

Department of Neurobiology, Care Sciences and Society  
Karolinska Institutet, Stockholm, Sweden

# **TO BE CHILD AND SURVIVE**

## **A NATURAL DISASTER**

Petra Adebäck



**Karolinska  
Institutet**

Stockholm 2021

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Published by Karolinska Institutet.

Printed by Universitetservice US-AB, 2021

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ISBN 978-91-8016-034-6

Cover illustration: Jonatan Adebäck

# To be a child and survive a natural disaster

## THESIS FOR DOCTORAL DEGREE

By

**Petra Adebäck**

The thesis will be defended in public at Alfreds Nobels Allé 23, Huddinge, 210319 9.00

*Principal Supervisor:*

Associate Professor  
Doris Nilsson  
Linköping University  
Department of Behavioral Sciences and Learning  
Division of Psychology  
Karolinska Institutet  
Department of Neurobiology, Care Sciences and Society

*Co-supervisor(s):*

RN, PhD  
Lena Lundh  
Karolinska Institutet  
Department of Neurobiology, Care Sciences and Society  
Division of Family Medicine and Primary Care

*Opponent*

Research Professor / Professor  
Grete Dyb  
Oslo University  
Department of Trauma, Catastrophes and Forced Migration  
Division of Children and Youths

*Examination Board:*

Senior Professor  
Kerstin Almqvist  
Karlstad University  
Department of Social and Psychological studies

RN, Associate Professor  
Anita Berlin  
Karolinska Institutet  
Department of Neurobiology, Care Sciences and Society  
Division of Nursing

Professor  
Fredrik Falkenström  
Linné University  
Linköping University  
Department of Behavioral Sciences and Learning  
Division of Psychology







## POPULAR SCIENCE SUMMARY OF THE THESIS

Trots att barn och ungdomar ofta drabbats av katastrofer vet vi inte vad som händer på längre sikt. Den internationella forskningen har varit inriktad på vilken effekt katastrofer har direkt eller efter några år för barn eller ungdomar och de har visat att reaktionerna då kan vara starka. Vi blev intresserade av de långvariga effekterna efter en katastrof under barndomen eller ungdomstiden då barnen eller ungdomarna har blivit unga vuxna. Många svenska familjer med barn och ungdomar hade semester i Sydostasien vid tiden för tsunamin i Indiska Oceanen år 2004.

Det övergripande syftet var att undersöka långtidspåverkan på svenska unga vuxna, åtta eller nio år efter 2004 års tsunami, som de upplevde då de var barn eller ungdom. Vidare avsåg vi att undersöka om det fanns ett samband mellan exponeringen under naturkatastrofen eller socialt stöd efteråt och konsekvenser efter åtta år samt att jämföra icke exponerade med exponerade. Ett ytterligare syfte var att undersöka om barn eller ungdomar hade sena påminnelser av sina upplevelser under katastrofen efter nio år och hur de i så fall hanterade dessa. Att jämföra dem som mist en nära person under tsunamin med de som var med om samma naturkatastrof men som inte förlorade någon nära och att beskriva de som hade förlorat någon nära som ung vuxen, var ett annat syfte.

Ett frågeformulär distribuerades till unga vuxna som under barndomen samt ungdomstiden var i Sydostasien under katastrofen. De var vid tidpunkten för naturkatastrofen i åldern 10-15 år och boende i Stockholms län. Frågeformuläret innehöll frågor om bakgrundsfaktorer, exponering under tsunamin, tiden upp till sex månader efter katastrofen och nuvarande tid. Deltagarna hade möjligheten att i frågeformuläret tillåta oss att kontakta dem för en intervju och av de som var kraftigt exponerade utfördes 17 statistik slumpmässiga djupintervjuer. Samtliga semi-strukturerade intervjuer genomfördes per telefon och en intervjuguide gjord för detta syfte användes. Nio av intervjuerna användes för att beskriva den grupp som förlorade någon nära under katastrofen.

Resultatet tydliggjorde exponeringens betydelse då de med flest typ av exponeringar var de som hade mer av de olika studerade utfallsvariablerna. När det gäller upplevt socialt stöd visade resultatet att både tiden upp till sex månader efter tsunamin samt tiden som ung vuxen hade samband med de studerade utfallsvariablerna. Resultatet visade också att samtliga 17 deltagare som intervjuats efter nio år sade att de hade sena påminnelser om tsunamin. De kunde se till genom att planera att sena påminnelser inte skedde eller de kunde sträva mot balans genom att tänka, tala, låta känslorna komma ut, göra något annat eller genom att aktivt

undvika känslorna. Jämfört med de som inte förlorat någon under tsunamin, hade de som förlorat någon nära, högre grad av de utfallsvariabler som studerades, åtta år efter naturkatastrofen. De som förlorat någon nära hade enligt resultatet dessutom en rad inre känslor kring förlusten, vilket inte i lika hög grad följdes av vad andra kunde se.

Sammanfattningsvis kan den negativa psykologiska påverkan på barn och ungdomar kan vara kvar åtta år eller nio år efter exponeringen av Indiska Oceanen tsunami. Samtidigt ser det ut att ha samband med de exponeringar som ett speciellt barn eller ungdom varit med om och det sociala stöd som de har upplevt efter katastrofen. Även efter nio år visade resultatet att många drabbade barn och ungdomar fick sena påminnelser som kunde delas in i yttre eller inre. Dessa kunde de hantera genom att tänka, tala, låta känslorna komma ut, göra något annat eller att aktivt undvika känslorna. Om du förlorat någon under katastrofen, till exempel en förälder eller ett syskon, kan du skilja dig från dem som inte förlorade någon nära. De som förlorat någon nära hade dessutom inre känslor kring förlusten som inte kunde vara så lätta att se för en utomstående.



## **ABSTRACT**

**Introduction:** Despite the fact that children or adolescents often are exposed to disasters, we do not know what happens to these children or adolescents in the end. Much of the international research has been concerned with the effect of disasters on children or adolescents soon after the event and that research shows that adverse psychological reactions can be very strong in this group. We became interested in learning if there are longer-term effects, perhaps even when children or adolescents who experienced disaster reach adulthood. Only a few studies have addressed that question. Many children in the Swedish families vacationing in Southeast Asia, when the Indian Ocean tsunami struck in 2004 and we wondered if the experience left its mark on them years later, even when they have become young adults.

**Aim:** The overall aim of our study was to investigate the long-term effects on Swedish individuals, eight to nine years after the Indian Ocean tsunami that they experienced when they were between 10 and 15 years of age. The specific aims were to examine, whether there was an association between different types of exposures and levels of social support and the adverse effects even after eight years. Another aim was to compare exposed children or adolescents with non-exposed children or adolescents as young adults. Did respondents individual experience produced late reminders of the experience nine years later and, if so, how do they handle them in young adulthood. We also wanted to compare respondents who had lost someone close to them with those who had not lost someone close during the tsunami 2004. To describe the bereaved as young adults was another specific aim.

**Methods:** A questionnaire was distributed in 2013 to young adults who were residents in Stockholm County in 2004 and had been in South East Asia during the Indian Ocean tsunami. The questionnaire consisted of questions about background factors, exposures, the time up to six months post disaster and the present time.

The respondents also could agree to be interviewed, and 17 respondents who had been seriously exposed to the tsunami were randomly selected for the interview. All the semi-structured interviews were done by telephone with the interviewer following an interview guide prepared for this study. Nine of the 17 had lost someone close to them, and the interviews with them were used as the basis for describing the group experience of loss.

**Results:** The result showed that the percentage of respondents with associations between exposures and studied outcomes variables eight years post disaster increased for every additional exposure studied, indicating that the greater the number of different exposures, the

greater the total impact. The most exposed respondents, compared with a population based matched sample, had significantly higher odds ratios that indicated higher psychological distress, lower self-rated health and more thoughts about suicide eight years post disaster. The least exposed had less psychological distress than the matched sample. The level of perceived social support up to six months post disaster as well as perceived social support as young adults was associated with the outcomes variables studied. All 17 interviewed stated that they had experienced different late reminders of the 2004 tsunami. The respondents said they could try to make plans in advance to keep late reminders from occurring and they reported different strategies they could use to strive for balance. These included thinking, talking, letting their feelings out, doing something else, or actively trying to avoid the hurtful feelings. Compared, with those who had not lost someone close, those who had lost someone close experienced psychological distress, more posttraumatic stress symptoms and lower self-rated health as young adults. They also described inner feelings that did not follow what others might think they could see as outside observers.

**Conclusions:** The negative psychological impacts on these young adults can still be observed eight or nine years after their exposure to the Indian Ocean tsunami in childhood or adolescence, and were associated with the exposures a certain child or adolescent have experienced and the social support they perceived after the natural disaster. These results also show that the respondents experience external and internal reminders nine years post disaster. Anyone who has lost a closely connected person, for example a parent or a sibling, can have more associations with negative outcomes, than respondents who did not lose someone close. The bereaved also had inner feelings of the loss that did not follow what others might think they could see as outside observers.

# LIST OF SCIENTIFIC PAPERS

I.

PETRA ADEBÄCK, ABBE SCHUMAN & DORIS NILSSON.

CHILDREN EXPOSED TO A NATURAL DISASTER-  
PSYCHOLOGICAL CONSEQUENCES EIGHT YEARS AFTER 2004  
TSUNAMI.

***NORDIC JOURNAL OF PSYCHIATRY***, 2018; 72(1): 75-81.

II.

PETRA ADEBÄCK & DORIS NILSSON.

SOCIAL SUPPORT FOR EXPOSED CHILDREN AND  
ADOLESCENTS WHO EXPERIENCED THE 2004 INDIAN OCEAN  
TSUNAMI - ASSOCIATIONS WITH PSYCHOLOGICAL HEALTH IN  
YOUNG ADULTHOOD.

***JOURNAL OF HEALTH SCIENCE & EDUCATION***, 2019; 3(6): 1-10.

III.

PETRA ADEBÄCK, LENA LUNDH & DORIS NILSSON.

LATE REMINDERS NINE YEARS POST DISASTER IN ADULTS  
WHO AS CHILDREN OR ADOLESCENTS WERE EXPOSED TO  
THE 2004 SOUTHEAST ASIAN TSUNAMI.

***CHILD CARE IN PRACTICE***, 2020, PUBLISHED ON LINE 28 APRIL.

IV.

PETRA ADEBÄCK, LENA LUNDH & DORIS NILSSON.

CHILDREN WHO HAVE LOST SOMEONE CLOSE DURING A  
NATURAL DISASTER.

***IN MANUSCRIPT***



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## **LIST OF ABBREVIATIONS**

CSS	Crises Support Scale
GHQ	General Health Questionnaire
IES-R	Impact of Event Scale - Revised
OR	Odds Ratio
PTSS	Posttraumatic Stress Symptoms
PTSD	Posttraumatic Stress Disorder
SRH	Self-Rated Health

# 1 INTRODUCTION

Even though children or adolescents are often exposed to disasters and suffer immediate adverse effects, little is known about possible long-term effects on this group. That they are vulnerable and can experience effects of disasters has been shown in many studies (Grant et al., 2003; Evans & Oehler-Stinnet, 2006; Purtscher, 2008; Dyregrov, 2010; Masten & Osofsky, 2010; Dyb et al, 2011; Scheeringa et al., 2011; Wang et al., 2013). Social support after the disaster have been found to be very important for young victims (Pina et al., 2008; Kaniasty & Norris, 2008; Jensen et al., 2009; Dyb et al., 2011; Wang et al., 2013; Banks & Weems, 2014; Braun-Lewensohn, 2015; Felix et al., 2015; Pfefferbaum et al., 2015). Studies of effects – between one and three years post disaster have been done (Wang et al., 2013) but we know little about possible long-term effects, if any. We felt that it is important to get knowledge of the effects of disasters on children or adolescents. How the experience might affect a young person's development throughout adolescence and even later into young adulthood. The question we posed was: Are there long-term effects that can be observed in individuals who have reached young adulthood?

Many Swedish families, some of them with children or adolescents, were vacationing in Southeast Asia, most of them in Thailand, during the Christmas season 2004. A tsunami struck on December 26 (Wahlström et al., 2008). The situation in areas struck by the tsunami changed very quickly from being that of a positive holiday experience to a chaotic and life-threatening situation for many. The tsunami hit the coast and many children or adolescents underwent a life-threatening experience; many were separated from their parents. A total of 543 Swedish citizens died in this disaster, some of them parents, siblings or grandparents. As tourists, the survivors were able to leave the disaster-struck areas and return to Sweden, far from the area where they had suddenly experienced a tsunami, a natural event that does not occur in Sweden. We have studied a group of Swedish children or adolescents, who were between 10 and 15 years of age when experiencing the tsunami in 2004, when they were in young adulthood, eight or nine years post disaster.





## 2 LITERATURE REVIEW

### *Children's or adolescent's reactions to a serious disaster*

Earlier international research has shown that the psychological reactions of children or adolescents to a serious disaster can be quite strong. (Jensen et al., 2009; Dyb et al., 2011; Alisic et al., 2011a; Wang et al., 2013; Braun-Lewensohn, 2015). Researcher have found that experience a disaster can become a risk factor even for the psychological health of children or adolescents (Grant et al., 2003; Landolt et al., 2003; Evans & Oehler-Stinett, 2006; Bokszczanin, 2007; Purtscher, 2008; Masten & Osofsky, 2010; Dyregrov, 2010; Dyb et al., 2011, Brown et al., 2019). It can have big consequences for children or adolescents especially if the impact on the society is great (Kronenberg et al., 2010; Dogan, 2011). During the 20th century, international interest has grown as concerns how young people are afflicted by disasters occurring throughout the world. One study done after Truck-Ramming Attack in Nice on July 14, 2016 found the necessity of a specific emergency psychological response for children, adolescents and their families (Askenazy et al. 2019).

Pynoos et al. found in 1987 that school- age children or adolescents alongside with adults can display posttraumatic symptoms, symptoms that can be acute and appear soon after, but they also have shown that initial symptoms and even new symptoms can be present long after a serious incident. Already Terr (1983) found, that children kidnapped from a school bus, could display posttraumatic stress symptoms and other earlier difficulties for the child, as pathology in the family, which may become risk factors for a child who experiences a stressful even. The children who experienced this kidnapping event could show pessimism for the future, shame, fear of re-experiencing such an incident, repression of thoughts and posttraumatic play. Pynoos et al. (1993) have shown in later studies too, that young victims can get posttraumatic stress symptoms.

Children or adolescents can then experience reactions after a disaster, for example, general increased wakening, fear, intrusive thoughts or pictures, repression of reminders of what happened, slowness due to depression and concentration difficulties. For many children or adolescents, achievements in school, friendships and recreational activities are important and all these areas can be impacted after a serious disaster (Grant et al., 2003; Evans & Oehler-Stinett, 2006; Masten & Osofsky, 2010; Dyregrov, 2010; Dyb et al., 2011). In a Swedish study after the discotheque fire in Gothenburg, the results showed the impact on the youngsters' school performance and one conclusion was that we ought to think about issues such as school performance after a serious incident (Broberg et al, 2005).

The child's or the adolescents' own experience are important both acutely and for a long time post disaster. The result from one study indicated that children's own assessment of their vulnerability was a part of the acute stress (Salmon et al., 2007). In another study, they found that children who thought that they should be physically hurt had more of trauma symptoms than children not physically hurt (Ellis et al., 2009) and some studies have found that many young victims experience symptoms whether they were physically hurt or not (Olsson & Schulman, 2004; Olofsson & Andersson, 2009). In another study, they found that children that maximize their vulnerability after the incident have increased risk for posttraumatic stress symptoms (Bryant et al., 2007). Acute worry (Olofsson & Andersson, 2009), heart rate (Bryant et al., 2007) and self-experienced danger (Bryant, et al., 2007; Ellis, et al., 2009) have been found in different studies to be associated both with acute stress symptoms and post-traumatic symptoms. The importance of talking with others (Dyregrov, 2010; Fivush, et al., 2011) and establishing that the child really understands the information she has been given has been highlighted in different studies (Masten & Osofsky, 2010). To help the child to understand what is happening was found to be crucial, if the child is to understand her own thoughts and reactions, and even the reactions of others (Dyregrov, 2010).

It is not uncommon that children react acutely and then be better off again and it was found that the stress symptoms disappeared in most cases (Winje & Ulvik, 1998; Olofsson & Andersson, 2009; Kronenberg et al, 2010). At the same time, some children got symptoms first after a while. One study found that the majority of children that developed posttraumatic stress symptom six months post disaster did not have stress symptoms during the first month post disaster (Bryant et al, 2007). A systematic review of studies of children after disasters 1987 to 2011 found that the magnitude of psychological problems was hard to define (Wang et al., 2013). A majority of the studies found improvement of symptoms but some studies found remaining problems or even worse results (Wang et al., 2013).

### ***Influence of development to children's or adolescents reactions***

Researchers have found that the children's reactions to disaster vary in part with age (Evans & Oehler-Stinnet, 2006; Purtscher, 2008; Dyrgrrov, 2010; Alisic et al., 2011). For example, preschool children have difficulty in understanding what is happening to them whereas older children not only understand what happened to them but they can respond differently from small children because they are better able to understand the consequences (Purtscher, 2008).

Experiencing a disaster can affect a child's development so that the child does not go through some particular developmental stage as is ordinarily expected (Williams et al., 2008;

Purtscher, 2008). An increasing interest in learning if stress affects brain development is evident in the literature, and, if brain development is affected the question becomes, in what ways. Some studies show that even that very small changes may affect overall development (Nader & Einarsson, 2010).

### ***Children's memories of the disaster***

Children's recollections of what they experienced in a severe situation has been a subject for some researchers (Dyregrov, 2010). Memory disorder and repression of memories can function as a guard against unbearable emotions. During the time after a child has experienced a serious incident, the brain may involuntarily begin to hold fantasies that aid in management of adverse effects. Generally, a single solitary trauma is committed to memory more exactly than a series of recurring traumatic situations. Sequence of time can be impacted and some aspects of the situation the child memorize clear and other aspects are forgotten (Dyregrov, 2010).

In an acute situation, Holmes et al, (2009) found that the memory content of the traumatic situation can be smaller if the center of attention is directed to playing Tetris on a computer.

### ***The influence of parents***

In trying to understand children's and adolescent's reactions to demanding situations one must take into consideration the possible role of parents in affecting their child or children. In one study it was found that witnessing a parent's helplessness and anxiety when faced with a difficult situation can have effect on the child (Dyb et al, 2011). In a study of Hurricane Katrina, it was found that children who were worried about their families had more symptoms three years after experiencing hurricane Katrina (Kronenberg et al, 2010).

Symptoms can be internalized by child making it difficult for parents to realize what the child is experiencing (Scheeringa et al., 2011). Kassam and Adams et al. (2006), found that parents with acute stress symptom overestimated their child's reactions whereas parents who were not suffering from stress symptoms thought the child was all right. It appears in general that parents who do not have any health problems related to the event can have difficulties in judging if their children are having difficulties (Jensen et al., 2009). However, later after the disaster, the judgements of the children and their parents are often of higher consensus (Meiser-Stedman et al., 2007).

### ***Descriptions from children or adolescents***

Various researchers have concluded that the children's judgements and descriptions of their experience must be obtained from the children themselves, not just from their parents (Ellis et al., 2009) since parental reports are often not reliable (Alicia et al., 2009). The child or adolescent must be given an opportunity to visualize a problem that perhaps has been completely internalized. Some researchers have given their young subjects the opportunity to give their own version of what happened to them and then describe their situation. This has led to new knowledge about children's needs post disaster (Jensen, et al., 2009; Alisic et al., 2011). In another study, it was found that although children wanted to be asked about the support they had received but not all children wanted to be given too much attention after a disaster (Jensen et al, 2009).

### ***Exposures during the disaster***

If we are to understand what a child experiences during a disaster, we must determine exactly the nature of the different types of exposure that a child has been subject to. A factor to explore after a disaster is therefore the severity of exposures rather than exposed to a disaster or not.

One type of exposure is a threat to the life of those closest to the child and researchers have found that this type of exposure is important to children (Scheeringa et al., 2006; Thienkrua et al., 2006). Bereavement and separation from parents during the disaster are other important exposures for children and adolescents (Hafstadt, 2010; Dyregrov, 2010).

### ***Social support after the disaster***

Many studies have shown that receiving social support after experiencing a disaster is crucial for children and adolescents. (Broberg et al., 2005; Jensen et al., 2009; Pina et al., 2008; Osofsky et al., 2009; Dyregrov, 2010; Kronenberg et al., 2010; Masten & Osofsky, 2010; Alisic et al., 2011; Banks & Weems, 2014; Chrisman et al., 2014; Turner et al., 2015; Felix et al., 2015). Support from family and from friends has been found to have associations with psychological health (Masten & Osofsky, 2010; Banks & Weems, 2014). Chrisman et al. (2014) described how important it was for children to be protected by family members and to have good relations with family members. Children need emotional support from a variety of individuals including parents, siblings, relatives, friends and professionals (Heystyanti, 2006). The support is important both in the short term and in long term (Broberg et al., 2005; Jensen et al., 2009; Kronenberg et al., 2010; Alisic et al., 2011). Parents ordinarily are the primary

element of the support system for children after disasters (Pina et al., 2008; Osofsky et al., 2009; Turner et al., 2015) as children are almost completely dependent on their caregivers for meeting basic needs (Felix et al., 2015). The importance of talks have been emphasized in different studies (Dyregrov, 2010; Fivush et al, 2011). Parent's way to approach these talks are an important factor too (Fivush et al., 2008).

### ***Reminders of the disaster***

Researchers have found that experiencing reminders of disasters is common up to three years post disaster (Wang et al., 2013; Banks & Weems, 2014). Little research has been done to determine if the victims experience reminders even years after an event. Few studies have been made of children and adolescents many years after, even when they have reached adulthood. There is a lack of knowledge about late reminders of the disaster experienced by young adults, heavily exposed during a disaster in childhood or adolescent.

### ***Loss during the disaster***

For a child or an adolescent to lose someone very close due to sudden death is extremely painful. Such a loss will have consequences both acute and for a child's psychological health, especially if it is unexpected (Dowdney, 2000; Kirwin & Hamrin, 2005; Melhem et al., 2011; Dopp & Cain, 2012; Socialstyrelsen, 2013; BSA Rapport, 2014; Nilsson & Ängarne-Lindberg, 2016; Stikkelbroek et al., 2016). Sometimes the course of grief could be problematic after bereavement, which was found in a study by Melhem et al., (2011). Melhem (2013) also found, that longing and yearning for the deceased, inability to accept the death, shock, disbelief, loneliness, and a changed world view were all present (Melham et al., 2013). Simultaneous occurrence of trauma and grief could increase the symptoms and traumatic aspects of the death may hinder or complicate issues of bereavement (Nader & Salloum, 2011).

### ***Natural Disasters***

Children or adolescents who have experienced natural disasters in Greece, China, Taiwan, Turkey and Armenia have all been studied. Posttraumatic symptoms have been found to have associations with being direct exposed to an earthquake (Giannopoulou, et. al., 2006) or to lose a close relative (Papadatou, et. al., 2012). One study found after a natural disaster that posttraumatic symptoms were later associated with depression (Roussos, et. al., 2005). In another study, the researchers found that worry could also be a symptom (Kilic et.al. 2008).

Yet another study that focused on the cognitive strategies of adolescents found that avoidance or efforts to gain control increased symptoms (Papadatou, et al., 2012). In an Armenian study of untreated adolescents the research found provision of help, both short and long term, was important in reducing the occurrence of posttraumatic symptoms (Goenjian, et.al, 2005).

### ***The Indian Ocean tsunami in 2004***

The physical and economic consequences of the 2004 tsunami, which were very large, were felt in the form of destroyed houses and schools and major economic loss. One study of victims in the affected countries found that traumatic stress during the disaster had associations with symptoms of posttraumatic stress symptoms and depression in children 7-14 years old (Thienkrua, et.al, 2006). A study of children in Sri Lanka found that the seriousness of the traumatic experience, loss in the family and earlier experiences of traumatic situations were risk factors for psychological consequences (Neuner, et.al, 2006). Other researchers found psychosocial factors of importance for children. Wickrama & Kaspar (2007) found that psychosocial loss in form of increased conflict in the family or the mother's decreased mental health contributed to posttraumatic symptoms and depression in children. They suggested that an evaluation of psychosocial and its effect on youngster's mental health must be made and these researchers emphasized the importance of family-focused interventions post disaster.

### ***Vacationers in an affected country during the 2004 tsunami***

Of special interest for this research was the children or adolescents who were in Southeast Asia on vacation when the 2004 tsunami hit, children who then returned to countries far from the tsunami zone after experienced something dreadful. Norwegian children, who were carefully studied, returned to their regular life after experiencing the tsunami. Interview studies were made with children 6-18 years old and their parents, 10 months after the tsunami and again 2,5 years after, interviews that have been analyzed in several different studies. Parents of these children and adolescents had also filled in a questionnaire six months post disaster. In conclusion they found that many of these children were experiencing difficulties after 2004 tsunami (Igelbaek et al., 2008; Jensen et al., 2009; Dyb et al., 2011; Nygaard et al., 2010; Hafstad 2010; Hafstad et al., 2012; Nygaard et al., 2012).

One result from Norway, was that 6-8 months after the disaster they found that 75% had one or more posttraumatic stress symptom according to the parents (Dyb et al., 2011). One of the Norwegian studies found that 83% of the children reported that this was one of the most frightening experiences they had ever had, that they were afraid that a family member or

friend would die (77%), or that they were afraid that a family member or friend would be seriously injured (71%). Four children (3%) had relatives who died in the tsunami (Jensen et al., 2009). The death of a family member and subjective distress was shown to be significantly associated with PTSD scores at 10 months (Jensen et al., 2009).

Despite the seriousness of their experiences, remarkably few were suffering from severe posttraumatic symptoms 10 months and there was a significant decrease in reactions at follow up (Jensen et al., 2009). After 2,5 year, the researchers found no decrease in general mental health problems, supporting the theory that some symptoms of posttraumatic stress reactions overlap with other, concurrent mental problems (Nygaard, et al., 2012). Norwegian researchers reported that the parent's posttraumatic stress symptoms were associated with their children's posttraumatic stress symptoms and they found that highly exposed children were more sensitive to their parent's pain than children who were not so seriously exposed (Dyb, et al., 2011). In another study, Norwegian researchers found that the joint family experiences did not influence development of posttraumatic stress disorder in the children but found that sibling's reactions were individual. These researchers noted that individual assessments of each child must be made even if each child was part of a group that mutually experienced trauma (Nygaard, et al., 2010). In yet another study, it was found that children's stories often involved themes like loss of control or emotions of helplessness and for some children the separation from a family member was the worst experience in the disaster (Hafstad, 2010). In another study by Hafstad et al (2012) reported that parent's who were influenced by the disaster had difficulties in giving their child support.

### ***Long-term consequences into young adulthood***

In a review of studies done between 1988 and 2011, Wang et al. (2013) found that all longitudinal studies had only followed children and adolescents for at most 2-3 years after the disaster (Wang et al., 2013) so nothing had yet been learned about psychological ill health in adulthood . Dyregrov noted (2010), that posttraumatic stress symptoms can be carried into adulthood which can suggest that the young adult may have one or more elements of poor psychological ill health, even if the symptoms are by then less severe than earlier. A qualitative study, (Alisic et al, 2011) found that passage of time helped and children were slowly returning to their normal life after a disaster.

International studies of individuals entering into young adulthood show diverse results and these have not been followed up as much as one might like. In one study, as many as a third of the subjects had posttraumatic stress symptoms in young adulthood after a skipping

disaster in childhood or adolescence (Yule et al., 2000). Bolton et al. (2000) found different emotional disturbances and anxiety after the same disaster and Udwin et al. (2000) found that the risk factors for posttraumatic stress in young adulthood were both objective and subjective for disasters happening at an earlier age. In two other studies of the effects of major fires researchers found no psychiatric impact on adults hit by disasters in childhood or adolescents (McFarlane et al., 2009; Galletly et al., 2011). In a Swedish study, twenty years after a bus accident, researchers found a decrease in symptom over time but some of the survivors carried these experiences into adulthood and were observed to come into later life in certain situations for example when they themselves become parents. At the same time, general mental health did not seem to have been affected. Some of the victims appreciated things in life in a new way but others felt guilt for surviving (Arnberg et al., 2011).

Young adulthood is a period in life that has been described as placing increased demands on individuals (Svensson et al., 2013). Therefore it becomes important to understand how earlier serious incidents impact individuals during young adulthood, a period in life when the young adults need to go away from the family into the society and they meet problems of self-image, intimate relations, the origin family, belonging and future occupation (Jacobsson, 2004).



### **3 RESEARCH AIMS**

#### *Overall aim*

The overall aim was to investigate the impact of a natural disaster on subjects now in young adulthood; eight to nine years post disaster, subjects who were Swedish children and adolescents who had been on vacation in a country in Southeast Asia when the 2004 tsunami hit them and their families.

#### *Specific aims*

To examine whether there was an association between different types of exposures during the 2004 tsunami and the associations in young adulthood, eight years post disaster with psychological distress, posttraumatic stress symptoms, self-rated health, diagnosis of depression, worry or anxiety, thoughts about or attempted suicide, physical symptoms or daily functioning.

To compare psychological distress, diagnosis of depression, suicide thoughts and suicide attempts eight years post disaster, of young adults who had been exposed or unexposed in the 2004 tsunami.

To examine social supports associations with psychological distress, posttraumatic stress symptoms, self-rated health, worry or anxiety and suicide ideation eight years post disaster. Social support divided into two periods; as remembered social support perceived directly after the natural disaster, during a period up to six months post disaster, and present social support. Our hypothesis are that perceived social support in both timeframes would be associated with levels of psychological distress, posttraumatic stress symptoms, self-rated health, worry or anxiety and suicide ideation eight years post disaster.

To describe and see if children and adolescents who were heavily exposed in the 2004 tsunami have late reminders of this disaster in young adulthood. Another special aim was to determine how they handled these late reminders.

To compare children now in young adulthood that had lost someone close in the 2004 tsunami and those in the same disaster who had not lost someone close. Yet another aim was to describe the group as young adults who lost someone close in the 2004 tsunami.



## 4 MATERIALS AND METHODS

### *Population*

In total 627 children, age 10 to 15 years, who were registered as residents of Stockholm County in 2004, were registered by the Swedish police upon their return to Sweden even though not all necessarily had been in a tsunami-struck area. In 2013, we obtained the addresses of 609 young adults, now between 18 and 23 years of age who had been registered by the police in 2004. Of the 609, 255 (42%) returned the questionnaire between August 2013 and October 2013. To be included in the study, the questionnaire recipient had to have been in an affected area at the time of the tsunami. Based on this criterion, 45 persons were excluded. The remaining 210 young adults (34%) constituted the base for our studies.

The respondents could indicate in the questionnaire if they were willing to be contacted for an interview, and of the total, 183 respondents agreed to be interviewed. The participants to be interviewed were chosen from exposure groups three and four, all of whom had been heavily exposed. The choice of those to be interviewed was made by selecting 30 individuals randomly following a statistical procedure and they were selected in proportion to the numbers of males and the number of females in exposure groups 3 and 4. In the end, 17 interviews were carried out, according to availability, 10 with females and 7 with males. The mean age in this group was 12 years in 2004 and 21 at the time of the interview. Eight participants came from exposure group three, those who had had been on the beach and/or had seen the wave and had felt a threat to their lives or to those close to them and separation from their parents too. Nine participants came from exposure group four; those who had also experienced loss and this group consisted of five females and four males. The mean age in this group was 13 years in 2004 and 22 years at the time of the interview.

### *Procedure*

#### *Questionnaire*

The questionnaire was open for responses from August to December 2013; eight years post disaster. The respondents consisted of 134 females and 76 males and the mean age at the time of the tsunami was 12 years and 20 years at time of the questionnaire. The questionnaire contained in total 175 items and it was divided into four parts: background factors, exposure during the tsunami 2004, the time up to six months post disaster and present time.

Background factors were age, gender, educational level, cohabitation and country where the respondents had grown up. The questionnaire included self-assessment scales; the 12 item

General Health Questionnaire, Impact of Event Scale-reversed and Crises Support Scale. The questionnaire also included questions about all other outcomes variables. It had some questions included from the 2010 Stockholm Health cohort and some questions special made for this questionnaire.

### *Interview*

An information letter was sent to 30 persons and it included a telephone number where the person could be reached or if not a telephone number was found, this letter included a desire that they should contact us. In our first telephone contact, the time for an interview was agreed upon.

The semi-structured interviews were made between August 2014 and April 2015 and they lasted between 30 and 90 minutes. The interviews were done by telephone with the interviewer following a semi-structured interview guide prepared for this study. The participants could have been interviewed face to face if they had preferred, but nobody chose that alternative. The choice to interview by telephone made it easier for the subjects to fit the interview into their own schedules, and they did not have to be in Sweden to be interviewed.

The interviewer knew nothing about the participant's previous questionnaire responses and the same psychologist performed all the interviews (PA). The interview started with a broad question and more specific questions followed. These questions concerned thoughts and feelings about the 2004 tsunami. The interview guide included questions about how the respondents were influenced by the 2004 tsunami in both present and past time and the respondent's psychological health today was also covered in the interview.

### *Exposure groups*

Exposures during the 2004 tsunami were divided into four exposure groups (Adebäck et al., 2018) after statistical analyses, and these exposure groups were constituted by children and adolescents who experienced the following types of exposures.

1. Physical presence on the beach, in the water or had seen the wave.
2. Met the criteria for group 1 and had experienced a personal life threat or life threat to a family member.
3. Met the criteria for groups 1 and 2 and were separated from their parents during the tsunami.
4. Met the criteria for group 1, 2 and 3 and had lost a close one or close ones due to the tsunami.

## *Outcome Variables*

### *General Health Questionnaire-12*

The 12-item General Health Questionnaire (GHQ-12) was used to examine psychological distress. GHQ-12 is often used in trauma research, and the scale contains questions pertaining to psychological health rated over the preceding few weeks (Goldberg & Williams, 1988). The GHQ-12 has been translated to Swedish and has been used in several studies and has been found to have sound psychometrics (Wahlström et al., 2013; Arnberg et al. 2014). Each item scored from zero to three and the higher the score, the more distressed the respondent. Responses were dichotomized in accordance with instructions (Goldberg & Williams, 1988) in study 1 and 2, whereby ratings 0 - 1 were coded as 0 and ratings 2 - 3 as 1, within a range of 0-12.

### *Impact of Event Scale-reversed*

The Impact of Event Scale Revised (IES-R) consists of 22 items and was used to identify posttraumatic stress symptoms (Creamer et al., 2003; Sveen et al., 2010). The scale has been translated to Swedish and been used in several studies (Wahlström et al., 2010; Arnberg, et al, 2014). The degree of distress during the preceding week in response to a specific stressor was rated for each item on a five-point scale, ranging from 0= not at all to 4= extremely. In this examination the stated stressor was the 2004 tsunami.

### *Crises Support Scale*

The Crises Support Scale (CSS) was used to identify social support (Joseph et al., 1992). The Swedish version of the CSS scale has been used and it is a seven-item scale, and answers are rated from 1 = never to 7 = always. The CSS was divided so that we could use two timeframes: 1) Social support remembered and reported up to six months post disaster, 2) Present-day social support, eight years post disaster. We divided the CSS into three parts, following earlier studies concerning adults (Wahlström et al., 2013). Part one (question 1-5) examined different aspects of social support, part two (question 6) examined disappointment as concerned experience with another person and part three (question 7) examined satisfaction with the perceived overall social support. The first part, including the five questions 1-5, was examined in both timeframes, up to six months post disaster or eight years post disaster. The respondent was asked if there was/is someone willing to listen to them, if they were/are able to speak about their thoughts and feelings, if they had/have personal contact with persons in the same situation or if others were/are supportive or helpful in a practical way. Question 6 asked if they felt/feel disappointed with anyone

whom they thought should support them, examined in both timeframes. Question 7, the respondent was asked if he or she was satisfied overall with the support received after the tsunami, examined only eight years post disaster.

#### *Self-Rated Health*

Self-rated health was assessed with one question. “How would you rate your general state of health?”. Rated from “Very good” to “Very poor” on a five-point scale.

#### *Worry or Anxiety*

The questions for this part were the same as in Stockholm Health Survey; “Are you bothered by worry or anxiety”. Rated from “No” to “Severe difficulties” on a three-point scale.

#### *Suicide thoughts and Suicide attempt*

The questions for this part were also the same as in the Stockholm Health Survey; “Have you considered to take your own life and maybe planned how to do it?” or “Have you tried to take your own life?” Rated from “No, never” to “Yes, during the last week” on a three-point scale.

#### *Physical symptoms*

Again, the questions are the same as in Stockholm Health Survey; “Have you trouble with or symptoms of the following? Headache, Fatigue, Sleeping problems, Dizziness.” Rated from “No” to “Yes, severe difficulties” on a three-point scale.

#### *Function*

Question made for this questionnaire for the present time; “How do you manage different everyday situations today? At work, In school, With others or At home”. Rated from “No difficulties” to “Extraordinary difficulties” on a four-point scale. The answer “Not current” was possible too.

#### *Got help*

Question made for this questionnaire; “How do you think it was for you up to six months after the tsunami.” Rated from “I got very much help from others” to “I managed mostly by myself” on a four-point scale.

#### *Satisfaction with perceived social support*

Question made for this questionnaire for the time up to six months post disaster; “Were you satisfied with the support you got from family, relatives and friends”. “Were you satisfied

with the support you got from school, teachers and principal”. Rated from “yes, very satisfied” to “did not get any support” on a five-point scale. The answers “Do not know” or “Do not remember” were possible too.

#### *Avoidance of talking*

Question made for this questionnaire for the time up to six months post disaster; “Did you avoid talking with somebody because of that person’s worry or psychological wellbeing”. Rated from “Yes” to “No” on a two-point scale. The answer “Do not remember” was possible too.

#### *Information*

Question made for this questionnaire for the time up to six months post disaster; “Did you get the information you needed”. Rated from “Yes, everything I wanted to know” to No, not at all” on a four-point scale. The answer “Do not remember” was possible too.

#### *Data Analyses*

Multivariate logistic regression models were conducted for the comparison between exposure group one and exposure groups 2–4, resulting in odds ratios, with control for significant explanatory variables ( $\alpha > 0.05$ ): gender, age, education and cohabitation. All outcome measures were used in the comparison with exposure groups 1. The potential of GHQ-12, IES-R, self-rated health, worry or anxiety and suicide thoughts was examined by using a series of binary logistic regression analyses, employing age, gender, education and cohabitation as confounders. No other explanatory factors were examined as confounders. The stability and uniqueness for the models were tested.

The distributions of GHQ-12 and IES-R were skewed, which was the reason why scores were dichotomized. This was done in accordance with the scale instruction (Goldberg & Williams, 1988) and in line with other published studies (Asukai, et al., 2002; Creamer et al., 2003; Wahlström et al., 2008). For GHQ-12, scores 0-2 were coded as 0 and scores 3-12 coded as 1. The cut-off used, between responses two and three, corresponds to the 75<sup>th</sup> percentile. For IES-R the cutoff was set at 75<sup>th</sup> percentile, which meant coding scores 0-32 as 0, and scores 33-88 as 1 (Wahlström et al., 2013; Sveen et al., 2010). All other outcome measures were also dichotomized; otherwise, the groups were too small to allow statistical comparison. For self-rated health, scores 1-3 were coded as 0 and scores 4-5 coded as 1. For suicide thoughts the score 1 was coded as 0 and the scores 2-4 was coded as 1. For

worry or anxiety, the score 1 was coded as 0 and scores 2-3 were coded as 1. For all other variables the response "never" was coded as 0 and "sometimes" or "several times" were coded as 1 or the response "no difficulties" was coded as 0 and difficulties at different levels were coded as 1.

The comparison group in study one, was from the Stockholm Public Health Cohort, a random sample of the population of Stockholm County above 18 years of age (Svensson et al., 2013). For the analysis with the matched comparison group a generalized estimating equation analysis for dependent sample was used since the matching was made with unique controls from 2010 Stockholm Public Health cohort. One matching variable was excluded in each step, according to gender, age, educational level and cohabitation. All respondents in our study group got one to five controls, totally 947 persons. Everyone in the study group as well as in the matched population-based sample had grown up in Sweden. Psychological distress, self-rated health, diagnosis of depression and thoughts about suicide or attempted suicide, were used in the comparison with a population based matched sample.

Multivariate logistic regression models were conducted for the comparison between higher social support due to Crises Support Scale (CSS) and medium social support and lower social support. The answers to the CSS were then divided into low, medium and high with mean at 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentile for questions 1-5 and 7 (Wahlström et al., 2013). For questions 1-5, scores 0- 19 were rated as low, 20- 29 were rated as medium and  $\geq 30$  were rated as high. For question 7, scores 0-3 were rated as low, 4-6 were rated as medium and  $\geq 7$  were rated as high. Question 6 was dichotomized to get two comparable groups and all respondents answering never (1) were given the code 0 and answering yes in different degree (2-7) were given the code 1. Logistic regression analysis was performed in the same way concerning satisfaction with support from family or school and the other three questions designed specifically for this questionnaire, with gender and exposures as predictors. To compare social support up to six months post disaster with social support eight years post disaster, Wilcoxon's test for matched pairs and signed-rank test was performed.

The qualitative data were analyzed, in study three, according to thematic analysis, according to Braun & Clarke (2006), a method for identifying, analyzing and reporting patterns or themes within data. In the interpreting step, themes or patterns within the data and the coding process were driven by a specific research question, in this case, if there were any late reminders and how the respondents handled these. A semantic approach was used, and the



analytic process involved both descriptions and interpretations and an essential approach were applied were motivations, experiences and meanings were theorized.

In the quantitative part of study four, T-tests were used to compare bereaved and non-bereaved. Qualitative data were analyzed by Interpretative Phenomenological Analysis (IPA) (Smith et al., 2012), a method used according to the aim of this study, to examine experiences of losing someone close. IPA describes each person's unique experiences, as well as their common experiences. The analysis of the interview statements followed the rules and steps according to Smith et al. (2012).

### ***Ethical considerations***

All respondents were informed in the printed information letter that participation was voluntary, that respondents would be anonymous, and that confidentiality was guaranteed. Information was given about anonymity in the form of de-identified data and group-data only.

A returned completed questionnaire or participation in an interview were considered as indicating informed consent. The respondents were told that they might want to be prepared to consider meeting with a psychotherapist if they felt any need. They were told that they could contact us at any time about this reason, and some of them did. Some of the respondents were also given information about psychotherapists near their homes.

Both the questionnaire studies and the interview studies were approved by the regional ethical review board in Stockholm, Sweden (Dnr:2013/619-31/5, Dnr:2014/607-31).



## 5 RESULTS

The respondents background factors were evenly distributed within four exposure groups, earlier described. See table 1.

Table 1. Background factors per exposure group (%).

	Total (n=210)	Exposure group 1 (n=61)	Exposure group 2 (n=83)	Exposure group 3 (n=37)	Exposure group 4 (n=29)
Age					
10-11	30	34	33	16	35
12-13	38	29	39	46	42
14-15	32	36	27	38	24
Genus					
Female	64	62	65	70	55
Male	36	38	35	30	45
Education					
E/I	19	17	16	22	27
H	72	75	71	70	66
C/U	9	8	10	5	7
Cohabitation					
Yes	81	82	84	78	72
No	19	18	16	22	28

### *The influence of exposure*

The results showed that the percentage of respondents with different outcomes increased for every exposure group, indicating that the severity of exposures had an impact. Exposure group four had significantly higher odds ratios for psychological distress, more posttraumatic stress symptoms, lower self-rated health, more thoughts of suicide, more suicide attempted, more worry and anxiety and less functioning at home compared with exposure group one, eight years post disaster. See table 2.

Table 2. Odds Ratio in comparison with exposure group 1 with control for age, genus, education and cohabitation.

Outcome variables	Exposer group 1	Exposure group 2	Exposure group 3	Exposure group 4
GHQ -12	1	1.6	2.3	5.3**
IES-R	1	10.5*	22.2**	81.9***
Self-rated health	1	1.7	1.0	5.6**
Seriously considered suicide	1	1.2	3.1*	4.3*
Suicide attempt	1	0.4	0.9	6.0*
Anxiety or Worry	1	2.9**	3.0*	6.1**
Function at home	1	2.8*	2.8*	4,7*

\*p<0.05    \*\*p<0.01    \*\*\*p<0.001

It was found that compared with a matched sample, the 2010 Stockholm Public Health Cohort, exposure group four had significantly higher odds ratios that indicated psychological distress, lower self-rated health and more thoughts about suicide eight years post disaster. For exposure group one the results indicated less psychological distress. See table 3.

Table 3. Odds ratio in comparison with a population based sample with control for age, genus, education and cohabitation.

Outcome variable	Exposure group 1	Exposure group 4
GHQ	0.4**	2.0*
Self- rated health	0.6	3.8***
Seriously considered suicide	0.7	3.2*

\*p< 0.05    \*\*p<0.01    \*\*\*p<0.001

### ***The influence of Social Support***

The hypothesis of perceived social support was confirmed. The remembered perceived social support directly after the tsunami and low perceived social support eight years post disaster showed to be associated with levels of psychological distress, posttraumatic stress symptoms, self-rated health, worry or anxiety and thoughts of suicide. The results from CSS showed that children or adolescents, who had low result compared to high result on questions one to five, had psychological distress, more posttraumatic stress symptoms and less self-rated health in both timeframes. Together with question six in CSS, the conclusion was that, results in both time intervals had significant associations with examined outcomes eight years post disaster. Satisfaction with perceived social support altogether, in question seven in CSS, had associations with outcomes variables eight years post disaster too. Those who were satisfied altogether with perceived social support had less psychological distress, less posttraumatic stress symptoms, higher self-rated health, less worry or anxiety and less thoughts of suicide compared with these who were not satisfied altogether.

The results also found that if the respondent felt disappointed with an individual whom they thought should have supported them, up to six months post disaster or in present time, these children and adolescents had more posttraumatic stress symptoms, lower self-rated health, more worry or anxiety and more thoughts about suicide than if they had not felt disappointed by someone. Nearly half answered that they got little help or managed mostly by themselves up to six months post disaster and these respondents had significantly higher odds ratios, eight years post disaster, for experiencing psychological distress than those who received help

and support from others. Most of the respondents remembered satisfaction with the support they got from family, relatives and friends up to six months post disaster and this had associations too with fewer posttraumatic stress symptoms, higher self-rated health, less worry or anxiety or less suicide ideation eight years post disaster, in contrast to support from school. If the respondent thought that, they did not get the information they needed up to six post disaster months, they experienced psychological distress, more posttraumatic stress symptoms, lower self-rated health and more worry or anxiety eight years post disaster.

The results showed that it was more common for individuals to perceive having received higher social support up to six months post disaster than they did as young adults.

### *The influence of late reminders*

All those interviewed stated that they had experienced different late reminders of the 2004 tsunami nine years post disaster. The respondents said they could make plans to try to prevent late reminders from occurring. They described how they tried to control different situations that might happen to them as young adults. To have control of situations in which they could expect to experience a late reminder was important. If the late reminders nevertheless occurred, they were divided into external and internal late reminders. External reminders, nine years post disaster, could be water, a special sound or smell, bad weather, travelling, films, music, media's reports, special places or hearing another person talking about the 2004 tsunami. Internal reminders could be thoughts about the 2004 tsunami or pictures of the disaster that they could see in their own mind.

The participants dealt with late reminders in many different ways and reported different strategies to handle the reactions nine years post disaster. These attempts to strive for balance were divided into five groups: to think, to talk, to let feelings out, to do something else, or to actively avoid having any feelings. To think about what happened during the 2004 tsunami was one way to handle reactions, and another very common way to handle the respondent's reactions was to talk with persons near them, family and friends. The respondents described how they always or in certain situations let their feelings out. They could cry openly or get feelings of sadness, fearfulness, or panic. One additional way to handle late reminders was to do something else such as writing thoughts down, drawing, taking a walk, watching television, watching a game or watching a movie. Some of the respondents described how they tried to forget the experiences from the disaster, to leave what happened behind them, and avoid reactions when present.

### *The influence of loss*

A comparison was made between those who answered the questionnaire, those who had lost a close person (34 persons) and the respondents who had not lost someone close (175 persons). It was found that the bereaved, who had lost someone close during the disaster, had psychological distress, more posttraumatic stress symptoms and a lower self-rated health eight years post disaster compared with the respondents who had not lost someone close.

The nine persons, who were interviewed and analyzed by IPA, were also troubled by inner feelings and still were handling the loss. In the interviews, they said that not only was it an awful situation during the disaster but they had also lost someone close to them with the result that their feelings were a mixture of feelings about the personal trauma and feelings about the loss. They felt lucky to have survived but at the same time, they had to live with the grief. They talked about how important it was to give themselves permission to feel sorrow and about how important it was to think positive thoughts. They had feelings of having a bad conscience but at the same time, they had a feeling of being proud. It was found in the interviews that some managed by themselves after the natural disaster or they were often alone when they felt sorrowful. Some of them did not handle the loss so well and simply avoided the whole situation.





## 6 DISCUSSION

The main results from the studies were that the respondents who were children or adolescents in 2004 still experienced psychological consequences eight or nine years later, in young adulthood. Studies have found associations with psychological outcomes earlier, but these have been studies made no longer, than three years post disaster (Wang et al., 2013). We are among the first to try to learn if victims still experience problems many years after an incident experienced in childhood or adolescence. Our findings are in line with findings in a study made 25 years after an earthquake, in which Goenjian et al found that (2020) post-disaster PTSD and depressive symptoms could persist for decades after a disaster. Some of our respondents wanted some help to be offered by society and to get help from professionals nine years post disaster. They wanted the opportunity to talk with a professional or with groups of survivors to discuss solutions to different problems, and under the supervision of a professional be able to help each other.

According to our research, the consequences are dependent on the nature of exposures during the disaster and on perceived social support given directly after the disaster as well as present-day social support. The consequences could also be in form of late reminders that could be divided into external or internal reminders to be handled in different ways. For anyone who has lost someone close during this natural disaster, the consequences were more severe than for those who had not lost someone close.

The severity of exposures does seem to still matter eight years post disaster. There were higher percentage of respondents with psychological problems with increasing exposures independently of gender, age, education or living situation. If the respondents had experienced several exposures, we found the highest associations with psychological distress, more posttraumatic stress symptoms, lower self-rated health, more thoughts of suicide and suicide attempt, more worry and anxiety and less functioning at home. Results from our study found that the child or adolescent had consequences depending of what they have experienced and how many exposures they have meet during the natural disaster. Consequently, you can not say solely that these children or adolescent survived 2004 tsunami or not, without consideration what they have experienced.

The results from the comparison with the matched sample from the Stockholm public health cohort showed that the group with the greatest number of exposures had the strongest associations with adverse psychological outcomes while the exposure group with least exposures had less psychological distress compared with matched sample eight years post

disaster. It is true that these respondents, in exposure group one, encountered something dreadful in 2004 but they have been able to manage well and in some cases even became stronger.

The results showed too, through the statistics on which we based the exposure groups, that specific types of exposures were of special importance for children and adolescents. Two of special importance were separation from parents during the disaster and loss of a person or persons to whom the respondents had been close. Even experiencing the threat to one's own life or to others is an important factor. Some psychological outcomes, like self-rated health and suicide ideation have not been studied very often in the past. However, in one study, suicide ideation was found to be high for children who survived an earthquake (Tang et al., 2018).

Social support after this disaster were of great value for exposed children and adolescents showed the results from our examination. The answers from the respondents eight years post disaster showed us how less perceived social support could be associated with more consequences. Our study found also that perceived social support was as important in young adulthood. Even after eight years, it was crucial for now young adults, who had experienced this natural disaster during childhood or adolescents, to have access to a well-functioning social network that allows them to ask for help. The importance for the respondents were that someone were there, who were prepared to listen to them and that the person who was supportive exist for many years. It was important that they were not frustrated by someone who the child or the adolescent thought to be supportive but made him or her feel worse directly after the 2004 tsunami. To get the information you need were important too due to the answers to the questionnaire from the respondents. Even so, it is unknown what information children or adolescents need and how they want to be informed.

The young adulthoods answered that they were satisfied with the overall social support they perceived. It is then very important to make sure that children or adolescents are satisfied with the support they perceive. To make shore that this is the case, is something important to remember, for example, when meeting children and adolescents after a natural disaster even if it was many years ago, also when they have become adults.

One finding was that the respondents heavily exposed, were still experiencing late reminders of the disaster nine years later. This may contribute to the understanding of how children and adolescents manage their life many years post disaster. We also found in our examination, that different reactions needed to be handled in different ways. The ways of handling late

reminders could vary from person to person but mostly for the same person in different situations. This is in line with the results from a study by Braun-Lewensohn (2015) who found that the developmental stage of the child, the different types of events and the cultural context of the individual should all be taken into consideration to understand the processes affecting individuals in disasters. One way of handling late reminders was to allow oneself to think about the 2004 tsunami and to talk about the experiences with other persons. Braun-Lewensohn (2015) states that thinking is one way of dealing with the situation and Hendrickson et al. (2019) showed us the importance of the quality of the talk.

General ways of handling with reminders, in the present examination, were letting the feelings out, which lead to increased understanding of the importance of letting ones feelings out. This was found too by Hendrickson et al. (2019) who showed that posttraumatic symptoms might be influenced in part by the emotions of the caregiver, which were important for the talks with the child or the adolescent. It was found in our examination, that one way to handle the reactions was through distraction. Using distraction was one way of dealing with the 2004 tsunami for children in the immediate phase according to Jensen et al. (2013). In the present examination, this was true for a long time and distraction sometimes turned into avoidance. Zhang et al. (2014) thinks that more attention should be paid to adolescents that are prone to adapt passive coping strategies such as avoidance.

Another result from our studies was that still after eight or nine years the surviving children or adolescents who had lost someone close to them in the tsunami were influenced by the loss and they had results that separated them from the non-bereaved. The bereaved, who answered that they lost someone close in the tsunami 2004, had associations that showed psychological distress, more post-traumatic stress symptoms and lower self-rated health compared with non-bereaved. Results in line with what Andrades et al. found (2020), that main predictors of PTSS and PTG were losses after the event. Perceived threats and feeling overwhelmed and confused during the traumatic event were associated with PTSS according to Jensen, (2019). Something found in the present results was that posttraumatic stress symptoms were something that was characteristic for the bereaved.

Loss of a close person is very hard, and the results from the interviews showed inner feelings of mourning, showing that adverse effects were not over for these now young adults. These respondents described the exposures to this natural disaster as involving experiences of disturbing, frightening or grotesque sights sounds, feelings and smells. The feelings between the trauma, the 2004 tsunami, and the loss were mixed up. Despite the fact

that most of the respondents described their life in society as good, most of them were fulltime students or employees, but one could not judge how they are dealing with their experience just by looking at these external factors. These individuals still can struggle inside with finding balance and they can perceive reminders, which they can handle, but an outside observer cannot see any sign of this. This is something important too to remember as an important result from this study. The results are in line with the results from Stikkelbroek et al. (2016) who found that the internalizing problems increased in adolescents after family bereavement. We also found that even after a very long time the internalizing problems still were there, eight or nine years later. In another study, the relationship between a child and parent was seen as a complex, dynamic and changing relationship when the child grows older and begins to see the parent as a multifaceted person (Blank & Werner-Lin, 2011). Maybe this is underlining the fact that the children and adolescents in our study were still working with their loss and had feelings of sorrow.

One strength of our studies were that we were able of reaching all Swedish children and adolescents, living in Stockholm County that have been in Southeast Asia when the tsunami struck. Thanks to the availability of police registry of all who returned we were able identify victims who could give us what we needed to be able to take a long-term perspective of the human effects of a disaster. Other strengths were the long-term perspective; eight or nine years post disaster, since long term studies are valued. Self-reports of children and adolescents when they have become young adults are valuable too. Another strength was the age when they experienced the 2004 tsunami, 10-15 years. A developmental stage when children and adolescents can understand, manage, think and talk about their experience. Being able to complete the questionnaire via internet or on paper was another strong point since the respondents could complete it in spite of what they were in the world. A strength too was that many young adults responded to the questionnaire, in spite of the difficulties presented in earlier studies of reaching persons in these ages, especially males. Every question in the questionnaire had the alternative “do not remember”, an alternative not chosen by many of the respondents, which showed that they their memories had not faded. Those interviewed were very interested and were quite willing to talk about their experience. A final strength was that the interviewed had to answer questions partly about present time and this reduced the importance of recall bias.

Limitations were otherwise the recall bias in the studies when we examined exposures, social support or loss, retrospectively. Another limitation was the response rate. Only 32%

of those getting a questionnaire constituted in the end the base group for our studies. We do not know why so many did not answer the questionnaire. It can only be speculated that several did not respond to the questionnaire because they had not been in an affected area, something that was observed in a survey study in Norway (Hussein et al., 2013). It was also possible that the most affected children may have chosen not to answer the questionnaire and therefore were not a part of the interview groups. One limitation of the qualitative studies was the fact that not all picked out to be interviewed could be reached for various reasons; not reaching them on the call or that they did not respond at the time booked for the interview. Another limitation was that we do not know the experience of potential traumas during the eight or nine years since 2004 tsunami. At last, an overall limitation was that the results are hard to be generalized because of small sizes of the study groups.



## **7 CONCLUSIONS**

Our studies have answered many questions about how the Indian Ocean tsunami in 2004 was experienced by children age 10 to 15 eight or nine years post disaster when they had reached young adulthood. The conclusion from these findings are that the negative psychological effects on these individuals that are still present eight years or nine years later appear to depend on the detailed nature of the exposures at the time and on the social support they perceived receiving after the natural disaster. Even after nine years, it is evident that there are reminders, external and internal, and that these can be handled through thinking, talking, letting feelings out, doing something distracting or avoid feelings. A young person who loses a person who is very close, for example a parent or a sibling, will experience adverse effects on psychological health. This may not be evident by simply observing the individual's behavior. Detailed studies are needed, for example by using interviews as we did. When meeting young adults that were heavily exposed, or even had lost someone close to them during a natural disaster in childhood or adolescents, all of us must have that in mind.





## **8 POINTS OF PERSPECTIVE**

Long-term studies that examine young victims of disaster many years later when they are entering young adulthood are needed to supplement the many short-term studies. Future research in the field of social support might well attempt to learn more about the kinds of social support children and adolescents say that they need themselves, or which kinds of social support have the least possible negative consequences. More knowledge is also needed, about the kinds of information that young people of different ages need after a disaster. At last, to make more research to determine late reminders of the disaster, experience present years later, and what their effects might be.



## 9 ACKNOWLEDGEMENTS

I especially want to thank:

**Doris Nilsson**, the best head supervisor I could have had during my years of research. She has guided me in an excellent way through the whole process and she has braced me when I have needed that. When I needed a doctoral course for psychologists, she arranged one at Linköping University.

**Lena Lundh**, was my supervisor in the last three years and she has under that time superiorly supervised me, for example in the qualitative work, which she has done brilliantly.

**Birgit Rune**, had been my topnotch mentor during the years to my disputation. With her, I have discussed different things of my research project. She has done this in an excellent way.

**Charlotte Therup Svedenlöf**, head of unit, who generously has let me do the research as a part of my job. Without her good will and support, it would not have been any doctoral thesis.

**Hans Michelsén**, has been my supervisor in the beginning of my research and he has done a lot in the two first studies.

**Abbe Schulman**, my supervisor in the beginning who helped me with the start of this project.

**Magnus Backheden & Hassan Alinaghizadeh**, for your enduring and excellent statistics.

**Sheri Fox & Larry Lundgren** for your outstanding English language views. **Webropol** for producing the web-based questionnaire and gathering all answers from the respondents.

**Stiftelsen Kempe Carlgrenska fonden** for economic support.

My earlier colleagues; **Lars Wahlström**, inspired me with his adult studies after the 2004 tsunami. **Bengt Andréé**, who has given me new insights in the research world. **Monica Scott Näslund**, **Malin Klaesson**, **Christina Ling** and **Anneli Lagerqvist** for their support in the beginning of my research work.

My present colleagues; **Catarina Cesaro**, **Pernilla Bergman**, **Fredrick Östlund** and **Eva Svensson Isfej** who have assisted me in such a good way and helped me finish my work.

**Jonatan**, **Mattias** and **Hampus**, my now grown up sons that I cannot live without, and their very fine **Hanna** and **Felicia**. My beautiful grandchild **Ophelia**, who by just being there is the best help I can get. Last, but not least, my loved husband **Tomas** who has been standing by my side all of this time.

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