหล่านี้ต้องการการช่วยเหลือทางสังคมและการดูแลสุขภาพร่างกายและจิตใจที่เพียงพอและเหมาะสม อย่างไรก็ตามจากการศึกษาครั้งนี้พบว่าการเผชิญหน้ากับคลื่นยักษ์สึนามิมีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับคุณภาพชีวิตทางด้านความเจ็บปวดทางร่างกายเท่านั้น ผลการศึกษาครั้งนี้จะเป็นประโยชน์ต่อบุคลากรทางการแพทย์ในการที่จะจำแนกและเข้าถึงความต้องการของผู้รอดชีวิตจากภัยพิบัติคลื่นยักษ์สึนามิ นอกจากนี้การที่มีแหล่งให้ความช่วยเหลือทั้งภายในและนอกประเทศจำนวนมาก ความรู้เกี่ยวกับเปลี่ยนแปลงของคุณภาพชีวิตภายหลังประสบภัยจะช่วยเป็นแนวทางในการจัดสรรแหล่งความช่วยเหลือและส่งเสริมสุขภาพตามช่วงระยะเวลาต่างๆให้เป็นไปอย่างมีประสิทธิภาพและเหมาะสม

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CHAPTER I

INTRODUCTION

Rationale and Justification

The 2004 Indian Ocean earthquake, known by the scientific community as the Sumatra Andaman earthquake, was an undersea earthquake that occurred at 00:58:53 Coordinated Universal Time (UTC) (07:58:53 local time) (1) on December 26, 2004. The Tsunami generated by the earthquake killed approximately 275,000 people, making it one of the deadliest disasters in modern history. The disaster is also known as the Boxing Day Tsunami. Various values were given for the magnitude of the earthquake, ranging from 9.0 to 9.3 on the Richter scale (which would make it the second largest earthquake ever recorded on a seismograph). The earthquake originated in the Indian Ocean just north of Simeulue island, off the western coast of northern Sumatra, Indonesia. The resulting Tsunami devastated the shores of Indonesia, Sri Lanka, South India, Thailand, the Maldives, Somalia, Malaysia, Seychelles, and other countries with waves up to 30 m (100 ft). It caused serious damage and deaths as far as the east coast of Africa (2).

The reported death toll from the earthquake, the Tsunami varies widely because of confusion and conflicting reports. The true final toll may never be known due to bodies having been swept out to sea. But could total to over 265,000 people with tens of thousands reported missing, and over a million left homeless. Relief agencies reported that one – third of dead appear to be children. This was a result of the high proportion of children in the populations of many of the affected regions and because children were the least able to resist

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being overcome by the surging waters. In addition, the large number of local residents, up to 9,000 foreign tourists (mostly Europeans) enjoyed the peak holiday travel season were among the dead or missing, especially Scandinavians. Measured in lives lost, this was one of the ten worst earthquakes in recorded history (3−4).

The impact of the Tsunami affected on many aspects, for instance humanitarian, economic, environment and other effects, including impact upon aspects of quality of life. It soon become clear that hundreds of thousands of people had lost their homes. Road railways, bridges, were washed away, leaving entire communities stranded. A great deal of humanitarian aid is needed due to widespread damage of the infrastructure, shortages of food and water, and economic damage (3). Most hospitals and health centers were destroyed or extensively damage (4). Furthermore, immediately after the Tsunami many people were afraid that there would be outbreaks of epidemics because the conditions were so unclean and there was no clean water available and due to the high population density and tropical climate of the affected areas. Cholera, dysentery, typhoid and other water – borne disease usually tend to spring up in the days immediately after a disaster when clean water is scarce. These disease, which can be deadly, come from drinking water contaminated with feces (5). Tsunami survivors will be highly vulnerable to the mosquito – borne illness because the combination of the Tsunami and the rains are creating the largest single set of breeding sites (6). One hundred thousands people could die across the Tsunami – hit zone that stretches across a dozen countries from Indonesia to Sri Lanka, India and as far away as Africa's eastern coast (7). The main concern of humanitarian and government agencies was to provide sanitation facilities and fresh drinking water to certain the spread of these diseases. And also provide essential health care to care for survivors. Many of whom had inhaled seawater or suffered massive injuries. And those with chronic illness and disability who were suddenly made vulnerable. Because they lacked essential medicine and care (4).

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Following a disaster, the level of illness and death among the surviving population was a reliable indicator of how mach basic relief which was reaching people in need. People who did not have access to clean water, proper sanitation, sufficient food and shelter or adequate health care were at an increase risk of death. Fortunately, no serious epidemics have occurred in Thailand (8).

The impact on coastal fishing communities and fisher folk, some of the poorest people in the region, has been devastating with high losses of pre and post Tsunami income earner as well as boats and fishing gear. But some economists believe that damage affected countries' economics will be minor because losses in the tourism and fishing industries are a relatively small percentage of the Gross Domestic Product (GDP) (9).

Beyond the heavy toll on human lives, the Indian ocean earthquake has caused an enormous environment impact that will affect the region for many years. It has been reported that severe damage has been inflicted on ecosystems such as mangroves, coral reefs, forests, coastal wetlands, vegetation, sand dunes, and rock formations, animal and plant biodiversity and groundwater. All surface and ground waters in Tsunami – inundated zone revealed significant salinity at that time (10). In addition, the spread of solid and liquid waste and industrial chemicals, water pollution and destruction of sewage collectors and treatment plants threaten the environment even further, in untold ways. The environment impact will take a long time and significant resources to assess (11).

Many health professionals and aid workers have reported widespread psychological trauma associated with the Tsunami. Millions of people may have survived the deadliest Tsunami in living memory, but many are so deeply traumatized, it will take years for them to heal, if ever. Survivors are in shock and utter despair. It is the psychological scars that many survivors will live with for the rest of their lives. Psychiatrists said survivors of major disaster will suffer emotional turmoil and grief for months, even years. First responders

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to disaster face both immediate and long term psychological effects (9). Disaster bring with them trauma of gargantuan proportions. These can range from simple fears to enduring mental health conditions such as post – traumatic stress disorder (PTSD).

A natural reaction to any traumatic event is an initial disbelief/denial, which is followed by anger, bargaining, sadness and finally acceptance, in psychological terms, stages of a **normal grief reaction.**

Acute stress disorder is less well known than post – traumatic stress disorder and depression. It is one of the commonest psychological problems that occur after exposure to extreme trauma such as natural disaster, a bad accident, rape, an assault, witnessing murder or war. If acute stress disorder persists for more than a month, and if these features are associated with functional impairment or significant distress, the diagnosis is changed to post – traumatic stress disorder.

Between 15 and 20 percent of survivors develop PTSD. PTSD could occur immediately or take place years later. People with severe PTSD go into depression. Those with PTSD will require professional help such as counseling, psychotherapy and making sure they have enough sleep to prevent them from going into depression. Depression is a very debilitating and painful disorder and suffers will not be able to carry on with their daily activities. If it was not recognized and treated, 15 percents (of those with depression) may commit suicide.

Large scale collective unforeseen disasters can also result in inability to grieve for the losses, there being denial and anger in the survivors. Acceptance result in depression and anxiety. A large scale calamity often result in physical damage, loss of loved one, loss of properties and occupational problems that can add to the psychological problems of the traumatic event.

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Most psychological problems arising from a disaster are amenable to psychotherapeutic interventions. Immediate debriefing in the form of crisis intervention can go a long way in preventing subsequent and long – standing mental health problems. Few vulnerable individuals may require additional help in medications form and individual counseling. Neglect and lack of immediate action can impede his/her recovery and can indeed impair the individual's quality of life. If handled appropriately and more importantly promptly, disasters can be deal with in a psychologically healthy manner (12).

Phang – Nga, the province hardest hit by the Tsunami in southern Thailand. Most of the deaths occurred in this province. The Tsunami killed approximately 5,395 people (at least 2,213 foreigners), 2,845 missing and 5,597 injured (data included 1,253 foreigners) (13). People in Phang – Nga province, still have mental health problems. The psychiatric hospital's records in March showed that 15,747 people had been treated for mental health problems and about 60 percent of the patients were male. Some needed continual medication (14).

In Phang – Nga Naval Base, Almost all of the area over 2,000 Rai had been destroyed by the killer wave, including General Headquarters, an arsenal a warship, Naval Base's hospital, Children Day Care Center, golf course, and Naval houses. Properties loss was assessed over than 670 million – baht. The Phang – Nga Naval Base reported Tsunami killed 4 civil servant, 1 Navy officer, 1 employee, 24 family's members, and 2 Navy officers missing (15).

Navies were on the front line from the moment when the Tsunami struck. In this situation, they were rescue workers. They were expected to help the victims and to manage a very large number of dead bodies in the sea – for more than they had ever seen in their entire careers. They had to provide help to the thousands of survivors who had lost family members, houses, including

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children orphaned by the Tsunami. They did all this while coping with their own personal losses and bereavement.

The Tsunami has been a terrible tragedy for all those involved, and a shock for all people in Phang – Nga Naval Base. Almost all of the 472 families exposed to the Tsunami. Properties loss was assessed over one hundred thousands baht per family. Some of their houses, cars, motorcycles, shops had been destroyed in the difficult way to live/use or make a living/using. Most of the effected people have suffered and almost complete loss of assets and homes. They were like to loss not only a home but also a sense of home and neighborhood. The impact on their livelihood will last for month or more.

And the biggest toll it take on the navies or their spouses were on their mental or emotional health, the emotion of losing. It was really difficult time for them as the Tsunami had taken away their life, husbands, wives, children, cousins, and most important their hope and human dignity. There was the trauma of trying to continue life and livelihoods when family members or the loved one have been killed or injured or were missing with no definite know outcome, no funeral.

After the Tsunami, part of the navies' families had moved to live with relatives outside the Phang – Nga Naval Base in more safety areas. The remaining families still living in these areas which were the Tsunami prone areas and there was no warning system installed in their community. Since, they did not have another place or another home. They have been living with the fear of such a new coming Tsunami or earthquake. When they live with the fear of a recurrence of a Tsunami, apprehension and worry were likely to follow (16).

The Commandant Phang – Nga Naval Base had set teams to relieve and work for immediate support (i.e. food, clean water, thing need in daily life)

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and recover in the long term. These included temporary camps, houses construction, health care service, hope and spirit moral support.

Six months, most people was affected by the Tsunami, they had been yet to re – establish secure livelihoods, and continued to need relief assistance, particularly money or personal loan. Many families still did not have enough money to resume their lives and reply debt. The women had not been able to restart any income earning activities due to the loss of equipment. People needed help from organization to identify needs and gaps and indicated what more needs to be done to help speed recovery so that more people were able to rebuild their livelihoods and maintained good health and a better quality of life. In addition to assessments of the overall impact of the recovery effort through regular information on the health status and well – being. They would like to make sure that their organization was achieved in more sensitive and equitable manner which over the long term provided a better quality of life.

Quality of life is an area of study that has attracted a great deal of interest over the past ten years, particularly in the areas of health and social services, but increasingly in medicine, education, and others. The study of quality of life is an examination of factors that contribute to the goodness and meaning of life, as well as people's happiness. The ideological thrust of quality of life study is to promote means for people, within their environments, to live in ways that are best for them. The ultimate goal of quality of life study and its subsequent application to people live is to enable people live that are both meaningful and enjoyed. The concept of quality of life includes physical functioning, psychological functioning, social functioning and perception of health status, pain and overall satisfaction with support with life.

Historical, Thailand has been a disaster – free country, suffering only minor losses from natural hazards through the year (17). As a result of the Tsunami affected upon most of the navies and their spouses. It could affected all aspects of an individual's health; physical, mental, social and perception of

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overall well – being which affected their quality of life. On the other hand, it was a opportunity to study on the effect of tremendous disaster because the Tsunami never struck Thailand for along time, the last Tsunami occurred in Thailand around 1955 (18). However, there was no data on how to assess quality of life in Thai population after exposed to disaster. So, the researcher conducted a study to assess the overall health – related quality of life of the navies or their spouses survivors in Phang – Nga Naval Base, six months after Tsunami disaster.

Research Objectives

1. General objective

To estimate the consequences of the Tsunami disaster on health – related quality of life after 6 months among the navies or their spouses survivors in Phang – Nga Naval Base, Phang – Nga Province by using SF – 36 version 1.0 questionnaires.

2. Specific objective

To determine association between general characteristics, i.e., age, gender, marital status, education, occupation, changes in income, characteristics and amount of losses, i.e., loss of family members, relatives or friends/loved one, loss of properties, estimated properties loss, characteristics of social support, i.e., needs for social support, received social support, levels of satisfaction with social support, history of illness, i.e., physical history illness, psychiatric history illness, Tsunami exposure and quality of life of the navies or their spouses.

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Research Hypotheses

1. Quality of life among the navies or their spouses survivors is lower than "2006 Thailand normative data (Bangkok metropolitan)" by Udomsubpayakul and Kongsakon (19).

2. There are association between general characteristics, i.e., age, gender, and quality of life.

3. There are association between characteristics and amount of losses and quality of life.

4. There are association between characteristics of social support and quality of life.

5. There are association between characteristics of history illness and quality of life.

6. There are association between Tsunami exposure and quality of life.

Population of the Study

Researcher has studied in the navies or their spouses who survived from the Tsunami disaster and still have been living in Phang – Nga Naval Base.

Variables in the Study

Independent variables in this study comprise of

1. General characteristics, i.e., age, gender, marital status, education, occupation, changes in income.

2. Characteristics and amount of losses, i.e., loss of family members, relatives or friends/loved one, loss of properties, estimated properties loss.

3. Characteristics of social support, i.e., needs for social support, received social support, levels of satisfaction with support.

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4. Characteristics of history illness, i.e., physical history illness, psychiatric history illness.

5. Tsunami exposure

Dependent variable is quality of life

Conceptual Framework

Figure 1 shows the factors from the literatures which appear to effect the navies or their spouses' QOL. Those factors are as follow;

1. General characteristics, i.e., age, gender, marital status, education, occupation, changes in income.

2. Characteristics and amount of losses, i.e., loss of family members, relatives or friends /loved one, loss of properties.

3. Characteristics of social support, i.e., needs for social support, received social support, levels of satisfaction with support.

4. Characteristics of history illness, i.e., physical history illness, psychiatric history illness.

5. Tsunami exposure

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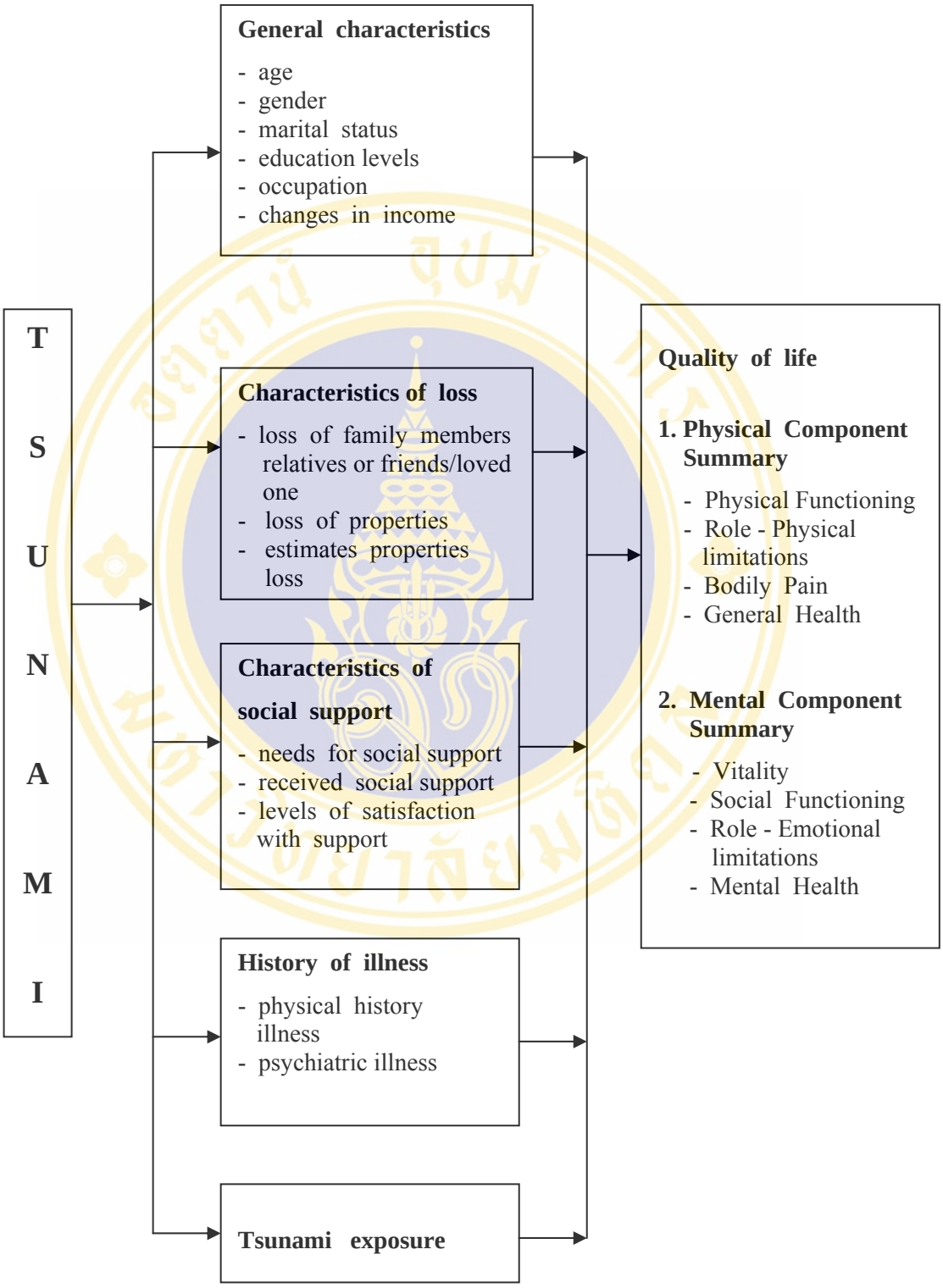

Figure 1 Conceptual framework of QOL among the navies or their spouses, 6 months after Tsunami disaster.

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Operational Definitions

Navies or their spouses means the navies or their spouses who survived from the Tsunami disaster.

Quality of life (QOL) means the value assigned to the duration of life as modify by the impairments, functional states, perceptions, and social opportunities that are influenced by disease, treatment or policy. In this study, refers to the exposure to Tsunami disaster, as evaluated by the SF – 36 items health survey version 1.0 questionnaires. The construct of SF – 36 V1.0 consisted of 2 main components, physical and mental. The physical component comprised 4 subscales, i.e., physical functioning, role – physical limitations, bodily pain, and general health subscales. Mental component also contained 4 subscales, i.e., vitality, social functioning, role – emotional limitations and mental health subscales (20).

Physical Functioning means levels and types of limitations between the extremes including lifting and carrying groceries, climbing stairs, bending, kneeing, and walking moderate distances, as well as estimation of the severity of each limitation.

Role – Physical limitations means levels of role limitations in work and other daily activities because of physical health problems .

Bodily Pain means frequency of bodily pain or discomfort and measurement of the extent of interference with normal activities because of pain.

General Health means health self – perception.

Vitality means differences in subjective well being and energy.

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Social Functioning means health – relates effects on social activities and impact of physical health or emotional problems on social activities.

Role – Emotional limitations means levels of role limitations in work and other daily activities because of emotional problems.

Mental Health means measurement of the four major mental health's subscales (anxiety, depression, behavioral loss or emotional control and psychological well – being).

Social support means types of social support which supported those who experienced Tsunami in terms of needs for social support, received social support and levels of satisfaction with support.

Physical history illness means variety of chronic diseases which the navies or their spouses had occurred before exposed to Tsunami.

Psychiatric history illness means variety of mental health conditions which the navies or their spouses had occurred before exposed to Tsunami.

Tsunami exposure means whether the navies or their spouses directly experienced the Tsunami. Tsunami exposure was assessed by the presence or absence of the navies or their spouses in the event when Tsunami occurred.

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CHAPTER II

LITERATURE REVIEW

In this chapter, review the literature which is to provide the theoretical background to understand the concept of the study on quality of life. The literature review consists following parts.

I. Tsunami and disaster
II. Concept of quality of life
   – Definition of quality of life
   – Measurement of quality of life
III. Research regarding the studied variables

I. Tsunami and Disaster

Tsunami (2, 21)

A Tsunami is a natural phenomenon consisting of a series of waves generated when water in a lake or the sea is rapidly displaced on a massive scale. Earthquakes, landslides, volcanic eruptions and large meteorite impacts all have the potential to generate a Tsunami. The effects of a Tsunami can range from unnoticed to devastation.

The term *Tsunami* comes from the Japanese language meaning "harbour" ("*tsu*") and "wave" ("*nami*"). The term was created by fishermen who returned to port to find the area surrounding the harbor devastated. Although, they had been aware of any wave in the open water. A Tsunami is not a sub – surface event in the deep ocean; it simply has a much smaller amplitude (wave height) off shore, and a very long wave length (often hundreds of

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kilometers long), which is why they generally pass unnoticed at sea, forming only a passing “hump” in the ocean.

Tsunami have been historically referred to as they approach land they take on the characteristics of a violent onrushing tide rather than the sort of cresting waves that are formed by wind action upon the ocean (with which people are more familiar). However, since they are not actually related to tides. The term is considered misleading and its usage is discouraged by oceanographers.

Causes

A Tsunami can be generated by any disturbance that rapidly displaces a large mass of water, such as an earthquake, volcanic eruption, landslide or meteorite. However, the most common cause is an undersea earthquake. An earthquake which is too small to create a Tsunami may trigger an undersea landslide quite capable of generating a Tsunami.

Tsunami can be generated when the sea floor abruptly deforms and vertically displaces the overlying water. Such large vertical movements of the earth’s crust can occur at plate boundaries. Subduction earthquakes are particularly effective in generating Tsunamis, and occur where denser oceanic plates slip under continental plates in a process known as subduction.

Sub – marine landslides; which are sometimes triggered by large earthquakes; as well as collapses of volcanic edifices, may also disturb the overlying water column as sediment and rocks slide down slope and are redistributed across the sea floor. Similarly, a violent submarine volcanic eruption can uplift the water column and generate a Tsunami.

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Waves are formed as the displaced water mass moves the influence of gravity to regain its equilibrium and radiates across the ocean like ripples on a pond.

Characteristics

There is a common misconception that Tsunamis behave like wind-driven wave or swells (with air behind them, as in this celebrated 19th century woodcut by Hokusai). In fact, a Tsunami is better understood as a new and suddenly higher sea level, which manifests as a shelf or shelves of water. The leading edge of a Tsunami superficially resembles a breaking wave but behaves differently: the rapid rise in sea level, combined with the weight and pressure of the ocean behind it, has far greater force.

Although often referred to as "tidal waves", a Tsunami does not look like the popular impression of "a normal wave only much bigger". Instead it looks rather like an endlessly onrushing tide which forces its way around and through any obstacle. Most of the damage is caused by the huge mass of water behind the initial wave front, as the height of the sea keeps rising fast and floods powerfully into the coastal area. The sheer weight of water is enough to pulverize objects in its path, often reducing buildings to their foundations and scouring exposed ground to the bedrock. Large objects such as ships and boulders can be carried several miles inland before the Tsunami subsides.

Difference between Tsunami and Waves

1. Mechanism of Tsunami and Waves

Both Tsunami and waves are wave motions caused by water vibration. Their behaviors look like each other when they reflect against barriers and their movement at shallow waters. However, the following is fundamentally different:

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waves are surface movement of seawater driven by wind, while Tsunami is the whole movement caused by up and down of sea floor. Besides, Tsunami energy (destructive power) is incomparably huge than waves.

2. Period of Tsunami and Waves

Period is the time between peak of wave and that of next one. Wave period is several ten seconds at the longer wave but that of Tsunami amounts to several ten minutes. As the rushing by this long period keeps long time, Tsunami invades deeply into land and flows against several kilometers along river. Moreover, as the receding continues long time, people will be carried off several kilometers if they are washed away by Tsunami. Height of inundation and trace are the height from the color – changed spot and driftage left on building and slope. The former is the height from ground and the latter from standard sea level. Run – up is the height from the highest point of reached wave to standard sea level. Here standard sea level is the height of sea at the time of Tsunami.

3. Wave Length of Tsunami and Waves

Wave length is the length between peak of wave and that of the next one. Wave length of waves extends from several meters to several hundred meters, while that of Tsunami ranges from several kilometers to several hundred kilometers. Due to this nature, velocity of Tsunami is faster in deep ocean and it decreases the velocity as the depth becomes shallow, but the wave height increases.

Character of Tsunami Damage

Tsunami damages are classified into two groups: on land and in sea areas. Damages on land are as follows: Human, building, facilities (shore protection, wharf and floodgate), fire spread, economics (service suspension), life – line (tap water and sewage, electric power, gas and communication), traffic

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(road), agriculture (invasion of salt water into farmland). On the contrary, those in sea area like this: Facilities (breakwater), ship, marine products, ground (scouring by migration of sand and soil), wash away of oil and wood (cause and spread of fire, aggravation of coastal environment). Typical disaster are mentioned below.

1. Human Damage

The past cases show that many peoples ware victimized in their houses. It is said there is strong correlation between human damages, and complete collapse and wash – away of houses. Human damage is largely influenced by evacuation behavior just after outbreak of earthquake. The most important factor is the time relation between occurrence of earthquake and evacuation. Even if they encounter with the huge Tsunami, no human casualty will occur in case they evacuate before it strikes them.

2. Damage of Building

Wooden, ferro – concrete and concrete building are undergone damages when flow speeds are over 4.2 m/s, 10.2 m/s and > 10.2 m/s, respectively, only by the force of Tsunami. However, stronger destructive powers are added when ship and floating wood collide with them by Tsunami.

3. Others

The fire spreads when fishing boats and steam ships aground and fall sideways and fuel is ignited, or when they collide with wharf and the leaked fuel from cracks is ignited. At the same time, regional environmental pollution occurs by the spread of spilled fuels.

Other damages are also reported: those of ship and breeding raft caused by strong current; scouring of building base by the migration of sand and soil and followed by collapse of buildings.

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Tsunami Heights and Its Damage

As for the quantity of Tsunami having close relation with Tsunami damage, Tsunami height and tidal level (stable tidal level + Tsunami height) and flow speed are listed. Concerning with flow speed, measured data are scanty because they are difficult to observe when compared with those of height. Therefore, it is suitable for the estimation of Tsunami damage to use the wave height as a standard.

1. Influence on Human Lives

the Tsunami height of 1 m is surely influential to human lives. Nine escaping persons from Tsunami of Nihonkai Chubu earthquake in 1983 at the mouth of Jyusannko lake, Aomori prefecture, were caught by Tsunami and three of them were dead. Victims of Tsunami increase rapidly when wave height comes over about 2 m.

2. Influence on Sea Bathing

Sea bather must evacuate to land in case of Tsunami watch. As the Tsunami wave length is long, infant holding float happens to be washed away over 1 km off the beach, even when the Tsunami height is as low as 20 to 30 cm. even adult feels strong current and can not ignore the influence of it when the height reaches at about 50 cm. Staying in the sea is dangerous when the water height is over human knee because the sea bather is prone to be robbed of free body movement.

3. Influence on Breeding Raft

Breeding raft starts running out at about 50 cm of Tsunami height. Drifting of it may hinder the evacuation of ship.

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4. Influence on Wooden House

The wooden house at coast is destroyed partly and collapsed completely at the Tsunami height of 1m and 2 m, respectively.

5. Influence on House Made of Stones

It can resist up to the Tsunami height of 4 m. however, partial collapse occurs at over 4 m height. Over 8 m Tsunami height will end in complete collapse of it.

6. Influence on Ferro – Concrete Building

It can stand up to about 10 m of Tsunami height if it is constructed firmly. Common dwelling with the ferro – concrete may endure by about 5 m of Tsunami height. Destructive power by floating materials is not considered in all cases.

7. Influence on Fishing Boat

Damage of fishing boat moored at fishing port starts increasing rapidly at over 2 m of Tsunami height and 50% of them are damaged at over 4 m height. All fishing ships are all run out or broken at 8 m and the drifted ships change into destructive power.

8. Influence on Coastal Villages

Damage of villages increase rapidly at the Tsunami height of 2 m and 50% of villages undergo damages at the height of 4 m. All villages are suffered from damages at 8 m height.

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9. Influence on Shore Protection Facilities

Transportation of tetra pods and breakdown of shore protection facilities occur at the height of about 10 m.

Warnings and Prevention

Tsunami cannot be prevented or precisely predicted, but there are some warning signs of an impending Tsunami, and there are many systems being developed and in use to reduce the damage from Tsunamis.

In instances where the leading edge of the Tsunami wave is its through, the sea will recede from the coast half of the wave's period before the wave's arrive. If the slope is shallow, this recession can exceed many hundreds of meters. People unaware of the danger may remain at the shore due to curiosity, or for collecting fish from the exposed sea bed.

In instances where the leading edge of the Tsunami is its first peak, succeeding waves can lead to further flooding. Again, being educated about a Tsunami is important, to realize that when the water level drops the first time, the danger is not yet over. In a low – lying coastal area, a strong earthquake is a major warning sign that a Tsunami may be produced.

Regions with a high risk of Tsunamis may use Tsunami warning systems and warn the general population before the wave reaches land. In some communities on the west coast of the United States, which is prone to Pacific Ocean Tsunamis, warning signs advise people where they run in the event of an incoming Tsunami. Computer models can roughly predict Tsunami and impact based on information about the event that triggered it and the shape of the sea floor (bathymetry) and coastal land (2).

One of early warnings comes from nearby animals. Many animals sense danger and flee to higher ground before the water arrives. The Lisbon

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quake is the first documented case of such a phenomenon in Europe. The phenomenon was also noted in Sri Lanka in the 2004 Indian Ocean earthquake (22). Some scientists speculate that animals may have an ability to sense subsonic Rayleigh waves from an earthquake minutes or hours before a Tsunami strikes shore (23).

While it is not possible to prevent a Tsunami, in some particularly Tsunami – prone countries. Some measures have been taken to reduce the damage caused on shore. Japan has implemented an extensive program of building Tsunami walls of up to 4.5 m (13.5 ft) high in front of populated coastal areas. Other localities have build floodgates and channels to redirect the water from incoming Tsunami. However, their effectiveness has been questioned, as Tsunamis are often higher than the barriers. For instance, the Tsunami which hit the island of Hokkaido on July 12, 1993 created waves as much as 30 m (100 ft) tall – as high as a 10 – story building. The port town of Aonae was completely surrounded by a Tsunami wall, but the wave washed right over the wall and destroyed all the wood – framed structures in the area. The wall may have succeeded in slowing down and moderating the height of the Tsunami but it did not prevent major destruction and loss of life.

Three Points for Evacuation (24)

Point 1 : Knowledge of Tsunami

1. Even if magnitude of earthquake is small, i.e., tremor is weak and tremor continues long, Tsunami happens to attack you.
2. When you feel strong tremor with over M 4, Tsunami will assault you in a short time.
3. Without tremor, Tsunami can swoop on you.
4. Tsunami can hit repeatedly and the first wave can not always from the height one.

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5. Waves do not always recede before its arrival. It can happen to fall on suddenly.

6. Both rushing and receding waves of Tsunami have very strong destructive powers.

Point 2 : Other Aspects of Tsunami

1. Tsunami can concentrate its energy at the tip of cape and the innermost of bay and the wave height there can get several times higher than that of the beach.

2. Tsunami invades faraway into the land of gentle beach and sandbar.

3. Tsunami can invade deeply into the land by ascending along the river. Therefore, the low level areas neighboring river is dangerous.

4. You must brace yourself for the outbreak of fire in huge Tsunami. Even if wooden materials get wet by Tsunami, moisture covers only surface. So, household goods and timbers etc. from collapsed houses are easily up on to land and collided with wharf and tetra pod, are easily ignited and cause fire spread.

5. It should be noted that Tsunami water may invade into the underground space and it can be submerged under water.

6. Even the height of breakwater , shore protection , and rock mass are higher than that of Tsunami wave, it is dangerous to stay there.

7. Sea water happens to overflow from manhole and sewerage at coastal low land.

Point 3 : Taking Disaster Prevention Measure Against Tsunami

1. When you feel earthquake, first of all, leave the beach and do your best to get Tsunami information.

2. Tsunami happen to attack you at the same time you get Tsunami forecast when huge one occurs at the neighboring sea. Quickly and temporally evacuate to the concrete building.

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3. Evacuation place and its route in your dwelling area should be confirmed at the ordinary time.

4. Measures in case you have sufficient time before it comes. (move up ship to land or to the wide and deep sea. After making preservation of their assets, coastal inhabitants should evacuate).

5. Problems of the aged – society (according to data, the average walking speed of the aged people is at 40 cm/s. They can walk only 250 m in ten minutes. Therefore, the community and administration must protect them from the disaster).

6. Problems of the car – society (Many who evacuated in cars were victimized on the way by the Tsunami. However, we can not avoid of car use in the consideration of the weak people against disaster).

Evacuation for Coastal Populations

1. When you feel strong and long frequency tremor, coastal populations should evacuate temporally to nearby high land or to over the second floor of concrete building and then confirm Tsunami information. Wooden houses is not recommendable for evacuation site.

2. When you find out shelter, keep in mind and remember that you should be apart from rocky place and bank as far as possible. (swallowed in Tsunami, many person die of drowning by lost of consciousness or by heavy injury caused by collision with hard matters).

3. In case no time left or Tsunami has already came, it is rather dangerous to evacuate faraway. You should escape to nearby higher floors of the ferro – concrete building. Tsunami energy is smaller for building in the second and the third rows than the first one facing with beach.

4. When Tsunami warning is announced, coastal inhabitants should evacuate on foot to the designated places along appointed routes.

5. Exception, the case that you have sufficient time before Tsunami comes, you should give up the idea to bring out or preserve your assets.

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6. The solitary aged and the disabled person are the most easily underwent disasters. Therefore, people should help them to evacuate with area collaboration.

Disaster

Globally, approximately 2 billion people were affected by natural or technological disaster between 1990 – 1999, with almost 600,000 fatalities. More than 86% of people were killed by disaster during this period succumbed of natural events. Windstorms claimed the largest proportion of lives (35%) while floods accounted for the largest proportion of people affected (75%). People in low – income countries are 4 times more likely to die from extreme natural events than those in high – income countries. During the 1990s, more than two – thirds of the deaths from disasters occurred in Asia, which was also the continent most frequently hit by disaster (25). And 1.2 billion people (23% of the world population) live with in 100 Km. of the coast, and 50% are likely to do so by 2030. These population are exposed to specific hazards such as coastal flooding, Tsunamis, hurricanes, and transmission of marine – related infection diseases (26).

What is a Disaster?

There are different definitions of the word “disaster”, but for clarity in this report on disaster with humanitarian implications, the term is defined as an event that has occurred unexpected with destructive consequences.

A disaster is a sudden, calamitous event that seriously disrupts the function of a community or society and causes human, material, economic or environment losses that exceed the community’s or society’s ability to cope using its own resources (27).

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The World Health Organization/Health Action in Crises Department defines 'disaster' as, "Any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on a scale sufficient to warrant and extraordinary response from outside the affected community area (25)."

In 1961, Fritz, a pioneer in disaster research, defined 'disaster' as actual or threatened accidental or uncontrollable events that are concentrated in time and space, in which a society or a relatively self – sufficient subdivision of a society undergoes severe damage, and incurs such losses to if members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society, or its subdivision, is prevented (28).

For a disaster to be entered into the database of the United Nations' International Strategy for Disaster Reduction (ISDR), at least one of the following criteria must be met:

1. a report of 10 or more people killed
2. a report of 100 people affected
3. a declaration of a state of emergency by the relevant government
4. a request by the national government for international assistance

Type of Disaster (27 − 29)

Disasters are classified into 2 categories: natural and technological (or human – made)

Natural disaster include hurricanes, earthquake, tornadoes, Tsunami, volcanoes, floods, landslides, winter storms, or more long term epidemics, drought, famine (catastrophic food shortage), blizzard, pestilence.

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Technological disasters include mass transportation accidents, nuclear power plant accidents involving hazardous materials (e.g., oil spills), and massively destructive fires.

Victims and Survivors

Almost everyone in the population is affected by a disaster. No one is untouched by it. Those who suffer damage are called 'victims'. The victims may die or live. Those who manage to live are called 'survivors'.

Peculiarities of Tsunami (29)

There are few ways in which Tsunami differs from other disasters.

- Time duration of the attack was very small. The entire attack took place in a matter of a few minutes.
- Extent of damage was very large, grossly disproportionate to the duration of attack. Extensive damage took place in a matter of few minutes, which took the people by surprise and awe.
- The victims are either alive and healthy or simply dead. There was very less physical injury and hence there was no great need for medical facilities, unlike other disasters.
- There have been no precedents of this type. People have not even heard of this type of a disaster.
- There were no outbreaks of any infections, which are common in floods.

This point is of note because in floods, it is freshwater – a good culture medium for organisms. And, when water stagnates, organisms flourish even more. But, in Tsunami, it was seawater which is hypertonic saline which is unfavorable for microorganisms. Moreover, there was no stagnation as the water receded back completely.

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Disaster Management Cycle (30)

Disaster management cycle includes the following stages/phases

Disaster phase : The phase during which the event of disaster take place. This phase is characterized by profound damage to human society. This damage/loss may be that of human life, loss of properties, loss of environment, loss of health or anything else. In this phase, the population is taken by profound shock.

Response phase : this is the period that immediately follows the occurrence of the disaster. All individuals respond to the disaster in their own ways. Almost everyone is willing to help. The needs of the population during this phase are immediate medical help, food, clothing and shelter.

Recovery phase : The recovery phase which is the most significant, in terms or long term outcome. It is during this time that the victims actually realize the impact of disaster. They perceive the meaning of the loss that they have suffered. They need intensive mental support so as to facilitate recovery. The course of recovery is patterned and predictable, with steps that include heroism, honeymoon, response, recovery and reconstruction (31).

How Disaster Disrupt Quality of Life (32)

Disasters create sudden changes to social networks, lifelines, the environment, housing, and the economy and also have dramatic effects on the health and well being of community residents. The following scenarios demonstrate some of these changes and impacts played out in many communities year after year.

- Reduced mobility, access to services due to damaged infrastructure.
- Damaged public facilities (schools, central business districts and down towns, historic districts, airports, harbors, storm water systems,

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power plants, telecommunication centers) affect education, employment, recreation, business, the economy and public safety.

- Damaged utilities (power lines, phone lines, water treatment plants) present a threat of disease and a breach of public safety.
- Partially damaged or uninhabitable housing can lead to loss of personal memoirs and documents and homelessness.
- Economic disruption, whatever its immediate cause, can spur unemployment, loss of tax base, and a shortage of basic supplies. Unemployment can in turn sever access to health insurance and other benefits.
- Environment damage can result from riverine erosion, beach/dune erosion, tree loss and pollution of air and water.
- A traumatized population can be further affected by damaged medical facilities and limited access to social services, family services and day care.

Population at Risk (33)

Within a community affected by disaster, several categories of victims can be defined.

Primary or impact victims are those who have experienced direct physical, material, and personal losses from the disaster.

Context victims are those who have witnessed the destruction of the disaster (such as the death or material, losses of family or friends and the sociocultural disorganization of the post impact environment) but have not directly experienced the specific impact.

Entry victims are people who enter the impact area during the post disaster crisis period (such as police and military personnel, rescue workers,

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government officials, and volunteers) and who are exposed to the death and destruction.

Peripheral victims are those who were not directly affected by the disaster but who suffer distress and uncertainly over the safety and well – being of family and friends.

Among these categories of disaster survivors and victims are the vulnerable population of central concern to the social work profession; poor people, older people, people with disabilities, people who are isolated, institutionalized, or otherwise at risk; and all exposed children. Outcomes for victims and survivors, particularly those who are most vulnerable, also include extensive damage to properties and possessions, dislocation, unemployment, health and coping problems, and death.

Disaster and the Effect to Human Health

Immediate Health Concerns (34)

- After the rescue of survivors, the primary public health concerns are clean drinking water, food, shelter, and medical care for injuries.
- Flood waters can pose health risk such as contaminated water and food supplies.
- Many survivors were displaced because of damage or destruction of dwelling and massive disruption of infrastructure throughout the affected region. Loss of shelter leaves people vulnerable to insect expose, heat, and other environmental hazards.
- The majority of deaths associated with Tsunami are related to drown but traumatic injuries are also primary concern (35). Injuries such as broken limbs and head injuries are cause by the physical impact of people being washed into debris such as houses, trees, and other stationary items. As the water recedes, the strong suction of debris

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being pulled into large populated areas can further cause injuries and undermine building and services.

- Medical care is critical in areas where little care exits.
- In the days and weeks following such a devastated disaster, the treat of infections disease outbreaks is high. Natural disasters that have a rapid onset and broad impact can produce many factors that work synergistically to increase the risk of morbidity and mortality resulting from communicable diseases. Anticipated diseases following disasters are diarrheal diseases, acute respiratory infections, measles, tetanus, vector borne diseases; malaria and dengue etc., (36−37).

Secondary Effects

Natural disasters do not necessarily cause an increase in infectious disease outbreaks. However, contaminated water and food supplies as well as the lack of shelter and medical care my have a secondary effect of worsening illnesses that already exist in the affected region.

Long – lasting Effects

The long impact caused by the disaster is the economic impact which is the high significance to the human health. The poverty bring many effect such as the lack of food, no public health service and lead to the violent crime.

Exposure to the disaster is not common event, that may cause physical as well as psychological harm. The mere threat of such an event may be a source of stress, associated with change in physical health, mental health and change in quality of life (38). Individuals who experience natural disasters have been known to develop excessive physical, mental and emotional stress (38−39).

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Research Regarding the Effected to Physical Health of Disaster

Following the December 26 Tsunami, Brennan and Rimba (40) conducted a rapid health assessment in Aceh Jaya District, Indonesia. The aim was to rapidly determine the public health impact of the Tsunami on the population of three communities and to prioritize health interventions. The results showed that almost 100% of dwelling were destroyed in all three communities. For the town of Calang: only 18.2% of the pre – Tsunami population remained 2 weeks following the disaster, with an estimated 70% of the population was died at the time of impact; government estimates of the remaining population were inflated by approximately 250%; mortality rates were not elevated post – Tsunami; 100% of the population lacked access to sanitation and clean water; 85% of children under 5 years reported diarrhea over the preceding 2 week period; 95% of individuals with a medical complaint reported satisfactory access to clinical care; acute malnutrition was not a significant problem; and over one – fifth of households were hosting an orphan. For the villages of Rigah and Sayeung; approximately 46.2 and 86.0% of the population survived the Tsunami impact, respectively; mortality rates were not elevated post Tsunami; 100% of the population lacked access to sanitation and clean water, diarrhea was the main cause of morbidity; primary care services were available only a Rigah; and only Rigah had received external assistance. In these study although morbidity rates were not evaluated post Tsunami, significant threats to public health persisted, especially water – borne diseases.

Krishnamoorthy et al. (41) studied in the Tsunami affected areas in Andaman district of the Andaman and Nicobar Island, India to assess the extent of breeding of malaria vectors in the habitats created by seawater flooding. Altered environment, due to saline water were found to support profuse breeding of *Anopheles sundaicus*, a vector implicated elsewhere. This area is endemic for both vivax and faciparum malaria. Malaria slide positively rate has started increasing during post – Tsunami period, which can be considered as an indication of risk of malaria outbreak.

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Slottje et al. (42) conducted historical cohort study to assess long term physical symptoms in workers occupationally involved in an air disaster, Amsterdam, 1992. The results showed that even after 8.5 years, occupationally involved workers reported a less well health – related quality of life with respect to general, physical, and psychosocial aspects. Similarity, occupationally involved workers reported various physical symptoms, i.e., pulmonary, dermal, joint, and possibly autoimmune – related symptoms, more often than did their reference group, without laboratory abnormalities.

Moreover, psychosocial stress – related phenomena such as earthquake, war, or threat of attack are known to be associated with several – fold higher occurrence of myocardial infarction and cardiac death. An increase in cardiovascular events has been associated with disasters (43). According to the 1994 Los Angeles earthquake, which occurred in the early morning, relative risk for cardiovascular death were observed. Sixty – five percent of those who died from atherosclerotic cardiovascular disease were men and their average age was 70 ± 13.5 years. These age and gender characteristics were similar to those of the people who died during the week before the earthquake and during the control period. This similarity suggests that the increase in the number of deaths on the day of the earthquake occurred among people already at risk for death from atherosclerotic cardiovascular disease.

According to a study by Kamp et al. (44), they conducted a questionnaire survey to assess the self – reported physical and mental health among the residents, passers – by, and rescue workers, who were involved in and/or affected by the disaster. Two to three weeks after the explosion of a fireworks storage facility in a residential area (May 2000, Enschede, The Netherlands). The results showed that at least 30% of those affected by the disaster reported serious physical and mental health problems 2 – 3 weeks after the explosion. Compared with reference values in the general Dutch population, high scores were found for somatic symptoms, sleeping problems, and restrictions in daily function due to physical and mental problems, such as

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anxiety, depression, and feeling of insufficiency. The strength of these differences varied between groups, based on the level of involvement and the level of being affected. Researchers concluded that the fireworks disaster had a substantial impact on the health of those affected by the disaster. The health impact was most pronounced for residents and passers – by and also for rescue workers living in the affected area, but lesser degree. Physical and mental health problems were strongly associated with the shock experiences during and shortly after the disaster.

In the study of the North Dakota flood experience and its impacts on survivors' health 6 months after the flood the respondents reported trouble sleeping, felt depress, unusually irritable and nightmares. One fourth of the respondents reported smoking or drinking more since the flood. Several studies were conducted to determine the personal effect of flooding in Purto Rico. The people who experienced disaster reported a higher prevalence of gastrointestinal problems such as abdominal pain, vomit, nausea, and excessive gas. They also experienced pseudoneurologic symptoms such as amnesia, paralysis, fainting, unusual spells, and double vision. It appears that the survivors of a disaster have strong emotional effects that can further influence their health and well – being (39).

Brown (45) studied on the effect of the 1989 Loma Prieto and 1994 Northridge earthquakes on hospital admission for acute myocardial infarction. He found that there was a 110% increase in admission rate for AMI in Los Angeles County on the day of the Northridge earthquake compared with the average of the 7 days before the earthquake. Similarity, there was a 80% increase risk of admission for AMI on the day of the Northridge earthquake in 1994 compared with the same date in 1995. He concluded that extreme emotional stress superimposed on the stress of awakening results in enhanced triggering of AMI.

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According to a study by Kloner and Leor (46) had studied on the effect of extensive environment disaster associated with tremendous emotional stress on the incidence of acute cardiac events. The results indicated a significant increase in the incidence of MI in the week following the 1994 Los Angeles earthquake. These observation support the concept that a stressful event can trigger acute MI. In another studies by Kloner et al. (47), they studied on cardiac death in the same earthquake. They found that there was an average of death increased from 73 to 125 on the day of the Northridge Earthquake, and then decreased to 57 deaths on the day after the earthquake. The Northridge Earthquake was associated with an increase in deaths due to myocardial infarction and trauma.

The Great Hanshin earthquake, which killed over 5,500 people and injured around 40,000 occurred in January 17, 1995. There was no doubt that this tragic earthquake caused a great deal of stress for those who experienced it, even if the stress was not uniformly distributed among the survivors. The study which was conducted to assess the effect of emotional stress caused by a natural disaster on Atopic Dermatitis (AD) symptoms. One thousand four hundred fifty – seven patients with AD, diagnosed by using the criteria of the Japanese Dermatology Association, were enrolled in the study. The data were obtained from a self – administered questionnaire given to patients with AD after experiencing the Great Hanshin Earthquake. People were divided into 3 groups: area A, severe damage to buildings and houses: Area B, mild damage: and control area, no damage. The results of this study demonstrated that exacerbation of skin symptoms was found in 38% and 34% of patients in areas A and B, respectively, whereas similar exacerbation was seen in 7% of control patients. The earthquake caused stress in 63% and 48% of the patients in area A and B, respectively, but fewer patients felt stress in undamaged areas (19%). Multiple logistic regression analysis revealed that stress caused by natural disaster influenced Atopic Dermatitis symptoms (48).

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The same earthquake, Saito et al. (49) conducted the study to assess the effect of tremendous psychological stress on blood pressure control in 221 hypertensive patients receiving antihypertensive medication. During the 4 weeks after the earthquake, on average, the mean blood pressure increased significant for both 105 patients who were exposed (living in the area of the very severe earthquake) and 116 patients who were not exposed (living in the surrounding area). In the exposed group, the increase in mean blood pressure peaked in the first week, declined thereafter, and returned to the baseline within 6 weeks after the disaster. The earthquake related blood pressure elevation was significantly attenuated in patients receiving ß – blockers compared with those receiving other drugs. The results indicated that acute psychological stress associated with a sudden natural disaster cause blood pressure elevation in treated hypertensive patients, and suggest the beneficial effect of ß – blockers on such a stress – related high blood pressure.

One of the study of Hanshin – Awaji earthquake, Aoyama et al. (50) examined retrospectively the influence of this earthquake on the occurrence of peptic ulcer disease among non – injured residents. Sixty – one hospitals, covering 70% of all endoscopy examinations performed in this area, joined the study and were divided into three areas, according to the severity of the damage. A comparison was made between a group of 10,831 patients who underwent upper gastrointestinal endoscopy within 2 months after the earthquake and 61,100 who did so in the same hospitals during the corresponding period in 1994. The results showed that in the most devastated area, in spite of a dramatic decrease in the total number of endoscopies (50%), patients with gastric ulcer were increased in 1995, whereas those with duodenal ulcer were decreased, resulting in a higher ratio of gastric to duodenal ulcers than in 1994 (3.07 versus 1.88). In particular, there was a marked increase in bleeding gastric ulcer. The mean age of patients with gastric ulcer was significantly higher in 1995 than in 1994. The Hanshin – Awaji earthquake induced life event stress not only triggered but also exacerbated gastric ulcer, particularly in the elderly.

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Another one is the study by Birketvedt et al.(51), they conducted a study to assessed the acute consequences of the World Trade Center disaster on blood pressure levels and incidence of depression in a primary care practice. They reviewed the charts of all patients visiting their primary care physician in a two week period before (group 1) and after (group 2) the September 11th disaster. They compared mean blood pressure and recorded the patients diagnosed with depression in both groups. Depression was diagnosed clinically by physicians, based upon the patients complaints and medical history. The results showed that they did not find any difference in blood pressure levels in the patients visiting the primary care center after the WTCD. This was not similarity to the previous study, perhaps because the patients visiting the primary care center were not immediately involved in the disaster. However, they found that there was a 30% increase in depressed patients visiting the primary care center.

Inui et al. (52) showed that the HbA_{1c} levels peaked 3 to 4 months after the Kobe earthquake and returned to pre – quake levels 5 – 6 months later. Also Kirizuka et al. (53) reported that HbA_{1c} levels increased after the Hanshin – Awaji earthquake and declined gradually to the pre – earthquake levels one year later.

In the study by ŞENGŰL et al. (54), their results indicated that the Marmara earthquake affected glycemic control in people with type 1 diabetes in short term. And also showed that HbA_{1c} levels and insulin requirements increased at the 3rd month after the earthquake. The results of the studies showed that not only does diabetes control become worse after the earthquake but also an increase in the number of newly diagnosed patients occurs following the earthquake. The trauma of the earthquake may aggravate glycemic control by elevating counter regulatory hormone levels. Moreover, compliance as therapy and nutrition guidelines may become worse due to behavior modification after the quake.

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Disasters and Mental Health (55 − 56)

The disasters have not only killed thousands of people, destroyed building towns and damaged the physical health of survivors but has also severely affected their psychological well – being. Million of people have been directly affected by the Indian Ocean Tsunami, the vast majority of them will recover due to the resiliency of human nature. At the same time, many of those people will develop psychological disorders such as major depression, generalized anxiety, Acute stress disorder (ASD), and Post – traumatic stress disorder (PTSD). Many more will experience non – specific distress, somatic complaint and other medical health conditions.

Some of the most – cited estimates of the toll come from World Health Organization, which in February suggested that up to half of the 5 million people affected by the Tsunami would experience moderate to severe psychological distress that would fade without intervention over the course of a year or more. Roughly 5% to 10% would develop more persistent problems, such as depression, post – traumatic stress disorder, or other anxiety disorders that would be unlikely to resolve themselves without intervention. And perhaps 1% to 2% would be left with incapacity mental problems such as major depression or psychosis (57).

The extent of the psychiatric morbidity depends on a number of factors, e.g., type of disaster, exposure, degree of injury, amount of life threat, and the duration of individual and community disruption. The effects of trauma and disaster may be rekindled by new experiences that remind the person of the past traumatic event. If the rate of psychological problems turns out similar to previous severe natural disasters studied 50% or more of those effected could suffer from clinical significant distress or psychopathology.

Although we do not have extensive knowledge of mental health consequences of Tsunami in particular**,** we do know from other large – scale disasters (such as the earthquakes in Asia (58), floods, volcanoes, and hurricanes

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in North and Central America) that are impact on the mental health of survivors in sometimes enormous. These the mental health consequences of a disaster on the scale of this Tsunami promise to be massive and severe. Studies of these other natural disasters have identified the following factors that in dictated individuals more at risk.

Risk Factors for Adverse Outcomes in Disasters. (25, 55, 56, 59 − 63)

1. Gender

- Almost always, women or girls were affected more adverse than were man or boys. The effects occurred across a broad range of outcomes, but the strongest effects were for PTSD, in which women's rates often exceeded men's by a ratio of 2:1.
- As has been demonstrated in the United States population more generally, women are at higher risk for anxiety and depression disorders, whereas men are more at risk for substance abuse and antisocial personality disorder.
- For various reasons, women were at much greater risk of death in the Tsunami than other people. The ratio of female to male deaths was 3:1 and in some communities only women are reported to have been killed.
- Surviving women may also have become more vulnerable than other survivors from a range of social and economic threats, and most of those who survived have been thrust into unemployment and poverty.
- About 150,000 women in the countries hardest hit by the Tsunami, would have been pregnant at the time of disaster, with 50,000 in the third trimester. Spontaneous and induced abortion become more likely with their hazard to maternal life; also babies are more likely to be born preterm or small – for – gestational age.
- Assumption about sexual violence in situations of chaos and forced displacement the risk is heightened. About sexual behavior after disasters is that in many disasters people seek emotional support and often enter into casual

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sexual relationships that are risky in term of both unwanted pregnancy and sexually transmitted infections.

2. Children

At least 30% of the survivors of the Tsunami are children. Past research on the reactions of children to natural disasters is limited, yet this proportion of children survivors is especially troubling since children generally exhibit more severe distress after disasters than do adults. This is an especially relevant concern for the Tsunami disaster where the United Nations estimates 50,000 children have died in the disaster and that tens of thousands have been orphaned. In some countries hit by the Tsunami half of the population affected is under 19 years old.

3. Age and Experience

- Older adults were at greater risk than other adults in only a small minority of adults samples where age differences were observed.
- Middle – aged adults were most adversely affected. Some research suggests that middle – aged adults are most at risk because they have greater stress and burdens (e.g. parental stress, financial stress, and occupational stress) before the disaster strikes. According to the Thompson et al.'s (64) study the effects of Hurricane Hugo in the Southeastern United States, younger people exhibited the most distress in the absence of disaster, but middle – aged people did so in its presence.
- Cross – cultural research suggests that the effected of age may differ across countries according to the social, politic, economic, and historical context of the disaster setting involved.

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4. Culture and Ethnicity

The effected of the disaster were greater in developing countries than in the United States. In the worldwide disaster statistics cited earlier, the distribution of disasters was not random. It was the poorest counties and those with the largest population that sustained the most death during the study period, and the people in the least – developed countries continued to run the greater risk of dying from disaster. Even within developed countries, low pre and post Tsunami income groups may be forced to live in more hazardous areas than those with more resources, increasing interactions of exposure and vulnerability.

5. Socioeconomic Status

As manifest in education, pre and post Tsunami income, literacy, or occupational prestige, was found that affect outcomes significantly in disaster victims. The effect of socioeconomic status has been found that grow stronger as the severity of exposure increases.

6. Family Factors

- Married status was a risk factor for women. Husbands' symptoms severity predicted wives' symptoms severity more strongly than wives' symptoms severity predicted husbands'. Marital stress has been found to increase after disasters. According to Gleser et al. (65) found that married women who were survivors of the Buffalo Creek disaster showed higher levels of psychopathology than women who lived alone.
- Being a parent also added to the stressfulness of disaster recovery and especially for events involving uncertain threats, mothers were especially at risk for substantial distress.
- Family environment is critical for children, who tend to be highly sensitive to post disaster distress and conflict in the family. Parental

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psychopathology was typically the best predictor of child psychopathology in child studies. Less irritable, more supportive, and healthier parents had healthier children.

7. Pre – Disaster Functioning and Personality

- Pre – disaster symptoms were almost always the best predictors of post disaster symptoms. According to Bravo et al. (66) found that pre – disaster levels of lifetime symptoms were good predictors of post – disaster lifetime symptoms levels in both retrospective and prospective samples.
- Persons with pre – disaster psychiatric histories were disproportionately likely to develop disaster – specific PTSD and to be diagnosed with some type of post – disaster disorder. According to the Smith et al. (67) found that more than two – thirds of the cases of acute post – disaster psychiatric disorders occurred in individuals with psychiatric histories.
- Pre – disaster symptoms have been found the interaction with severity of exposure.
- Having a "neurotic" personality increases the likelihoods that an individual will experience post – disaster.

8. Individual Risk Factors

The victims of the disaster are likely to have an experience in multiple intense stressors. Pre – disaster function, secondary stressors and psychological resources (ways of coping, belief about coping, self – efficacy, mastery, perceived control, self – esteem, hope, optimism, and social support) are important in determining resilience. Factors such as bereavement, self injury or another family member, life threat, panic or similar emotions during the disaster, horror, separation from family (especially among youth), extensive loss of properties, and displacement have been found that predict adverse outcomes.

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Secondary stressors were almost important. Both life – event stress (discrete changes) and chronic stress have been strong predictors of survivor's health outcomes. In part, the long – term effects of acute stressors on psychological distress operate through their effects on chronic stressor, such as marital stress, financial stress, and ecological stress. Attention needs to be paid to stress levels in stricken communities long after the disaster has happened and passed (68).

Bereavement: in situations of traumatic or catastrophic loss the bereaved person may demonstrate both traumatic stress reaction phenomena and bereavement phenomena, with either predominate or appear intermittently. Although a discussion of loss usually focuses upon death, loss that results from post – disaster experience may thus include

- Loss by death of loved one, family, relatives, or friend
- Properties destruction
- Sudden unemployment
- Impaired physical, social, or psychological capacities and processes

Normal bereavement shows both attenuation of psychological distress and progressive functional adaptation during the first few months. Complications may include adverse mental health outcomes such as a impact on immune function, development of depressive or anxiety disorders, and adverse social or health effects. Personality vulnerabilities and a past history of losses may also contribute. Thus it is clear that many circumstances of disaster deaths may likely to higher risk of bereavement complications. It has also been shown that inability to see the body of the dead person may further contribute to risk of adverse outcomes.

9. Severity of Exposure

The amount of exposure to the disaster is highly related to risk of future mental problems. Both individual and community exposure will play a

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role. Those, directly experienced the Tsunami, followed by those in close contact with victims will experience more lasting impact than those who only had indirect experiences, such as news of the enormity of the devastation. The current literature shows that injury and life threat are most predictive of likelihood of psychological impairment. In most cases, the more severe or intense the exposure, the more likely the person is to develop negative symptoms in the post disaster period. According to the study by Johnsen et al. (69) their study investigated the effects of multiple trauma exposure and coping style on post – traumatic stress symptoms and quality of life. The results showed that the single exposure group revealed a decrease in trauma specific stress reactions from three weeks to four months, with a persistent reduction at 12 months follow – up, while the repeated exposure group showed an increase in symptom reporting over the 12 months period.

Protective Factors that may Mitigate Negative Effects (55)

The notion of protective factors is of particular appeal because of its implications for prevention and minimization of morbidity.

1. Social Support

Social support is frequently mentioned as a critical factor that protects individuals following exposure to disasters. It is one of the key ingredients to recovery. The availability of social support is important in helping people overcome difficult situations and control stress (70). Received social support is the actual helping behavior that emerges in response to stress. Although it is usually related positively to mental health, the findings are not entirely consistent, in part because levels of help received are confounded with need. Received support is important primarily because it protects and replenishes other resources, such as perceived social support. The perception of social support is critically determined by the individual' s personality. Perceived social support depends upon the belief about the availability of other to assist rather than the actual receipt of assistance. Solomon et al. (71) made the interesting

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observation that mid – range levels of support availability were associated with the most favorable outcome for women. This study found that women with excellent spouse support had worse outcome than those with weaker spouse ties. In contrast, men tended to do better if they had a stronger spouse relationship. This suggests that there are important differences between men and women, where the strength of attachment for women may be a burden rather than supportive at times of extreme stress.

2. Resilience

The three models of adaptation (normality, positive psychology and maturity) that provide a context for considering the nature of resilience. Many of the attributes of a well – adjusted life in the circumstances of suburban civility are very different from the skills that would allow an individual to optimally survive some critical life stress. The literature referred to social support indicates that attachment can be a risk factor in the setting of a disaster, whereas in the absence of such an experience it may have increased the individual' s quality of life. Of the three models, maturity is the one that is most likely to characterize resilience in the face of a disaster. Situation of major loss and threat demand the ability to give up previous certainties and to sense the survival of others as bearing major value in contrast to the discomforts and suffering of one's immediate situation, which is essential to embodying a sense of hope.

Despite these estimates we still do not know the exact numbers that will develop serious and entrenched psychological problems or the number of individuals that will recover in the next few months. Based on previous studies of disasters human resilience dictates that large number of individuals will natural recover from the event and move on, without experience debilitated mental health issues.

3. Higher income and education
4. Successful mastery of past disasters and traumatic events

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5. Limitation or reduction of exposure to any of the aggravate factors

6. Provision of information about expectations and availability of recovery services

7. Care, concern and understanding on the part of the recovery services personnel

8. Provision of regular and appropriate information concerning the emergency and reasons for action

Psychosocial Consequences of Disasters (33, 63, 72)

Most of the extensive literature over the past 30 years suggests that disasters have psychopathological consequences as well as medical and social ones. Quantitative social science research has shown that exposure to disaster increases the risk of depression, anxiety, and somatic complaints, with various risk factors, such as female, prior psychiatric history, severity of disaster exposure, perceived lack of control during disaster, and inadequate social support after disaster (73). The review of this literature found a wide range of effects. The majority of people exposed to trauma and disasters do well. However, some individuals experience distress, others have behavioral changes and some develop psychiatric illness post disaster. Such illness include those that are secondary to physical injury (e.g., organic brain disorders, psychological responses to physical disease) as well as specific trauma – related psychiatric disorders such as acute stress disorder (ASD), post – traumatic stress disorder (PTSD) and trauma – related depression, anxiety . The extent of the psychiatric morbidity depends on a number of factors, e.g., type of disaster, exposure, degree of injury, amount of life threat, and the duration of individual and community disruption. There are a range of reactions from the stress that are universal, normal for the situation and widely shared and that abate natural. Typical reactions include feelings of distress, grief, diminished role functioning, problems in living, irritability, frustration, guilt, and disillusionment.

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A significant percentage of survivors develop profound, debilitating post – traumatic stress reactions requiring extended mental health interventions rather than short – term disaster assistance. These extreme stress reactions include fear and irrational behavior, shock, immobilization, withdrawal, denial and intrusive thoughts, hyper vigilance, easy startle, insomnia, decreased attention and concentration, and psycho – physiological reaction. Although stress reactions may seem "extreme", and cause distress, they generally do not become chronic problems. Most people recover fully from even moderate stress reactions within 6 to 16 months. Children are especially vulnerable and often display stress reactions such as fear, sleep disturbances, separation anxiety, confusion, disruptive classroom behavior, and aggressiveness. Some survivors experience the reactivation of distress at anniversary points.

Psychiatric shock is an important and neglected issue after devastating events such as the Tsunami. Losing family, home, and livelihood will traumatize a normal person in any culture, but time and natural resilience help most victims in their recovery. Nevertheless, some will require professional help, and severely ill patients from the period before the disaster will need continued care in the aftermath (74).

Post – traumatic psychiatric disorders are most often seen in those directly exposed to the threat to life and the horror of a traumatic event. The greater the 'dose' of traumatic stressors, the more likely an individual or group is to develop high rates of psychiatric morbidity. There are a number of possible reactions to a traumatic situation which are considered within the 'norm' for individuals experience traumatic stress as the following:

1. Traumatic Stress Reactions (75 − 76)

Most child and adult survivors experience normal stress reactions for several days, such as:

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1. **Emotional reactions**: temporary feelings (i.e., for several days to a couple of weeks) of shock, fear, grief, anger, resentment, guilt, shame, helplessness, hopelessness, emotional numbness (difficulty feeling love and intimacy, or in taking interest and pleasure ion day – to – day activities).
2. **Cognitive reactions**: confusion, disorientation, indecisiveness, worry, shortened attention span, difficulty concentration, memory loss, unwanted memories, self – blame
3. **Physical reactions**: tension, fatigue, edginess, difficulty sleeping, bodily aches or pain, being startled easily, racing heartbeat, nausea, change in appetite, change in sex drive.
4. **Interpersonal reactions in relationships at school, work, in friendships, in marriage, or as a parent**, such as: distrust, irritability, conflict, withdrawal, isolation, feeling rejected or abandoned, being distant, judgmental, or over controlling.

Many disaster survivors only experience mild normal stress reactions, and disaster experiences may even promote personal growth and strengthen relationships. However, as many as one in three disaster survivors experience some or all of the following severe stress symptoms, which may lead to lasting post – traumatic stress disorder (PTSD), anxiety disorders, or depression:

1. Dissociation (feeling completely unreal or outside yourself, like in a dream; giving 'blank' periods of time you cannot remember)
2. Intrusive re – experience (terrify memories, nightmares, or flashbacks)
3. Extreme attempts to avoid disturb memories (such as through substance use)
4. Extreme emotional numbing (completely unable to feel emotion, as if utterly empty)
5. Hyperarousal (panic attack; rage; extreme irritability; intense agitation)
6. Severe anxiety (paralyzing worry, extreme helplessness, compulsions or obsessions)

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7. Severe depression (complete loss of hope, self – worth, motivation or purpose in life)

Survivors are at greatest risk for severe stress symptoms and last readjustment problems if any of the following are either directly experienced or witnessed during or after the disaster:

1. Life threatening danger or physical harm (especially to children)
2. Exposure to gruesome death, bodily injury, or death bodies
3. Extreme environment or human violence or destruction
4. Loss of home, valued possessions, neighborhood, or community. Loss of communication with/support from close relationship
5. Intense emotional demand (such as faced by rescue personnel or caregivers)
6. Extreme fatigue, weather exposure, hunger, or sleep deprivation
7. Extended exposure to danger, loss, emotional/physical strain

Studies also show that some individuals have higher than typical risk for severe stress symptoms and lasting PTSD, including those with a history of:

1. Exposure to other traumas (such as severe accidents, abuse, assault, combat, rescue work)
2. Chronic medical illness or psychological disorders
3. Chronic poverty, homelessness, unemployment, or discrimination, recent or subsequent major life stressors or emotional strain (such as single parent)

Disaster stress may revive memories of prior trauma, as well as possibly intensifying preexisting social, economic, spiritual, psychological, or medical problems.

2. Posttraumatic Stress Disorder (55, 75, 77 − 78)

Some people will be more affected by a traumatic event for a longer

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period of time than others, depending on the mature of the event and the nature of the individual who experienced the event. One of the most debilitating effects of traumatic stress is a condition known as Post – traumatic Stress Disorder (PTSD). The current trauma literature suggests that many factors are related to the increased or decreased risk for PTSD. The likelihood of developing PTSD and the severity and chronicity of symptoms experienced is a function of many variables, the most important being exposure to a traumatic event. It is therefore important to bear in mind that, even among vulnerable individuals, PTSD would not exist without exposure to a traumatic event. The studies of populations exposed to traumatic events indicate that PTSD may occur alone in 5% or less of those who develop the disorder.

Symptoms of PTSD

Posttraumatic Stress Disorder (PTSD) is a mental disorder resulting from exposure to an extreme, traumatic stressor. PTSD has a number of unique defining features and diagnostic criteria, as published in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM – IV). These criteria include:

1. Exposure to a traumatic stressor
   - An event, or events, in which an individual experience, witnesses, or is confronted with life endangerment, death, or serious injury of threat to self or others; and
   - The individual responds to the experience with feelings of intense fear, horror, or helplessness

2. Re – experiencing symptoms (one or more)
   - Intrusive recollection; distressing dream; flashback; dissociative phenomenon; psychological and physical distress with reminder of the event.

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3. Avoidance and numbing symptoms (three or more)
   - Avoidance of thoughts, feelings, or conversations associated with the event
   - avoidance of places, situations, or people that are reminiscent of the event
   - inability to recall important aspects of the event
   - diminished interest
   - estrangement from others
   - restricted range of affect
   - sense of a foreshortened future

4. Symptoms of increased arousal (two or more)
   - Sleep disruption
   - Impaired concentration
   - Irritability or anger outburst
   - Hyper vigilance
   - Exaggerated startle reaction
5. Duration of at least one month
6. Significant distress or impairment of functioning

Specifies ;

Acute : symptoms duration from 1 to 3 months

Chronic : symptoms duration greater than 3 months

Delayed onset : symptoms onset at least 6 months after the stressor

3. Acute Stress Disorder (ASD)

Acute Stress Disorder (ASD) is less well known than post – traumatic stress disorder and depression. It is one of the commonest psychological problems that occur after exposure to extreme trauma such as natural disaster, a bad accident, rape, an assault, witnessing murder or war. The symptoms begin during or shortly after trauma. To meet a diagnosis of ASD, symptoms

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must occur between 2 days and 4 weeks after a traumatic experience. Individuals suffer from acute stress reaction experience persistent nightmares and keep re – experiencing the traumatic event in the form of flashbacks. They are often benumbed and find it is difficult to react normally to life situations. Continuation of these symptoms, however, may impair the person's quality of life and disrupt social and other functioning (79). If acute stress disorder persists for more than a month, and if these features are associated with functional impairment or significant distress, the diagnosis is changed to post – traumatic stress disorder.

The percentage of those exposed to traumatic stressors, who then develop Posttraumatic Stress Disorder (PTSD) can vary depending on the nature of the trauma. At the time of a traumatic event, many people feel overwhelmed with fear, others feel numb or disconnected. Most trauma survivors will be upset for several weeks following an event but will recover to a variable degree without treatment.

Several factors present in the acute – phase recovery environment of a disaster have been found to aggravate stress reactions and therefore increase survivors' risk of developing negative outcomes. These include:

- Lack of emotional and social support
- Presence of other stressors such as fatigue, cold, hunger, fear, uncertainty, loss, dislocation, and other psychologically stressful experiences.
- Difficulties at the scene
- Lack of information about the nature and reasons for the event
- Lack of, or interference with, self – determination and self – management
- Treatment (given) in an authoritarian or impersonal manner
- Lack of following – up support in the weeks following the exposure

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4. Associated Disorders

In addition to PTSD and ASD, individuals who have experienced trauma are at heightened risk for developing other psychiatric disorders, including:

1. Generalized Anxiety Disorder (GAD)

Anxiety is an emotional reaction with ambiguity, fear and worry and develops after an encounter with an internal of external threat. It results from a threat to the body, death of family member or friends, divorce, loss of job, interpersonal difficulties, or a change of role function. GAD has been consistently detected following disasters. GAD is distinguished by the presence of multiple worries about a number of events or activities in association with various physical symptoms such as restlessness and muscle tension.

2. Depression

Depression is an emotional response that involves persistently low spirits, hopelessness, loss of interest and can cause a combination of physical symptoms such as changes in appetite, sleep, body movement, thought and concentration. A person might have severe feeling of worthlessness, guilt or suicidal tendencies (80).

3. Substance abuse

4. Panic Disorder

5. Obsessive – compulsive disorder

6. Sexual dysfunction

7. Eating disorder

After a disaster event the contribution of the psychological factors to medical illness can also be pervasive – from heart disease (81), to diabetes (82), unexplained somatic symptoms, sleep disturbance (83), increased alcohol, caffeine, and cigarette.

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Majors depression, generalized anxiety disorder, substance abuse, and adjustment disorders in disaster victims have been less often studied than ASD and PTSD, but available data suggest that these disorders also occur at higher than average rates. Major depression, substance abuse, and adjustment disorders may be relatively common in the 6 – 12 months after a disaster and many reflect survivors' reactions to their injuries, to affects and feeling stimulated by the disaster and/or to their attributions of the cause of the disaster.

Research Regarding the Effected to Mental Health of Disaster

Van Ommeren et al. (74) had analyzed patients' records from a large Red Cross hospital in Aceh after the Tsunami between January 11 and 31, 2005. They found out of 1174 consultations, 9.6% (113 patients) had a psychiatric disease as the main diagnosis. Diagnosis ranged from anxiety, insomnia, and depression to psychosomatic disorders. No severe psychiatric illness was observed except for one patient with schizophrenia. Most patients were adults, and only eight (7%) were aged 12 or younger. Better understanding of age related vulnerability would improve psychosocial services target.

A comprehensive longitudinal investigation was initiated in the Matara district of Sri – Lanka 8 weeks after the Tsunami, with the collaboration of the National Institute of Mental Health in Japan. In the first part of this investigation, a set of questionnaires, The Harvard Trauma Questionnaire (HTQ), the Hopkins Symptoms Checklist (HSC), and the Impact of Events Scale – Revised (IES – R), was administered to adults in a Tsunami affected area and in a close by non – affected area. They found that there were more than 40% of checklist positive subjects for possible PTSD detected by HTQ at the time point of 2 months after the disaster. The depression score of HSC had strong significant correlation with the HTQ PTSD score (84).

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One hundred sixty – two St. Louis area survivors of the 1993 Great Midwest Floods were interviewed a few months after the flood subsided using the Diagnostic Interview Schedule (DIS) and its Disaster Supplement to assess psychiatric history relative to PTSD and five other psychiatric disorders. Thirty – five subjects (23%) met criteria for PTSD related to the flood. PTSD was frequently comorbid with other disorders. Seventeen subjects (10%) developed a new, non – PTSD psychiatric disorder after flood (85).

Some studies had studied the frequency of PTSD in a group of search and rescue workers. For instance, a study by Ozen et al. was conducted 2 months after the May 2003 Bingol earthquake. Forty – four of 55 workers were interviewed. PTSD was diagnosed in 25% of the subjects. The high scores of all scales showed that PTSD may also have comorbidity with other psychiatric disorders. This comorbidity may affect the family, work, and social life of people more negatively (86).

A study by Kiliç et al., their study examined the predictors of psychological distress in survivors of the 1999 earthquakes in Turkey. The results showed that the traumatic stress factor was predicted by six variables; the strongest predictors were degree of fear during the earthquake, being married and female gender. Earthquake severity variables, such as participation in rescue work and loss of friends, were also predicted. The depression factor was also predicted by six factors; lower education was the strongest predictor. Relocation status, which did not predict traumatic stress, was a strong predictor of depression. Other predictors of the depression factor included loss of family members, previous trauma, and previous psychiatric illness (87).

In a study of psychosocial sequelae of the 1989 Newcastle earthquake, Australia, the results indicated that high levels of direct exposure, older, age, female, lower social support correlated with higher psychiatric morbidity. Similar results, despite decline at 2 years' follow – up. Those with persistent

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symptoms were more likely to have used psychotropic medication and to have had prior life events (88).

Following the Hanshin – Awaji earthquake Kato et al. (89) assessed the frequency of short – term, post – traumatic symptoms among a group of evacuees. A total of 142 people under the age of 60 years and elderly people from emergency shelters who had been living in the area close to the epicenter were assessed using the Post – Traumatic Symptom Scale. This was undertaken during the third week following the earthquake. Another sheltered group of 123 young and elderly subjects from the same community was assessed in the eighth week. Results from the first group found that subjects from both age groups experienced sleep disturbance, depression, hypersensitivity and irritability. In the second group, the percentage of younger subjects symptoms did not decrease, while elderly subjects showed a significant decrease in most of the symptoms.

Another study by Kato (90), two comparative studies conducted in the early and reconstruction stages following the 1995 Hanshin – Awaji earthquake in Japan are presented. In the secondary study, the psychological effects of those who lived in temporary housing and those who did not were compared during the reconstruction stage. That study demonstrated that the temporary housing residents had high exposed to the traumatic event, poor socioeconomic status, and various secondary stressors. The result of these factors was that they had a higher chance of facing various types of mental health problems.

The middle and long – term health effects related to general chronic disease of survivors has also been a subject of study. Findings pointed to a correlation between deterioration in the condition of survivors with a chronic disease caused by psychological factors. Inui et al. (52) demonstrated that glycemic control was aggravated among diabetic patients in Kobe. The study demonstrated that psychological problems following the earthquake might be responsible for the aggravation of glycemic control in diabetic patients.

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Roorda and his colleagues (91) studied on post – disaster health effects: experiences from the Enschede firework. The follow up survey started three weeks after the incident and was repeated 18 months and almost four years after the incident. In the first health survey they found a significant proportion of the study group displayed various health problems three weeks and were limited in their daily activities. More than 50% of residents experienced anxiety, depression, and other health complaints. Seventy per cent reported re – experiencing the disaster and has avoidance reactions. Persons who had lost loved one and/or properties, had suffered personal injury or who were severely disorientated by the disaster displayed the greatest incidence of health related problems. And in the second survey, conducted 18 months after the incident, found a significant proportion of the study group continued to display a number of health problems. For instance, the 10 most commonly reported health complaints occur in 45% – 60% of the affected residents (while 25% – 48% of the comparison group report these problems). The most common complaints were neck and shoulders pain, general fatigue, and lethargy. Over one third (33% – 37%) of the affected residents reported anxiety, feeling of depression, and hostility. Twenty six per cent of the residents fulfilled the criteria for the diagnosis of post – traumatic stress disorder (PTSD). Of those persons current suffering from PTSD, 40% were actually receiving treatment.

One of the study in an Asia – Pacific region was carried out by Staab et al (92). They investigated 385 individuals who experienced five typhoons that struck the Guam island in 1992. Although no fatalities, survivors were scattered over a wide area and suffered minor injuries. One week after the typhoon they used their own version of a 23 – item scale approximating DSM – IV diagnosis of ASD to classify subjects into three groups; probable ASD; an early traumatic stress response (ETSR); and no acute diagnosis. The criteria of ETSR were composed of those of ASD without dissociative symptoms. The study found subjects with probable ASD were significantly more likely to develop PTSD 8 months after the first typhoon and somewhat more likely to develop depression than other exposed individuals.

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A study by Boscarino and his colleagues (93) was conducted a community survey by telephone of 2368 adults living in New York City on September 11, 2001. To assess prevalence and predictors of mental health service which used in New York City, one year after the attacks. They found that in the past year 19.99% of New Yorkers had mental health visits and 8.1% used psychotropic medications. Mental health visits were associated with younger age, peri – event panic attack, posttraumatic stress disorder (PTSD) and depression. In addition, World Trade Center Disaster (WTCD) – related visits had a positive "dose – response" association with WTCD event exposures. WTCD – related visits also were positively associated with peri – event panic, anxiety, lower self – esteem, PTSD, and depression. In conclusion the residents of the New York City who experienced WTCD events were more likely to report lower well – being and were more likely to suffer from depression and PTSD, and reports greater use of mental health services and psychotropic medications compared to the less exposed.

In the present study, they assessed the impact of exposure to the WTCD on individual well – being 2 years after the terrorist attacks, as measured by using the SF – 12 mental health and physical health scales, and contrast to their earlier cross – sectional results, they found that exposure was associated with lower physical health 2 years after the attacks, controlling for demographic characteristics, stress risk, and social psychological resource variables. And result also indicated that experiencing a panic attack, negative life events or traumatic events were related to poorer physical health. Response dents who met screening criteria for possible alcohol dependence post – disaster, experienced negative life events, or experienced traumatic events, were more likely to suffer from poorer mental health compared to those who did not meet the criteria (94).

Ompad et al. (95) conducted a random digit dial telephone survey of adults in NYC 6 – 9 months after September 11, 2001 to assess the relations between psychological sequelae of the attacks and asthma symptom severity and

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the utilization of urgent health care services for asthma. After adjustment for pre – 9/11 asthma measures, demographics and event exposure, posttraumatic stress disorder was a significant predictor of self – reported moderate – severe asthma symptoms, seeking care for asthma at an ER, and unscheduled physician visits for asthma since 9/11. Number of PTSD symptoms was also significantly related to moderate – severe symptoms and unscheduled physician visits since 9/11.

In a study of mental health impact of 9/11 Pentagon Attack, Jordan et al. (96) found that overall, 1837 (40%) respondents net the screening criteria for any of the symptom domains of interest 1 to 4 months after the attack: PTSD (7.9%), depression (17.7%), panic attacks (23%), generalized anxiety (26.9%), or alcohol abuse (2.5%). Mental health risk groups were highly correlated with self – reported reduced daily functioning and use of counseling services. Additionally, risk factors known to be associated with mental health problems after traumatic events were strongly predictive of the high – risk categories identified.

In the same, Fullerton and his colleagues (97) studied the mental heath effected of the crush of a United Airlines DC – 10 in disaster or rescue workers. They found that the exposed disaster workers had significant higher rates of acute stress disorder, PTSD at 13 months, depression at 7 months than comparison subjects. Exposed disaster workers with acute stress disorder were 3.93 times more likely to be depressed at 7 months. Similarity, those who were depressed at 7 months were 9.5 times more likely to have PTSD. Overall, 40.5% of exposed disaster workers versus 20.4% of comparison subjects had acute stress disorder, depression at 13 months, or PTSD.

Also, the study by Bodvarsdottir and Elklit (70) was conducted to explore the psychological consequences of two earthquake in Iceland in two probability samples of subjects residents in the exposed area and a control

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group from an unexposed area. The results revealed that 24% in the exposed group had Posttraumatic Stress Disorder (PTSD).

In accordance with the study by Reijneveld et al. (98), they studied on adolescents in Volendam, Netherlands after a fire disaster by using the youth self – report (YSR) questionnaire about behavioral and emotional problems 5 months after the disaster. The results showed that adolescents exposed to a disaster undergo increases in the self – reported anxiety, depression, thought problems, and aggression, and a large increase in self – reported excessive use of alcohol. Increase in all effects were larger in girls than in boys, and those in alcohol use were larger in adolescents who had been in fire.

There is evidence suggesting that stressful life events may precede major psychiatric illness, such as major depression, and that the severity of a traumatic event outside the range of usual human experience may provoke post – traumatic stress disorder (PTSD). The study by Maes and his colleagues (99) was carried out to examine the effects of pre and post – disaster stressful life events on the incidence rate of PTSD following two man – made traumatic events. An epidemiological study of 127 victims of a flash fire in ballroom and 55 motor vehicle accident victims was undertaken. They found that there were no significant relationships between stressful life events the year prior to the traumatic event and the incidence or severity of PTSD. There were highly significant relationships between the cumulative number and event severity of post – disaster negative life events and the incidence rate and severity of PTSD. The most significant life events were: loss of job or income, broken relationships, serious illnesses or injuries in the victims and death or illness in close acquaintances. The results of this study showed that the number and severity of additional stressful life events signal higher risk to develop PTSD and a higher severity of the avoidance – depression dimension of PTSD symptomatology.

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After the earthquakes in El Salvador, Woersching and Synder (100) studied mental health and psychosocial changes after the disaster. The participant's questionnaire was used to investigate the relationship between physical health, access to health care, housing, food and water, and the occurrence of negative mental health markers six months after the disasters. Finding indicated that the majority (67%) of respondents experienced 6 or more mental health complaints (such as having thoughts of death, feeling sad or depressed, increase in stress, losing energy or feeling more tired, trouble concentrating, trouble sleeping, losing interest in daily activities, losing weight, change in appetite, gaining weight due to increase in appetite). Risk factors associated with multiple negative mental health symptoms included change in household income and loss of job, a new illness or a new injury in the household, reliance on healthcare services since the earthquake, and managing a chronic illness.

One of some studies by Wang et al. (101) about earthquake – related PTSD in North China. Longitudinal study was conducted. The aim of the study was to describe rates of posttraumatic stress disorder (PTSD) in two groups with different levels of severity of exposure to an earthquake in North China. Subjects were randomly sampled in two villages at different distances from the earthquake epicenter. The subjects were assessed at 3 months and 9 months after the earthquake, respectively, for PTSD by using both DSM – IV and DSM –III – R criteria. They found that the village with a higher level of initial exposure to the earthquake and a higher level of post – earthquake support had a lower frequency of PTSD than the village with a lower level of initial exposure and less post – earthquake support.

Three months after the devastating Chi – Chi earthquake struck the central area of Taiwan, 663 victims were screened for psychiatric morbidity at a local hospital in a community mental health program. The rate of psychiatric morbidity which was defined by the 12 – item Chinese Health Questionnaire as greater than 4, was 24.5%. Post – traumatic symptoms were still prevalent. The

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rate of posttraumatic stress disorder was 11.3%, and the rate of partial PTSD was 32%. Variables associated with the presence of psychiatric morbidity and posttraumatic symptoms included female, old age, financial loss, obsessive trait, and nervous trait (102).

One study has shown progressive improvement over time in psychological distress after disaster. Ohta et al. (103) conducted a follow – up study among evacuees of a volcanic eruption in Japan. Psychological distress in 248 evacuees was evaluated using a 30 – item General Health Questionnaire (GHQ – 30) at four time points after evacuation: 6 months, 12 months, 24 months and 44 months. The proportion of evacuees with psychological distress (defined as a GHQ score ≥ 8) significantly decreased from 66.1% (6 months) to 45.6% (44 months) the GHQ mean score significant improved from 12.6 to 8.9. Investigation of each factor on the GHQ showed progressive improvement over time in 'anxiety, tension and insomnia' and 'anergia and social dysfunction'. However, 'depression' began to improve only after 44 months and 'interpersonal dysfunction' started to worsen after 12 months. The dysfunction in interpersonal relationship continued at 44 months. Examination of the relation between GHQ mean scores and age group showed that recovery from psychological distress was more difficult in middle – aged and older evacuees than in younger evacuees.

Research has suggested that exposure to psychological trauma was associated with increased abuse of psychoactive substances, particularly alcohol. To assess this Boscarino and his colleagues (104) analyzed alcohol consumption, binge drinking, and alcohol dependence among a random sample of 1681 New York City adults 1 year and 2 years after the September 11 attacks. In multivariate models controlling for demographic factors, other stressor exposures, social psychological resources, and history of anti – social behavior, they found that greater exposure to the World Trade Center Disaster (WTCD) was associated with greater alcohol consumption at 1 year and 2 years after this event. In addition, their analyses also indicated that exposure to the WTCD

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was associated with binge drinking at 1 year after but not 2 years after this event. Alcohol dependence, assessed as present in either year 1 or year 2, also was positively associated with greater WTCD exposure. Post – traumatic stress disorder was not associated with alcohol use, once WTCD exposure and other covariates were controlled. Their study suggested that exposure to psychological trauma may be associated with increases in problem drinking long after exposure.

In contrast, Shimizu et al. (105) assessed changes in alcohol consumption attributable to the Great Hanshin Earthquake to test the assumption that alcohol consumption increased after natural disaster. Quarterly alcohol sales figures were compared for three periods: before, immediately after and subsequent to the Great Hanshin Earthquake in three areas of the Hyogo prefecture: the severity affected area, the moderately affected area and the unaffected area. Possible confounding by population movement, damage to retail outlets and normal variation in sales, was assessed. They found that the quantity of alcohol beverages consumed in the heavily damaged areas as well as throughout the prefecture decreased from the 1994 pre – disaster level, both immediately after the Great Hanshin Earthquake (January – March 1995) and 2 years after the disaster.

Since the 1970s, researchers have learnt lessons about disasters and families. Despite gains, the research and the understanding of the impact of disasters on marital relationships remained sparse and unclear at best. Sociologically, disaster research indicated that disasters result in unemployment, loss of child care, separation of family members, extensive material loss, homelessness, physical and emotional exhaustion, and other stressful experiences for residents and their households. Davis and Ender (106) had studied on the impact of the 1997 Red River Valley Flood on marital relationships, the results indicated that the flood had a noticeable impact on marital relationships and the impact appeared to be mediated by the state of the couples' relationships prior

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to the flood. Strong pre – flood relationships emerged stronger in the aftermath while weak pre – flood relationships emerged weaker in the aftermath.

II. Concept of Quality of Life

The term "*quality of life*" was first introduced in 1920 by Pigou, in a book about economics and welfare. In this book, he introduced the concept of governmental support for lower class, and discussed its impact on their lives as well as on public finance. This surfaced more strong after 1948 as consequence of acceptance of the World Health Organization's definition of health that included physical, emotional and social well – being (107): *Health is a state of complete physical mental and social well-being, and not merely the absence of disease or infirmity* (108).

Many other definitions of both *health* and *quality of life* have been attempted, often linking the two and, for QOL, frequently emphasizing components of happiness and satisfaction with support with life (109). In the absence of any universally accepted definition, some investigators argue that most people, in the western world at least, are familiar with the expression *quality of life* and have an intuitive understanding of what it comprises.

The term, '*quality of life*' represents a broad spectrum of subscales of human experiences ranging from those associated with necessities of life, such as food and shelter, to those associated with achieving a sense of fulfillment and personal happiness. Cultural, psychological, interpersonal, spiritual, financial, political, temporal, and philosophical subscales may be incorporated into various definitions. These widely valued aspects of human existence may not be thought of as part of personal health status and well – being. A safe environment, adequate housing, a guaranteed income, respect, love, and freedom all contribute to an individual's 'quality of life' (110).

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However, it is clear the QOL means different things to different people, and takes on different meanings according to the area of application. In the context of clinical trails we are rarely interested in QOL in such a broad sense, but are concerned only with evaluation those aspects that affected by disease or treatment, for disease, This may sometimes be extended to include indirect consequences of disease such as unemployment or financial difficult. To distinguish between QOL in its more general sense and the requirements of clinical medicine and clinical trials, the term " *health – related quality of life* " (HRQOL) is frequently use in order to remove ambiguity.

Health – related quality of life (HRQOL) is still a loose definition. It is generally agreed that the relevant aspects may vary from study to study, but can include general health, physical functioning, physical symptoms and toxicity, emotional functioning, cognitive functioning, role functioning, social well – being and functioning, sexual functioning, and existential issues (111).

Definition of Quality of Life

Quality of life has been studied worldwide for several decades. Researchers have tried to define the term.

Quality of life is a descriptive term that refers to people's emotional, social and physical well – being, and their ability to function in the ordinary tasks of living (112).

Bloom (113) described quality of life as a concept of human welfare with many influences that vary in importance over time and across different cultures, rather than just a technical term in the social sciences. In their analysis, "Quality of life is viewed broadly as having multiple set of components such as health, nutrition, education, pre and post Tsunami income,

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gender equality, fertility, political, civil and economics freedom, environment quality, access to infrastructure, access to information."

Stuart and Rachel (114) described quality of life as a concept of encompassing a broad range of physical and psychological characteristics and limitations which describe an individual's ability to function and to derive satisfaction with support from doing so.

Szoba (115): Individuals' perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns.

"*Health – related quality of life* " (HRQOL) is the value assigned to duration of life as modified by the impairments, functional states, perceptions, and social opportunities that are influences by disease, injury, treatment, or policy (109).

Wilson (116): "*Health – related quality of life* " (HRQOL) is an individual's satisfaction with support or happiness with domains of life insofar as they affect or are affected by "health". HRQOL represents an attempt to determine how variables within the dimension of health (e.g., a disease or its treatment) relate to particular dimension of life that have been determine to be important to people in general or to people who have a specific disease. Most conceptualizations of HRQOL emphasize the effects of disease on physical, social/role, psychological/emotional, and cognitive functioning.

And Stuart (114) described "*Health – related quality of life* " (HRQOL) can be defines as the level of well – being and satisfaction with support associated with events or conditions in a person's life as influenced by disease, accidents or treatments. This concept is a broad – ranging one that covers all the roles and activities that people engage in including work, recreation, household management, family life, and considers not only the ability to

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perform the social roles and activities, but also the degree of satisfaction with support derived form performing them.

Measurement of Quality of Life

There are several instrument in order to measure quality of life according to the subject and object of the study. The Quality of Life Instruments Database was developed by Mapi Research Institute, Lyon, France which describes 461 instruments to measure Quality of life, November 2004 (117).

One widely used instrument, the Short Form 36 health survey (SF – 36), provides self – reported information on various aspects of HRQOL. Developed for the Medical Outcomes Study, the SF – 36 uses 36 self – reported items in eight multi – item scales and two summary scores to measure various aspects of HRQOL, including functional status, well – being, and overall health (20).

Fayers (111) mentions the instrument as "It is designed to provide assessments involving generic health concepts that are not specific to an age, disease or treatment group."

The SF – 36 is a multipurpose, short – from health survey with only 36 questions. It yields an eight scale profile of scores as well as physical and mental health summary measures. It is a generic measure, as opposed to one that targets a specific age, disease, or treatment group. According, the SF – 36 has been useful in comparing general and specific populations, comparing the relative burden of diseases, differentiating the health benefits produced by a wide range of different treatments, and screening individual patients.

The SF – 36 has been documented in more than 1000 publication. The usefulness of the SF – 36 in estimating disease burden is illustrated in articles

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describing more than 130 diseases and conditions. Among the most frequently studied conditions, with more than 20 SF – 36 publications each, are arthritis, back pain, depression, diabetes, and hypertension.

The SF – 36 was constructed to satisfy minimum psychometric standards necessary for group comparisons. The eight health concepts were selected from 40 concepts included in the Medical Outcomes Study (MOS). Those chosen represent the most frequently measured concepts in widely used health surveys and those most affected by disease and treatment. SF – 36 items were also represent multiple operational indicators of health, including behavioral function and dysfunction, distress and well – being, objective reports and subjective ratings, and both favorable and unfavorable self – evaluations of general health status.

MOS SF – 36 items have their roots in instruments that have been in use since the 1970s and 1980s, including the general psychological well – being inventory, various physical and role functioning measures, the Health Perceptions Questionnaire, and other measures that were useful during the Health Insurance Experiment (HIE). The MOS researchers selected and adapted questionnaire items from these and other sources and developed new measure for a 149 – items Functioning and Well – Being Profile (FWBP). The FWBP was the source for questionnaire items and in structures adapted for use in the SF-36. The SF – 36 was first made available in a ‘developmental’ form in 1988 and in ‘standard’ form in 1990. As documented elsewhere, the standard from eliminated more than one fourth of the words contained in MOS versions of the (118).

The SF – 36 was developed by Ware et al, evaluates general health status, and was intended to fill a gap between the much more lengthy questionnaires and other relatively coarse single – item measures. Emphasis was placed upon physical, social and emotional functioning (111).

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The SF – 36 was constructed to survey health status in the Medical Outcomes Study. The SF – 36 was designed for use in clinical practice and research, health policy evaluations, and general population surveys. And it was constructed to achieve minimum standards of precision necessary for group comparisons in eight conceptual areas. It was also constructed to yield a profile of scores that would be useful in understanding population differences in physical and mental health status, the health burden of chronic disease and other medical conditions, and the effect of treatments on general health status (20, 119).

The SF – 36 has been successfully administered to persons age 14 and older using self – administration and interviewer in – person. However, the SF – 36 can also administered at home and in many other setting, including telephone interviews, mail – out/mail – back questionnaires, and face – to – face interviews. The SF – 36 can also be included as one part of a longer interview.

The SF – 36 comprises 36 multiple – choice questions addressing eight concepts. There are two summary measures, Physical Health and Mental Health. Physical Health is divided into scales for Physical Functioning (PF) 10 items, Role – limitations as a result of physical problems (RP) 4 items, Bodily Pain (BP) 2 items, General Health (GH) 5 items, Mental Health comprises scales for Vitality (the frequency of feeling full of energy versus feeling tired) (VT) 4 items, Social Functioning (SF) 2 items, Role – Emotional (role limitations resulting from emotional problems) (RE) 3 items, and Mental Health (MH) 5 items. In addition, The SF – 36 includes a sixth general health rating item, Reported Health Transition 1 item, which asks respondents the amount of change in their health in general over a 1 – year period. This item is not used to score any of the eight multi – item scales. The transition item can be analyzed as a categorical variable or as an ordinal – level or interval – level scale (120). Most questions refer to the past four weeks , although some relate to the present. A few questions, such as those for “role physical”, take yes / no responses, while some, such as the physical functioning items, have three

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categories (limited a lot, limited a little, not limited at all), and other items have five or six categories for responses. Low numeric scores reflect a perception poor health, loss of function, and presence of pain. High numeric score reflect a perception of good health, no functional deficits, and absence of pain, Ceiling and floor effects can be tabulated for each subcategory. This survey instrument is easily scored manually or with widely available software (111).

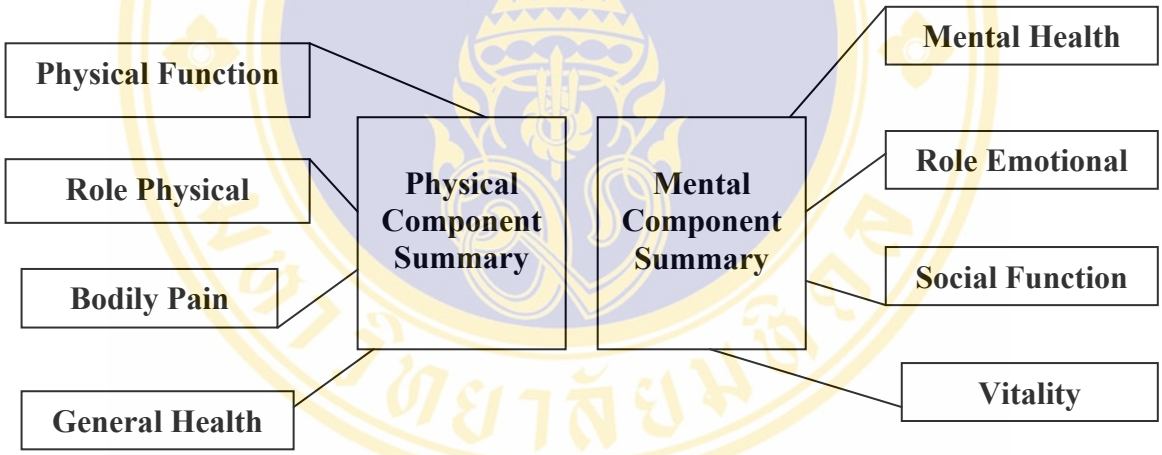

Figure 2 SF – 36 scales measure physical and mental components of health. (source : Ware, Kosinski, and Keller) (121).

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Table 1 Information about SF – 36 health status scales (20)

Concepts	No. of Items	No. of Levels	Meaning of Scores	
			Low	High
Physical Functioning (PF)	10	21	Limited a lot in performing all physical activities including bathing or dressing due to health	Performs all types of physical activities including the most vigorous without limitations due to health
Role – Physical (RP)	4	5	Problems with work or other daily activities as a result of physical health	No problems with work or other daily activities as a result of physical health
Bodily Pain (BP)	2	11	Very severe and extremely limiting pain	No pain or limitations due to pain
General Health (GH)	5	21	Evaluates personal health as poor and believes it is likely to get worse	Evaluates personal health as excellent
Vitality (VT)	4	21	Feels tired and won out all of the time	Feels full of pep and energy all of the time
Social Functioning (SF)	2	9	Extreme and frequent interference with normal social activities due to physical or emotional problems	Performs normal social activities without interference due to physical or emotional problems
Role–Emotional (RE)	3	4	Problems with work or other daily activities as a result of emotional problems	No problems with work or other daily activities as a result of emotional problems
Mental Health (MH)	5	26	Feeling of nervousness and depression all of the time	Feels peaceful, happy, and calm all of the time
Reported Health Transition	1	5	Believes general health is much better now than one year ago	Believes general health is much worse now than one year ago

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Reliability (118)

The reliability of eight scales and two summary measures has been estimated using both internal consistency and test – retest methods. With rare exceptions, published reliability statistics have exceeded the minimum standard of 0.70 recommended for measure used in – group comparisons in more than 25 studies, most have exceeded 0.80. Reliability estimates for physical and mental summary scores usually exceed 0.90. A review of the first 15 published studies revealed that the median reliability coefficients for each of the eight scales was equal or greater than 0.80 except for Social Functioning, which had a median reliability of 0.93 has been reported for the Mental Health scale, by using the alternate forms method, suggest that the internal consistency method underestimated the reliability of that scale by about 3%.

The trends in reliability coefficients for the SF – 36 scales and summary measures summarized have also been replicated across 24 patients groups differing in sociodemographic characteristics and diagnoses. Although studies of subgroups indicate slight declines in reliability for more disadvantaged respondents, reliability coefficients consistently exceeded recommended standards for group level analysis. Reliability estimates consistent with these trends have been published in more than 200 studies, results from more than 30 test – retest studies have also been summarized.

Validity

Studies of validity generally support the intended meaning of eight and low SF – 36 scores as documented in the original user's manuals. Because of the widespread use of the SF – 36 across a variety of applications, evidence from many types of validity research is relevant to these interpretations. Studies to date have yielded content, concurrent, criterion, construct, and predictive evidence of validity.

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The content validity of the SF – 36 has been compared with that of other widely used generic health survey. Systematic comparisons indicate that the SF – 36 includes eight of the most frequently measured health concepts. Among the content areas included in widely used surveys, but not included in the SF – 36, are: sleep adequacy, cognitive functioning, sexual functioning, health distress, family functioning, self – esteem, eating recreation and hobbies, communication, and symptoms and problems that are specific to one condition. Symptoms and problems that are specific to a particular condition are not included in the SF – 36, because the SF – 36 is a generic measure.

The validity, and therefore the interpretation, of each of the eight scales and the two summary measures has been shown to differ markedly, as would be expected from factor – analytic studies of their constrict validity. Specifically, the Mental Health, Role – Emotional, and Social Functioning scales and MCS summary measure have been shown to be the most valid of the SF – 36 scales as mental health measures. This pattern of results has been replicated in both cross – cultural and longitudinal tests using the method of known – groups validity. The Physical Functioning, Role – Physical, and Bodily Pain scales and the PCS summary have been shown to be the most valid SF – 36 scales for measuring physical health.

The Mental Health scale has been shown to be useful in screening for psychiatric disorders, as has the MCS summary measure. For example, using a cutoff score of 42, the MCS had a sensitivity of 71% and a specificity of 82% in detecting patients diagnosed with depressive disorder (122). Results from clinical studies comparing scores for patients before and after treatment have largely supported hypotheses about the validity of SF – 36 scales based on results of psychometric studies. For example, clinical studies have shown that three of the scales (Physical Functioning, Role Physical, and Bodily Pain) with the most physical factor content tend to be most responsive to the benefits of knee replacement, hip replacement, and heart valve surgery, In contrast, the three scales with the most mental factor content (Mental Health, Role Physical,

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and Social Functioning) in factor analysis studies have been shown to be most responsive in comparisons of patients before and after recovery from depression, change in the severity of depression, and as well as drug treatment and interpersonal therapy for depression.

Finally, the SF – 36 self – evaluated health transition item (five response categories ranging from "much better" to "much worse"), which is not used in scoring the scales or summary measures, has been shown to be useful in estimating average changes in health status during the year before its administration. In the MOS, measured changes in health statue during a 1 – year follow – up period corresponded substantially to self – evaluated transitions at the end of year.

Administration Methods

The SF – 36 is suitable for self – administration, computerized administration, or administration by a trained interviewer in person or by telephone, to persons aged 14 years and older. The SF – 36 has been administered successfully in general population surveys in the United States and other countries as well as to young and older adult patients with specific diseases. It can be administered in 5 – 10 minutes with a high degree of acceptability and data quality.

Translations

The International Quality of Life Assessment (IQOLA) Project is translating, validating, and norming the SF – 36 Health Survey for use in multinational clinical trials and other international studies. Based at the Health Assessment Laboratory at New England Medical Center, the project began in 1991 with sponsored investigators from 14 countries. In addition, researchers from more than 30 countries translate and validate the SF – 36 using IQOLA Project methods include: English (123), Spanish (124), French (125−126), Swedish (123), Korean, German (127), Dutch (128−129), Portuguese, Chinese

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(130), Czech, Finnish, Danish (129, 131−132), Hungarian, Hebrew, Italian (129, 133), Japanese (129, 134−135), Norwegian (129), Polish, Romanian, Slovak, Russian, Afrikaans, Kiswahili (136), Iranian (137), Turkish (138), Greek (139), Basque (140).

Four major stages of activity are included. First, translation follows a standard protocol, including multiple forward and backward translation. Qualitative and quantitative methods are sued to evaluate the quality of a translation and its conceptual equivalence with the original survey. Second, formal psychometric tests of scaling assumptions and scoring assumptions are conducted before publication of a translation. Third, data from clinical trials and other studies are being analyzed to address issues of validity and comparability across countries. Normative data are being collected in general population surveys in eleven countries for purposes of norm – based interpretation.

Reliability and Validity in Thai Version

Kongsakon and Silpakit (141) conducted a study to examine the reliability and validity to Thai version SF – 36 for use in Thai mental disorder patients. They had translated the original English SF – 36 of Ware with his permission into a Thai version with some adaptation. The translation was based on the translation/back – translation methodology. Meeting among translators, researchers and patients were organized in order to produce successive versions. Five experts were involved to assess the content validity of the translated form of SF – 36 by reviewing each response choice of the questionnaire items. Finally, internal consistency and reproducibility of the Thai version SF – 36 were assessed by administering questionnaire to 100 patients with mental disorder twice 2 weeks apart. The results indicated that the item coefficients were greater than 0.8 for all scales indicating that the validity was well accepted. The reliability of the SF – 36 Thai version on a test and retest had a Pearson's correlation of 0.6 and Cronbach' s alpha coefficients were greater

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than 0.7 for all subscales except for Social Functioning scale (alpha = 0.60). The coefficients of the total items was 0.92. A Thai version of the SF – 36 has been successfully constructed with apparent equivalence to the original SF – 36 and with an acceptable level of reliability.

The pilot study of Leurmarnkul and Meetam (142) was carried out in 60 people to assess the feasibility and further tested in 569 people aged 17 or older from May to November 1999, the average missing data rate for all eight subscales was 1.4 %. The percentage of the convergent and discriminate validity were found to be 91.4% and 96.4%, respectively. However, confounding correlation, i.e., between validity and mental health dimension, was demonstrated. The internal consistency presented as Cronbach's alpha coefficients ranged from 0.63 to 0.77. Thai version was consistent with the original.

Charoencholvanich and Pongcharoen (143) studied the SF – 36 compared with 12 – item Oxford (Oxford – 12), which those were translated into a standard Thai version. The aim was to assess reliability of those two questionnaires and correlation between them among 100 patients having total knee replacement (TKR). The results showed that Oxford – 12 revealed that it was very reliable with Cronbach's alpha for function, pain and total score of 0.82 , 0.87 and 0.92 respectively. For 8 health domains of SF – 36, Cronbach's alpha varied from 0.65 (VT) to 0.99 (RP). Since a low score of Oxford – 12 indicates a better state of health compared to high score for SF – 36, negative correlation between them was expected. PF of SF – 36 had the highest negative correlation with both Oxford function and pain with Pearson's correlation coefficient (r) of – 0.69 and − 0.72 respectively. PCS was correlated well with both Oxford function and pain with r of − 0.73 and − 0.76 respectively whereas correlation between MCS and Oxford function and pain were only − 0.60 and − 0.58 respectively. Thai version of Oxford – 12 and SF – 36 retain their original characteristics and are reliable for assessing the quality of life after TKR in Thai speaking patients.

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Jirarattanaphochai et al. (144) developed the Thai version of the Medical Outcomes Study Short – Form Survey version 2.0 (SF – 36 V2) and tested it in 100 low back pain patients. Reliability of the Thai version of SF – 36V2 was assessed by internal consistency using Chronbach's alpha coefficient and item – scale correlation. The authors demonstrated that the Chronbach's alpha coefficient of the physical health and mental health summary scales were 0.93 and 0.92 respectively. The Chronbach's alpha coefficient of eight scales in the Thai version of the SF – 36V2 ranging of 0.72 − 0.94. The Chronbach's alpha coefficient tested in acute or chronic low back pain patients whether they have back pain only or back pain with radiculopathy ranging was 0.72 − 0.93. the item correlation coefficient for the 35 items within the eight health aspects ranged from 0.42 − 0.8. The Thai version of the Medical Outcome Study Short – Form Survey version 2.0 (SF – 36V2) is a reliable tool for assessing functional disability of low back pain in Thai patients.

In addition, there was several studies that used SF – 36 Thai version including version 2.0 to assess quality of life in various patients as the following.

Bunyavejchevin and Veeranarepanich (145) conducted a cross – sectional study comparing the quality of life among 3 groups of Thai postmenopausal women with an overactive bladder (OAB), diabetes, and without these conditions. Using SF – 36 Thai version translated by Ronnachai and Silpakit, which successfully constructed with an acceptable level of validity and reliability. The study showed that the quality of life was more significantly impaired in Thai postmenopausal women with OAB and diabetes than in those without such conditions. The general health, social function and role – function emotional subscales were more impaired in women with OAB than in those with DM.

Jongjit et al. (146) conducted a population – based case – control study six months after hip fracture, they investigated the association between

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functionality and quality of life. The Functional Independence Measure (FIM), the Frenchay Activities of Daily Living Index (FAI), and the Berg Balance Scale (BBS) were used to measure physical function, and quality of life was measured by completing a Short Form – 36 (SF – 36). The results showed that all eight domains were significantly lower in hip fracture group compared with the controls. The reduction in function was reflected in a reduction in the quality of life.

III. Research Regarding the Studied Variables

The experience of an disaster was associated with a multidimensional impairment of QOL. Most studies (70, 74, 84, 89, 91−99, 147−148) have shown evidence of both physical and psychological sequelae in people after disaster, including provoke MI, aggravated diabetes mellitus, posttraumatic stress disorder (PTSD), major depressive episode (MDE), sleep disorder, anxiety, and substance abuse. The most common disaster – related psychiatric diagnoses are MDE and PTSD, which are strongly associated. More recent work has supported earlier observations that traumatic events, including man – made and natural disasters, cause emotional, biological, behavioral, and interpersonal alternations, and elicit PTSD. In the 20th century, many of the most devastating natural disasters have been earthquakes whether generated Tsunami. Unlike many other natural disasters, earthquakes usually provide no warning, their impact can be wide spread and severe, and effects are often ongoing.

Research into the short – term psychological effects of earthquakes has revealed an elevated prevalence of physical and psychological problems among earthquake survivors. Presumably, one would expect that most respondents prefer positive health status, and those respondents experiencing a lower quality of life are usually willing to invest more time in improving their health – related quality of life (HRQOL). Understanding how a catastrophic earthquake and its sequelae affect people is necessary for determining their quality of life (QOL).

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According to the study by Wang et al. (149), they conducted an observation study of longitudinal change of quality of life (QOL) and psychological well – being in a community sample in northern China which affected by an earthquake and examined the relationship between QOL and disaster exposure, post – disaster support and other related variables. The subjects, from two villages at different distances from the epicenter, were assessed using the brief version of the World Health Organization Quality of Life (WHOQOL – BREF) and three subscales of a symptoms checklist at 3 months and 9 months after the earthquake, respectively. They found that the exposure to the earthquake was associated with multidimensional impairment in QOL, including physical, psychological and environment domains at 3 months, and psychological and environmental domains at 9 months. The victims also suffered significantly more psychological distress in terms of depression, somatization and anxiety. At both assessment points the group that experienced lower initial exposure but then received less post – disaster help reported poorer QOL and psychological well – being. The two victim groups also differed significantly in changing trend along time. The group that received more support showed a general improvement in post – disaster well – being from 3 months to 9 months. The results confirm that post – disaster variables could be as important to post – disaster psychosocial outcomes as variables of pre – disaster vulnerability and disaster per se.

A study by Chou et al. (150) conducted a population survey to investigate quality of life and related risk factors to Taiwanese earthquake survivors with different psychiatric disorders 21 months after the earthquake using the Medical Outcomes Study Short Form – 36 (MOS SF – 36) and the questionnaires to interview 461 respondents (209 males and 252 females) 16 years or older who were equally exposed to the earthquake. Psychiatrists interviewed the same respondents using the Mini – International Neuropsychiatric Interview (MINI), with an adjusted response rate of 79.9%. The results showed that the prevalence of varied psychiatric disorders in earthquake survivors ranged from 3.3% to 18%. However, there was almost a positive trend in

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quality of life in survivors among the following groups: posttraumatic stress disorder combined with major depressive episode; major depressive episode; posttraumatic stress disorder; other psychiatric diseases; and healthy mentality groups on the physical aspect or mental aspect of the MOS SF – 36. When survivors were elderly or female and had experienced prominent financial loss immediately after the earthquake, social network change, and mental impairment, their quality of life trended to be worse. The earthquake survivors had a higher percentage of psychiatric disorders. The risk factors that affected quality of life in survivors were age, female, financial loss, social network change, and mental impairment.

Three years after the 1999 Chi – Chi earthquake, Wu et al. (151) conducted a population survey investigated quality of life (QOL) and related risk factors in Taiwanese earthquake survivors diagnosed with different psychiatric disorders. Trained assistants used the Medical Outcomes Study Short Form – 36 (MOS SF – 36) and questionnaires to interview 405 respondents aged 16 years and older, who had been exposed to the earthquake. Psychiatrists interviewed the same respondents using the Mini – International Neuropsychiatric Interview, with and adjusted response rate of 70.2%. The results showed that the prevalence range for psychiatric disorders in the earthquake survivors was 0.2% − 7.2% 3 years after the Chi – Chi earthquake, with rates for major depression (MD) and the PTSD/MD group were lower than for the other two diagnostic groups, as determined scores. The predictors for poor QOL were female, economic problems, physical illness, subjective assessment of memory and social – activity decline and diagnosis of PTSD or MD. In addition, the results indicated that the older respondents and women showed lower QOL. The married respondents showed higher QOL in the mental health subscale than the single respondents: divorced, widows, and widowers. The impact of “emotional problems due to the loss or injury of one’s family member” affects the 3 mental subscales and MCS; the results indicated that loss of family members would reduce a significant negative influence on QOL, especially on the MCS score. Compared with the previous investigations of the 1999 Chi –

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Chi earthquake, this study showed that, relative to the general population, a higher percentage of the survivors developed various psychiatric disorders, with the increased prevalence persisting but gradually declining at 3 years after the event. However, this inter – study difference was decrease. The QOL for earthquake survivors with psychiatric disorders, especially PTSD or MD, was inferior compared with the mentally healthy analogues, with contemporaneous decreases in mental and physical function scores across the QOL subscales. The persistence of long – term economic problems was one of many important factors affecting QOL.

Lin et al. (152) studied the impact of the Chi – Chi earthquake on quality of life among elderly survivors in Taiwan. This paper examined the impact of the earthquake, which hit central Taiwan on September 21, 1999 on the quality of life among the elderly survivors. The 28 – item Taiwanese – adapted brief version of the World Health Organization's quality of life questionnaire (WHOQOL) was used to measure quality of life in four domains: physical capacity, psychological well – being, social relationships, and environment. These measures were coincidently collected in a separate study from 368 subjects aged 65 and older in the affected area shortly before the earthquake. Of these subjects, 268 were interviewed in a follow – up assessment 12 months after the earthquake. In conclusion, elderly survivors tended to report lower quality of life in physical capacity, psychological well – being, and environment 12 months after the earthquake than at the assessment prior to the earthquake, regardless of the level of damage to their residences during the earthquake.

In 2001, two disasters in New York city, the World Trade Center Disaster (WTCD) and the subsequent American Airlines Flight 587 crash, present an opportunity to study the long – term consequences of cumulative disaster exposure (CDE) on overall health – related quality of life (HRQOL) among patients presenting to the emergency departments. A cross – sectional study was conducted. Participants completed a self – administered questionnaire.

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The Short Form 36 (SF – 36) was used to assess overall health status. The results showed that the participants with cumulative disaster exposure (CDE) had lower SF – 36 scores for general health ($p < 0.009$), mental health ($p < 0.003$), and bodily pain ($p < 0.004$). That mean those with CDE had lower overall health status than those with one or no disaster exposure (153).

Salman et al. (154), evaluated the impact of earthquakes which happened in August and November, 1999 in Turkey, on quality of life (QOL) of type I diabetic patients. 77 type I diabetic patients affected by the earthquake included in this study. DQOL questionnaire had administered two times to all patients participated in a prior QOL study before first quake and 3 months after the second quake. The same time of BMI, BP, insulin (IU/kg/day) requirement and HbA_{1c} levels were assessed. The results indicated that HBA_{1c}, systolic and diastolic BP levels and daily insulin requirement were increased after the earthquake. Mean total DQOL scores were adversely influenced by the earthquake, however satisfaction with support subscale scores did not affected significantly, on the other hand all other subscales scores were decreased. The disaster seems to have a global negative impact on QOL perception of type 1 diabetic patients. However, specific decrease in diabetes worried may be related to ignorance due to an impending new quake and worries about general life quality in the future.

The study by Wang et al. (155) had documented about the relation between post – traumatic stress disorder, depression, anxiety and quality of life. In this study, the results showed that quality of life had a negative correlation with PTSD, depression and anxiety. The study let we known that the most common psychological traumas were post – traumatic stress disorder which affects not only personal quality of life, but also that of families and society. Although physical injuries following trauma can be treated through medical care and rehabilitation, the psychosocial impact can last for several weeks, months, years, or even throughout life. In addition, the levels of anxiety, depression and

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quality of life were significantly improved from week 1 to week 6 following physical injury.

Melick and Logue (156) determined the effect of disaster on the health and well – being of older women. The data discussed in this article were gathered through use of a retrospective cohort survey five years following a major flood in the Wyoming Valley of Pennsylvania. The subsample of women sixty – five years and older used in this analysis was composed of 122 female victims and forty – five controls from the same communities. The instruments used to measure mental status included Langner's 22 items Scale, Zung's Self – rating Depression Scale, and a modified Self – Report Symptom Inventory (SCL – 90). Additional items related to self – perceptions of health status, influence of the flood on health and well – being, and to other issues. Significant differences occurred in self – perceptions, including state of mind after the flood, distress during recovery, quality of life after the flood ($p < 001$).

Phifer and Norris (157) measured community destruction from administrative data of the state emergency services organization following floods in Kentucky, USA and found that this measure of exposure predicted increases in depression and decreases in well – being over and above preflood symptom levels (measured prospectively) and demographic factors.

ŞENGÜL et al. (54) studied the short and long – term influences of the Marmara earthquake, which occurred on August 17, 1999 in Turkey, on glycemic control and quality of life, HbA_{1c} insulin requirement and quality of life of 88 people with type 1 diabetes living in the quake zone were evaluated one year before, 3 months after and one year after the earthquake. The results indicated that mean total QOL scores at 3 months after the earthquake were significantly lower than the scores obtained at one year before the earthquake. People with type 1 diabetes living in the same house after the earthquake and not having enough food supply were reported to have lower QOL than people moving to another house and having enough food supply after the earthquake.

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The Marmara earthquake had a negative impact on the glycemic control and QOL of the subjects with type 1 diabetes for the short term but pre – quake scores might be achieved after a long period. This was the first study reporting short and long – term effects of life – threatening disasters such as earthquakes on QOL of people with type 1 diabetes. QOL decreased at the 3rd month after the earthquake and returned to pre – earthquake levels after one year.

Several follow – up studies have suggested the association of PTSD with lower QOL in survivors of physical trauma or illness. In a study of eligible trauma patients, on short and long – term outcomes and on QOL. Stress symptoms scores were the most significant predictors of mental health – related QOL outcomes.

Tsai et al. (158) conducted a prospective study, evaluated the relationship between the clinical course of posttraumatic stress symptoms (PTSS) and quality of life (QOL) among Taiwan earthquake survivors for 3 years. A population survey was done in a Taiwan township near the epicenter of a severe earthquake. Trained assistants used the Medical Outcome Study Short Form – 36 (MOS SF – 36) and the Disaster – Related Psychological Screening Test to interview earthquake survivors 16 and older. A total of 1756 respondents were surveyed during the 3 – years follow – up period. The results showed that at 0.5 and 3 years after the earthquake, the estimated rate of PTSS (cutoff point, 3/4) was 23.8% and 4.4%, respectively. The survivors with PTSS scored lower for each concept of the MOS SF – 36 at these two intervals. Three years after the earthquake, the survivors in the persistently healthy group showed the highest scores in all subscales and domains of the MOS SF – 36; second highest was the recovering group; third – highest was the delayed PTSS group; and the persistent PTSS group showed the lowest scores in all concepts and domains. Notably, survivors with delayed onset PTSS exhibited a lower QOL when PTSS occurred. In addition, they found that the impact of emotional problems due to the loss or injury of one's family

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member affected the 3 mental subscales (except vitality) and MCA. Loss of family member will induce a significant negative influence on QOL, especially on the MCS score. They concluded that the estimated rate of PTSS has declined, and the QOL of the survivors varied according to how their PTSS had progressed.

Chou et al. (159) investigated the relationship between quality of life and psychiatric impairment in a Taiwanese community located near the epicenter of the 1999 earthquake, as assessed four to six months after the natural catastrophe. Trained assistants interviewed the 4,223 respondents using the disaster – related psychological screening test (DRPST). Additional, the 36 – items Short – From Survey (SF – 36) was used to evaluate quality of life. The 4223 respondents were divided into 4 psychiatric – impairment groups based on DRPST score: healthy, mild impairment, moderate impairment, and severe impairment. The four groups were compared for a number of salient factors, including gender, age, current marital status and psychiatric – impairment score, as determine impact on quality of life. Respondents assessed as psychiatrically impaired tended to be older, female, divorced/widowed, and less educated, and they were more likely to have experienced major familial financial loss as an immediate consequence of the earthquake. Further, the greater the severity of the psychiatric impairment, the lower the scores for quality of life, for both the physical and mental aspects of this important general indicator.

A study of the effect of sensitization and coping style on post – traumatic stress symptoms and quality of life by Johnsen et al. (69), the present study showed that repeated exposure to traumatic events yields higher trauma – related symptoms as well as decreased quality of life compared with a single – exposure control group.

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CHAPTER III
MATERIALS AND METHODS

Study Design

A descriptive cross sectional survey is conducted to find out the health – related quality of life among the navies or their spouses who survived from the Indian Ocean Tsunami and lived in the Phang – Nga Naval Base.

General characteristics, characteristics and amount of losses, characteristics of social support, history of illness, Tsunami exposure were also explored.

Study Population

The study population was the navies or their spouses who survived from the Indian Ocean Tsunami and lived in the houses of Phang – Nga Naval Base.

Inclusion Criteria :

The included respondents were :

1. The navies or navies' spouses who survived from the Indian Ocean Tsunami and lived in the houses of Phang – Nga Naval Base.
2. Literate and could answer questionnaires by themselves.
3. Willing to participate in the study and informed consents were obtained.

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Exclusion Criteria :

The excluded respondents were :

1. The navies or navies' spouses who working in Phang – Nga Naval Base or lived in the houses of Phang – Nga Naval Base after Tsunami occurred.
2. Cannot answer the questionnaires due to severe physical or psychiatric illness.
3. Not willing to participate in the study.

Sample Size

The whole population, 614 people in 472 households who lived in the houses of Phang – Nga Naval Base were required for this study survey.

Research Instruments

The two parts of questionnaires are as follow :

Part one was general characteristics comprised 9 items including age, gender, education level, marital status, occupation, changes in income, characteristics and amount of losses comprised 3 items including family members, relatives, friends/loved one, loss of properties, and estimated properties loss, characteristics of social support comprised 3 items including needs for social support, received social support, and levels of satisfaction with support, history of illness comprised 2 items including physical illness, and psychiatric illness, Tsunami exposure 1 item.

Part two was SF – 36 Version 1.0 comprised 36 items. The SF – 36 included multi – item scales, measured the following eight subscales: physical

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functioning (10 items in question 3), role limitations due to physical health problems (4 items in question 4), bodily pain (2 items question 7 and 8), social functioning (2 items question 6 and 10), general mental health, covering psychological distress and well – being (5 items question 9b, 9c, 9d, 9f, and 9h), role limitations due to emotion problems (3 items question 5a, 5b, 5c), vitality, energy and fatigue (4 items: question 9a, 9e, 9g, and 9i), general health perceptions (5 items: question 1 and 11a, 11b, 11c, and 11d), report health transition (question 2) as shown in Table 2.

Table 2 Abbreviated content for items in each SF – 36 scale, Version 1

SCALE	ITEM	ABBREVIATED ITEM CONTENT
Physical Functioning (PF)	3a	Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports
	3b	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf
	3c	Lifting or carrying groceries
	3d	Climbing several flights of stairs
	3e	Climbing one flight of stairs
	3f	Bending, kneeling, or stooping
	3g	Walking more than a mile
	3h	Walking several blocks
	3i	Walking one block
	3j	Bathing or dressing yourself
Role Physical (RP)	4a	Cut down the amount of time you spread on work other activities
	4b	Accomplished less than you would like
	4c	Were limited in the kind of work or other activities
	4d	Had difficulty performing the work or other activities (for example, it took extra effort)
Bodily Pain (BP)	7	Intensity bodily pain
	8	Extent pain interfered with normal work

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Table 2 Abbreviated content for items in each SF-36 scale, Version 1 (continued)

SCALE	ITEM	ABBREVIATED ITEM CONTENT
General Health (GH)	1	Is your health; excellent, very good, good, fair, poor
	11a	I seem to get sick a little easier than other people
	11b	I am as healthy as anybody I know
	11c	I expect my health to get worse
	11d	My health is excellent
Vitality (VT)	9a	Feel full of pep
	9e	Have a lot of energy
	9g	Feel worn out
	9i	Feel tired
Social Functioning (SF)	6	Extent physical or emotional health problems interfered with normal social activities
	10	Frequency physical or emotional health problems interfered with social activities
Role Emotional (RE)	5a	Cut down the amount of time spent on work or other activities
	5b	Accomplished less than you would like
	5c	Did work or other activities less carefully than usual
Mental Health (MH)	9b	Been very nervous
	9c	Felt so down in the dumps that nothing could cheer you up
	9d	Felt calm and peaceful
	9f	Felt downhearted and blue
	9h	Been happy person
Reported Health Transition (HT)	2	Rating of health now compared than one year ago

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Checking Quality of the Instruments

1. Finding accuracy of content validity from general questionnaire through checking of qualified examiner before applies it.

2. Thai version SF – 36 was developed and examined the reliability and validity by Kongsakon and Silpakit (141). Five experts were involved to assess the content validity of the translated form of SF – 36 by reviewing each response choice of the questionnaire items. The items coefficients of Thai version SF – 36 were greater than 0.8 for all subscales indicating that the validity was well accepted. The reliability on a test and retest had a Pearson's correlation of 0.6 and Cronbach's alpha coefficients were greater than 0.7 for all subscales except Social Functioning subscale (alpha = 0.6025). The coefficients of the total items was 0.92.

Scoring Criteria

The scoring followed SF – 36 version 1 scoring criteria. The response for each item was recorded with a value from 0 – 100. The scale score was calculated without the missing item. If more than 50% of the items are missing from any scale, it cannot be calculated.

In this study, used the cutoff point as the cutoff point in the previous study (160). An overall quality of life score of equal or greater than 75% of total scores was considered as "good quality of life", the remaining was considered as "need for improvement".

Data Collection

Collecting data took place over 15 days from 24 July to 7 August 2005 by self – reported and personal interview in some respondents. During every visit, the purpose of the research project was explained to the interviewee in detail. Informed consent forms were obtained from all

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respondents, together with approval from the ethic committee of the Faculty of Ramathibodi Hospital, Mahidol University. Household registrations indicated that the Phang – Nga Naval Base had 614 residents in 472 households who were the navies and their spouses. The researcher learnt later that the registered population of 614 residents included some residents who had left Phang – Nga Naval Base after the attack of Tsunami (manifested as vacant households) and some residents were not present at the time of data collection because of various reasons. In this most recent study, there were 434 residents in total (344 men and 100 women), giving an overall response rate was 71% of the total registered population. When the residents in vacant households were not taken into account, however, the researcher believed that the adjusted response rate was greater than 71%.

Data Quality Control

Every questionnaire batch was checked during collection by the researcher and research assistants for missing data and the respondents were asked to fill in any missing data in order to ensure the best answer to each question. All the collected questionnaires were checked again for data quality. If the respondents were not at home during collection, the questionnaires were left with the family to be collected the next day. The researcher and research assistants also left a leaflet that had contact information and a description of the study objectives on it.

Protection of Human Subjects

In this study, the proposal was submitted to the ethic committee of the Faculty of Ramathibodi Hospital, Mahidol University for study permission. Furthermore, the proposal of the study was submitted to the Commandant of the Phang – Nga Naval Base.

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After obtaining the permission, the researcher start collecting the data. Before the beginning of interview, the navies or their spouses were approached and informed about the details of this study in order that they could understand and know their rights. Their rights included the right to refuse to participate in this study without any effects on their appropriate support. Their rights also were to cancel or give up during interview any sections if they wanted.

Data Analysis

Data processing and analysis was done according to the standard protocol of the manual in "SF – 36 Health Survey: manual and interpretation guide". SPSS/PC program was used, as follow :

1. Descriptive statistics such as mean, standard deviation, percentage, frequency distribution were used to describe all study variables.
2. Analytic statistics were performed (Chi – square) to determine the association between eight subscales in SF – 36 and independent variables.

Data Scoring (20)

SF – 36 items and scales are scored so that a higher score indicates a better health state. For example, functioning scales are scored so that a high score indicates better functioning and the pain scale is scored so that a high score indicates freedom from pain. After data entry, items and scales are scored in three steps :

1) Items recoding, for the 10 items that require recoding

Items recoding is the process of deriving the item values that will be used to calculate the scale scores. The recoding of response choices as shown in Tables 3 through 11.

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Table 3 Physical Functioning : verbatim items and scoring information

Verbatim Items

3a	Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports
3b	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
3c	Lifting or carrying groceries
3d	Climbing several flights or stairs
3e	Climbing one flight of stairs
3f	Bending, kneeling, or stooping
3g	Walking more than a mile
3h	Walking several blocks
3i	Walking one block
3j	Bathing or dressing yourself

Pre – coded and Final Values for Items 3a – 3j

Response Choices	Pre – coded Item Value	Final Item Value
Yes, limited a lot	1	3
Yes, limited a little	2	2
No, not limited at all	3	1

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Table 4 Role – Physical Limitations: verbatim items and scoring information

Verbatim Items

4a	Cut down the amount of time you spent on work or other activities
4b	Accomplished less than you would like
4c	Were limited in the kind of work or other activities
4d	Had difficulty performing the work or other activities

Response Choices	Pre – coded Item Value	Final Item Value
Yes	1	1
No	2	2

Table 5 Bodily Pain : verbatim items and scoring information

Verbatim Items

7	How mach bodily pain have you had during the past 4 weeks?
8	During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Pre – coded and Final Values for Items 7

Response Choices	Pre – coded Item Value	Final Item Value
None	1	6.0
Very mild	2	5.4
Mild	3	4.2
Moderate	4	3.1
Severe	5	2.2
Very severe	6	1.0

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Table 5 Bodily Pain : verbatim items and scoring information (continued)

Scoring for Item 8 – If both Items 7 and 8 are answered

Response Choices	If item 8 Pre-coded Item Value	Item 7 Final Item Value	Item 8 then Final Item Value
Not at all	1	1	6
Not at all	1	2 through 6	5
A little bit	2	1 through 6	4
Moderate	3	1 through 6	3
Quite a bit	4	1 through 6	2
Extremely	5	1 through 6	1

Scoring for Item 8 – If Item 7 is not answered

Response Choices	Pre – coded Item Value	Final Item Value
Not at all	1	6.00
A little bit	2	4.75
Moderate	3	3.50
Quite a bit	4	2.25
Extremely	5	1.00

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Table 6 General Health : verbatim items and scoring information

Verbatim Items	
1	In general, would you say your health is :
11a	I seem to get sick a little easier than other people
11b	I am as healthy as anybody I know
11c	I expect my health to get worse
11d	My health is excellent

Pre – coded and Final Values for Items 1 & 11a – 11d

Item 1	Response Choices	Pre – coded Item Value	Final Item Value
	Excellent	1	5.0
	Very good	2	4.4
	Good	3	3.4
	Fair	4	2.0
	Poor	5	1.0

Items 11a&11c	Response Choices	Pre – coded Item Value	Final Item Value
	Definitely True	1	1
	Mostly True	2	2
	Don't Know	3	3
	Mostly False	4	4
	Definitely False	5	5

Items 11b&11d	Response Choices	Pre – coded Item Value	Final Item Value
	Definitely True	1	5
	Mostly True	2	4
	Don't Know	3	3
	Mostly False	4	2
	Definitely False	5	1

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Table 7 Vitality: verbatim items and scoring information

Verbatim Items	
9a	Did you feel full of pep?
9b	Did you have a lot of energy?
9c	Did you feel worn out?
9d	Did you feel tired?

Pre – coded and Final Values for Items 9a, 9c, 9g, & 9i

Item 9a&9c	Response Choices	Pre – coded Item Value	Final Item Value
	All of the time	1	6
	Most of the time	2	5
	A good bit of the time	3	4
	Some of the time	4	3
	A little of the time	5	2
	None of the time	6	1

Items 9g&9i	Response Choices	Pre – coded Item Value	Final Item Value
	All of the time	1	1
	Most of the time	2	2
	A good bit of the time	3	3
	Some of the time	4	4
	A little of the time	5	5
	None of the time	6	6

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Table 8 Social Functioning : verbatim items and scoring information

Verbatim Items

6 During the part 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

10 During the part 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

Pre – coded and Final Values for Items 6 & 10

Item 6	Response Choices	Pre – coded Item Value	Final Item Value
	Not at all	1	5
	Slightly	2	4
	Moderately	3	3
	Quite a bit	4	2
	Extremely	5	1
Items 10	Response Choices	Pre – coded Item Value	Final Item Value
	All of the time	1	1
	Most of the time	2	2
	Some of the time	3	3
	A little of the time	4	4
	None of the time	5	5

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Table 9 Role – Emotional Limitations : verbatim items and scoring information

Verbatim Items

5a	Cut down the amount of time you spent on work or other activities
5b	Accomplished less than you would like
5c	Didn't do work or other activities as carefully as usual

Pre – coded and Final Values for Items 5a – 5c

Response Choices	Pre – coded Item Value	Final Item Value
Yes	1	1
No	2	2

Table 10 Mental Health : verbatim items and scoring information

Verbatim Items

9b	Have you been a very nervous person?
9c	Have you felt so down in the dumps that nothing could cheer you up?
9d	Have you felt calm and peaceful?
9f	Have you felt downhearted and blue?
9h	Have you been a happy person?

Pre – coded and Final Values for Items 9b, 9c, 9f & 9h

Item 9b,9c&9f	Response Choices	Pre – coded Item Value	Final Item Value
	All of the time	1	1
	Most of the time	2	2
	A good bit of the time	3	3
	Some of the time	4	4
	A little of the time	5	5
	None of the time	6	6

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Table 10 Mental Health : verbatim items and scoring information (continued)

Items 9d&9h	Response Choices	Pre – coded Item Value	Final Item Value
	All of the time	1	6
	Most of the time	2	5
	A good bit of the time	3	4
	Some of the time	4	3
	A little of the time	5	2
	None of the time	6	1

Table 11 Reported Health Transition : verbatim items and scoring information

Verbatim Items

2 Compared to one year ago, how would you rate your health in general now?

Pre – coded and Final Values for Items 2

Response Choices	Pre – coded Item Value
Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same as one year ago	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

Seven items are reverse scored. Reverse scoring of items is done to ensure that a higher item value indicates better health on all SF – 36 items and scales. SF – 36 items that need to be reverse scored are worded so that a higher pre – coded item value indicates a poorer health state.

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2.) Computing scale scores by summing across items in the same scale (raw scale scores). This score is the simple algebraic sum of responses for all items in that scale, as shown in Table 12. For example, the raw scale score for the Role – Physical scale is the sum of the scores for Items 4a, 4b, 4c, and 4d. Use recoded items values and imputed values where applicable. This simple scoring method is possible because items in the same scale have roughly equivalent relationships to the underlying health concept being measured, and no item is used in more than one scale. Thus, it is not necessary to standardize or weight items. These assumptions have been extensively tested and verified across 24 patients groups.

Table 12 Formulas for scoring and transforming scales

Scales	Sum Final Item Values	Lowest and highest possible raw scores	Possible raw score range
Physical Functioning	3a+3b+3c+3d+3e+ 3f+3g+3h+3i+3j	10, 30	20
Role – Physical	4a+4b+4c+4d	4, 8	4
Bodily Pain	7+8	2, 12	10
General Health	1+11a+11b+11c+11d	5, 25	20
Vitality	9a+9e+9g+9i	4, 24	20
Social Functioning	6+10	2, 10	8
Role – Emotional	5a+5b+5c	3, 6	3
Mental Health	9b+9c+9d+9f+9h	5, 30	25

3.) Transforming each raw scale scores to a 0 – 100 scale (transformed scale scores) using the formula shown below.

$$\textit{Transformed Scale} = \frac{[(\text{Actual raw score} - \text{lowest } \textit{possible} \text{ raw scale})]}{\textit{Possible} \text{ raw score range}} \times 100$$

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Example: A Physical Functioning raw score of 21 would be transformed as follows:

$$\left[\frac{(21 - 10)}{20} \right] \times 100 = 55$$

Where lowest possible score = 10 and possible raw score range = 20

This transformation converts the lowest and highest possible scores to zero and 100, respectively. Scores between these values represent the percentage of the total possible score achieved. While this final step is optional, it is strongly recommended because transformed scale scores can be compared with norms derived from the MOS.

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CHAPTER IV
RESULTS

This descriptive study was conducted to evaluate the quality of life of the navies or their spouses who lived in Phang – Nga Naval Base, Phang – Nga province, 6 months after experienced Tsunami disaster using self – administered questionnaires. In this chapter, the results of the data analysis were divided into seven parts as follow :

1. Demographic characteristics
2. Quality of life among the navies or their spouses
3. Association between general characteristics and quality of life among the navies or their spouses
4. Association between characteristics and amount of losses, social support, history of illness, Tsunami exposure and quality of life

Demographic Characteristics

The residents of Phang – Nga Naval Base, Phang – Nga province were selected for evaluation as they were considered equally exposed to the effects of the Tsunami. The data was collected from 24 July to 5 August 2005. Demographic characteristics of the participants were shown in Table 13.

1. Age

Their age ranged from 19 to 58 years with the mean and standard deviation were 33.56 and 9.262 years respectively.

2. Gender

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Table 13 showed that 334 (77%) of the participants were male and 100 (23%) of them were female.

3. Marital status

The majority of them (291) were married (67.1%), 126 (29%) participants were single and 17 (3.9%) participants were widowed/divorced.

4. Education

The educational background was ranged from primary school (13.1%) to bachelor degree (6.9%). However , the most common education level of the participants was secondary school (55.5%). The others education (7.6%) was included certificate for graduated at the Naval Cadet School, Naval Quartermaster General School.

5. Occupation and side – occupation

More than half of them were governments (70.0%) while 9.9% and 19.6% were employees and housewives, respectively. Most of them did not have side – occupation (53.5%) while 16.6% reported that side – occupation were vendor and 9.9% were agriculture, 6.7% and 13.4% were employees and had own business, respectively.

6. Incomes before Tsunami experience (per month)

The large groups of them reported their incomes before Tsunami experience ranged from 5,000 – 9,999 baht (32%). The second large groups reported their incomes ranged from 10,000 – 14,999 baht (23.5%) and the third large groups reported their incomes less than 5,000 baht (21.7%). And 15.4% reported their incomes ranged from 15,000 and more and 7.4% reported no income.

7. Incomes after Tsunami experience (per month)

The largest groups of them reported their incomes after Tsunami experience ranged from 5,000 – 9,999 baht (30.9%). The second large groups

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reported their incomes less than 5,000 baht (25.1%) and the third large groups reported their incomes ranged from 10,000 – 14,999 baht (18.2%). And 12% reported their incomes ranged from 15,000 and more and 13.8% reported no income.

8. Changes in income

The majority of them (342 respondents, 78.8%) reported their incomes constant and increased after Tsunami experience and 92 (21.2%) reported that their incomes decreased after Tsunami experience.

9. Loss of family members, relatives, and friends/loved one

The majority of them (400 respondents, 92.2%) reported that they did not loss of family members or relatives and 34 (7.8%) reported that they lost family members or relatives. In this group, 2 (0.5%) reported that they lost their fathers, 4 (0.9%) reported they lost their mothers, 9 (2.1%) reported that they lost their brothers or sisters, 8 (1.8%) reported that they lost their children and 15 (3.5%) reported that they lost others persons, e.g., friends, colleagues, neighbors, etc,.

10. Loss of properties

Total of them reported they lost their properties (100%). In this group, 298 (68.7%) reported that they lost their houses, 116 (26.7%) reported that they lost their own business and shops, 6 (1.4%) lost their guest houses, 10 (2.3%) lost their agriculture products and 297 (68.4%) lost others properties, e.g., necessaries things for living, clothing, cars, motorcycles, bicycles, televisions, washing machines, furniture, computers, sewing machines, radios, refrigerators, etc,.

11. Estimated properties loss

The results showed that 105 (24.2%) reported their estimated properties loss less than 10,000 baht. 108 (24.9%) reported their estimated properties loss ranged from 10,001 – 50,000 baht. 95 (21.9%) reported their estimated properties

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loss ranged from 50,001 – 100,000 baht and 126 of them (29%) reported their estimated properties loss ranged over 100,000 baht.

12. Needs for social support

As described in table 15, majority of them (385 respondents) reported that they needed for social support (88.7%). Among the respondents, 129 (29.7%) needed for re – established houses, 114 (26.3%) needed equipments and re – established shops, 333 (76.7%) needed money for re – established their own living, their children education and for re – established their side – occupation, 112 (25.8%) needed for emotional support and 48 (11.1%) needed for physical support. Only 49 (11.3%) reported that they did not need for social support.

13. Received social support

The results revealed that 388 (89.4%) of the participants received social support. Only 46 (10.6%) of the participants reported that they did not receive any social support. Among the respondents, 299 (68.9%) reported that they received re – established houses, 28 (6.5%) reported that they received equipments and re – established shops, 319 (73.5%) reported that they received money, 54 (12.4%) received emotional support and 27 (6.2%) received physical support.

14. Levels of satisfaction with support

The majority of them (193 respondents, 44.5%) rated their satisfaction with support in moderate satisfied groups. The second large groups (122 respondent, 28.1%) rated their satisfaction with support in mild satisfied groups. The third large groups (71 respondents, 16.4%) rated their satisfaction with support in not satisfied groups. Only 39 (9.0%) rated their satisfaction with support in very satisfied groups and 9 (2.1%) did not put a comment on this item.

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15. History of illness

As described in table 16, the majority of them (432 respondents, 99.5%) reported they did not have psychiatric illness and only 2 (0.5%) reported that they had psychiatric illness. As to physical illness, the majority of them (388 respondents, 89.4%) reported that they did not have physical illness and only 46 (10.6%) reported they had physical illness, e.g., cardiovascular diseases, hypertension, brain tumor, migraine, diabetes mellitus, asthma, cancer, seizure, gout, peptic ulcer, rheumatoid arthritis, etc.

16. Tsunami exposure

As described in table 17, most of them (351 respondents, 80.9%) directly experienced the Tsunami when it occurred and only 83 (19.1%) were not in the time when it occurred.

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Table 13 General characteristics of 434 respondents

General characteristics	Number	%
Gender		
Male	334	77.0
Female	100	23.0
Age (years)		
< 25	116	26.7
25 – 34	120	27.6
35 – 44	135	31.1
45 and more	63	14.5
Mean ± SD = 33.56 ± 9.262 Range = 39 years		
Marital status		
Single	126	29.0
Married	291	67.1
Widowed/Divorced	17	3.9
Educational level		
Primary school	57	13.1
Secondary school	241	55.5
Higher secondary (diploma)	73	16.8
University	30	6.9
Others	33	7.6
Occupation		
Government officers	306	70.5
Employees	43	9.9
Housewives	85	19.6

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Table 13 General characteristics of 434 respondents (continued)

General characteristics	Number	%
Side – occupation		
None	232	53.5
Vendor	72	16.6
Agriculture	43	9.9
Employee	29	6.7
Own business & Others	58	13.4
Income (per month)		
Before Tsunami experience (baht)		
Lower income (less than 5,000)	94	21.7
Average income (5,000 – 9,999)	139	32.0
Moderate income (10,000 – 14,999)	102	23.5
High income (15,000 and more)	67	15.4
No income	32	7.4
After Tsunami experience (baht)		
Lower income (less than 5,000)	109	25.1
Average income (5,000 – 9,999)	134	30.9
Moderate income (10,000 – 14,999)	79	18.2
High income (15,000 and more)	52	12.0
No income	60	13.8
Changes in income		
Decreased income	92	21.2
Constant or increased income	342	78.8

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Table 14 Characteristics and amount of losses among 434 respondents

Characteristics and amount of losses	Number	%
Loss of family members or relatives		
No	400	92.2
Yes	34	7.8
~ Fathers or mothers	6	1.4
~ Brothers or sisters	9	2.1
~ Children	8	1.8
~ others	15	3.5
Loss of properties		
No	–	–
Yes	434	100.0
~ Houses	298	68.7
~ Own businesses & Shops	116	26.7
~ Guest houses	6	1.4
~ Agricultural products	10	2.3
~ Others	297	68.4
Estimated properties loss (baht)		
≤ 10,000	105	24.2
10,001 – 50,000	108	24.9
50,001 – 100,000	95	21.9
100,001 and more	126	29.0

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Table 15 Social support among 434 respondents

Social support	Number	%
Needs for social support		
No	49	11.3
Yes	385	88.7
~ Instruments support		
1 Houses	129	29.7
2 Equipments and shops	114	26.3
3 Money	333	76.7
~ Emotional support	112	25.8
~ Physical support	48	11.1
Received support		
No	46	10.6
Yes	388	89.4
~ Instruments support		
1. Houses	299	68.9
2. Equipments and shops	28	6.5
3. Money	319	73.5
~ Emotional support	54	12.4
~ Physical support	27	6.2
Levels of satisfaction with support		
Very satisfied	39	9.0
Moderate satisfied	193	44.5
Mild satisfied	122	28.1
Not satisfied	71	16.4
No comment	9	2.1

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Table 16 History of illness among 434 respondents

History of illness	Number	%
History of psychiatric illness		
No	432	99.5
Yes	2	0.5
History of physical illness		
No	388	89.4
Yes	46	10.6

Table 17 Tsunami exposure among 434 respondents

Tsunami exposure	Number	%
No	83	19.1
Yes	351	80.9

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Quality of Life among the Navies or their Spouses

As described in table 18, the results revealed that the overall mean scores and standard deviation of SF – 36 summary scales of the navies or their spouses were 67.98 and 18.85, respectively. The mean scores ranged from 13.19 to 98.88. The lowest mean scores were in vitality (58.98 ± 17.48) and the highest mean scores were in physical functioning (78.62 ± 21.502). SF – 36 mean scores of PCS were higher than MCS (70.56 ± 20.44 VS 65.41 ± 19.50).

Table 18 Distributions of scores[a] for SF – 36 subscales of 434 respondents

Total sample (N = 434)	**Mean**	**SD**	**Min**	**P25**	**Median**	**P75**	**Max**
Overall SF – 36 summary scales	**67.98**	**18.85**	**13.19**	**54.25**	**72.26**	**83.15**	**98.88**
PCS	**70.56**	**20.44**	**6.25**	**56.09**	**75.62**	**86.87**	**100.00**
Physical Functioning	78.62	21.50	10.00	65.00	85.00	95.00	100.00
Role – Physical	66.47	40.16	00.00	25.00	100.00	100.00	100.00
Bodily Pain	76.52	19.94	00.00	62.50	75.00	87.50	100.00
General Health	60.61	21.70	00.00	45.00	65.00	80.00	100.00
MCS	**65.41**	**9.50**	**11.75**	**49.89**	**69.06**	**80.03**	**100.00**
Mental Health	62.78	18.39	00.00	52.00	64.00	76.00	100.00
Vitality	58.98	17.48	00.00	50.00	60.00	70.00	100.00
Social Functioning	74.28	20.29	12.50	62.50	75.00	87.50	100.00
Role – Emotional	65.59	40.88	00.00	33.33	100.00	100.00	100.00

a = higher scores mean better functioning, few limitations, or less pain

PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 19 showed the mean scores of SF – 36 for 2006 Thailand normative data (Bangkok) (19) comparison with the mean scores of SF – 36 for the navies or their spouses. The mean scores of the navies or their spouses were lower than 2006 Thailand normative data (Bangkok) almost all subscales except physical functioning, bodily pain, social functioning subscales.

Table 19 Comparison between the mean scores of 2006 Thailand normative data for SF – 36 (Bangkok) and the mean scores of SF – 36 for the study population

Subscales	Mean		SD	
	2006 Thailand normative data (Bangkok)	Scores of the study population	2006 Thailand normative data (Bangkok)	Scores of the study population
PCS	**72.25**	**70.56**	**14.57**	**20.44**
Physical Functioning	72.52	78.62	21.09	21.50
Role – Physical	82.16	66.47	27.06	40.16
Bodily Pain	70.84	76.52	18.78	19.94
General Health	63.48	60.61	16.85	21.70
MCS	**69.58**	**65.41**	**12.80**	**19.50**
Mental Health	70.83	62.78	14.48	18.39
Vitality	63.51	58.98	13.87	17.48
Social Functioning	67.51	74.28	19.83	20.29
Role – Emotional	76.48	65.59	32.70	40.88

PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 20 Comparison between mean scores of 2006 Thailand normative data for SF – 36 (Bangkok) and mean scores of SF – 36 among the study population by gender

Subscales	Mean (SD)			
	Male		Female	
	2006 Thailand normative data (Bangkok)	Scores of the study population	2006 Thailand normative data (Bangkok)	Scores of the study population
PCS	**70.99**	**74.81**	**73.03**	**56.33**
	(14.16)	**(17.89)**	**(14.77)**	**(22.04)**
Physical Functioning	72.98	81.61	72.24	68.65
	(20.84)	(20.20)	(21.25)	(22.20)
Role – Physical	79.58	73.42	83.74	43.25
	(28.39)	(36.59)	(26.11)	(42.91)
Bodily Pain	68.29	79.75	72.41	65.75
	(18.84)	(17.81)	(18.58)	(22.79)
General Health	63.10	64.47	63.72	47.70
	(16.11)	(20.30)	(17.30)	(20.30)
MCS	**69.63**	**69.06**	**69.55**	**53.21**
	(13.76)	**(18.13)**	**(12.17)**	**(18.13)**
Mental Health	70.46	65.50	71.05	53.68
	(14.71)	(7.64)	(14.34)	(18.01)
Vitality	64.05	61.60	63.17	50.25
	(13.94)	(17.02)	(13.82)	(16.18)
Social Functioning	70.52	76.08	65.67	68.25
	(19.60)	(19.71)	(19.76)	(21.12)
Role – Emotional	73.47	73.05	78.32	40.66
	(33.63)	(37.15)	(32.01)	(43.05)

PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 20 showed the mean scores of 2006 Thailand normative data (Bangkok) comparison with the mean scores of SF – 36 among the navies or their spouses by gender. For male, the results revealed that the mean scores of the study population were higher than 2006 Thailand normative data (Bangkok) in physical functioning, bodily pain, general health, and social functioning. For female, the mean scores of the study population were lower than 2006 Thailand normative data (Bangkok) in almost all subscales except social functioning.

Association between General Characteristics and Quality of Life among the Navies or their Spouses

As described in table 21, the overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by gender. The results revealed that both overall and individual the mean scores of female were statistically significant lower than male in all subscales ($p < 0.05$). Female was closed to significant association with need for improvement quality of life for overall and all subscales of SF – 36. For male, the subscales with the highest mean scores that greater than 75% of total scores were physical functioning, bodily pain and social functioning, respectively.

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Table 21 Overall and individual mean scores of SF – 36 by gender

Subscales Total (n = 434)	Mean		p – value*
	Male (n = 334)	Female (n = 100)	
Overall SF – 36 summary scales	**71.94**	**54.77**	**0.001***
PCS	**74.81**	**56.33**	**0.001***
Physical Functioning	81.61	68.65	0.001*
Role – Physical	73.42	43.25	0.001*
Bodily Pain	79.75	65.75	0.001*
General Health	64.47	47.70	0.001*
MCS	**69.06**	**53.21**	**0.001***
Mental Health	65.50	53.68	0.004*
Vitality	61.60	50.25	0.001*
Social Functioning	76.08	68.25	0.002*
Role – Emotional	73.05	40.66	0.001*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 22 showed the overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by age groups. The results revealed that both overall and the individual mean scores of the older age groups were significantly lower than the younger groups in all subscales. The dimension with the lowest mean scores was vitality (56.19) and the dimension with the highest mean scores was social functioning (72.81). There was statistically significant association between age and SF – 36 only PCS, bodily pain, and mental health subscales ($p < 0.05$).

Table 22 Overall and individual mean scores of SF – 36 by age groups.

	Mean				
Subscales	**19 – 24**	**25 – 34**	**35 – 44**	**≥ 45**	**p – value***
Total (n = 434)	**(n = 116)**	**(n = 120)**	**(n = 135)**	**(n = 63)**	
Overall SF – 36 summary scales	**71.53**	**70.31**	**65.28**	**62.78**	**0.056**
PCS	**74.42**	**73.75**	**67.53**	**63.84**	**0.032***
Physical Functioning	80.81	83.00	76.88	70.00	0.083
Role – Physical	71.12	68.95	63.33	59.92	0.570
Bodily Pain	80.81	80.00	73.24	69.04	0.003*
General Health	64.95	63.04	56.66	56.42	0.175
MCS	**68.64**	**66.88**	**63.04**	**61.72**	**0.110**
Mental Health	66.55	63.53	60.56	59.17	0.008*
Vitality	62.54	59.62	56.66	56.19	0.054
Social Functioning	75.64	76.04	72.22	72.81	0.320
Role – Emotional	69.82	68.33	62.71	58.73	0.417

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 23 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by marital status. The results revealed that mean scores of the single group were higher than the others both in overall and individual subscales. The subscale with the lowest mean scores was vitality (63.21) and the subscale with the highest mean scores was physical functioning (81.62). The mean scores of widowed group were lower than the others except role – physical limitations and MCS. There was statistically significant association between SF – 36 and marital status almost all subscales ($p < 0.05$) except physical functioning, role – physical limitations, general health, and social functioning subscales.

Table 23 Overall and individual mean scores of SF – 36 by marital status

Subscales Total (n = 434)	Mean			p – value*
	Single (n = 126)	Married (n = 291)	Widowed (n = 17)	
Overall SF – 36 summary scales	**73.14**	**65.90**	**65.41**	**0.001***
PCS	**76.08**	**68.43**	**65.91**	**0.002***
Physical Functioning	81.62	78.16	64.41	0.247
Role – Physical	75.99	62.02	72.05	0.057
Bodily Pain	81.05	74.87	71.32	0.046*
General Health	65.67	58.69	55.88	0.102
MCS	**70.19**	**63.36**	**64.91**	**0.003***
Mental Health	66.34	61.38	60.23	0.008*
Vitality	63.21	57.28	56.76	0.013*
Social Functioning	76.88	73.28	72.05	0.069
Role – Emotional	74.33	61.51	70.58	0.014*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 24 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by education. For overall dimension, the result revealed that people with primary school had mean scores lower than the others groups. The individual mean scores of the SF – 36 which in primary school groups were lower than the others groups and there was statistically significant association between SF – 36 and education almost all subscales ($p < 0.05$) except general health, mental health, and vitality.

Table 24 Overall and individual mean scores of SF – 36 by education

Subscales Total (n = 434)	Mean					p–value*
	Primary (n = 57)	Secondary (n = 241)	Higher secondary (n = 73)	University (n = 30)	others (n = 33)	
Overall SF – 36 summary scales	**57.24**	**67.89**	**71.98**	**73.31**	**73.48**	**0.007***
PCS	**57.79**	**70.96**	**74.17**	**75.43**	**77.21**	**0.005***
Physical Functioning	63.85	79.64	84.52	83.83	78.93	0.001*
Role – Physical	47.80	66.70	71.57	70.83	81.81	0.004*
Bodily Pain	69.07	76.65	78.76	80.41	79.92	0.004*
General Health	50.43	60.85	61.84	66.66	68.18	0.078
MCS	**56.69**	**64.83**	**69.78**	**71.20**	**69.76**	**0.037***
Mental Health	56.63	63.00	63.34	68.80	65.09	0.080
Vitality	55.00	58.42	60.82	63.50	61.81	0.142
Social Functioning	69.51	72.61	80.99	75.83	78.40	0.011*
Role – Emotional	45.61	65.28	73.97	76.66	73.73	0.002*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 25 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by occupation. The results showed that both overall and individual mean scores of housewives group were statistically significant among government officers and employees groups in all subscales ($p < 0.05$).

Table 25 Overall and individual mean scores of SF – 36 by occupation

Subscales Total (n = 434)	Mean			p – value*
	Government (n = 306)	Employees (n = 43)	Housewives (n = 85)	
Overall SF – 36 summary scales	**71.81**	**70.61**	**52.85**	**0.007***
PCS	**74.77**	**72.55**	**54.37**	**0.001***
Physical Functioning	82.33	73.60	67.82	0.001*
Role – Physical	72.54	75.00	40.29	0.001*
Bodily Pain	79.90	77.90	63.67	0.001*
General Health	64.31	63.72	45.70	0.001*
MCS	**68.85**	**68.67**	**51.34**	**0.001***
Mental Health	65.13	67.44	51.95	0.008*
Vitality	61.47	59.30	49.88	0.002*
Social Functioning	76.38	75.87	65.88	0.001*
Role – Emotional	72.44	72.09	37.64	0.001*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 26 demonstrated overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by changes in income. The results revealed that both overall and individual mean scores of decreased income group were lower than the constant and increased income group in all subscales. However, there was statistically significant association between QOL scores and changes in income in almost all subscales except mental health subscale ($p \leq 0.05$). For overall SF – 36 summary scales, decreased income was closed to significant association with need for improvement quality of life.

Table 26 Overall and individual mean scores of SF – 36 by changes in income

Subscales Total (n = 434)	Mean		p – value*
	Decreased income (n = 92)	Constant & increased income (n =342)	
Overall SF – 36 summary scales	**59.84**	**70.17**	**0.001***
PCS	**62.12**	**72.82**	**0.001***
Physical Functioning	72.33	80.32	0.003*
Role – Physical	51.90	70.39	0.001*
Bodily Pain	70.51	78.14	0.001*
General Health	53.75	62.45	0.001*
MCS	**57.55**	**67.52**	**0.002***
Mental Health	57.34	64.24	0.186
Vitality	54.07	60.30	0.004*
Social Functioning	69.15	75.65	0.006*
Role – Emotional	49.63	69.88	0.003*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Association between Characteristics and Amount of Losses and Quality of Life

Table 27 demonstrated overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by loss of family members, relatives or friends/loved one. The results revealed that both overall and individual mean scores of those who had lost family members, relatives or friends/loved one were lower than those who did not loss family members, relatives or friends/loved one in all subscales. There was statistically significant association between SF – 36 scores and loss of family members, relatives, and friends/loved one in all subscales ($p < 0.05$). For overall SF – 36 summary scales, those who had lost family members, relatives or friends/loved one were closed to statistically significant association with need for improvement quality of life ($p < 0.05$).

Table 28 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by loss of houses. The results revealed that both overall and individual mean scores of people who lost houses were lower than those who did not lose houses. There was statistically significant association between QOL scores and loss of houses almost all subscales except MCS, mental health, and role – emotional limitations ($p < 0.05$). Those who had lost their houses were closed to statistically significant association with need for improvement quality of life for overall SF – 36 summary scales ($p < 0.05$).

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Table 27 Overall and individual mean scores of SF – 36 by loss of family members, relatives or friends/loved one.

Subscales Total (n = 434)	Mean		p – value*
	No (n = 400)	Yes (n = 34)	
Overall SF – 36 summary scales	**69.03**	**55.66**	**0.001***
PCS	**71.70**	**57.09**	**0.001***
Physical Functioning	79.76	65.29	0.001*
Role – Physical	68.50	42.64	0.001*
Bodily Pain	77.46	65.44	0.001*
General Health	61.08	55.00	0.046*
MCS	**66.36**	**54.23**	**0.012***
Mental Health	63.65	52.58	0.025*
Vitality	59.68	50.73	0.041*
Social Functioning	75.18	63.60	0.023*
Role – Emotional	66.91	50.00	0.002*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Table 28 Overall and individual mean scores of SF – 36 by loss of houses

Subscales Total (n = 434)	Mean		p – value*
	No (n = 136)	Yes (n = 298)	
Overall SF – 36 summary scales	**72.91**	**65.73**	**0.034***
PCS	**76.11**	**68.02**	**0.029***
Physical Functioning	83.63	76.34	0.004*
Role – Physical	72.24	63.84	0.042*
Bodily Pain	82.99	73.57	0.001*
General Health	65.58	58.33	0.024*
MCS	**69.71**	**63.44**	**0.231**
Mental Health	65.91	61.35	0.138
Vitality	62.13	57.55	0.002*
Social Functioning	78.76	72.23	0.045*
Role – Emotional	72.05	62.63	0.159

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

Table 29 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by loss of own businesses and shops. The results revealed that both overall and individual mean scores of people who had lost own businesses were lower than those who did not lose own businesses and shops in all subscales ($p < 0.05$). There was statistically significant association between QOL scores and loss of own businesses and shops all QOL subscales. For overall SF – 36 summary scales, those who had lost own business were closed to statistically significant association with need for improvement quality of life ($p < 0.05$).

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Table 29 Overall and individual mean scores of SF – 36 by loss of own businesses & shops

Subscales Total (n = 434)	Mean No (n = 318)	Mean Yes (n = 116)	p – value*
Overall SF – 36 summary scales	**70.45**	**61.21**	**0.001***
PCS	**73.23**	**63.21**	**0.001***
Physical Functioning	80.45	73.62	0.002*
Role – Physical	70.91	54.31	0.001*
Bodily Pain	78.61	70.79	0.001*
General Health	62.97	54.13	0.001*
MCS	**67.66**	**59.21**	**0.028***
Mental Health	64.27	58.68	0.017*
Vitality	60.25	55.51	0.005*
Social Functioning	76.02	69.50	0.002*
Role – Emotional	70.12	53.16	0.001*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

Table 30 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by estimated properties loss. The results revealed that both overall and individual mean scores of people who had lost over 100,000 baht were lower than the others in almost all subscales except in physical functioning. However, there was statistically significant association between SF – 36 and estimated properties loss in almost all subscales ($p < 0.05$) except physical functioning, role – physical limitations.

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Table 30 Overall and individual mean scores of SF – 36 by estimated properties loss

Subscales Total (n = 434)	Mean				p – value*
	≤ 10,000 baht (n = 105)	10,001 – 50,000 baht (n = 108)	50,001 –100,000 baht (n = 95)	>100,000 baht (n = 126)	
Overall SF – 36 summary scales	**73.28**	**68.84**	**67.24**	**63.38**	**0.020***
PCS	**75.65**	**71.82**	**69.52**	**66.00**	**0.026***
Physical Functioning	82.00	78.88	76.15	77.46	0.591
Role – Physical	72.38	69.90	66.84	58.33	0.073
Bodily Pain	82.38	77.77	74.21	72.32	0.008*
General Health	65.85	60.74	60.89	55.91	0.029*
MCS	**70.91**	**65.85**	**64.97**	**60.76**	**0.019***
Mental Health	68.45	63.85	60.04	59.20	0.011*
Vitality	64.19	59.21	57.00	55.95	0.082
Social Functioning	79.28	72.45	76.18	70.23	0.017*
Role – Emotional	71.74	67.90	66.66	57.67	0.047*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Association between Social Support and Quality of Life

Table 31 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by characteristics of social support. The results revealed that both overall and individual mean scores of those who needed for social support were lower than those who did not need social support all subscales. However, it was found that there was statistically significant association between SF – 36 and needs for social support in almost all subscales ($p < 0.05$) except role – physical limitations, general health, vitality and role – emotional limitations.

Need for money support, the results revealed that both overall and individual mean scores of people who needed for money support were lower than those who did not need for money support in all subscales. And the table also showed that there was statistically significant association between SF – 36 and need for money support almost all subscales ($p < 0.05$) except role – physical limitations subscales.

Need for emotional support, the results revealed that both overall and individual mean scores of people who needed for emotional support were lower than those who did not need for emotional support in all subscales. And the table also showed that there was statistically significant association between SF – 36 and needs for emotional support almost all subscales ($p < 0.05$) except general health, mental health, and vitality subscales.

Received social support, the results revealed that the individual mean scores of those who did not receive social support were lower than those who received social support in general health, MCS, mental health and vitality subscales. Notably, people who received social support reported the lower mean scores almost all subscales except physical functioning and bodily pain subscales. Regarding this variable, it was found that there was no statistically

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significant association between any of eight subscales of SF – 36 and received support.

Table 31 Overall and individual mean scores of SF – 36 by social support

Subscales Total (n = 434)	Need for social support		Need for money support		Need for emotional-support		Received social support	
	No (n =49)	Yes (n=385)	No (n=101)	Yes (n=333)	No (n=322)	Yes (n=112)	No (n =46)	Yes (n=388)
Overall SF – 36 summary scales	**76.31**	**66.92***	**74.18**	**66.10***	**69.89**	**62.49***	**68.33**	**67.94**
PCS	**79.46**	**69.42***	**75.85**	**68.95***	**72.52**	**64.93***	**71.50**	**70.44**
Physical Functioning	86.53	77.62*	83.66	77.10*	80.34	73.70*	79.23	78.55
Role – Physical	80.61	64.67	73.01	64.48	69.87	56.69*	67.39	66.36
Bodily Pain	83.16	75.68*	80.69	75.26*	78.22	71.65*	79.07	76.22
General Health	67.55	59.72	66.03	58.96*	61.63	57.67	60.32	60.64
MCS	**73.16**	**64.42***	**72.51**	**63.25***	**67.27**	**60.05***	**65.15**	**65.44**
Mental Health	70.20	61.83*	69.06	60.87*	63.95	59.42	57.73	63.38
Vitality	63.77	58.37	64.60	57.28*	59.54	57.36	55.43	59.40
Social Functioning	83.16	73.14*	79.82	72.59*	76.12	68.97*	75.00	74.19
Role – Emotional	75.51	64.32	75.56	62.26*	69.46	54.46*	72.46	64.77

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

Table 32 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by levels of satisfaction with support. The results revealed that the highest overall and individual mean scores were in the very satisfied group in all subscales. In accordant to unsatisfied group showed the lowest overall and individual mean scores almost all subscales except role – physical limitations, social functioning, and role – emotional limitations. There was statistically significant association between SF – 36 and levels of satisfaction with support almost all subscales ($p < 0.05$) except physical functioning, role – physical limitations.

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Table 32 Overall and individual mean scores of SF – 36 by levels of satisfaction with support

Subscales Total (n = 425)	Mean				p – value*
	Very satisfied (n = 39)	Moderate satisfied (n = 193)	Mild satisfied (n = 122)	unsatisfied (n = 71)	
Overall SF – 36 Summary scales	**83.94**	**68.22**	**64.61**	**63.84**	**0.001***
PCS	**83.79**	**70.61**	**68.09**	**66.44**	**0.019***
Physical Functioning	86.15	77.17	78.97	76.90	0.161
Role – Physical	85.89	65.93	61.68	64.78	0.066
Bodily Pain	90.70	76.23	74.59	72.18	0.007*
General Health	72.43	63.10	57.13	51.90	0.001*
MCS	**84.08**	**65.84**	**61.41**	**61.23**	**0.001***
Mental Health	80.30	64.55	58.26	55.88	0.001*
Vitality	78.58	60.00	54.75	52.32	0.001*
Social Functioning	89.42	74.22	70.90	71.47	0.002*
Role – Emotional	88.03	64.59	60.65	65.25	0.001*

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

Association between History of Illness and Quality of Life

Table 33 showed overall and individual mean scores of the SF – 36 among the navies or their spouses comparison by physical history illness. The results revealed that the overall and individual mean scores of those with physical history illness were particularly lower than those with no physical history illness in all subscales especially on general health subscale. There was statistically significant association between SF – 36 and physical history illness

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almost all subscales except role – physical limitations and role – emotional limitations. Those with physical history illness were closed to statistically significant association with need for improvement quality of life for overall SF – 36 summary scales (p = 0.004).

Table 33 Overall and individual mean scores of SF – 36 by physical history illness

Subscales Total (n = 434)	Mean		p – value*
	No (n = 388)	Yes (n = 46)	
Overall SF – 36 summary scales	**69.32**	**56.70**	**0.004***
PCS	**72.10**	**57.52**	**0.002***
Physical Functioning	79.85	68.26	0.004*
Role – Physical	67.84	54.89	0.216
Bodily Pain	77.93	64.67	0.005*
General Health	62.78	42.28	0.001*
MCS	**66.54**	**55.87**	**0.007***
Mental Health	62.88	53.47	0.002*
Vitality	60.05	50.00	0.007*
Social Functioning	75.12	67.11	0.033*
Role – Emotional	67.09	52.89	0.243

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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Association between Tsunami Exposure and Quality of Life

Table 34 showed overall and individual mean scores of the SF – 36 subscales among the navies or their spouses comparison by Tsunami exposure. The Tsunami exposure was assessed in terms of presence or absence of the respondents in the event when Tsunami occurred. The results revealed that the overall and individual mean scores of people who presented in the event when Tsunami occurred were particularly lower than those who absented in all subscales. Interestingly, There was statistically significant association between SF – 36 and Tsunami exposure only on bodily pain subscale ($p = 0.030$)

Table 34 Overall and individual mean scores of SF – 36 by Tsunami exposure

Subscales	**Mean**		
Total (n = 434)	**No (n = 83)**	**Yes (n = 351)**	**p – value***
Overall SF – 36 summary scales	**71.28**	**67.02**	**0.066**
PCS	**73.73**	**69.80**	**0.118**
Physical Functioning	80.48	78.19	0.270
Role – Physical	69.58	65.74	0.355
Bodily Pain	81.02	75.46	0.030*
General Health	63.85	59.84	0.337
MCS	**68.82**	**64.60**	**0.680**
Mental Health	66.60	61.88	0.138
Vitality	60.96	58.51	0.200
Social Functioning	79.06	73.14	0.109
Role – Emotional	68.67	64.86	0.838

*significant at $p \leq 0.05$, PCS = Physical Component Summary, MCS = Mental Component Summary

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CHAPTER V
DISCUSSION

The 2004 Indian Ocean Tsunami, it has been a terrible tragedy for all those involved particularly people in Phang – Nga Naval Base. As a result of the Tsunami affected upon most of the navies or their spouses. It could affected all aspects of an individual's health; physical, mental, social and perception of overall well – being which affected their quality of life. This study aimed to measure the quality of life among the navies or their spouses survivors, six months after experienced Tsunami. This chapter presents the discussion of research finding and compares the results with previous studies.

Quality of Life Among the Navies or their Spouses

The Thai version of SF – 36 version 1.0 questionnaires were used to measure the quality of life among the navies or their spouses survivors six months after experienced Tsunami disaster in Phang – Nga Naval Base, Phang – Nga province. After transforming the original response category 1 – 6 to recoded value of 0 to 100. The cutoff point of equal or grater than 75% total scores was classified as "good quality of life", the remaining was considered as "need for improvement quality of life".

The navies or their spouses reported markedly that they needed for improvement their quality of life. The result indicated the lower mean scores of quality of life in almost all subscales. This result was similar to many previous studies (149 – 159). However, they tended to have good quality of life in physical functioning and bodily pain subscales (78.62 ± 21.50 and 76.52 ±

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19.946, respectively) (table 18). This could be explained that the majority of them (77%) were male and they also were the navies who were the healthy group than general population since they always trained their physical health.

For comparison with the 2006 Thailand normative data (Bangkok) (table 19), their mean scores were lower than 2006 Thailand normative data (Bangkok) in almost all subscales except physical function, bodily pain, and social function subscales. When comparison by gender (table 20), it was clearly shown that the mean scores of both male and female were lower than 2006 Thailand normative data (Bangkok) in almost all subscales of MCS except social function. This could be explained that the consequences of Tsunami were seriously affected their mental health even if time passed. This was in accordance with Toukmanian et al. (161), they stated that disasters involving death, extensive casualties and massive destruction were related to more severe and chronic psychological problems in victims and disaster experience was related to increasing psychological impairment in the individual.

Association between Variables and Quality of Life among the Navies or their Spouses

The mean scores of SF – 36 in female were statistically significant lower than male both in all subscales of SF – 36 ($p < 0.05$) and overall SF – 36 summary scales ($p = 0.001$) (table 21). It might be reasonable to conclude that female could be more of a risk factor for lower quality of life and they needed for more improvement than male in all subscales of QOL. These result also confirmed many previous finding (149 – 151). Wu et al. (151) found that female gender tended to have lower QOL scores on the bodily pain, general health, vitality, and mental health subscales. This could be explained that women, traditionally, had more responsibilities in home management and family care giving than men do. Therefore, women may feel greater disruption than men when they could not resume their livelihood and women had been found to struggle to maintain their usual family role after Tsunami event and to

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resume household activities early during recovery period they may felt more tired and women more likely than men to express feeling of fear and anxiety. Some researchers also believed that biological hormonal changes that put added stress and women suffering from depression may not take good care of themselves, lack the energy to exercise, and forget to keep healthcare appointments (162).

The navies or their spouses whose age 45 years and more were tended to need for improvement QOL in PCS, bodily pain, and mental health ($p < 0.032$, $p < 0.003$, $p < 0.008$, respectively) (table 22). These was in accordance with the many previous studies (150 – 152, 156, 158). Study by Wu et al.(151) found the aged scores lower on the QOL subscales, especially in the physical subscales. Many results reported in disaster literatures indicated that people in the middle – age group experience more psychological than other age groups and the recovery from psychological distress was more difficult than in younger (103) because they have greater stress and burdens. When survivors were elderly their quality of life trended to be worse (150). The relationship between age and quality of life also may be more complicated than a question simply of old versus young subjects showing more or fewer quality of life. Comparing different studies on age is difficult because most of the studies divided their subjects into different age groups, some defining the “old” group as older than 60 years (89), while others define “old” as aged 45 and above (88). Therefore, it was not certain that older people were more vulnerable to disaster effects more research was needed with different age groups to clarify the matter.

The navies who were single tended to have good quality of life for both PCS scales and MCS scales ($p < 0.05$). The navies or their spouses who were married or widowed/divorced tended to need for improvement their quality of life. A possible explanation was that the single group might bear an even lesser obligation to their family than the married or widowed/divorced respondents. Further, as the single respondents were typically younger and more active, no effect was demonstrated on bodily pain. Persons who were married

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or widowed/divorced respondents, even in normal times, played an important role in society in maintaining and developing family households. Having children, especially younger children, may be a special source of distress for parents. Although most studies on disaster survivors reported that being married was generally related with lower quality of life, there were finding to contrary. Study by Tsai et al. (158), founded that the married respondents showed higher quality of life in the mental health subscale than the single respondents; divorced persons, widows and widowers showed higher quality of life in role – emotional limitations due to emotional problems than the single respondents.

In this study, the persons with lower levels of education had a lower quality of life. This was in contrast to the study by Tsai et al. (158), they founded that the people with higher levels of education had a lower quality of life, possibly because these respondents expected a higher quality of life than they had, which led to the subjective feeling of a lower quality of life.

The mean scores of SF – 36 for housewives were statistically significant lower than others both in all subscales of SF – 36 ($p < 0.05$) and overall SF – 36 summary scales ($p = 0.007$). Generally, women, parents were more likely to suffer psychological difficulties after a community disaster when compare to men, childless individuals. These result was similar to earlier report and support the notion that female gender needed for improvement quality of life in all subscales. The explanation were in elsewhere above.

Another important finding in this study was the significant association between changes in income and overall subscales quality of life ($p = 0.001$). The decrease of family income produced most significant effects except on mental health subscale (no significant finding). Decreased income was based on the difference between income before the attack of Tsunami compared to income after the attack. A possible explanation was that there was less opportunity to work for other operative forms of income, for women, such as textile work or bread making within the home, after the Tsunami disaster and

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most family incomes decreased. This is in accordance with the results from some studies that stated the financial loss affects physical and psychological health (163). Study by Chou et al. (150) indicated that one of the risk factors that affected quality of life in survivors were financial loss. Study by Woersching et al. (100) reported that loss of income to be factors consistent increased mental health markers.

Association between Characteristics and Amount of Losses and Quality of Life

In this study, the losses were assessed in terms of injury to oneself; death of family members, relatives, friends/loved one; damaged to one 's house, own business and shops, and estimated properties loss. The results shown that the impact of the loss of one's family members, relatives, friends/loved one affected overall quality of life and all subscales ($p = 0.001$). Similarly, in a study by Tsai et al.(158) indicated that loss of family member would induced a significant negative influence on quality of life, especially on the MCS score. The impact of the loss of one's house affected overall quality of life, PCS dimension, vitality and social function ($p = 0.034$, $p = 0.029$, $p = 0.002$, $p = 0.045$, respectively). The impact of the loss of one's own business or shop affected overall quality of life ($p = 0.001$) and all subscales of PCS and MCS ($p \leq 0.05$). Notably, the results also indicated that the higher the estimated properties loss the lower the scores for quality of life. The results also confirmed previous finding that financial loss affects physical and psychological health. In accordance with Wu et al.(151) also reported that the persistence of long – term economic problems was one of many important factors affecting quality of life.

Association between Social Support and Quality of Life

The importance of social supports and life events and their relationship to physical and psychological health has been amply documented. Because social support has been proposed as a key resource for overcoming life crises, when social network change, the physical or mental aspects of life quality are

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strongly influenced (150). Social support was highly supportive and facilitate post – disaster recovery among victims (149).

The needs for social support were assessed in terms of need for money and need for emotional support. The results shown that the persons who needed for social support tended to report lower quality of life except on role – physical limitations, general health, vitality, and role – emotional limitations subscales. The impact of the need for money affected almost all subscales except on role – physical limitations. The impact of the need for emotional support affected almost all subscales except on general health, mental health, and vitality. The explanation was likely to account for the relationship between the needs for social support and quality of life was that subjects who need a lot of help because of a large number of losses they experienced and a large number of psychological symptoms, may be more likely to seek social support than subjects in a good condition. The available of social support was important in helping people overcome difficult situations and control stress (70).

Regarding received social support, in examining the scores of quality of life, one could see that there was no significant association between quality of life and received social support. On the other hand, received social support did not produce any significant effects on quality of life subscales. Nevertheless, the navies or their spouses who received social support tended to report lower quality of life subscale scores except on physical functioning and bodily pain. Kato et al. (90) noted that if people did not get some kind of support immediately, it was possible that the prevalence of various psychiatric problems, such as depression, adjustment disorders, alcoholism, or chronic PTSD, would increase.

Regarding the levels of satisfaction with support, those of unsatisfied group tended to report lower scores of quality of life except on physical functioning and role – physical limitations. In the case of a Tsunami, a possible explanation might be that the residents in the Phang – Nga naval base were not

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the targeted as high priority over the victims of the disaster in the provision of relief efforts, including mental health services. Those subjects were very disappointed with the support they received in the time after the Tsunami. It seemed that persons did not receive as much support as they wanted and needed. Their inability to express their own feeling and thoughts might impair their ability to seek support and relief from other people. Social support received in the time after the Tsunami should be of importance more than support received in any time later. Those of very satisfied group tended to report higher scores of quality of life except on general health. It might be that this group did not feel the need of special support during the time after the Tsunami, thus giving a high rating in general to support. This results were similar to those of Wang et al. (149). They indicated that the group that experienced lower initial exposure but then received less post – disaster help reported poorer quality of life and psychological well – being. The group that received more support showed a general improvement in post – disaster well – being from 3 months to 9 months.

Association between History of Illness and Quality of Life

The persons with physical history illness scored lower on all quality of life subscales, reflecting the generality of effect across both physical and mental subscales. Physical history illness was significantly associated with almost all subscales of quality of life except on role – physical limitations and role – emotional limitations. These result suggested that physical history illness had the greatest negative impact on respondents. Therefore, the feeling of respondents were that their overall quality of life were poor. This finding supported previous research indicating that illness or physical injuries could impair individual quality of life, compounded by changes in occupation, financial condition and social support (155). This finding was also in line with some studies (154, 164) which have shown that when subjects with physical illness experience disaster, their prognosis and quality of life become worse. Dixon et al. (165) also reported an association between medical comorbidity

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with poorer self – reported physical health and greater psychotic and depressive symptoms. A study by Wu et al.(151) founded that the predictors for poor quality of life were physical illness.

Association between Tsunami Exposure and Quality of Life

The Tsunami exposure was assessed in terms of presence or absence of the participants in the event when Tsunami occurred. Participants that presented in the event when Tsunami occurred scored lower on all quality of life subscales, reflecting the generality of effect across both physical and mental subscales. It appeared reasonable to conclude that, for participants who presented in the event when Tsunami occurred should be emphasized to improve their quality of life. This finding was also in line with Wang et al. (149) have demonstrated that disaster exposure was associated with multidimensional impairment in quality of life, including the physical, psychological, and environmental domains. Similar to Chou et al.'s (159) finding, the results suggested that survivors of catastrophic event would tend to suffer degradation in terms of their subjective perception of quality of life. Other study showed that one of the most consistent risk factors for poor physical and mental well – being among adults survivors in a population experiencing a communitywide disaster were intensity of exposure (63). However, the present study also revealed the Tsunami exposure was significantly associated with quality of life only on bodily pain subscale which reflected the subjective feeling of body function ($p = 0.030$). One reason given to explain for this finding could be that the participants were traumatized by Tsunami when it occurred. They also suffered major physical injury or disability.

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Limitations of the Study

As any study, the results need to be viewed in light of its limitations and strengths. Researcher believe that the strengths of this study are as follows. First, this was a population survey with no sampling bias, and no significant differences were found comparing basic information for respondents and non – respondents. Second, others workers have supported the validity of the SF – 36 to determine quality of life. Third, this article is one of a few articles that have examined Tsunami survivors ' quality of life. Forth, if the impact of the Tsunami on quality of life diminished over time, then the maximum impact on each domain of quality of life may have been underestimated. However, the negative effect of the Tsunami on quality of life in this study have been captured by the post – Tsunami assessment administered 6 months after the disaster.

However, there are several limitations to the study. The navies or their spouses survivors who were unable to undertake the interview, especially those who had moved out of the affected area after the Tsunami, would have more likely reported a decreased quality of life. Consequently, the QOL of the navies or their spouses may have been underestimated. The second and a major limitation of this study is that all subjects in the study experienced the Tsunami, and they were not compared to any controls from non – Tsunami areas. Therefore, it is impossible to distinguish changes in quality of life due to the Tsunami from those due to a natural time trend. However, it may be reasonable to assume that the quality of life among the people in Phang – Nga naval base would have remained relatively unchanged over 6 months if there had been no Tsunami, so the changes in quality of life can be attributed to the Tsunami. Finally, one must take into account that the results indicate only possible relationships between independent and dependent variables, without stating causal relationship.

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CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

Conclusion

This descriptive cross – sectional study aimed to identify the consequences of the Tsunami disaster on health – related quality of life among the navies or their spouses who survived from the Indian Ocean Tsunami, 6 months after Tsunami disaster and compared these data with 2006 Thailand normative data (Bangkok), and to determine the association between quality of life and characteristics and amount of losses, Tsunami exposure, post – disaster support and other related variables. Data was collected from 24 July to 5 August, 2005, using a structured questionnaires modified from Medical Outcomes Study Short Form – 36 (MOS SF – 36), which included demographic data, characteristics and amount of loss, social support, health information, and type of Tsunami exposure.

A total of 434 subjects participates in the study. Majority of the sample was men (77%), married (67%), and the mean age of 34 years old. The quality of life scores among the navies or their spouses were lower than 2006 Thailand normative data (Bangkok) in almost all subscales, except physical functioning, bodily pain, social functioning subscales. Comparison of the studied QOL scores and the 2006 Thailand normative data (Bangkok) by gender found that the major consequence of Tsunami was mental health problem. Majority of survivors who seriously experienced mental problem were female, low education, and had experienced a changes in income, loss of one's family member / loved one or properties, needs for social support, physical history illness, their quality of life tended to be worse. To improve their quality of life, these people required an appropriate social support, physical and mental

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health care. However, there was statistically significant association between quality of life and exposed to Tsunami. Bodily pain, only an indicator subscale of quality of life was statistically significant associated to Tsunami exposure.

Recommendations

Based on the findings of this study, the following points of recommendations could be advantageous for the further implementation for promoting better quality of life among the navies or their spouses and other disaster survivors**.**

Recommendations for Further Research

1) The results of the study reveal that Tsunami disaster has an effect on mental health problems and quality of life of the navies or their spouses. It is suggested that further studies be undertaken among them for a longer period such as 12 months, 18 months or 24 months and compare the results with 6 months. The effective intervention should be planned and continued to improve their mental impairment and quality of life. The results would then serve as guidelines for promoting mental health support in recovery phase after experienced Tsunami because the long – term effects of the psychological trauma of disaster affects good quality of life.

2) Need for social support leads to lower quality of life of the navies or their spouses. It is therefore recommended the further studies should cover the factors related to social support that affects good quality of life. The results of such studies will suggest guidelines for providing adequate and efficient social support.

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Policy Recommendations

1) This study and many studies worldwide have reported the long – term effects of the psychological trauma of disasters. It is recommended that the government should establish health promotion policy for the victims include entry victims (such as police, military personnel, rescue workers, government officials, volunteers) in the impact area. The policy may emphasize the promotion of mental rehabilitation programs.

2) The findings show that the victims who have insufficient income or lower incomes are more likely to have lower quality of life. In order to generate income for the them, the government should provide appropriate work and promote a market for distribution of victims made products. In addition, a tax deduction system should be offered to them.

3) Female, married and the widow/divorce victims have lower quality of life than do males, and the single groups. The government should pay special attention in promoting health and quality of life among female victims and those who are married and widowed, divorced.

4) There is evidence that a large amount of resources, both domestic and international, was under – utilized in the efforts to assist the victims and therefore, knowledge of changes in quality of life over the time. The government should efficiently allocate resources at different time. However, it is critical to carry out longitudinal studies to identify and assess the mental health needs to be met for the sake of those who have not yet recovered and the victims' needs in each phase following the disaster because their needs can change as time passes.

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APPENDIX

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APPENDIX A
INFORMATION SHEET

เอกสารชี้แจงข้อมูล/คำแนะนำแก่ผู้เข้าร่วมการวิจัย

(Patient/Participant Information Sheet)

ชื่อโครงการ "คุณภาพชีวิตของทหารเรือประจำการ – คู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิ 6 เดือน ณ ฐานทัพเรือพังงา จังหวัดพังงา"

ภาษาอังกฤษ "Quality of Life Among the Navies, their Spouses Survivors, Six Months after the Tsunami Disaster in Phang – Nga Naval Base, Phang – Nga Province"

ชื่อผู้วิจัย รศ.นพ รณชัย คงสกนธ์ (Assoc. Pro. Dr. Ronnachai Kongsakon)
รศ.พญ สมจิต พฤกษะริตานนท์ (Assoc. Pro. Dr. Somjit Prueksaritanond)
นางสาวธนุช พุทธาวรางค์ (Miss Thanuch Putthavarang) นักศึกษาปริญญาโท หลักสูตรวิทยาศาสตร์มหาบัณฑิต สาขาวิทยาการระบาดคณะแพทยศาสตร์ ศิริราชพยาบาล มหาวิทยาลัยมหิดล

สถานที่ทำการวิจัย ฐานทัพเรือพังงา ตำบลลำแก่น อำเภอท้ายเหมือง จังหวัดพังงา

บุคคลและวิธีการติดต่อเมื่อมีเหตุฉุกเฉินหรือความผิดปกติที่เกี่ยวข้องกับการวิจัย

1. รศ.นพ.รณชัย คงสกนธ์ โทรศัพท์ 0 2201 1478
2. รศ.พญ.สมจิต พฤกษะริตานนท์ โทรศัพท์ 0 2201 1486

ผู้สนับสนุนการวิจัย โครงการรามาธิบดีช่วยเหลือผู้ประสบภัยภาคใต้อย่างต่อเนื่อง คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี

ความเป็นมาของโครงการ

วันที่ 26 ธันวาคม 2547 เวลาประมาณ 07058 (ตามเวลาในประเทศไทย) ได้เกิดคลื่นยักษ์สึนามิขึ้นรอบมหาสมุทรอินเดียโดยมีจุดศูนย์กลางอยู่ทางตะวันตกของเกาะสุมาตรา ความรุนแรงของแผ่นดินไหววัดได้ 9.0 ริคเตอร์ สำหรับประเทศไทยได้รับผลกระทบบริเวณ ภาคใต้ของประเทศบริเวณชายฝั่งทะเลอันดามัน รวม 6 จังหวัด ได้แก่ จังหวัดระนอง พังงา ภูเก็ตกระบี่ ตรัง

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และสตูล ก่อให้เกิดความเสียหายอย่างไม่สามารถประเมินค่ามิได้ และทำให้มีผู้เสียชีวิต 5,395 คน ผู้ได้รับบาดเจ็บ 8,457 คน และผู้สูญหาย 2,932 คน ตามลำดับ (วันที่ 8 มีนาคม 2548 โดยพังงาเป็นจังหวัดที่มีจำนวนผู้เสียชีวิตและสูญเสียทรัพย์สินมากที่สุด) สำหรับฐานทัพเรือพังงา จังหวัดพังงา จากการสำรวจของสภาวิศวกรเมื่อวันที่ 8 มกราคม – 9 มกราคม 2548 พบว่าคลื่นได้ซัดเข้าไปทำลายฐานทัพเรือเสียหายมาก นอกจากนี้สึนามิยังได้ซัดเรือหลวงกระบุรี เอฟเอฟ 457 ซึ่งมีขนาดยาวกว่า 150 ฟุตขึ้นฝั่งด้านทิศตะวันตกของฐานทัพเรือ สำหรับทหารและครอบครัวซึ่งรอดชีวิตจากภัยดังกล่าวต้องเผชิญกับความสูญเสียจากภัยพิบัติดังกล่าวซึ่งมิอาจประเมินค่าได้ ถึงแม้ว่าที่ผ่านมาจะมีหน่วยงานทั้งภาครัฐและภาคเอกชนได้ให้ความช่วยเหลือกับผู้ประสบภัยดังกล่าวแล้ว ส่วนใหญ่จะเน้นการช่วยเหลือด้านกายภาพเป็นส่วนใหญ่ มิได้ใส่ใจกับด้านจิตใจเท่าที่ควร

สำหรับฐานทัพเรือพังงาซึ่งประกอบไปด้วยทหารซึ่งเป็นผู้ชายเป็นส่วนใหญ่สังคมมักมองเป็นที่พึ่งพาของผู้อื่นและมีความเข้มแข็งทั้งทางร่างกายและจิตใจ ฉะนั้นภาพที่ปรากฏออกสู่สาธารณชนอาจมิได้เป็นตัวตนที่แท้จริง ลึกๆแล้วอาจมีเจ็บป่วยทั้งทางด้านร่างกายและจิตใจซ่อนเร้นอยู่ซึ่งเมื่อสะสมเป็นระยะเวลานานโดยไม่ได้รับการช่วยเหลืออาจส่งผลให้เกิดการเจ็บป่วยทางกายและทางจิตที่รุนแรง อาจส่งผลกระทบต่อหน้าที่ความรับผิดชอบต่อชาติบ้านเมืองในอนาคตได้

วัตถุประสงค์

เพื่อประเมินและศึกษาถึงคุณภาพชีวิตของทหารประจำการหรือคู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิ 6 เดือน ณ ฐานทัพเรือพังงา จังหวัดพังงา

รายละเอียดที่จะปฏิบัติต่อผู้เข้าร่วมการวิจัย

ผู้เข้าร่วมการวิจัยตอบแบบสอบถาม ข้อมูลทั่วไป และแบบสำรวจสุขภาพทั่วไป (Medical Outcome Study Short Form 36 Item Health Survey) ใช้เวลาประมาณ 10 – 15 นาทีขณะตอบแบบสอบถามถ้าเกิดความไม่เข้าใจสามารถสอบถามผู้วิจัยได้ หากผู้เข้าร่วมการวิจัยไม่สะดวกสามารถปฏิเสธการการเข้าร่วมในการวิจัยครั้งนี้ได้

ประโยชน์และผลข้างเคียงที่จะเกิดแก่ผู้เข้าร่วมการวิจัย

ประโยชน์จากข้อมูลการวิจัยครั้งนี้จะนำไปเป็นแนวทางสำหรับการดูแลให้ความช่วยเหลือฟื้นฟูทั้งด้านร่างกายและจิตใจและพัฒนาคุณภาพชีวิตต่อไป

การเก็บข้อมูลเป็นความลับ

ข้อมูลทั้งหมดจากการตอบแบบสอบถามจะได้รับการปกปิดเป็นความลับ การรายงานผลการวิจัยจะรายงานเป็นผลสรุปของการศึกษาทั้งหมด

ถ้าท่านมีปัญหาข้องใจหรือรู้สึกกังวลใจกับการเข้าร่วมในโครงการวิจัยนี้
ท่านสามารถติดต่อกับประธานกรรมการ

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APPENDIX B
INFORMED CONSENT FORM

ชื่อโครงการ "คุณภาพชีวิตของทหารประจำการ – คู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิ 6 เดือน ณ ฐานทัพเรือพังงา จังหวัดพังงา"

ภาษาอังกฤษ "Quality of Life Among the Navies, their Spouses Survivors, Six Months after the Tsunami Disaster in Phang – Nga Naval Base, Phang – Nga Province"

ชื่อผู้วิจัย รศ.นพ. รณชัย คงสกนธ์ (Assoc. Pro. Dr. Ronnachai Kongsakon)
รศ.พญ.สมจิต พฤกษะริตานนท์ (Assoc. Pro. Dr. Somjit Prueksaritanond)
นางสาวธนุช พุทธาวรางค์ (Miss Thanuch Putthavarang) นักศึกษาปริญญาโท หลักสูตรวิทยาศาสตร์มหาบัณฑิต สาขาวิทยาการระบาด คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

* ชื่อผู้เข้าร่วมการวิจัย

คำยินยอมของผู้เข้าร่วมการวิจัย

ข้าพเจ้า.....ได้ทราบรายละเอียดของโครงการวิจัย ตลอดจนประโยชน์และข้อเสี่ยงที่จะเกิดขึ้นต่อข้าพเจ้าจากผู้วิจัยแล้วอย่างชัดเจน ไม่มีสิ่งใดปิดบังซ่อนเร้นและยินยอมให้ทำการวิจัยในโครงการที่มีชื่อข้างต้นและข้าพเจ้ารู้ว่าถ้ามีปัญหาหรือข้อสงสัยเกิดขึ้นข้าพเจ้าสามารถสอบถามผู้วิจัยได้ และข้าพเจ้าสามารถไม่เข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้ โดยไม่มีผลกระทบต่อการรักษาที่ข้าพเจ้าพึงได้รับ นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่างๆที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น

ลงชื่อ.....(ผู้เข้าร่วมการวิจัย)

.....(พยาน)

.....(พยาน)

วันที่.....

หมายเหตุ กรณีผู้เข้าร่วมการวิจัยไม่สามารถอ่านหนังสือได้ ให้ผู้วิจัยอ่านข้อความในหนังสือยินยอม

*ผู้เข้าร่วมการวิจัย หมายถึง ผู้ยินยอมตนให้ทำวิจัย

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APPENDIX C
INSTRUMENTS

□□□ เลขที่แบบสัมภาษณ์

แบบสัมภาษณ์ข้อมูลทั่วไปสำหรับทหารเรือประจำการ – คู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิ

คำชี้แจง

ผู้ตอบแบบสัมภาษณ์ต้องเป็นทหารประจำการหรือคู่สมรสที่รอดชีวิตภายหลังประสบภัยธรณีพิบัติคลื่นยักษ์สึนามิเมื่อวันที่ 26 ธันวาคม พ.ศ.2547

1) ข้อมูลของท่านจะเป็นประโยชน์อย่างยิ่งสำหรับการศึกษาวิจัยทางด้านเวชศาสตร์ชุมชนและเพื่อประยุกต์สู่การดูแลผู้ประสบภัยในอนาคต
2) โปรดทำเครื่องหมาย ✓ ในช่อง ( ) หรือเติมข้อความในช่องว่างตามความเป็นจริง

ชื่อ.....นามสกุล.....

ตำแหน่ง.....

สำหรับผู้วิจัย

1. เพศ ( ) 1. ชาย ( ) 2. หญิง SEX □ 4

2. อายุ..... ปี (นับจำนวนเต็มปีบริบูรณ์) AGE □ 5

3. ที่อยู่ปัจจุบันของผู้ตอบแบบสัมภาษณ์ บ้านเลขที่..... ADD □ 6

4. จบการศึกษาสูงสุด EDU □ 7

( ) 1. ประถมศึกษา ( ) 2. มัธยมศึกษา

( ) 3. ประกาศนียบัตร ( ) 4. ปริญญาตรี

( ) 5. อื่นๆ (ระบุ).....

5. สถานภาพสมรส STATUS □ 8

( ) 1. โสด ( ) 2. คู่

( ) 3. หย่าร้าง ( ) 4. หม้าย

6. อาชีพ OCC □ 9

( ) 1. รับราชการ ( ) 2. ลูกจ้างประจำ

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( ) 3. ลูกจ้างชั่วคราว ( ) 4. แม่บ้าน

6. อาชีพเสริม EXOCC ☐ 10

( ) 1. ไม่มี ( ) 2. ค้าขาย

( ) 3. เกษตรกร (ทำนา, ทำไร่ , ทำสวน) ( ) 4. รับจ้าง

( ) 5. ธุรกิจส่วนตัว ( ) 6. อื่นๆ(ระบุ).....

7. ตัวท่านมีรายได้ต่อเดือนประมาณ BEINC ☐ 10

( ) 1. 4,999 บาทและต่ำกว่า ( ) 2. 5,000 – 9,999 บาท

( ) 3. 10,000 – 14,999 บาท ( ) 4. 15,000 บาทและสูงกว่า

( ) 5. ไม่มีรายได้

8. หลังประสบภัยตัวท่านมีรายได้ต่อเดือนประมาณ AFINC ☐ 11

( ) 1. 4,999 บาทและต่ำกว่า ( ) 2. 5,000 – 9,999 บาท

( ) 3. 10,000 – 14,999 บาท ( ) 4. 15,000 บาท และสูงกว่า

( ) 5. ไม่มีรายได้

9. ภายหลังประสบภัยมีการสูญเสียบุคคลในครอบครัวหรือไม่

( ) 1. ไม่มี PSLOSS ☐ 12

( ) 2. มี (ตอบได้มากกว่า 1 ข้อ)

( ) 1. พ่อ PSLOS 1 ☐ 13

( ) 2. แม่ PSLOS 2 ☐ 14

( ) 3. พี่ – น้อง PSLOS 3 ☐ 15

( ) 4. ลูก PSLOS 4 ☐ 16

( ) 5. อื่นๆ (ระบุ)..... PSLOS 5 ☐17

10. ภายหลังประสบภัยมีการสูญเสียทรัพย์สินหรือไม่

( ) 1. ไม่มี PPLOS ☐ 18

( ) 2. มี (ตอบได้มากกว่า 1 ข้อ)

( ) 1. บ้าน – ที่อยู่อาศัย PPLOS 1 ☐19

( ) 2. กิจการ/ร้านค้า PPLOS 2 ☐ 20

( ) 3. โรงแรม/รีสอร์ท PPLOS 3 ☐ 21

( ) 4. ผลิตผลทางเกษตรกรรม PPLOS 4 ☐ 22

( ) 5. อื่นๆ ระบุ..... PPLOS 5 ☐ 23

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11. ประเมินมูลค่าทรัพย์สินที่สูญเสีย.....บาท ESTLOS ☐ 24

( ) 1. ต่ำกว่า 10,000 บาท ( ) 2. 10,001 – 50,000 บาท

( ) 3. 50,001 – 100,000 บาท ( ) 4. 100,001 – 500,000 บาท

( ) 5. 500,001 ขึ้นไป

12. ความต้องการความช่วยเหลือ

( ) 1. ไม่ต้องการ HLP ☐ 25

( ) 2. ต้องการ (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ด้านกายภาพ(สิ่งแวดล้อม)

( ) ที่อยู่อาศัย HLPPSC 1 ☐ 26

( ) ที่ทำมาหากิน HLPPSC 2 ☐ 27

( ) 2. ด้านการเงิน

( ) ทุนประกอบอาชีพ.....บาท HLPMON 1 ☐ 28

( ) ทุนการศึกษา.....บาท HLPMON 2 ☐ 29

( ) ค่าครองชีพ.....บาท HLPMON 3 ☐ 30

( ) 3. ด้านจิตใจ HLPPSY ☐ 31

( ) 4. ด้านร่างกาย HLPBO ☐ 32

13. ในช่วงเวลาที่ผ่านมาหลังประสบภัยท่านได้รับความช่วยเหลือ

( ) 1. ด้านกายภาพ(สิ่งแวดล้อม)

( ) ที่อยู่อาศัย PHLPPSC 1 ☐ 33

( ) ที่ทำมาหากิน PHLPPSC 2 ☐ 34

( ) 2. ด้านการเงิน

( ) ทุนประกอบอาชีพ..... บาท PHLPMON 1 ☐ 35

( ) ทุนการศึกษา.....บาท PHLPMON 2 ☐ 36

( ) ค่าครองชีพ.....บาท PHLPMON 3 ☐ 37

( ) 3. ด้านจิตใจ PHLPPSY ☐ 38

( ) 4. ด้านร่างกาย PHLPBO ☐ 39

14. ท่านพึงพอใจกับความช่วยเหลือที่ได้รับในช่วงที่ผ่านมาในระดับใด PHLPCON 1 ☐ 40

( ) 1. พอใจมาก

( ) 2. ปานกลาง

( ) 3. น้อย

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( ) 4. ไม่พอใจ เพราะ

.....

.....

.....

.....

( ) 5. ไม่แสดงความคิดเห็น

15. ท่านเคยมีประวัติการเจ็บป่วยทางจิตเวชหรือไม่

( ) 1. ไม่มี PSY ☐ 41

( ) 2. มี (ระบุ).....

16. ท่านมีโรคประจำตัวหรือไม่

( ) 1. ไม่มี

( ) 2. มี (ระบุ)..... SICK ☐ 42

17. ขณะเกิดคลื่นยักษ์สึนามิท่านอยู่ในเหตุการณ์หรือไม่

( ) 1. ไม่อยู่ TSUN ☐ 43

( ) 2. อยู่

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แบบสำรวจสุขภาพทั่วไป (SF-36)
Rand 36- Item Health Survey 1.0

คำถามเหล่านี้จะถามเกี่ยวกับสุขภาพของท่าน ว่าท่านรู้สึกอย่างไรและสามารถทำกิจกรรมต่างๆ ตามปกติได้อย่างไร ถ้าท่านไม่มั่นใจการตอบคำถาม โปรดให้คำตอบที่ดีที่สุดเท่าที่ท่านเข้าใจ

โปรดเลือกกา × ในช่องที่ตรงกับความเห็นของท่าน<u>เพียงหนึ่งช่องในแต่ละข้อ</u>

๑. โดยทั่วไปที่ผ่านมา ๑ เดือนสุขภาพของท่าน.....(เลือกเพียงหนึ่งช่อง)

	ดีเยี่ยม
	ดีมาก
	ดี
	พอใช้
	ไม่ดีเลย

๒. เปรียบเทียบช่วง ๑ ปีที่ผ่านมา ปัจจุบันสุขภาพของท่าน.....(เลือกเพียงหนึ่งช่อง)

	ดีขึ้นมาก
	ดีขึ้นบ้าง
	เหมือนเดิม
	แย่ลงบ้าง
	แย่ลงมาก

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ภาวะสุขภาพของท่านในปัจจุบัน **มีผลกระทบหรือเป็นข้อจำกัด** ในการประกอบกิจกรรมต่างเหล่านี้หรือไม่มากน้อยเพียงใด.....(เลือกเพียงหนึ่งช่องในแต่ละข้อ)

	มีผลมาก	มีบ้างเล็กน้อย	ไม่มีผล
๓. กิจกรรมที่ต้องออกแรงมาก เช่น วิ่ง ยกของหนักๆ เล่นกีฬาที่ใช้แรงมาก			
๔. กิจกรรมที่ออกแรงปานกลาง เช่น ย้ายโต๊ะ ถูบ้าน			
๕. ยกของ หรือหิ้วตะกร้าจ่ายตลาด			
๖. เดินขึ้นบันไดหลายๆชั้น			
๗. เดินขึ้นบันได ๑ ชั้น			
๘. ก้มตัว หรือคุกเข่า หรือโค้งตัว			
๙. เดินทางระยะมากกว่า ๑ กิโลเมตร			
๑๐. เดินทางหลายช่วงเสาไฟฟ้า			
๑๑. เดินทางมากกว่า ๓๐ เมตร หรือประมาณครึ่งทางระหว่างเสาไฟฟ้า			
๑๒. อาบน้ำและแต่งตัว			

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ในช่วงหนึ่งเดือนที่ผ่านมาสุขภาพร่างกายของท่าน **มีผลต่อการทำงานหรือกิจวัตรประจำวันบ้างหรือไม่**.....(เลือกเพียงหนึ่งช่องในแต่ละข้อ)

	ใช่	ไม่ใช่
๑๓. ทำให้ต้องลดเวลาในการทำงานหรือกิจกรรมลง		
๑๔. ทำงานได้น้อยกว่าที่ตั้งใจไว้		
๑๕. ทำงานหรือกิจกรรมบางอย่างไม่ได้อย่างที่เคย		
๑๖. มีความยากลำบากในการทำงานหรือกิจกรรมต้องใช้ความพยายามเพิ่มมากขึ้น		

ในช่วงหนึ่งเดือนที่ผ่านมา **ปัญหาทางอารมณ์ (เช่นซึมเศร้า หรือวิตกกังวล) มีผลต่อการทำงานหรือกิจวัตรประจำวันบ้างหรือไม่**..... (เลือกเพียงหนึ่งช่องในแต่ละข้อ)

	ใช่	ไม่ใช่
๑๗. ลดเวลาในการทำงานหรือกิจกรรมลง		
๑๘. ทำงานได้น้อยกว่าที่ตั้งใจไว้		
๑๙. ขาดความรอบคอบในการทำงานหรือกิจกรรมเหมือนอย่างที่เคยทำได้		

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๒๐. ในช่วง ๑ เดือนที่ผ่านมา **ปัญหาสุขภาพกายหรือปัญหาทางอารมณ์รบกวนความสัมพันธ์ของท่านกับครอบครัว เพื่อนฝูง หรือเพื่อนบ้าน** บ้างหรือไม่อย่างไร.....
(เลือกเพียงหนึ่งช่อง)

	ไม่เลย
	เพียงเล็กน้อย
	ปานกลาง
	ค่อนข้างมาก
	มาก

๒๑. ในช่วง ๑ เดือนที่ผ่านมา **ท่านมีอาการเจ็บปวดตามร่างกายหรือไม่**.....
(เลือกเพียงหนึ่งช่อง)

	ไม่มีเลย
	เพียงเล็กน้อย
	เล็กน้อย
	ปานกลาง
	รุนแรง
	รุนแรงมาก

๒๒. ในช่วง ๑ เดือนที่ผ่านมา **อาการปวดรบกวนการทำงานตามปกติของท่านหรือไม่**.....
(เลือกเพียงหนึ่งช่อง)

	ไม่เลย
	เพียงเล็กน้อย
	ปานกลาง
	ค่อนข้างมาก
	มาก

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คำถามต่อไปนี้ ถามเกี่ยวกับความรู้สึกและเรื่องราวที่ผ่านมา**ในช่วง ๑ เดือน** โปรดเลือกข้อที่ใกล้เคียงกับความรู้สึกของท่านมากที่สุดในแต่ละข้อ.....(เลือกเพียงหนึ่งช่องในแต่ละข้อ)

	ตลอดเวลา	เกือบตลอดเวลา	บ่อยๆ	บางเวลา	นานๆครั้ง	ไม่มีเลย
๒๓. รู้สึกสดชื่นมีชีวิตชีวา						
๒๔. ประสาทเครียด						
๒๕.หดหู่จนไม่มีอะไรทำให้สดชื่นขึ้นได้						
๒๖. สงบและเป็นสุข						
๒๗. มีพลังมาก						
๒๘. ท้อแท้ ห่อเหี่ยว						
๒๙. รู้สึกว่าจะทนอะไรไม่ได้						
๓๐. มีความสุข						
๓๑. รู้สึกเหนื่อยล้า						

๓๒. ในช่วง ๑ เดือนที่ผ่านมา **ปัญหาสุขภาพทางกายหรือจิตใจทำให้รบกวนต่อการเข้าสังคม การพบปะเพื่อนฝูงและญาติสนิทของท่านอย่างไรบ้าง**.....(เลือกเพียงหนึ่งช่อง)

	ตลอดเวลา
	เกือบตลอดเวลา
	บางเวลา
	นานๆครั้ง
	ไม่รบกวน

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เลือกคำตอบที่ตรงกับสุขภาพของท่านให้มากที่สุด.....(เลือกเพียงหนึ่งช่องในแต่ละข้อ)

	ถูกต้องที่สุด	ถูกต้องส่วนมาก	ไม่ทราบ	ไม่ถูกเป็นส่วนมาก	ไม่ถูกต้องเลย
๓๓. ฉันดูเหมือนจะป่วยง่ายกว่าคนอื่นๆ					
๓๔. ฉันมีสุขภาพดีเหมือนทุกคนที่ฉันรู้จัก					
๓๕. ฉันคาดว่าสุขภาพของฉันจะแย่ลง					
๓๖. สุขภาพของฉันดีเยี่ยม					

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APPENDIX D

SF – 36 Health Survey version 1

INSTRUCTIONS: This set of questions asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer every question by marking the answer as indicated. If you are unsure about how to answer a question please give the best answer you can.

1. In general, would you say your health is? (Please tick **one** box)

	Excellent
	Very Good
	Good
	Fair
	Poor

2. Compared to one year ago, how would you rate your health in general now? (Please tick **one** box.)

	Much better than one year ago
	Somewhat better now than one year ago
	About the same as one year ago
	Somewhat worse now than one year ago
	Much worse now than one year ago

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3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?
(Please circle one number on each line.)

	Activities	**Yes, limited a lot**	**Yes, limited a little**	**Not, limited at all**
3(a)	**Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
3(b)	**Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
3(c)	Lifting or carrying groceries	1	2	3
3(d)	Climbing **several** flights of stairs	1	2	3
3(e)	Climbing **one** flight of stairs	1	2	3
3(f)	Bending, kneeling, or stooping	1	2	3
3(g)	Waling **more than a mile**	1	2	3
3(h)	Walking **several blocks**	1	2	3
3(i)	Walking **one block**	1	2	3
3(j)	Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?
(Please circle one number on each line.)

		Yes	**No**
4(a)	Cut down on the **amount of time** you spent on work or other activities	1	2
4(b)	Accomplished less than you would like	1	2
4(c)	Were **limited** in the **kind** of work or other activities	1	2
4(d)	Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

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5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (e.g. feeling depressed or anxious)? **(Please circle one number on each line.)**

		Yes	**No**
5(a)	Cut down on the **amount of time** you spent on work or other activities	1	2
5(b)	Accomplished less than you would like	1	2
5(c)	Didn't do work or other activities as **carefully** as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? (Please tick **one** box)

	Not at all
	Slightly
	Moderately
	Quite a bit
	Extremely

7. How much physical pain have you had during the past 4 weeks?
(Please tick **one** box.)

	None
	Very mild
	Mild
	Moderate
	Severe
	Very Severe

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8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)? (Please tick **one** box.)

	Not at all
	A little bit
	Moderately
	Quite a bit
	Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. Please give the one answer that is closest to the way you have been feeling for each item. **(Please circle one number on each line.)**

		All of the time	**Most of the time**	**A good bit of the time**	**Some of the time**	**A little of the time**	**None of the time**
9(a)	Did you feel full of life?	1	2	3	4	5	6
9(b)	Have you been a very nervous person?	1	2	3	4	5	6
9(c)	Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
9(d)	Have you felt calm and peaceful?	1	2	3	4	5	6
9(e)	Did you have a lot of energy?	1	2	3	4	5	6
9(f)	Have you felt downhearted and blue?	1	2	3	4	5	6
9(g)	Did you feel worn out?	1	2	3	4	5	6
9(h)	Have you been a happy person?	1	2	3	4	5	6
9(i)	Did you feel tired?	1	2	3	4	5	6

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10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives etc.) (Please tick **one** box.)

	All of the time
	Most of the time
	Some of the time
	A little of the time
	None of the time

11. How TRUE or FALSE is each of the following statements for you?
(Please circle one number on each line.)

		Definitely true	Mostly true	Don't know	Mostly false	Definitely false
11(a)	I seem to get sick a little easier than other people	1	2	3	4	5
11(b)	I am as healthy as anybody I know	1	2	3	4	5
11(c)	I expect my health to get worse	1	2	3	4	5
11(d)	My health is excellent	1	2	3	4	5

Thank you for completing these questions!

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BIOGRAPHY

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