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# **Violence through the life cycle: A public health problem**

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*Lisbeth, Tove Hannes och Ebba utan er är mitt hjärta bara halvt!*

### ***Flykten***

*Jag bodde i Tanzania tills jag blev 8 år för att det blev krig. Jag vaknade på natten och hörde pistoler som sköt. Farmor tog min lillasyster Lovisa, mamma höll i pappa och min storasyster höll i mig. Vi sprang och sprang tills mammas syster Margareta. Hon visade en väg till ett hus bredvid en sjö, Lotssjön sa hon att den hette. Sen somnade vi i huset. Jag vaknade av att det var soldater som knackade på vår dörr. Margareta sa att vi skulle gå ut ur bakhöjden. När vi kom ut hörde vi att soldaterna pratade med Margareta. Sedan tog dom Margareta. Mamma och pappa sprang efter. Dom tog med sig Lovisa. Jag farmor och storasyster fick fortsätta utan dom. Vi åkte med en lastbil till en flygplats. Pengarna räckte precis till 3 flygbiljetter. Vi satte oss på planet. Det var mysigt så jag somnade. Sen väckte farmor mig och sa att vi skulle gå ut från planet. Vi gick till nått ställe där vi fick bo sen fick vi ett uppehållstillstånd. Vi bodde med farmor ett år sen kom mamma och pappa och min lillasyster.*

*Tove Wikström 8 år*



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# ABSTRACT

**Background:** Violence has probably always been part of the human experience. Its impact can be seen, in various forms, in all parts of the world. In 1996, WHO's Forty-Ninth World Health Assembly adopted a resolution, declaring violence a major and growing public health problem around the world. Public health work centers around health promotion and disease prevention activities in the population and public health is an expression of the health status of the population taking into account both the level and the distribution of health. Exposure to violence can have many aspects, differing throughout the life course — deprivation of autonomy, financial exploitation, psychological and physical neglect or abuse — but all types share common characteristics: the use of destructive force to control others by depriving them of safety, freedom, health and, in too many instances, life; the epidemic proportions of the problem, particularly among vulnerable groups; a devastating impact on individuals, families, neighborhoods, communities, and society.

**Methods:** Three different data sources were used in the four articles, three cross-sectional studies ("Life and Health in Norrland" and "Health on Equal Terms 2004 and 2006") and one longitudinal ("Level-of-Living Survey").

**Results:** We present an important picture of the strong association between exposure to violence and ill health through the life cycle. A population-based study showed an increased risk of poorer physical and psychological health among boys and girls aged 0-18, as reported by their mothers exposed to violence. Further, a strong association between those exposed to violence and physical and mental ill health was demonstrated in young adults aged 18-25, also after adjusting for possible confounders, specifically for women. Even in an elder group aged 65-84, representative results showed an extensive negative health outcome panorama caused by fear of crime and exposure to abuse both in elderly men and women. Lastly, in trying to provide additional empirical support for the association between exposure to violence and ill health the prospective study demonstrated that violence exposure in adolescence and young adulthood presented a negative association to severe illness burden in adulthood for women but not men.

**Conclusion:** Exposure to violence among both men and women is an important risk factor for ill health and should receive greater attention in

public health work. A strong association between violence and various health outcomes was demonstrated in different time periods through the life cycle.

# LIST OF PAPERS

This thesis is based on the following papers. The published papers have been reprinted with permission of the journals. The papers are referred to in the text by their Roman numerals I-IV.

## Paper I

Niclas Olofsson, Kent Lindqvist, Katja Gillander-Gådin, Lennart Bråbäck, Ingela Danielsson. Physical and psychological symptoms and learning difficulties in children of women exposed and non-exposed to violence: a population-based study. *Int J Public Health*. 2011 Feb; 56(1):89-96. Epub 2010 Jul 9.

## Paper II

Niclas Olofsson, Kent Lindqvist, Katja Gillander-Gådin, Ingela Danielsson. Violence against young men and women: a vital health issue. *The Open Public Health Journal*, 2009, 2, 1-6.

## Paper III

Niclas Olofsson, Kent Lindqvist, Ingela Danielsson.

Fear of crime and psychological and physical abuse associated with ill health in a Swedish population aged 65-84 years. Accepted 16 January 2012 in *Public Health* (2012), doi:10.1016/j.puhe.2012.01.015.

## Paper IV

Niclas Olofsson, Kent Lindqvist, Benjamin A. Shaw, Ingela Danielsson. Long-term health consequences of violence exposure in adolescence: A 26-year prospective study. Submitted to *BMC Public Health* 20111206.



# ABBREVIATIONS

AUDIT:	Alcohol Use Disorders Identification Test
CI:	Confidence interval
CVD:	Cardiovascular disease
GDP:	Gross Domestic Product
GHQ:	General Health Questionnaire
HPA axis:	Hypothalamic-pituitary-adrenal axis
LNU:	Level of Living Survey
MDV:	Maternal Domestic Violence
SRS:	Simple Random Sample
OR:	Odds ratio
PTSD:	Post-traumatic Stress Disease
RR:	Risk Ratio
SND:	Swedish National Data service
SRH:	Self-rated Health
US:	United States
WHA:	World Health Assembly
WHO:	World Health Organization





# INTRODUCTION

Every year, more than 1.6 million people worldwide lose their lives to violence. For every person who dies as a result of violence, many more are injured and suffer from a range of physical, sexual, reproductive and mental health problems <sup>1</sup>. Violence places a massive burden on national economies, individuals, families, communities and society, costing countries billions of US dollars each year in health care, law enforcement and lost productivity <sup>2-5</sup>. In the United States alone, estimates of the costs of violence reach 3.3% of the GDP (estimated GDP 2005; \$12.4 trillion US dollars) <sup>3</sup>.

Despite the fact that violence has always been present and is among the leading causes of death worldwide for people aged 15–44, the world does not have to accept it as an inevitable part of the human condition. As long as there has been violence, there have also been systems – religious, philosophical, legal and communal – that have grown to prevent or limit it. None has been completely successful, but all have made their contribution to this defining mark of civilization. Since the early 1980s, the field of public health has been a growing asset in this response to battle violence. Violence can be prevented and its impact reduced, in the same way that public health efforts have prevented and reduced pregnancy-related complications, workplace injuries, infectious diseases and illness resulting from contaminated food and water in many parts of the world <sup>1</sup>.

## Background

Public health work centers around health promotion and disease prevention activities in the population. Public health is an expression of the health status of the population, taking into account both the level and the distribution of health <sup>6</sup>. Health is a key factor for sustainable societal development. The public health approach to health is that it is a multidimensional and multifaceted concept subject to constant discussion and development. Achieving health does not have to do merely with the absence of disease or disability, but also with well-being in several other dimensions <sup>7</sup>. Factors such as where we live, the state of our environment, genetics, our income and education level, and our relationships with friends and family all have considerable impacts on

health, whereas the more commonly considered factors such as access and use of health care services often have less of an impact <sup>8</sup>. Among other things, health has physical, psychological and social domains <sup>9</sup>. There are objective domains in the determinants of health that cover the most important determinants of Swedish public health. The first six objective domains relate to “structural” factors, i.e. conditions in society that are primarily influenced by public opinion and political decisions, such as economic and social prerequisites, during childhood and adolescence, and health in working life. The last five objectives concern “lifestyle” factors which an individual can influence but where the social environment also plays a very important part in supporting or overturning positive or negative intentions, for example. The objective domain “Healthy and safe environments and products” is fairly broad and covers widely different types of environments and exposure situations. The fourth sub-area in this domain aims to create safety based on an injury perspective in various types of settings such as traffic, work, home, school, leisure environments and violence <sup>8,9</sup>. Many violence-control measures are undertaken alongside public education and awareness-raising campaigns that aim to increase understanding of the risks and impacts of violence. One of the Swedish Public Health Institute’s main tasks is to be a national centre of knowledge. This task involves developing and conveying knowledge through yearly national surveys, for instance. These surveys include general questions tapping all domains in the determinants of health, including questions about violence <sup>8</sup>. In the national public health report from the Swedish National Board of Health and Welfare there is a whole chapter describing violence in relation to public health in Sweden <sup>8</sup>.

## **Violence theoretical framework**

In 1996, the Forty-Ninth World Health Assembly adopted Resolution WHA49.25, declaring violence a major and growing public health problem across the world. In this resolution, the Assembly drew attention to the serious consequences of violence – in both the short-term and the long-term – for individuals, families, communities and countries, and stressed the damaging effects of violence on health care services. The first World Report On Violence and Health is an important part of WHO’s response to Resolution WHA49.25 <sup>10, 11</sup>.

The World Health Organization defines violence as: The intentional use of physical force or power, threatened or actual, against oneself, another person,

or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal development or deprivation <sup>190</sup>.

A typology of violence was developed by the World Health Organization in its 1996 resolution in accordance with its declaration on violence against women as a leading public health problem. The main aim of the typology is to differentiate the different types of violence that exist, based on their characters. Violence can therefore be divided into three major categories, namely self-directed, interpersonal and collective violence (Figure 1) <sup>1, 12</sup>.

#### *Self-directed violence*

Self-directed violence can be further divided into self-abuse (such as self-mutilation) and suicidal behaviors, which includes suicidal thoughts as well as attempts.

#### *Interpersonal violence*

Interpersonal violence can be divided into two groups: one, family and intimate partner violence, to which child abuse and abuse of the elderly also belong, and two, community violence, which usually occurs outside the home and commonly involves unrelated individuals and individuals who do not know each other.

#### *Collective violence*

This type of violence can be divided into economic, political and social subcategories and is usually committed by a large group of people with a common identity or by the state. Economic violence includes acts carried out by a large group with the intention of gaining economic advantages. Other examples of economic violence are acts that interfere with the economic activities of the society. Political violence on the other hand includes acts such as wars, genocides and abuse of human rights committed by the state. Social violence includes hate crimes committed by organized groups, mob violence and terrorism. The figure below (Figure 1) gives an illustration of the violence categories and their subcategories with patterns of violence.

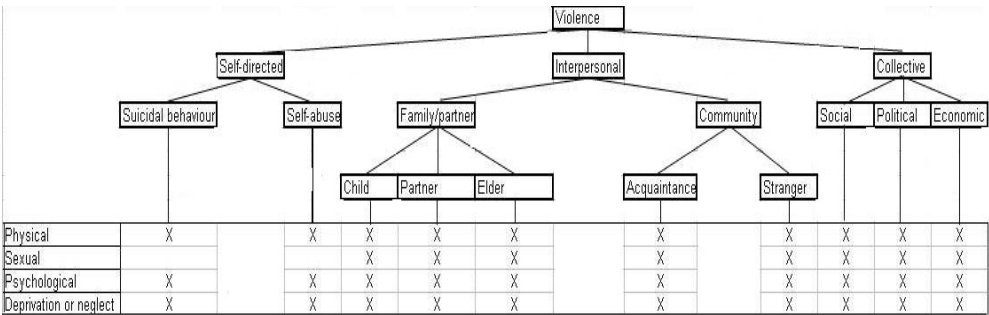


Figure 1. A typology of violence <sup>1</sup>

Throughout this thesis violence is generally defined as any type of self-reported violence or threats of violence, and self-reported health or ill health expressed as physical and psychological symptoms, health utilization and use of pharmaceuticals.

As with its impacts and various manifestations, some causes of violence are easy to see. Others are deeply rooted in the social, cultural and economic fabric of human life. Recent research suggests that while biological and other individual factors explain some of the predisposition toward aggression, more often these factors interact with family, community, cultural and other external factors to create a situation where violence is likely to occur <sup>11, 13, 14</sup>. Against this background, the World Health Organization has drawn up a holistic model to explain and help us understand this interaction. The holistic model (Figure 2) used by the World Health Organization was developed in the late seventies with the aim of understanding child abuse but has later been used to understand the outcome of violence in general <sup>1, 15</sup>.

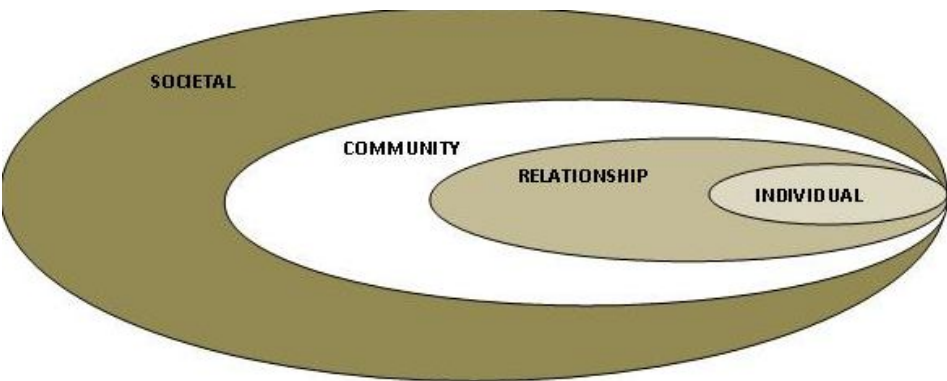


Figure 2 An ecological model for understanding violence <sup>1</sup>.

The model consists of four levels: individual, relationship, community and societal (structural). At the individual level factors such as witnessing marital conflicts as a child, being abused as a child, alcohol use and absence of a rejecting father are associated with causes of violence. Factors that are associated with causes of violence at the relationship level are: female-male power inequality, marital conflicts, unemployment, poverty and decision-making in the family whereby the men are in control of the distribution of familial wealth. Looking at the community level factors such as lack of social support network, low socioeconomic status, isolation of women and family and transition of gender roles are associated with violence against women. Lastly factors that cause violence at the societal level are presence of cultural norms, male power superiority in society, laws and policies <sup>15, 16</sup>.

Public health (public health practitioners and researchers) has been the framework and growing asset in the task of understanding the roots of interpersonal violence and preventing its occurrence <sup>12, 14, 17-30</sup>.

The factors that contribute to violent responses – whether they are factors of attitude and behavior or related to larger social, economic, political and cultural conditions – can be combated and changed <sup>30-35</sup>. One step towards change is to fully understand the mechanisms behind the phenomenon. A primary insight is that individuals' past experiences can cumulatively and interactively influence future outcomes through complex life histories, or sequences of experiences within interrelated life domains, of a social, economical, or political character <sup>36, 37</sup>.

## **The life course perspective — potential and challenge**

The current epidemiological focus on a life course approach to diseases emerged in the 1980s <sup>38</sup>. However, the notion that experiences in early life shape adult health is not new. It was, in fact, a prominent perspective in public health during the first half of the previous century, but was superseded by the “life style” model of chronic disease which focused almost exclusively on adulthood risk factors. This was largely a result of the success of cohort studies in confirming, for example, smoking or high cholesterol levels as major risk factors for several chronic diseases <sup>39-41</sup>. The current revived emphasis on a life course perspective has emerged against a background of increasing evidence, especially from revitalized historical cohorts and maturing birth or child-cohort studies, that the risk for instance of cardio vascular diseases (CVD) or

diabetes is not just determined by risk factors in mid-adult life, but begins in childhood or adolescence and potentially even earlier, during fetal development<sup>38</sup>. Specifically, the new awakening of the life course perspective has been boosted by prominence given to (a) the increasing evidence on the “tracking” of conventional risk factors from childhood to adulthood from large and extended cohort studies such as the Bogalusa Heart Study<sup>42</sup>; (b) the rise of “programming” as a model of disease etiology, in particular the fetal origins of adult disease hypothesis<sup>43, 44</sup>; and (c) emerging evidence to indicate that some early risk factors may act across generations, thus increasing cardiovascular risk in offspring<sup>45</sup>. Whilst consideration of early life factors or exposures is a main focus of the life course perspective, it is much broader than that. Its aim is to transcend the dichotomy between traditional “adult lifestyle” and “early origins” models of adult disease, both of which, on their own, are unable to fully explain individual risk as well as geographical, social and temporal variations in disease patterns<sup>46</sup>. Thus, the life course perspective considers the social and physical hazards, such as exposure to violence, and the resulting behavioral, biological and psychosocial processes, that act across *all* stages of the life span—gestation, infancy, childhood, adolescence, young adulthood and midlife—to affect risk of disease later on. The inclusion of different life stages in the analyses enriches our understanding of the development of adult disease risk. The different life stages are listed in the model below and can be read about more thoroughly in Kuh and Ben-Shlomo’s “A life course approach to chronic disease epidemiology”<sup>38</sup>.

- 1 *Fetal Life*: fetal growth, maternal nutritional status, socioeconomic position at birth, maternal safety
- 2 *Infancy and Childhood*: growth rate, breastfeeding infectious diseases, unhealthy diet, lack of physical activity, obesity socioeconomic position, exposure to violence directly or indirectly
- 3 *Adolescence*: unhealthy diet, lack of physical activity, obesity, tobacco and alcohol use, exposure to violence
- 4 *Adult life*: known adult behavioral and biological risk factors, exposure to violence

The major challenge in harnessing the potential of the life course perspective for public health policy is to fully elucidate the pathways and mechanisms by which, in different populations and at different historical periods, factors or exposures in earlier and later life act to determine subsequent risk of disease. Of particular importance is to identify the relative role of—and interaction

between—earlier and later factors, and the critical periods and exposures that may shape chronic disease risk later on. So far, and on the basis of available evidence, several theoretical models have been advanced to explain the possible ways in which factors over the life course may act to cause chronic disease <sup>47, 48</sup>:

1. A critical period model, where an insult during a specific period of growth or development has a lasting, lifelong effect on physical functioning or structure, thus resulting in disease later on.
2. A critical period with later effect modifiers, where later factors may modify such a risk incurred earlier.
3. Accumulation of risk with independent and uncorrelated results, where separate and independent risk factors at each stage of life combine to raise disease risk.
4. Accumulation of risk with correlated results, where risk factors cluster in socially or biologically patterned ways and may raise the risk of disease through social and/or biological chains (or pathways) of risk, that is, where one adverse (or protective) experience will tend to lead to another adverse (or protective) experience in a cumulative way.

In models 1 and 2, the term “critical period” implies exposures that must occur in some specified window(s) of time and that often involve exposures that alter normal biological development. The models suggests that exposures to material deprivation and/or social muddle during certain critical periods in the life course, e.g., in utero, during childhood and/or adolescence, could start the individual’s biological constitution routing on a negative course, making the individual more vulnerable and susceptible to negative symptoms and diseases <sup>40, 46</sup>. It is possible that hazardous exposures throughout the life course accumulate and gradually increase the risk of negative health outcomes (model 3). The frequency and duration of exposures to disadvantage experienced throughout life correspond to an increase in the risk of poor health <sup>46</sup>. Another plausible explaining model (model 4) suggests that early exposure to social and material disadvantage increase the risk of unhealthy lifestyle “careers” or “risk clustering”. Early disadvantage exposures increase the risk of exposure to subsequent chains of risk factors throughout the life course <sup>40, 49, 50, 51</sup>. Disentangling the ways in which factors at each stage of life act or interact to shape disease risk is, obviously, complex and difficult. The complexity is further increased by the fact that explanations are not only disease-specific, but may also vary from one cohort, population or context to another. It is crucial to understand that the effects of early life exposures on later disease risk are likely to be highly contextualized in both time and space

<sup>38, 52</sup>. The general orientation to the interconnected nature of experiences across various points in an individual's life motivates attention to potential linkages between childhood and adolescence social and/or economical situation as well as violence exposure and adult health.

## **Socioeconomic position, lifestyle and life course health**

Especially in domains related to health, some of the clearest demonstrations of the effects of social forces on individual outcomes have been disclosed. Discoveries in the health sciences have continued to point to the role of multiple aspects of social experience on health outcomes (e.g., nutrition, toxin exposure, lifestyle factors) <sup>53-55</sup>. The unavoidable necessity of incorporating the analysis of social forces into such research is well illustrated in the work of biologists Peter Gluckman and Mark Hanson, who describe their version of "a life course approach" in remarkably familiar terms: "There are at least three aspects to consider: the various strands of inheritance, the environment experienced during development, and the environment now being faced" <sup>56</sup>. Barker's work relating birth weight and adult obesity was an important catalyst for this developing field, which emphasizes the interaction of early and subsequent environments in determining the form of gene expression <sup>43, 44</sup>. There is a substantial amount of evidence suggesting that childhood socioeconomic conditions affect future health problems <sup>57-59</sup>. Even more, there is a growing interest in the effect of social circumstances experienced earlier in life on health later in life. Some studies have suggested that exposure to social disadvantage during childhood increase the risk of mortality, morbidity and impaired cognition in adulthood <sup>60, 61</sup>.

There is also well-founded evidence that exposure to disadvantageous social and socioeconomic conditions significantly increases the risk of health problems and mortality <sup>53-55</sup>. Furthermore there is reason to believe that such exposures aggregate throughout the life course and in turn affect the likelihood of poor health later in life <sup>62, 63</sup>.

Furthermore, even stressful life events have been related to both physical and mental health <sup>27, 64, 65</sup>. Stress is a part of life and it has been shown in many earlier and recent studies that stressful life events, minor or major, can have health implications and may be connected with a sudden onset or worsening of physical illnesses <sup>66, 67</sup>. Sex differences have also been shown when analyzing stress in relation to health <sup>68, 69</sup>, along with age differences in



connection to stress and health outcomes <sup>70, 71</sup>. The importance of timing <sup>72</sup> of life events has also been established by research. In addition to the recognition of these dynamic life course histories that contribute to an adult's current health outcomes, the life course perspective also emphasizes the dynamic nature of these outcomes themselves in relation to the individuals functioning within a given domain. This means that early violence exposure could lead to increasing life inequalities (social and/or socioeconomic) over time which challenges a more rapid decline in health <sup>56, 73</sup>.

## **Violence exposure and health**

### ***Children and adolescents***

Various studies have addressed childhood exposure to domestic violence and related psychological ill health <sup>74-76</sup>. The physical health consequences of exposure to domestic violence during childhood are less well documented <sup>77</sup>. In addition, few studies exist that describe the health effects on children whose mothers suffered violence outside their intimate relationship. Children can be affected by domestic violence in several ways, such as witnessing violence, hearing it, being used as a tool of the perpetrator and being abused by the violent parent <sup>78, 79</sup>. In the case of mothers suffering violence outside their intimate relationship it is less probable that children are affected in such a way <sup>80, 81</sup>.

Children who suffer violence themselves are likely to develop PTSD and other psychological symptoms <sup>80</sup>. It has also been proposed that the mere fact of witnessing domestic violence affects children's physical and mental health as much as being subjected themselves <sup>75</sup>. Externalized and internalized behavioral problems have been related to witnessing domestic violence. Externalized behavioral problems refer to rule breaking and aggression. Internalized behavior problems are defined as affective and somatic symptoms, poorer cognitive functioning and traumatic stress symptoms <sup>74, 82</sup>. In conclusion, studies on children exposed to domestic violence most often focus on mental health problems, and insights on physical health problems are scarce. As well, it is not known how children are affected by their mother being exposed to violence outside their intimate relationship.

A few reports on violence against teenagers and young women and men have been published, most often in connection with so-called dating violence <sup>83-85</sup>.

There is no strict definition of dating violence but it is often described as physical violence, sometimes also including emotional violence, from a boyfriend, dating partner or intimate partner <sup>83, 86-88</sup>. Very few population-based studies on the association between violence and health outcomes in young men and women have been published so far and those published have dealt mainly with dating violence and mental or sexual health <sup>83, 84, 85</sup>. Moreover, socioeconomic correlates have rarely been reported or adjusted for in earlier studies <sup>85, 89</sup>.

## **Adults**

The magnitude, nature and health impact of violence differ greatly for men and women. Most violence experienced by men is perpetrated by men and primarily occurs in public areas <sup>84, 90, 91</sup>. Violence against men usually occurs as isolated incidents, rather than repeated ongoing abuse like violence perpetrated against women <sup>84</sup>. Few studies have concentrated on gender differences in health outcomes as a consequence of violence, with increased risks of negative health in both genders <sup>84, 88, 92-94, 95, 96</sup>.

The area most thoroughly investigated is intimate partner violence i.e. a male abusing a female partner. Researchers maintain that men make up the majority of perpetrators and women the majority of victims in cases of intimate partner abuse <sup>97</sup>. Some evidence has been put forward that indicates that experiences of intimate partner violence have stronger and broader associations, with negative health outcomes among women <sup>95</sup>. In 2005, the initial results from a major multi-country study on domestic violence against women were presented <sup>16</sup>. The conclusion was that violence against women is an important risk factor for women's ill health and should receive greater attention, and that domestic violence is very common but varies widely from place to place and country to country. A strong association between violence and various health outcomes was demonstrated. Several earlier studies on domestic violence against women have shown similar results <sup>86, 87, 89, 98</sup>. Occasional studies have demonstrated mainly mental, but also to some extent physical, health consequences of intimate partner violence also for men <sup>88</sup>. Different populations of women have been investigated to identify health consequences of exposure to violence such as women with disabilities <sup>99</sup>, living in urban areas<sup>100</sup>, living in rural areas or having a low-income <sup>101, 102</sup>, ethnic differences <sup>103</sup> and women from different countries <sup>14, 87, 104, 105</sup>. The impact of intimate partner violence varies greatly for each woman and may depend on the form and frequency of the violence. Apart from direct physical effects of

harm<sup>87, 95, 98, 106-109</sup>, many women also experience negative psychological effects<sup>95, 106, 107, 110</sup>, loss of vital social functioning skills<sup>95, 107</sup> and depression<sup>111, 112</sup>.

However, men's violence towards each other<sup>113</sup> and socially constructed masculine behavior<sup>114-116</sup>, such as social isolation<sup>117</sup> and excessive alcohol usage<sup>116</sup>, have extensive negative health consequences<sup>93, 118-120</sup>.

## *The elderly*

Elder abuse is often defined as any action or any lack of appropriate action that causes harm, intentionally or unintentionally, to an elderly person<sup>121</sup>. The main types of abuse that have been identified are physical, psychological/emotional, sexual, financial, and neglect<sup>1, 122-124</sup>. The range of prevalence of elderly abuse reported by general population studies from different countries is wide (3-27%), possibly reflecting true variation in abuse rates across cultures as well as differences in measuring<sup>125</sup>.

Several studies have reported that severe abuse among men and women declines with age<sup>121, 126-128, 129</sup>. Research has confirmed a relation between elderly abuse and ill health in studies concerning domestic violence<sup>127, 130</sup>, in limited populations such as primary care settings<sup>131</sup> or independent living settings<sup>132, 133</sup>. Little, if any, research has described the relation between self-reported violence exposure and negative health in a general population of elderly. Physical abuse could have both physical consequences as well as experienced psychological consequences<sup>133-136</sup>. Elderly who are victims of psychological abuse are more likely to experience poor physical health and emotional and/or mental impairment than a non-abused population<sup>137</sup>. Not only abuse but perceived fear of crime is also found to be associated with poorer mental health, limitation in physical functioning and a lower quality of life<sup>138, 139</sup>.

## **Still unexplored areas of knowledge summarized**

A growing body of literature has reported severe psychological and physical consequences of intimate partner violence against women<sup>1, 13, 19, 33, 107</sup>, but few studies have demonstrated that this is also true for women exposed to violence not restricted to domestic violence<sup>1, 19</sup>. Few studies have included physical symptoms among children exposed to domestic violence<sup>77, 80</sup>. It is likely that these negative health effects are not restricted to children suffering from domestic violence. Even fewer studies describe the association between

violence-exposed mothers and their children's health when the violence against the women is inflicted outside their home in everyday life. Probably, such indirect health effects can also be found in the children of mothers who suffer violence outside their intimate partner relationship. However, no studies exist to show such effects.

Some population-based studies of adolescents and young adults have described an association between dating violence and health, mainly restricted to mental and gynecological ill health<sup>83, 85</sup>. Sociodemographic variables, smoking and substance abuse have seldom been reported for, or adjusted.

Very few population-based studies have assessed the link between elder abuse and health, although some minor studies have been made<sup>131, 140, 141</sup>.

Previous research has made significant contribution to our understanding of the lasting effects of abuse in early life<sup>142-145</sup>. However, no studies, to our knowledge, have considered the prospective long-term health consequences of violence exposure in adolescence. Especially not when trying to disentangle the long-term health consequences of violence exposure in early life using a life course perspective and a life course methodological framework.

## Rationale of the studies

It is obvious to everyone that life has a course with a beginning, middle and an end. The perspective of a life cycle tries to relate the place where the individual is in the course of his or her life with the kind of issues they are facing and the individual resources available to them to help them face these issues, as well as the possible disturbance that might develop if they fail to cope successfully with the issues<sup>38, 40</sup>.

The consequences of child abuse, violence exposure during adolescence or young adulthood, intimate partner violence and elderly abuse are commonly encountered within the health care system<sup>18, 146-150</sup>. In the past, these different types of violence exposure have been studied in isolation. More recently it has become apparent that they are often closely interconnected<sup>151</sup>. Interventions directed at one form of violence may be beneficial to others as well<sup>146, 147, 152</sup>.

Exposure to violence can have many consequences, differing throughout the life course — deprivation of autonomy, financial exploitation, psychological and physical neglect or abuse — but all types share common characteristics: 1) the use of destructive force to control others by depriving them of safety, freedom, health and, in too many instances, life; 2) the epidemic proportions of the problem, particularly among vulnerable groups; 3) the potential for

intergenerational transmission; and 4) a devastating impact on individuals, families, neighborhoods, communities and society<sup>10, 13, 19, 71, 98, 153</sup>.

Being born into a social and physical hazardous environment in Bangladesh in 2000 is likely to be associated with very different early life exposures than being born into social and physical hazardous environment in the United States in the 1950s. The social meaning and the means to deal with physical hazards, in connection to its life course links to particular types of exposures, as well as the prevailing disease environment will all influence the potential for early life factors to be expressed in different adverse outcomes later in life.

What we did not know was how exposure to violence in the general population was associated to ill health through the life course.

## **Aims**

### **Overall aim**

The general aim of this thesis is to describe the relation between exposure to violence or threats of violence and ill health at different ages and in different time periods of life.

### **Specific aims**

Paper I. The aim of this study was to analyze both the physical and psychological health of children (0-18 years, divided into three age groups) living with mothers who had been exposed to violence or threats either within or outside intimate partner relationships, during the past 12 months.

Paper II. The principal aim of the study was to compare self-reported health outcomes for young men and women exposed to violence during the past 12 months with young men and women not exposed to violence. Another aim was to examine the use of medical services by those exposed and not exposed to violence and also to analyze various socioeconomic correlates for victimization.

Paper III. The aim of the study was to assess the association between experiencing a fear of crime and/or self-reported exposure to psychological and/or physical violence in relation to self-reported physical and psychological

health, using a large representative sample of elderly men and women in Sweden.

Paper IV. The aim of this study was to evaluate the association between adolescent exposure to violence and adult health in a long-term prospective population-based study, with a follow up of 9, 19, and 26 years. Our hypothesis was that individuals who reported exposure to violence during the transition from adolescence to young adulthood were at increased risk for poor health in adulthood compared to those not exposed to violence.

## METHOD

Three data sources have been used in the four articles, three cross-sectional studies ("*Life and health in Norrland*," "*Health on Equal Terms 2004* and *Health on Equal Terms 2006*") and one longitudinal ("*Level-of-Living survey*") (Table 1).

Table 1. Summary of design, data sources, and participants

Paper	Design	Data sources	Population	Study sample
I	Cross sectional	<i>Life and Health in Norrland</i> ; 1997	22418 men and women in Västernorrland, Jämtland, Västerbotten and Norrbotten	2137 women aged 18-64 with 4947 children aged 0-18
II	Cross sectional	<i>Health on Equal Terms</i> ; 2004	National sample of 20004 people	1603 men and 1923 women aged 18-25
III	Cross sectional	<i>Health on Equal Terms</i> ; 2006	National sample of 9360 men and women	4974 women and 4386 men aged 65-84
IV	Longitudinal	<i>Level-of-Living survey</i> ; 1974, 1981, 1991 and 2000	Originates from a national random sample of 1/1000 of Swedish population	1974: 191m 205w 1981: 247m 231w 1991: 120m 111w 2000: 588m 547w 1974-1991 followed to 2000

## Population

In the spring of 1997, the four northernmost County Councils in Sweden conducted a population survey called "*Life and Health in Norrland*" <sup>154</sup>. The aim was to form a picture of how the region's inhabitants apprehended their own health, lifestyle and living conditions.

A questionnaire was mailed in the beginning of 1997 to 22418 people living in the counties of Västernorrland, Jämtland, Västerbotten and Norrbotten, to

collect information for the survey *"Life and Health in Norrland"*. Sixty-five percent of the questionnaires were answered and returned. In the particular mother-children sample, the response rate was 71%. A total of 2137 women aged 18-64 and living with their own or their spouse's children (4947 children) aged between 0-18 constituted the study sample in paper I (Figure 3).



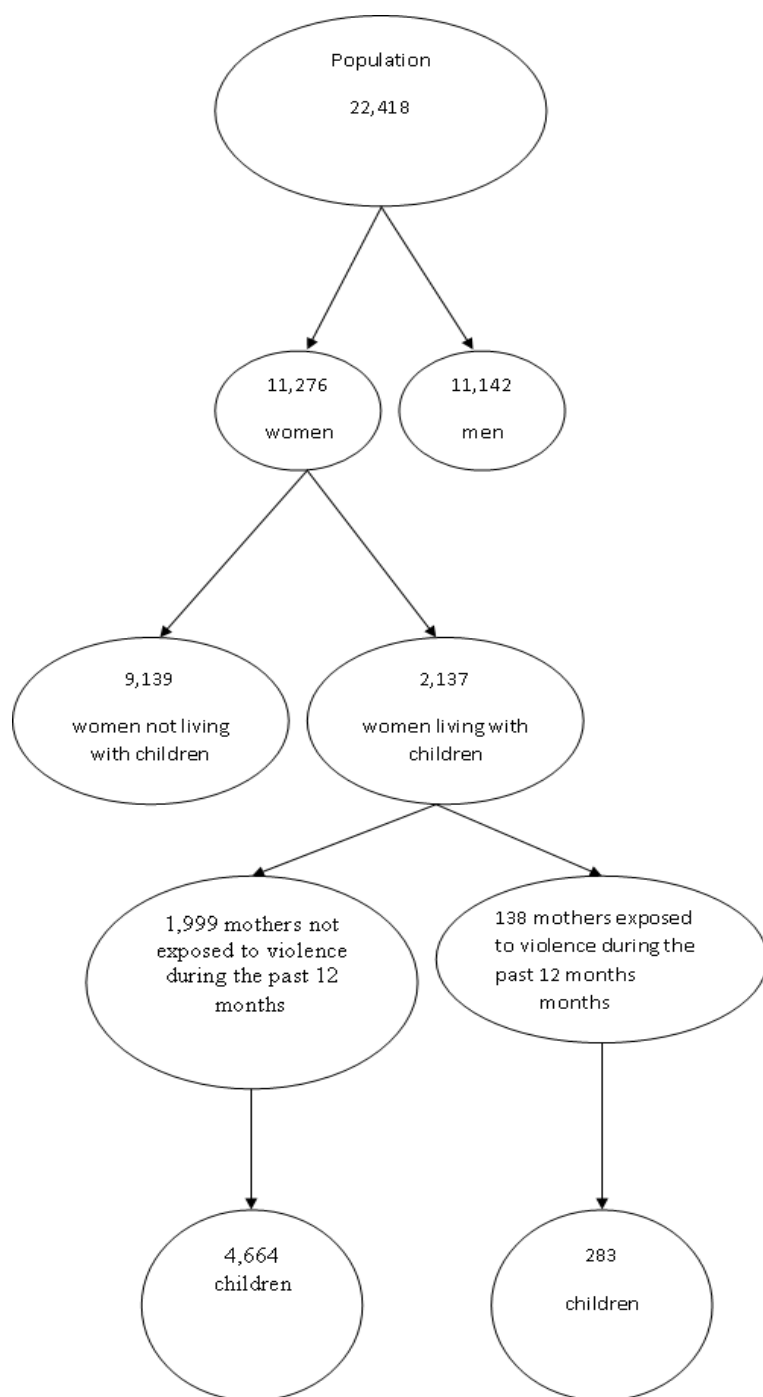


Figure 3. Flowchart showing the sampling procedure in the Life and Health Survey

As a part of the Swedish National Institute for Public Health mandate to follow up public health policy, a national public health survey, "*Health on Equal Terms*"<sup>155, 156</sup>, has been conducted regularly every year since 2004 to follow up self-reported health and the factors that determine this. The survey, which shows the state of the population's health and follows up changes over time, is an ongoing collaboration between the Institute and county councils/regions in Sweden. The survey samples were chosen to represent the populations through stratified SRSs. The 2004 survey selection comprised a total of 20004 men and women aged 18-84. The response rate for this age group was 49% for men and 64% for women. Data from men and women between the ages of 18-25 (1603 men and 1923 women) were selected for the analyses in paper II.

Data from the 2006 nationwide public health survey "*Health on Equal Terms*" were analyzed to be used in paper III. A nationally representative sample of close to 60000 women and men aged 16-84 had been asked to reply to a questionnaire, sent to them by mail. In our analyses, men and women between the ages of 65-84 were selected, comprising 4974 women and 4386 men. The response rate for this age group was 59% for men and 70% for women.

In paper IV the Swedish "*Level-of-Living Survey*" (LNU)<sup>157, 158</sup>, one of the longest-running longitudinal social science surveys in the world, was used. It was first conducted in 1968, after which it has been replicated at somewhat irregular intervals in 1974, 1981, 1991, 2000 and 2010. The basis for the LNU was a random sample of 1/1000 of the Swedish population between 15 and 75 years of age. In 1991, the lower age limit was raised to 18. The same respondents have been interviewed again at later waves, and 2100 respondents have in fact contributed to all five waves (see table 2). We restricted our analyses to comparing four cohorts (15-19 years of age in 1974 and 1981, 18-19 years of age in 1991 and 2000). The first three of the cohorts were followed up in 2000, being 41-45 years of age, 34-38 years of age, and 27-28 years of age.

Table 2 Selected technical data from the Level of Living Survey (LNU)

Survey year	Total sample size (n)	Response (n)	Total non-response rate (%)	Age range	Birth cohorts covered	N in all previous surveys
1968	6524	5924	9.2	15-75	1892-1953	-
1974	6593	5617	14.8	15-75	1998-1959	4722
1981	6802	5605	17.6	15-75	1905-1966	3713
1991	6773	5306	21.7	18-75	1915-1973	2561
2000	6711	5142	23.4	18-75	1925-1982	2100

## Questionnaires

The *“Life and Health in Norrland”* questionnaire used in paper I contained a total of 70 questions addressed to the sampled population, covering their health, living conditions, socioeconomic factors and work. Under the heading *“Security”* there was two questions about violence, with the following wording: *“During the past 12 months, have you been exposed to physical violence?”* and *“During the past 12 months, have you been exposed to threats of violence so severe that you felt afraid?”*

A specific question answered by the parents about their children aged 0-18 contained 10 sub-questions about their health and behavior: *“During the past three months, has your child had any the following symptoms/disorders: (1) headache, (2) eating disorder, (3) stomach ache, (4) pain anywhere in the body, (5) allergy/asthma, (6) inability to concentrate, (7) anxiety, (8) difficulty in keeping/finding friends, (9) need of extra support at school or (10) reading/writing disabilities?”* Questions regarding health care utilization were also included in the survey: *“During the past 12 months, has your child visited a physician or nurse?”* Other health care sources were available but not relevant. The use of pharmaceuticals was asked about in six sub-questions: *“During the past 12 months, has your child received any of the following medications: (1) cough mixture, (2) nose drops, (3) asthma medication, (4) allergy medication, (5) antibiotics or (6) analgesics?”*

All questions had binary response alternatives (yes/no) and were all taken from *“Living Conditions Survey,”* an annual national survey conducted by Statistics Sweden <sup>159</sup>.

In paper II and paper III the *“Health on equal terms”* questionnaire was used. The questionnaire contained some 80 questions, 40 of which were about

physical and mental health and the use of the health care system, 30 pertained to socioeconomic factors, form of housing and work environment, and five dealt with cigarette smoking and the use of alcohol and cannabis. Three questions regarding violence were included under the heading "Security" worded as follows: (1) "Have you been exposed to physical violence during the past 12 months?," (2) "Where did it happen?," and (3) "Have you been exposed to any threats or threats of violence that made you feel afraid during the past 12 months?." Questions (1) and (3) had binary answers, yes/no, while (2) had several given alternatives. To assess mental health, the 12 questions from the General Health Questionnaire (GHQ-12) were included. The GHQ is one of the most thoroughly tested questionnaires regarding mental health and is used for screening current general psychological and psychiatric disorders. Alcohol use was assessed using the Alcohol Use Disorders Identification Test (AUDIT), constructed by WHO in 1992 and widely used for adults but also for young men and women. The first three AUDIT questions regarding consumption were used, and different cut-off values for men and women were chosen to discriminate for hazardous drinking. For smoking, one question out of seven questions was chosen, namely, "Are you a daily smoker?," while for cannabis the following question was used: "Have you used any form of cannabis during the past year?."

Most health variables had three response categories: No; Yes, some problems; and Yes, severe problems. There was one question about accidents: "Have you been through one or several accidents that made you seek medical care during the last three months?"

In paper IV the questionnaires used in the "Level of Living Survey" (LNU) were used. The respondents were asked questions (a comprehensive structured interview guided by a checklist) about their living conditions in several areas i.e. growth, family relationships, life-events, living conditions, health history and status, working conditions, behavioral, psychosocial and demographic variables. Questions tapping health were also measured in 1974, 1981, 1991, and 2000. The main health outcome measure was constructed from a long list of symptoms, signs of disease and manifest diseases, introduced by the question "During the past 12 months, have you had any of the following illnesses or ailments?" For each item the response alternatives were No, Yes, minor problems, and Yes, severe problems. The list was comprised of different kinds of health status information, including symptoms and feelings as experienced by the interviewee directly (e.g., stomach pain or dizziness), as well as test results and diagnoses obtained from a physician (e.g., anemia or bronchitis) <sup>158</sup>. In this study we used the list of symptoms and diseases to

capture the burden of ill health in total, which has been used in several previous studies. An index of 42 items, included in all survey waves, was used to capture those who were “free of health problems” (score 0-5) and those with “a heavy illness burden” (score 6 or more) <sup>57, 60, 160</sup>.

Another outcome of interest was the respondents self rated health (SRH), measured by the question “How would you rate your health?”. The response alternatives were “Good,” “In between” or “Bad”. In the analyses, SRH was dichotomized into “Good” versus “Bad” or “In between”. In a number of studies, this question of self-rated health has been found to be an excellent predictor of future health <sup>160, 161</sup>.

## Statistical analyses

Choosing between odds ratio (OR) and risk ratio (RR) the odds ratio was preferred. When the dependent variable is “rare” (prevalence<10 percent) or there is stability in dependent variables, independent variables or covariates, OR is justified <sup>162</sup>. The main analytical tool throughout the four papers was logistic regression.

In paper I, multilevel logistic regression analyses were selected to analyze the dichotomous dependent variables. In that material, the sampling structure introduced multilevel relationships between the observations, i.e. associations within families. Level 1 included children about whom information is reported and level 2 was the mother who answered the questions about these children. The relationships were mainly caused by interdependence – economic, social or biological – among the family members.

In paper II the researchers were challenged with a high rate of non-response and particularly a skewed non-response. To adjust for the skewed dropout rates and selection differences between different areas, various weights were calculated by calibration by Statistics Sweden, which carried out the original survey on behalf of the Swedish National Institute of Public Health. These weights were applied to each participant and were used throughout all the analyses, to produce as “true” odds ratio estimates as possible <sup>163</sup>. Further in paper II, binary logistic regression was used to analyze for possible association between violence and socioeconomic factors and different health outcomes. Multivariate logistic regression was used to analyze the association between violence and health outcomes, controlling for socioeconomic factors, smoking, hazardous alcohol use, and use of cannabis. In paper III again binary logistic regression was used again to analyze the possible associations between abuse

and socioeconomic factors and different health outcomes. Multivariate logistic regression was used to analyze the association between abuse and health outcomes, controlling for socioeconomic factors and smoking. Prevalence, with a 95% confidence interval, was used to describe and analyze differences in socioeconomic background (education, unemployment, financial situation and civil status), smoking, hazardous alcohol use and use of cannabis, for those exposed to violence compared with those not exposed. Generally, when comparing two parameter estimates, the estimates are statistically significantly different if the confidence intervals do not overlap <sup>164</sup>.

In paper IV a more complicated model was necessary as two years of the respondents' lives were to be analyzed. In order to assess the independent association between being exposed to violence in adolescence and adult health, the analyses controlled for potential confounders measured early in life, as well as adulthood violence exposure. The first step of the analyses was to explore the prevalence of social demographics, health outcomes and smoking in adolescent men and women exposed and not exposed to violence for each cohort, during every period. These analyses were also done to identify potential confounders of the relationship between violence exposure in late adolescence and adult health. The multivariate analyses in the second step were conducted to include the potential confounders in the analyses if there was theoretical or empirical support for its potential as a risk factor to a negative health outcome. A series of multiple-predictor models estimated the impact of late adolescence violence exposure on the severe illness burden and self-rated health (SRH) outcomes. Different models accounting for various potential confounders of the observation between exposure to violence and health were estimated.

The significance level used was  $<0.05$  in all papers.

Throughout the papers chi-square statistics were used to test the difference between demographic characteristics (education, unemployment, financial situation, civil status, smoking, hazardous drinking) of violence-exposed and their non-exposed counterparts. In one case Student's t-test was used to analyze average differences in physical symptoms and the average sums of pharmaceutical usage (paper I).

## **Non-response**

The non-response in the responding samples used in papers I to IV are presented in each paper. But as the problem of non-response is general in all

population-based surveys a section about non-response has its place here. In order to say anything about public health and its determinants, national and regional surveys are carried out which are then used as the basis for planning and research <sup>165</sup>. The major problem is whether the non responding individuals would have answered similarly to the ones who did answer. Two recent Swedish studies, using Swedish surveys (e.g. "Life and Health in Northern Sweden" and "Equal Health") as the basis for the analyses, have put forward the point of view that the non-responders would indeed have answered similarly to those who did answer <sup>165, 166</sup>. Lindén-Boström and Persson 2012 respond to the question, "Can we use the results from public health surveys that have progressively lower response frequencies?," with "Yes, we believe we can". Both studies however recommend using calibration, as some groups could be under represented and otherwise bias the results. Calibration means that register data is used as auxiliary information to adjust for non-response bias in various groups <sup>167, 168</sup>. Calibration was used in paper II, in the thesis.

## Ethical considerations

Concerning "Life and Health in Norrland" (Paper I) a decision by Justitiekanslern, Länsrätten Stockholms län Dnr 355-98-60 approved the study. Paper I was also approved by the regional ethics committee at the Mid-Sweden University. Papers II and III were approved by the Ethics Committee at the Swedish National Board of Health and Welfare (Protokoll 20031208). In paper IV the data used is openly available and permission has been received by the original authors. Ethical assessments along with an appraisal of the research plan were performed before allowing the researchers access to the data from Swedish National Data Service (Förbindelse 081114 Svensk Nationell Datatjänst, SND). In papers I- III, all participants were informed about the study in a cover letter enclosed with the questionnaire. Answering the questionnaire was judged to be consent to join the study.

## RESULTS

### Prevalence of exposure to violence

In paper I, children of mothers who had reported being exposed to violence were compared to children whose mothers reported not having been exposed to violence. Six percent of the mothers (138/2137) had answered that they had been exposed to violence and/or threats of violence during the past 12 months. Of these, 45% had experienced violence at home or at somebody else's home, 24% at their place of work or in an educational environment and 19% in a public place/restaurant or nightclub. The number of children whose mothers had suffered violence was 283 (6%), while 4664 children lived with non-exposed mothers.

In paper II, the main subjects were 18-25 years of age. The prevalence of exposure to violence for young men was 19.2% and for young women 12.7%. The place where the physical violence took place differed somewhat between men and women. Among the men, 61.7% had been exposed to violence in a public place, while 18.9% were exposed in a home environment, while young women had been exposed to violence almost as often in a home (38.4%) as in a public place (41.3%). An equal percentage of men and women had been subjected to violence at their place of work (18%).

An elderly population was studied in paper III. Men and women aged 65-84 years reported being exposed to physical violence with the following proportions women 65-74: 1.0% (0.6-1.4), men 65-74: 3.0% (2.4-3.6), women 75-84: 0.6% (0.3-0.9), men 75-84: 0.2% (0.0-0.4). More than twice as many women reported being exposed to physical abuse in their home compared to men, while almost all physical abuse in public places (restaurant, nightclub or the like) was directed against a man. About 50% of both men and women reported having been abused in other places, which was not further specified in the questionnaire.

The prevalence of self-reported violence was not specifically analyzed in paper IV. However, to provide an understanding of the exposure to violence prevalence, the different survey years, 1974, 1981, 1991, and 2000, are presented in table 3. In order to depict repeated violence, those exposed to



violence in adolescence in 1974 were followed up in 1981, 1991, and 2000. The men who were followed from 1974 to 2000 showed a chronological prevalence of exposure to violence: 12.5%, 1.9%, 1.9%, 0.0%, while the women reported 8.6%, 0.9%, 0.4%, and 0.4%.

Table 3. Prevalence (%) of self-reported exposure to violence in the 1974, 1981, 1991, and 2000 survey year samples.

<b>Men</b>			
Age 15-19 (n=191)	Age 15-19 (n=247)	Age 18-19 (n=120)	Age 18-19 (n=114)
1974	1981	1991	2000
12.5	13.8	26.7	15.4
<b>Women</b>			
Age 15-19 (n=205)	Age 15-19 (n=231)	Age 18-19 (n=111)	Age 18-19 (n=88)
1974	1981	1991	2000
8.6	6.1	9.9	12.5

## Sociodemographic characteristics

In paper I, the women who had experienced violence were more likely to have a more difficult economic situation, to be daily smokers, to have a lower education level, and to be unemployed. They were also more frequently single parents.

The young adults in paper II showed substantial differences in regard to financial problems. Those exposed to violence reported more financial problems than those not exposed to violence. Young women exposed to violence were more frequently daily smokers than those not exposed, while abused men much more often had hazardous drinking habits. Both young men and women exposed to violence had a greater tendency to use cannabis than those not exposed.

In the elderly population (paper III), irrespective of sex and age, the majority were born in Sweden, married or cohabiting, had a low level of education and lived in a home of their own. The women more frequently reported living in a single household (specifically, being widowed) and having a lower

educational base, more difficult economic situation, and lower percentage of risk consumption of alcohol than the men.

In paper IV, the age cohorts were followed for several years and the sociodemographic characteristics were presented with a yearly comparison. Few significant differences were seen between exposed and unexposed men and women. But there were tendencies in the 2000 cohort compared to the 1974, 1981, and 1991 cohorts toward fewer manual working fathers, higher educational level and fewer smokers, both among the exposed and non-exposed young men and women. There was also a tendency, at least in the non-exposed group, toward a lower likelihood of living with both parents (for example, chronologically 87%, 83%, 77%, and 60% among the men vs. 89%, 83%, 72%, and 64% among the women). Childhood economic problems were significantly more common in young women exposed to violence from the 1981 cohort.

## **Self-reported health in relation to self-reported violence exposure**

In paper I, the odds ratios (OR) for maternally reported physical symptoms among the children of exposed mothers were compared with those regarding the children of unexposed mothers. The crude ORs were adjusted for mother's sociodemographic characteristics (economic situation, education, employment situation and marital status) and smoking. Maternal age did not affect the odds ratios and was consequently left out of the analysis. Odds ratios regarding all registered physical symptoms (with the exception of allergy/asthma in the youngest age groups and headache and diffuse pain in the oldest boys group) showed that children of violence-exposed mothers had a significantly higher risk of ill health than children of non-exposed mothers. The odds ratios can be seen in table 4.

Table 4. Adjusted<sup>1</sup> odds ratios (OR) with 95% confidence intervals for different physical and psychological outcomes and learning difficulties over the past three months of children living with mothers exposed to violence compared with children living with unexposed mothers. Significant raised OR in bold print ( $\alpha<0.05$ ).

Age group	Physical symptoms					Psychological symptoms and learning difficulties				
	Headache	Eating problems	Stomach ache	Diffuse physical pain	Allergy/asthma	Inability to concentrate	Anxiety	Difficulty finding/keeping friends	In need of extra support at school	Reading/writing difficulties
Girls										
0-6 y	2.2 (1.2-4.3)	7.1 (5.9-8.5)	2.4 (1.9-3.1)	2.6 (2.0-3.4)	1.0 (0.8-1.4)	2.2 (1.8-2.7)	6.2 (5.2-7.4)	1.9 (1.5-2.3)	3.6 (3.0-4.2)	n.a.
7-12 y	1.4 (1.0-1.8)	3.6 (3.0-4.3)	1.9 (1.4-2.4)	1.9 (1.5-2.5)	1.9 (1.5-2.4)	4.1 (3.5-4.8)	6.2 (5.1-7.5)	1.8 (1.5-2.3)	5.2 (4.4-6.2)	4.3 (3.6-5.1)
13-18 y	2.1 (1.6-2.6)	4.0 (3.4-4.7)	2.2 (1.7-2.8)	2.2 (1.7-2.8)	2.1 (1.7-2.6)	2.6 (2.2-3.2)	5.8 (4.9-6.8)	3.4 (2.9-4.0)	2.3 (1.9-2.8)	1.3 (1.0-1.6)
Boys										
0-6 y	2.3 (1.6-3.3)	5.5 (4.4-6.8)	3.0 (2.2-4.1)	1.7 (1.2-2.3)	0.9 (0.6-1.1)	0.5 (0.3-0.9)	2.7 (2.1-3.4)	0.9 (0.6-1.2)	0.5 (0.3-0.8)	n.a.
7-12 y	1.2 (0.9-1.5)	2.9 (2.4-3.4)	2.5 (1.9-3.1)	1.2 (0.9-1.6)	1.7 (1.4-2.2)	0.8 (0.5-1.3)	2.5 (2.0-3.0)	1.1 (0.8-1.4)	0.6 (0.4-0.9)	1.0 (0.9-1.1)
13-18 y	1.3 (1.0-1.7)	3.0 (2.5-3.6)	2.6 (2.0-3.3)	1.3 (1.0-1.6)	2.0 (1.6-2.6)	0.6 (0.4-0.9)	2.2 (1.8-2.7)	1.6 (1.2-2.1)	0.3 (0.2-0.4)	1.6 (1.3-1.8)

<sup>1</sup> Adjusted for socioeconomic factors (civil status, economic situation, employment and education) and smoking of the mother

Children of violence-exposed mothers also demonstrated higher utilization of the health care system as reported by the mothers, with almost twice the risk in overall terms of having visited a physician during the past 12 months, with an adjusted OR for boys of 1.4 (95% CI 0.9-2.0), 2.0 (95% CI 1.5-2.6) and 2.4 (95% CI 1.8-3.3) for the youngest to the oldest age group. The corresponding figures for girls were 1.2 (95% CI 0.9-1.6), 1.4 (95% CI 1.1-1.9) and 1.6 (95% CI 1.3-2.1), respectively. There was a general increase in the overall risk of pharmaceutical consumption for children living in a household where mothers had reported being exposed to violence (figure 4).

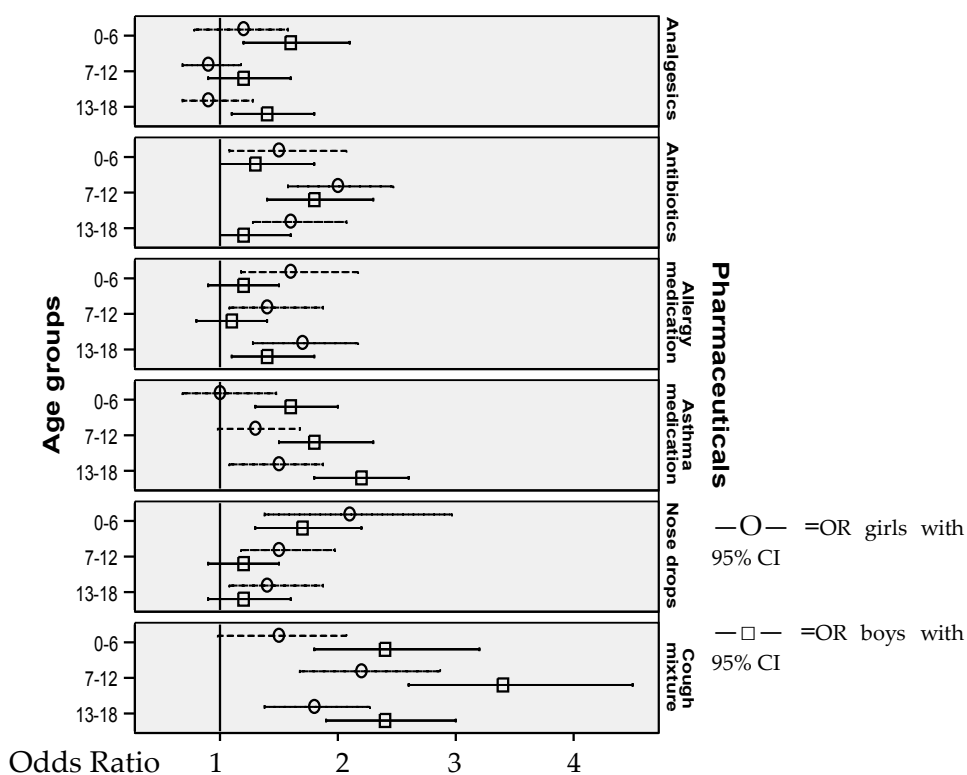


Figure 4. Adjusted odds ratios (OR) for pharmaceutical usage among children living with mothers exposed to violence compared to those living with non-victimized mothers. OR was adjusted for civil status, economic situation, employment, smoking, and education of the mother

When reporting the results in paper II (young adults), crude and adjusted odds ratios for different health outcomes and the use of medical care for men and women exposed vs. not exposed to violence were produced and are demonstrated here in table 5.

The crude odds ratios were considerably increased for most variables for both sexes, not only those describing mental health qualities, but also variables like general health and severe allergic and asthmatic problems. Especially the exposed women answered more often that they had suffered an accident that made them seek medical care. The odds ratios for different forms of health care utilization were raised for both men and women. Furthermore, both women and men exposed to violence had raised odds ratios for needing medical treatment but not applying for it.

Table 5. Crude and adjusted odds ratios (OR) and confidence intervals for health outcomes and use of medical care, adjusted for socioeconomic factors and smoking for young men and women exposed to violence and/or threats during the last 12 months, compared with those not exposed. Significant raised OR in bold print ( $\alpha < 0.05$ ).

Variables	Women		Men	
	<i>Crude OR</i>	<i>Adjusted OR</i>	<i>Crude OR</i>	<i>Adjusted OR</i>
Poor or very poor general health	<b>3.4(3.3-3.6)</b>	<b>3.4(3.3-3.6)</b>	<b>3.4(3.2-3.5)</b>	<b>2.2(2.1-2.3)</b>
One or several accidents	<b>2.3(2.2-2.3)</b>	<b>2.1(2.1-2.2)</b>	<b>1.3(1.2-1.3)</b>	<b>1.1(1.1-1.2)</b>
Long-term illness or disability	<b>1.9(1.9-2.0)</b>	<b>1.9(1.9-2.0)</b>	0.9(0.9-1.0)	0.8(0.8-0.8)
Reduced mental health (GHQ 12)	<b>2.3(2.2-2.3)</b>	<b>2.2(2.1-2.2)</b>	<b>2.4(2.4-2.5)</b>	<b>2.0(2.0-2.1)</b>
Anxiety or nervousness*	<b>2.6(2.5-2.7)</b>	<b>1.6(1.5-1.6)</b>	<b>2.3(2.2-2.4)</b>	<b>1.9(1.9-2.0)</b>
Fatigue and insomnia*	<b>4.1(4.0-4.3)</b>	<b>1.7(1.6-1.8)</b>	<b>4.2(4.0-4.5)</b>	<b>4.2(3.9-4.4)</b>
Stress*	<b>2.1(2.1-2.2)</b>	<b>1.7(1.7-1.8)</b>	<b>1.9(1.8-2.0)</b>	<b>1.1(1.1-1.2)</b>
Muscular/skeletal pain*	<b>3.4(3.3-3.6)</b>	<b>3.1(3.0-3.3)</b>	<b>2.2(2.1-2.4)</b>	<b>3.8(3.4-4.3)</b>
Headache or migraine*	<b>1.7(1.6-1.8)</b>	<b>1.7(1.6-1.8)</b>	<b>1.6(1.5-1.7)</b>	1.0(0.9-1.1)
Gastrointestinal problems*	<b>1.2(1.1-1.2)</b>	<b>1.3(1.3-1.4)</b>	<b>1.6(1.5-1.7)</b>	0.5(0.5-0.6)
Allergic symptoms*	<b>1.9(1.8-1.9)</b>	<b>1.8(1.7-1.8)</b>	<b>1.2(1.2-1.3)</b>	0.9(0.8-0.9)
Asthmatic symptoms*	<b>1.6(1.5-1.8)</b>	<b>2.8(2.6-3.1)</b>	<b>1.4(1.3-1.5)</b>	N.A.
Overweight*	<b>2.6(2.5-2.8)</b>	<b>1.4(1.3-1.5)</b>	<b>5.2(5.0-5.5)</b>	<b>5.4(5.1-5.7)</b>
Consulted a physician	<b>1.5(1.4-1.5)</b>	<b>1.6(1.5-1.6)</b>	0.9(0.8-0.9)	0.9(0.9-0.9)
Visited an emergency ward	<b>3.0(2.9-3.1)</b>	<b>2.3(2.2-2.4)</b>	<b>1.1(1.0-1.1)</b>	0.9(0.9-0.9)
Treated in a hospital #	<b>3.0(2.8-3.2)</b>	<b>2.8(2.6-3.0)</b>	<b>1.8(1.7-1.9)</b>	0.9(0.8-0.9)
In need of medical treatment but have not consulted anyone	<b>2.5(2.5-2.5)</b>	<b>1.9(1.8-1.9)</b>	<b>1.8(1.7-1.8)</b>	<b>1.9(1.8-1.9)</b>
#				

\*Severe problems Last 3 months

In paper III, the elderly population was analyzed and adjusted odds ratios for different health outcomes and use of medical care are given for women and men in perceiving vs. not perceiving fear of crime and being vs. not being exposed to psychological and/or physical abuse (Table 6).

Table 6. Adjusted odds ratios (OR) and confidence intervals for health outcomes adjusted for age, civil status, work history<sup>87</sup> and smoking for women and men experiencing fear of crime and/or being psychologically or physically abused during the past 12 months, compared to non-abused (age 65-84). Statistically significant ORs in bold print

	Fear of crime		Psychological abuse		Physical abuse	
	Women	Men	Women	Men	Women	Men
Poor general health	<b>1.1 (1.0-1.1)</b>	<b>1.6 (1.1-2.4)</b>	<b>3.8 (2.7-5.3)</b>	<b>2.2 (1.4-3.4)</b>	1.2 (0.5-2.6)	<b>2.2 (1.2-4.1)</b>
Muscular/skeletal pain (index)	1.1 (0.9-1.3)	1.0 (0.8-1.4)	<b>2.2 (1.7-2.9)</b>	<b>2.1 (1.5-2.9)</b>	2.1 (0.7-5.9)	<b>2.6 (1.7-4.2)</b>
Headache	<b>1.3 (1.1-1.6)</b>	<b>1.7 (1.3-2.4)</b>	<b>1.5 (1.1-2.0)</b>	<b>2.1 (1.4-3.0)</b>	1.5 (0.9-2.4)	<b>1.8 (1.1-3.2)</b>
Incontinence	1.1 (0.9-1.3)	1.2 (0.8-1.6)	<b>1.6 (1.2-2.1)</b>	<b>1.7 (1.2-2.4)</b>	<b>1.8 (1.2-2.9)</b>	<b>2.3 (1.4-3.7)</b>
Stomach problem	<b>1.4 (1.2-1.6)</b>	<b>1.5 (1.1-1.9)</b>	<b>2.0 (1.6-2.6)</b>	<b>1.3 (1.0-1.9)</b>	1.5 (0.9-2.4)	1.1 (0.1-1.7)
Overweight	<b>1.2 (1.1-1.4)</b>	<b>1.5 (1.2-2.0)</b>	<b>1.4 (1.0-1.8)</b>	<b>1.4 (1.0-1.9)</b>	1.3 (0.8-2.1)	<b>1.7 (1.1-2.7)</b>
Diabetes	1.0 (0.8-1.2)	1.2 (0.9-1.7)	1.4 (0.9-2.0)	1.2 (0.8-1.9)	1.5 (0.8-3.1)	<b>1.7 (1.0-2.9)</b>
Allergy	<b>1.2 (1.0-1.5)</b>	<b>1.8 (1.3-2.6)</b>	<b>1.8 (1.4-2.5)</b>	<b>2.2 (1.5-3.3)</b>	<b>1.8 (1.1-3.1)</b>	1.3 (0.7-2.4)
Blood pressure	1.1 (0.9-1.3)	1.3 (0.9-1.7)	0.9 (0.7-1.2)	1.2 (0.9-1.7)	1.2 (0.7-2.0)	1.1 (0.7-1.7)
Anxiety	<b>1.8 (1.2-2.9)</b>	1.9 (0.9-4.0)	<b>6.3 (3.7-11)</b>	<b>10 (5.3-19)</b>	<b>7.4 (3.6-15)</b>	<b>7.1 (3.0-16)</b>
Sleeping problem	<b>1.5 (1.2-2.0)</b>	<b>2.5 (1.6-4.0)</b>	<b>3.0 (2.0-4.3)</b>	<b>3.5 (2.1-5.9)</b>	<b>2.3 (1.4-4.5)</b>	<b>5.1 (2.8-9.3)</b>
Stress	<b>1.6 (1.2-2.3)</b>	<b>3.3 (2.0-5.3)</b>	<b>6.3 (4.2-9.3)</b>	<b>5.7 (3.5-9.5)</b>	<b>3.8 (1.9-7.6)</b>	<b>5.9 (3.1-11)</b>
GHQ-12	<b>1.5 (1.2-1.9)</b>	<b>2.2 (1.6-3.1)</b>	<b>5.9 (4.4-7.9)</b>	<b>3.9 (2.7-5.7)</b>	<b>4.0 (2.4-6.7)</b>	<b>3.2 (1.9-5.5)</b>
Suicidal thoughts	1.1 (0.8-1.5)	<b>3.7 (2.3-5.7)</b>	<b>3.5 (2.3-5.2)</b>	<b>7.3 (4.6-11)</b>	1.9 (0.9-4.3)	<b>4.7 (2.4-9.0)</b>
Attempted suicide	1.4 (0.8-2.4)	<b>4.0 (1.8-8.7)</b>	1.1 (0.4-2.8)	<b>5.3 (2.3-12)</b>	1.4 (0.3-6.0)	<b>5.4 (1.8-16)</b>
Pharmaceutical index	<b>1.1 (1.0-1.4)</b>	<b>2.0 (1.4-2.7)</b>	<b>2.0 (1.5-2.7)</b>	<b>2.1 (1.4-3.0)</b>	<b>2.1 (1.2-3.4)</b>	<b>3.3 (2.0-5.4)</b>
Use of healthcare index	<b>1.3 (1.0-1.5)</b>	<b>1.6 (1.2-2.1)</b>	<b>2.6 (1.9-3.5)</b>	1.4 (0.9-2.1)	<b>1.8 (1.0-3.1)</b>	1.2 (0.7-2.2)

In general, a considerable amount of the odds ratios for both men and women who perceived fear of crime or reported being exposed to psychological abuse were significantly raised. Only blood pressure did not show any raised odds ratios. Regarding physical abuse, the odd ratios for negative health outcomes were more often significantly raised for the men than for the women. Anxiety,

sleeping problems, stress, and psychological health (GHQ12) stood out as problem areas irrespective of sex and negative exposure. The odds ratio for suicidal thoughts and attempted suicide were highly increased for men who had experienced fear of crime or psychological or physical abuse but only for suicidal thoughts and psychological abuse among the women.

In the last paper, paper IV, several models were tested. Father's social class, childhood severe illness in the family, childhood family status, illness burden, and daily smoking qualified to be used as confounders in the multivariate analyses. In table 7, the multivariate model of violence exposure in adolescence in the 1974 cohort and adult health in 2000 is reported for men and women.

Compared to the unexposed, women exposed to violence in 1974 had elevated odds for heavy illness burden (5.2 (1.0-28)) as well as poor SRH (6.3 (1.6-25)) in 2000, after controlling for possible confounders; similar findings were not evident among men (Table 7). The same trends were seen in the 1981 cohort (Table 8) as well as in the 1991 cohort (Table 9). In the 1981 cohort, the women who reported being exposed to violence 1981 only showed a poor SHR in 2000 and the men did not.



Table 7. Multivariate model of predictors of heavy illness burden and poor SRH over time (1974 to 2000), in men and women who have reported versus not reported violence exposure, with adjustment for risk factors for poor health (odds ratio with 95% confidence interval). Statistically significant ORs in bold print.

	Heavy illness burden in 2000				Poor SRH in 2000			
	Unadjusted model 1		Adjusted model 2		Unadjusted model 1		Adjusted model 2	
	Men	Women	Men	Women	Men	Women	Men	Women
Reported violence IP 1974								
No	1	<b>1</b>	1	<b>1</b>	1	<b>1</b>	1	<b>1</b>
Yes	1.4 (0.5-4.2)	<b>2.8 (1.7-11)</b>	1.1 (0.4-3.6)	<b>5.2 (1.0-28)</b>	1.2 (0.4-4.2)	<b>6.7 (1.8-24)</b>	1.1 (0.3-3.9)	<b>6.3 (1.6-25)</b>
Fathers social class								
I and II			1	<b>1</b>			1	<b>1</b>
III			1.8 (0.9-4.0)	0.8 (0.4-1.7)			1.5 (0.6-3.4)	1.6 (0.7-3.6)
Childhood economic problem								
No			1	<b>1</b>			1	<b>1</b>
Yes			1.7 (0.2-11)	<b>5.7 (1.7-19)</b>			0.5 (0.1-5.6)	2.0 (0.7-5.8)
Childhood health problem in family								
No			1	<b>1</b>			1	<b>1</b>
Yes			1.1 (0.4-3.3)	0.9 (0.3-2.5)			1.3 (0.5-4.2)	0.9 (0.3-2.7)
Childhood family status								
Both parents			1	<b>1</b>			1	<b>1</b>
Divorced, dead or absent			1.5 (0.5-4.8)	2.0 (0.6-6.2)			1.2 (0.3-4.3)	1.7 (0.5-5.4)
Illness burden								
1974 IP								
No			<b>1</b>	<b>1</b>			<b>1</b>	<b>1</b>
Yes			<b>3.6 (1.5-8.6)</b>	1.6 (0.8-3.2)			<b>2.7 (1.1-7.0)</b>	1.0 (0.4-2.3)
Smoking 1974 IP								
No			1	<b>1</b>			1	<b>1</b>
Yes			1.0 (0.4-2.3)	0.8 (0.4-1.6)			0.6 (0.2-1.7)	1.2 (0.5-2.7)
Reported violence IP 2000								
No			1	<b>1</b>			1	<b>1</b>
Yes			0.6 (0.1-5.4)	1.5 (0.4-5.2)			1.0 (0.1-9.4)	1.6 (0.4-6.0)



Table 8. Multivariate model of predictors of heavy illness burden and poor SRH over time (1981 to 2000), in men and women who have reported versus not reported violence exposure, with adjustment for risk factors for poor health (odds ratio with 95% confidence interval). Statistically significant ORs in bold print

	Heavy illness burden in 2000				Poor SRH in 2000			
	Unadjusted model 1		Adjusted model 2		Unadjusted model 1		Adjusted model 2	
	Men	Women	Men	Women	Men	Women	Men	Women
Reported violence IP 1981								
No	1	<b>1</b>	1	1	1	<b>1</b>	1	<b>1</b>
Yes	0.4 (0.4-2.8)	<b>9.0 (1.1-33)</b>	0.8 (0.3-2.1)	2.0 (0.8-31)	2.5 (0.9-6.7)	<b>4.8 (1.3-18)</b>	2.6 (0.8-8.3)	<b>7.3 (1.1-46)</b>
Fathers social class								
I and II				1			1	1
III			1.4 (0.7-2.8)	1.3 (0.7-2.5)			0.7 (0.3-1.7)	1.3 (0.6-3.0)
Childhood economic problem								
No	1	1	1	1	1	1	1	1
Yes	0.5 (0.1-2.9)	1.3 (0.3-6.2)					2.9 (0.4-19)	0.3 (0.1-2.0)
Childhood health problem in family								
No	1	1		1			1	1
Yes	2.0 (0.8-5.0)	0.9 (0.3-2.6)					1.9 (0.6-5.9)	1.1 (0.3-4.0)
Childhood family status								
Both parents	1	1		1			1	1
Divorced, dead or absent	1.4 (0.6-3.6)	0.8 (0.7-4.7)					0.6 (0.2-2.3)	2.2 (0.8-6.0)
Illness burden 1981 IP								
No	<b>1</b>	1	<b>1</b>	1			1	1
Yes	<b>2.2 (1.0-5.4)</b>	1.3 (0.7-2.7)					0.3 (0.1-1.2)	1.7 (0.7-4.1)
Smoking 1981 IP								
No	1	1	1	1			<b>1</b>	1
Yes	1.2 (0.5-2.6)	0.8 (0.4-1.7)					<b>2.9 (1.2-7.4)</b>	1.7 (0.7-4.0)
Reported violence IP 2000								
No	1	<b>1</b>		<b>1</b>			1	1
Yes	1.5 (0.4-6.4)	<b>4.5 (1.2-17)</b>					4.2 (0.9-20)	0.6 (0.1-2.5)



Table 9. Multivariate model of predictors of heavy illness burden and poor SRH over time (1991 to 2000), in men and women who have reported versus not reported violence exposure, with adjustment for risk factors for poor health (odds ratios with 95% confidence interval). Statistically significant ORs in bold print

	Heavy illness burden in 2000				Poor SRH in 2000			
	Unadjusted model 1		Adjusted model 2		Unadjusted model 1		Adjusted model 2	
	Men	Women	Men	Women	Men	Women	Men	Women
Reported violence IP 1991								
No	1	<b>1</b>	1	<b>1</b>	1	<b>1</b>	1	<b>1</b>
Yes	1.6 (0.7-3.9)	<b>3.1 (1.8-13)</b>	1.3 (0.5-3.4)	<b>2.1 (1.0-11)</b>	0.9 (0.1-8.3)	<b>3.4 (1.1-10)</b>	0.5 (0.1-6.3)	<b>3.2 (1.0-11)</b>
Fathers social class								
I and II			1	1			1	1
III			1.2 (0.5-3.0)	0.4 (0.1-1.0)			1.4 (0.4-4.6)	0.5 (0.2-2.2)
Childhood economic problem								
No			1	1			1	1
Yes			8.7 (0.9-44)	2.0 (0.3-14)			4.2 (0.6-27)	3.3 (0.6-33)
Childhood health problem in family								
No			1	1			1	1
Yes			0.6 (0.2-2.6)	1.2 (0.3-4.8)			0.9 (0.1-11)	0.5 (0.1-5.5)
Childhood family status								
Both parents			1	<b>1</b>			1	1
Divorced, dead or absent			0.7 (0.2-2.6)	<b>3.2 (1.1-10)</b>			0.6 (0.1-4.0)	1.1 (0.2-6.2)
Illness burden 1991 IP								
No			1	1			1	1
Yes			2.5 (0.9-7.5)	1.3 (0.5-3.3)			1.7 (0.5-7.0)	2.4 (0.5-12)
Smoking 1991 IP								
No			1	1			1	1
Yes			1.3 (0.4-4.5)	1.3 (0.5-3.7)			1.7 (0.3-7.6)	1.6 (0.4-9.1)
Reported violence IP 2000								
No			1	1			1	1
Yes			1.1 (0.2-5.7)	1.8 (0.4-7.1)			1.9 (0.2-17)	1.2 (0.2-9.3)

In the 1981 cohort (Table 8 ), women exposed to violence during the past year (i.e., 2000) had increased odds of heavy illness burden in 2000 (4.5 (1.2-17)), but violence exposure in adolescence was no longer associated with current illness burden after controlling for recent violence exposure.

For men in the 1974 and 1981 cohorts, being exposed to violence in adolescence was not associated with future health problems, but having a heavy illness burden during the survey years 1974 and 1981 (Table 7 and Table 8) was associated with increased odds ratios of heavy illness burden in 2000 (1974: 3.6 (1.5-8.6)) in table 7 and (1981: 2.2 (1.0-5.4)) in table 8. Heavy illness burden in the survey year 1974 also increased the odds of poor SRH in 2000 (2.7 (1.1-7.0)) (Table 7.) and in 1981, the association was between smoking and poor SHR 2000 (2.9 (1.2-7.4)) in (Table 8.) among men.

## Summarized main results

Paper I: Both girls and boys (0-18 years of age) with violence-exposed mothers had increased odds ratios for most physical symptoms in all age groups compared with children of non-exposed mothers as reported by their mothers. Regarding psychological symptoms and learning difficulties, the odds were raised for the girls for most symptoms, but not for the boys. A twofold increase in health-care utilization and an overall general increase in the risk of pharmaceutical consumption were shown for both girls and boys with exposed mothers.

Paper II: Increased odds ratios were found for most health outcomes, and health care utilization for young men and women aged 18-25 exposed to violence compared to non-exposed. After adjusting for socioeconomic factors, smoking, and use of alcohol and cannabis, most variables were principally unchanged for women but somewhat lower for men. Socioeconomic factors, smoking, and the use of drugs were all correlated to victimization.

Paper III: Fear of crime and psychological and physical abuse among elderly women and men (65-84 years of age) produced raised odd ratios for negative health outcomes, independently of socioeconomic status. Strong correlation between psychological abuse and negative health outcomes was found in both men and women, while physical abuse showed less significantly raised odds ratios, especially among women. The men in particular had high odds ratios

for suicidal thoughts and even for attempted suicide in connection with both physical and psychological abuse and fear of crime.

Paper IV: In a prospective longitudinal study, multivariate models of violence exposures in adolescence in the 1974-91 cohorts were used as predictors of adult health for both men and women in 2000. Adult women exposed to violence in adolescence had raised odds ratios for ill health, measured as heavy illness burden, and poor self-rated health, after controlling for possible confounders. No such associations were found for men.

# DISCUSSION

## Highlighting the main results

With unavoidable necessity, researches have to incorporate social forces into their studies of health outcomes <sup>56</sup>. A negative social force that seems to be associated to ill-health is exposure to violence. In our study, women who reported exposure to physical violence and/or threats during the past 12 months also reported more signs of poor physical and psychological health in their children aged 0-18, both boys and girls, as compared with women who did not report any exposure to violence. Young adults aged 18-25, in turn, showed a strong association between a self-reported history of exposure to violence and a poorer health outcome in a wide range of physical and psychological health variables, for both young men and women, as compared to those not exposed to violence. Almost finalizing the life cycle, self-reported exposure to psychological and physical violence among elderly women and men (65-84) was analyzed and produced raised odd ratios for ill health, independently of socioeconomic status.

When a prospective long-term perspective was adopted, young women exposed to violence in late adolescence had increased odds of heavy illness burden and poor self-reported health in adulthood compared to non-exposed women, controlling for social demographics, health/smoking, and adult violence exposure. The men did not show the same relationship.

All in all, self-reported violence through the life cycle appears to have serious self-reported health consequences. Similar patterns of ill-health symptoms, use of health care, and pharmaceutical usage are recurrent through different periods of life.



## Self-reported exposure to violence and reported health outcome patterns

Based on this thesis, the literature, and earlier research, it is reasonable to expect that those who have reported exposure to violence have more health problems, irrespective of age and sex <sup>19, 20, 93, 114, 124, 169, 170</sup>.

The chronological results from papers I-IV could be added to the lifetime spiral of violence (Figure 5) to expand on the description of exposure to violence but also to describe the chronological vulnerabilities and harms the individuals might face.

In paper I, the women who reported exposure to physical violence and/or threats during the past 12 months also reported more signs of poor physical health in their children in all age groups and in both boys and girls, as compared to women who did not report any exposure to violence. Furthermore, higher medical health-care utilization and a higher use of various medicines were reported for both girls and boys with exposed mothers. The results remained stable, irrespective of the mother's economic situation, age, smoking habits, education, employment or civil status.

The most essential aspect of paper II was the strong association between a self-reported history of violence and a poorer health outcome in a wide range of physical and psychological health variables, for both young men and women, compared with those not exposed to violence. Another important finding was the strong association between exposure to violence and the increased health care utilization reported by the young women, but not by the men, after controlling for socioeconomic factors, smoking and the use of alcohol and cannabis.

In a study performed by Danielsson et. al. 2005, the association between answers to four questions about exposure to violence and health were analyzed for men and women from 18–44 years of age. A strong association between violence/threats and most of the other health issues was found for both men and women. The association remained after controlling for various socioeconomic variables as well as smoking, although then with somewhat lower odds ratios <sup>19</sup>.

In paper III, the researchers showed that exposure to psychological and physical violence against elderly women and men produced raised odd ratios for negative health outcomes, independently of socioeconomic status. Both psychological as well as physical ill-health outcomes were analyzed. There was a strong relation between exposure to psychological violence and negative

health outcomes in both men and women, while exposure to physical violence showed less significantly raised odds ratios among especially the women. Not only retrospective snapshots throughout the life show the association between self-reported exposure to violence and ill-health outcomes. In paper IV, a long-term prospective study, young women exposed to violence in late adolescence had increased odds of heavy illness burden and poor self-reported health in adulthood compared to non-exposed women, controlling for social demographics, health/smoking, and adult violence exposure. The men did not show the same relationship between violence exposure in adolescence and increased odds of heavy illness burden or poor self-reported health.



Figure 5. The Lifetime Spiral by the Asian & Pacific Islander Institute on Domestic Violence reveals patterns of victimization by enumerating the types of violence, vulnerabilities, and harms individuals might face (<http://www.apiidv.org/violence/lifetime-spiral.php>).

To sum up the results of the papers in this thesis, a figure developed by the Asian & Pacific Islander Institute on Domestic Violence<sup>171</sup> figuratively shows the outcomes of a life time exposure to violence (Figure 5). Another way of summarizing would be to put together some of the results of the papers in this thesis in the form of a table (Table 10). Health outcomes throughout the life cycle among violence-exposed and not exposed women and men are all

reported in this thesis, with the exception of adult women and men <sup>19</sup>. Several of the ill-health symptoms caused by exposure to violence are the same in the different life stages and no major differences between girls/boys or women/men are present (Table 10.)

Table 10 Summarized health outcomes throughout the life cycle, comparing reported exposure to non-exposure of violence, adjusted OR, and 95% CI. Significant raised OR in bold print

	Children 0-18 y Girls/Boys	Young adults 18-29y Women/Men	Adults <sup>1</sup> 30-44y Women/Men	Elderly 65-84y Women/Men
Stomach ache	<b>2.2 (1.5-3.2)</b> <b>1.7 (1.1-2.7)</b>	<b>1.3 (1.3-1.4)</b> 0.5 (0.5-0.6)	<b>6.6 (5.4-7.9)</b> 1.2 (0.9-1.6)	<b>1.5 (1.0-2.4)</b> 1.0 (0.6-1.7)
Diffuse muscular pain	<b>2.2 (1.7-2.9)</b> <b>1.4 (1.0-1.8)</b>	<b>3.1 (3.0-3.3)</b> <b>3.8 (3.4-4.3)</b>	0.8 (0.8-0.9) <b>1.6 (1.4-1.7)</b>	1.1 (0.7-1.9) <b>2.6 (1.8-4.1)</b>
Allergy/asthma	<b>1.7 (1.1-2.7)</b> 0.8 (0.4-1.7)	<b>2.3 (2.1-2.5)</b> 0.9 (0.8-1.1)	N.A. <b>7.9 (6.8-9.2)</b>	<b>1.9 (1.1-3.2)</b> 1.2 (0.7-2.3)
Anxiety	<b>6.1 (5.1-7.2)</b> <b>2.5 (2.0-3.0)</b>	<b>1.6 (1.5-1.6)</b> <b>1.9 (1.9-2.0)</b>	<b>2.9 (2.6-3.3)</b> <b>4.3 (3.7-5.0)</b>	<b>7.5 (3.7-15)</b> <b>6.7 (2.9-15)</b>
Tiredness/problem with concentration	<b>3.0 (2.5-3.6)</b> 0.6 (0.4-1.0)	<b>1.7 (1.6-1.8)</b> <b>4.2 (3.9-4.4)</b>	<b>2.5 (2.3-2.6)</b> <b>2.5 (2.3-2.6)</b>	<b>2.3 (1.2-4.6)</b> <b>4.9 (2.6-8.9)</b>
Visited physician	<b>1.4 (1.1-1.9)</b> <b>1.9 (1.4-2.6)</b>	<b>1.6 (1.5-1.6)</b> 0.9 (0.9-0.9)	<b>2.3 (2.2-2.4)</b> <b>4.4 (4.2-4.7)</b>	1.0 (0.5-1.9) <b>1.5 (0.9-2.5)</b>

1. Danielsson et. al., 2005 <sup>19</sup>

## Understanding the association between self-reported exposure to violence and ill health

In trying to understand the results of paper I, two earlier findings need to be taken into account, since they have demonstrated 1) that many children living in a family where the mother is exposed to domestic violence are frequently abused themselves and 2) that violence-exposed women are often insufficient caregivers <sup>81, 172</sup>, which could affect the children regardless of whether they have seen the violent act or not. Violence against women may also have indirect negative effects on their children. Women exposed to violence or threats experience physical and mental health impacts and depression <sup>14, 19, 173</sup>. Maternal depression may also have negative health effects on children, including increased illness <sup>174</sup>, increases in health care utilization <sup>175, 176</sup>, poorer

health status <sup>177</sup>, and greater risk of mental health problems <sup>178</sup>. Furthermore, associations between childhood maltreatment and post-traumatic stress and emotional distress in the children have been described <sup>179</sup>. Several authors have pointed out that these children are in fact often exposed to several other stressors, such as negative disclosures about the family or economic and social disadvantages <sup>81</sup>.

Subsequent research has suggested that post-traumatic stress is a plausible biological mechanism for negative physical health outcomes and that post-traumatic stress symptoms tend to take on a mediating role or add negative physical and psychological effects to the children <sup>80, 180, 181</sup>.

Linton and associates have in several articles discussed the association between exposure to violence or threats of violence and the experience of pain and ability to cope with pain <sup>182-184</sup>. Other researchers have proposed that ill health in connection to self-reported exposure to violence could be due to increased somatization <sup>185</sup>. In an article in *The Lancet*, Campbell discusses the impact of increased stress: strained psychological health might influence the immune system which in turn might affect the person's health in a negative way <sup>186</sup>. Several earlier studies have highlighted the negative association between a heightened level of stress and the immune system and health <sup>187-190</sup>.

The results from paper II offer other possible inputs to understanding concerning young adults and a possible association between self-reported exposure to violence and ill health. The vast majority of the men exposed to violence in that study had been subjected in a public place, meaning that this violence was probably not inflicted by an intimate partner, while 40% of the women exposed to violence had been exposed in a domestic setting and a higher percentage may thus have been the victims of violence inflicted by an intimate partner. Taken together, these findings indicate that violence against young women often differs from that against young men, frequently occurring at other places and possibly in other situations, with consequences that are more serious for the health of the women. Young men and women do not face equal risks of exposure to violence. There were significant differences for all socioeconomic variables and the use of various drugs for those exposed to violence compared with those who were not. The violence-exposed young men had more often hazardous drinking patterns, but it was impossible to tell from this study whether the violence was experienced in connection with drinking or whether the alcohol was used, for example, to reduce pain or anxiety after an experience of violence or threats, as discussed by Campbell (2002), in which it is pointed out that physical abuse may contribute to both cigarette and substance abuse <sup>186</sup>.

When analyzing an elderly population in paper III, physical abuse was more strongly associated with men's self-reported ill health. This could have reflected an actual lower association among women between physical abuse and self-reported health, but could as likely have been an artifact caused by the low prevalence of physical abuse among women. The demonstrated strong association between psychological abuse and self-rated health in that study resembled the results in another study <sup>140</sup>. Indeed, being psychologically abused seems to be a stronger negative predictor of poor self-rated health, when comparing to being exposed to physical violence. Experienced psychological consequences of violence could be a sense of powerlessness, shame at having to admit that the abuse is occurring at the hands of close family members, fear of retaliation from the abuser, or fear of institutionalization if the abuse is reported. Such fears might increase the victim's reluctance to report abuse, often causing self-imposed isolation and anxiety <sup>133-136</sup>. Psychological symptoms such as anxiety and depressive symptoms have also been shown to significantly mediate the effect on health status <sup>191</sup>.

Although perceiving fear of crime seems to have little connection to victimization <sup>192</sup>, the actual perception and fear of being exposed to a crime strongly relate to ill health both in women and men. This might suggest that the experience of fear of crime could lead to poor health through psychosocial mechanisms like stress and that the mechanisms are shared by both women and men <sup>193</sup>.

## Exposure to violence and life course health

An expanded way of possibly understanding the results of paper IV is needed. Although an association between socioeconomic condition, social disadvantages, and other stressful life events with health problems has been demonstrated, the underlying causal mechanisms have remained unclear. There are an array of mechanisms through which experiences of child abuse or violence in adolescence, for instance, can jeopardize individuals' functioning well into adulthood <sup>36, 194</sup>. Focusing specifically on adult physical health, there are four trajectories through which early exposure to violence can lead to poorer adult physical health, namely, behavioural trajectories (e.g., excessive drinking, substance abuse, or smoking), social trajectories (e.g., homelessness and repeated victimizations), cognitive pathways (e.g., troubled early attachment, learning difficulties, externalizing or internalizing problems), and

emotional trajectories (e.g., depressive symptoms or post traumatic stress symptoms (PTSD))<sup>194, 195</sup>. In relation to accumulating traumatic childhood or adolescent events, family characteristics (such as parental psychopathology, parental loss or absence, or parental divorce) during childhood could contribute to the development of subsequent future health-related well-being or problems in adulthood<sup>196, 197</sup>. Also, persons who have experienced adversities during their upbringing are more likely to participate in high-risk behaviors<sup>194, 197</sup>, which are related to both ill health and violence exposure<sup>198</sup>.

Continual psychological pressure and/or persistent wear and tear of the body due to repeated stressful or traumatic experiences over the life course might dysregulate the normal physiological adaptations to stress and threats, and later sensitivity to stress<sup>199, 200</sup>, or influence immune functioning which may in turn contribute to increased adult health problems<sup>201</sup>.

## **Gendered differences between self-reported exposure to violence and ill health**

In paper I, the psychological variables showed most pronounced gender differences, where living with a violence-exposed mother seemed to affect the girls much more than the boys. This was consistent with findings from other studies on domestic violence showing that behavioral problems differ between boys and girls and also between ages<sup>202 107, 203 39</sup>. One explanation for the differences between boys and girls is that girls in particular, besides witnessing violence, might also experience other forms of victimization<sup>181</sup>. The unexpected finding that boys of violence-exposed mothers showed less pronounced risk than the girls for psychological symptoms could perhaps be understood by the fact that boys living with a violence-exposed mother are often reported to display more internalizing problems and are thus less frequently reported when it comes to typical externalizing symptoms, like the inability to concentrate<sup>82, 172, 204</sup>.

In paper II the highlighted gender difference was the strong association between exposure to violence and the increased health care utilization demonstrated for the young women, but not for the men, after controlling for socioeconomic factors, smoking, and use of alcohol and cannabis. Some previous studies have pointed out more severe physical and psychological consequences for young women exposed to partner violence compared to young men<sup>84, 205, 206</sup>.

When analyzing the results of paper III, the most obvious gender difference was higher odds ratios noted for men concerning suicidal thoughts and suicidal attempts. Consistent and repeated findings about suicide in the elderly confirm that suicide rates are higher in males than females <sup>207</sup>. Overall, research puts forward men's association with to masculine ideals as influencing both the connectedness and detachment between older men's depression and suicide <sup>208</sup>.

In paper IV, the results expressed distinct gender differences concerning the potentially prospective effects of reported exposure to violence in adolescence on health status in adulthood. In an earlier short-term prospective study, Zona (2011) demonstrated differences between women and men concerning their health responses to exposure to violence <sup>209</sup>; similar results were found in cross-sectional studies <sup>20, 209</sup>. Several reasons for this have been put forward. The magnitude, nature, and health impact of violence differ greatly for young men and women. In a study by Sundaram et. al. (2004), young men were significantly more likely to experience violence than women <sup>84, 209</sup> but the associations between physical violence, poor self-rated health, and self-reported morbidity were significant for women, but not for men. Danielsson et. al. (2009) showed pronounced gender differences in adolescents and young adults, both in type, prevalence, and the association of exposure to violence to ill health<sup>20</sup>. The young women reported more severe adverse effects from all types of abuse than the men. It is probable that gender-specific experiences of violence and gender differences in health perceptions interact and contribute to a gender-specific process of victimization <sup>84</sup>.

Gender differences in health outcomes could also be understood as having possible biological explanations <sup>210</sup>. Research has shown sex differences in brain maturation during childhood and adolescence, indicating possible diverse developmental pathways due to different or similar adverse experiences such as violence exposure <sup>209-212</sup>. A potential mechanism is sex differences in the development of brain structures that process experiences (HPA axis; hypothalamic-pituitary-adrenal axis). In females, there is an increased response of the HPA axis to stress with advancing puberty, while in males, the response is decreased, possibly associated with increased testosterone levels <sup>199, 213</sup>. This, in connection with the stress associated with violence exposure, might differentiate males and females with respect to the rates of onsets, courses, and symptomatology of common psychiatric disorders and psychological symptoms <sup>213</sup>. It is well known that women in the general population in all ages have higher rates of post-traumatic stress disorder

(PTSD), which could indicate a psychological fragility whereby violence exposure may be more harmful to young women than young men <sup>92, 214</sup>.

## **Understanding the complex association between self-reported exposure to violence and ill health: summing up with a model**

The life-course perspective generally refers to the interweave of age-graded trajectories, such as work careers and family pathways, that are subject to changing conditions and future options, and to short-term transitions ranging from leaving school to retirement <sup>73</sup>. Trying to fit together all parts and connections of the life course into a model would be tremendously difficult. However, different main parts with interconnections could be fitted into a model, where they could be potentially confirmed and supported with references. Research supports the different main parts of the model in figure 6; one's upbringing during childhood/adolescence lays the foundation in the *environment during development* and its association to different life course pathways (accumulating negative experiences such as exposure to violence or positive experiences during potentially critical periods) and negative stress <sup>58, 59, 215</sup>. But, it is not only upbringing that shapes the life course. There are a present *environment being faced* <sup>61, 216, 217</sup> and a past including an *inheritance* <sup>56, 218, 219</sup>. Different exposures in different time periods are intertwined in an *accumulating* fashion <sup>62, 63, 152</sup> or in certain *critical periods* <sup>54, 55, 194, 200, 220</sup> with potentially *negative stress* as outcomes <sup>21, 92, 196, 199, 221-224</sup>. Eventual wear and tear over the life course might end up in *adult illness burden* <sup>36, 37, 201, 225</sup>.



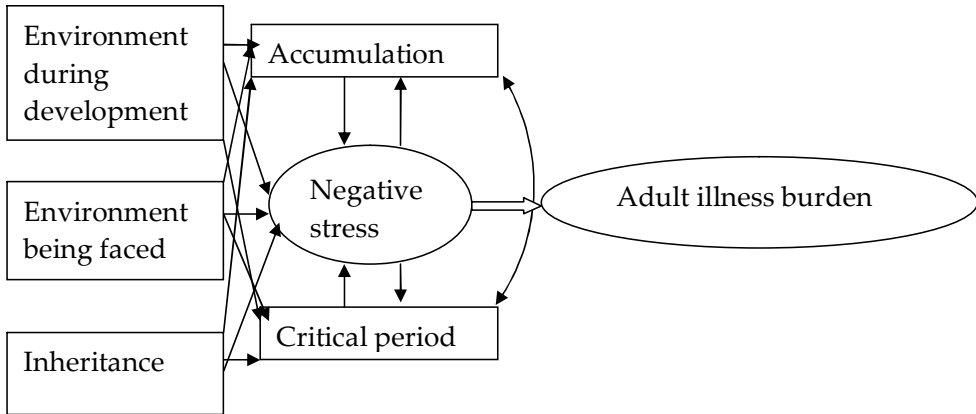


Figure 6. A possible model of understanding of the association between violence exposure and ill health

In figure 7 this complex network is exemplified through different empirical results in another model. Children living in a home where they are exposed to family violence have a higher risk of ending up in a violent relationship <sup>226</sup>. As children spend most of their time at home in younger years, it is a possible that this causes them to be exposed to the adverse family environments more often <sup>181</sup>. A potentially higher health risk in younger children is that the younger the child, the more dependent it is on the mother and/or father for its well-being <sup>172</sup>. Age influences the way children make sense of their experiences and at a younger age, children are more likely to express their fears in physical symptoms <sup>227, 228</sup>. As the number of adverse violent experiences cumulate over time, a graded relationship between PTSD, chronic medical conditions and the risk of severe adult illness burden increases <sup>225</sup>. During the critical time of victimization in childhood and adolescence, several other areas of age-related activities suffer, such as educational performance <sup>229</sup>.

The results in this thesis (Papers I to IV) could easily be fitted into the model (Figure 7). Papers I and II put forward that violence both during a child's development, i.e., childhood/adolescence, and in the present situation (dependency on a violent home environment and/or exposure to violence during adolescence or young adulthood), may be connected to ill health through stress. Papers I to III taken together (Table 10.) also potentially make it potentially feasible that accumulating exposure to violence and wear and tear on the body evolve into ill health. In paper IV, adverse family environment, current violence, and possibly an important transition from adolescence into

young adulthood all play a role in the model of understanding exposure to violence and adult ill health.

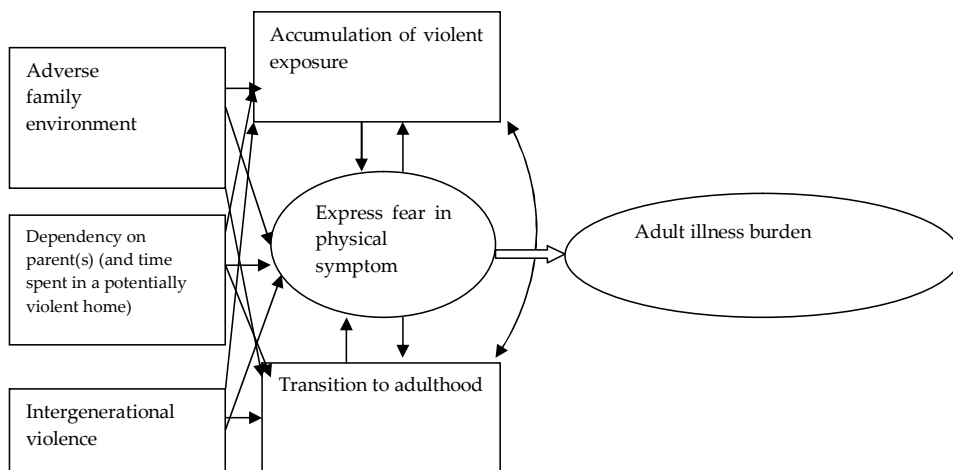


Figure 7 Trying to fit empirical research on violence exposure and ill health into the theoretical model

## A potential benefit of our findings to clinical everyday life in the health care system

An attempt to implement the results from this thesis would be to take into account the pattern of self-reported ill-health symptoms and the self-reported use of the health care system when dealing with a potential victim of violence. We know that exposure to violence is strongly associated with ill health so, in order to stop a potentially vicious circle of downward-spinning health circle (see Figure 5 and Table 10), the health care system needs to be able to identify this connection. One or two single symptoms alone do not give an indication of a violent relationship or otherwise of having been exposed to violence, but a pattern of symptoms does (see e.g., Table 10). Identification by asking men and women about their experiences of violence exposure might give the health care system an opportunity to bring into light potential violence, but also a developed sense of what to look for in the clinical situation.

In paper I, the research supports not only the importance of discussing screening for Maternal Domestic Violence (MDV) in pediatric settings, and even of discussing “mere” maternal exposure to violence<sup>230</sup> but also the need

of randomized studies. In 2004, a review of the evidence for screening for family violence was undertaken to evaluate the advantages and disadvantages<sup>231</sup>, and the conclusion was that several large randomized studies are needed before it is possible to relate the effects of screening to the health of abused women and their children.

In paper II, the researchers call attention to the importance of professionals who meet young people in hospitals, clinics, doctor's offices, adolescent health centers, and schools to be aware of the strong association between violence exposure and psychological as well as various forms of physical ill health. Several authors have previously argued that routine questions about violence should be used in various types of medical care settings, principally for adult women<sup>112, 186</sup>. A major challenge became evident in helping the staff that works with young people to summon the courage, strength, and knowledge to ask and listen to and help these young men and women find their way to better health and to being able to move on with their lives. An even greater challenge is to find ways to reduce violence among young people in the first place.

An important message that emerged in paper III concerning identifying violence exposure was that attentiveness should be paid to patterns of abuse and their correlation with ill health among elderly women and men and to the frequent occurrence of the fear of crime. Even if abuse in elderly men and women is not very common, it has a great effect on their health, suggesting that different causes, histories and dynamics are at play in different forms of negative health outcomes.

Taken together, the prevalence of abuse varies throughout life but the negative health outcomes remain relatively stable regardless of age (Table 10), and different forms of abuse affect the health of the victimized person, irrespective of age. The great challenge for all of us working in the social and health sectors should be to be aware of the consequences of violent exposure from childhood and adolescence to adulthood and elderly abuse, and especially to take action against it. The scope of this problem does not stop at a repeated and grave public health problem; it spills over to many institutions in society<sup>34</sup>. As such, it is an all-embracing problem.

## Methodological considerations

### Weaknesses

The non-response rate in questionnaire studies in general is high. Indeed today, a response rate of around 50% is not uncommon. In papers I to IV, the response rate ranged from 49% to 70% peaking in the 1974 years LNU survey with a full 85% response rate (paper IV), but non response is always an inconvenience nonetheless. In this thesis, all the papers (I to IV) emanated from population-based surveys and non-response could affect the results if it was selective. In paper II especially, there was a selectively low response rate, for the young men, but by using weights that were constructed partly to overcome the problem of skewed dropout rates, the data was considered to be representative for Swedish men and women aged 18-25.

Another general weakness is the cross-sectional design of the surveys (papers I, II, and III). A cross-sectional questionnaire in which questions are asked about things that have happened in the past have an inherent causal weakness<sup>232</sup>. We do not know, for example, if the children of the exposed mothers were selectively unhealthier before the mothers were exposed to violence (paper I). But when it comes to reported exposure to violence and the association between violence and ill health, they have to date been almost the only method used<sup>129, 131, 233</sup>.

In the first study (paper I), we selected women with children from a large population-based survey. These mothers reported about themselves and their children. The health of the children whose mothers reported having been exposed to violence was compared with the health of children whose mothers did not report being exposed to violence or threats of violence. The material did not give the authors the possibility of determining whether the children had exposed to violence themselves<sup>234</sup>.

There may be cause for criticism regarding the questions about violence used in all papers. This type of question has been used in several Swedish health surveys and in some international studies regarding dating violence<sup>83, 235, 236</sup>, while others have used more specific questions or questionnaires, with different kinds of psychological, physical, and sexual violence often being exemplified<sup>8, 15, 89, 205, 206, 237</sup>. Some researchers have argued for more differentiated questions, where varying sorts of emotional, physical, and

sexual violence are described<sup>15, 16, 237-239</sup>. Most likely, more specific questions about violence would yield higher prevalence rates, since “mild” violence like hitting or pushing may not always be perceived as violence as such. Furthermore, the questions did not allow for an analysis of the extent of the violence; nor were there any questions about the perpetrator. But none of the papers had a main purpose of analyzing the prevalence or degree of different kinds of violence but only of comparing different health outcomes among those exposed vs. not exposed to violence.

In paper IV, the relative low sample size could have affected the power of the results, with an increased risk of false negatives, for example with regard to the low number of statistically significant differences found among the social demographic descriptives. It is also possible that the respondents’ conceptual understandings of some survey questions might have changed over the study period. For example, the importance of different health-related assessments varies between adolescence and adulthood since health problems differ then (the study is framed on a broad age range), and probably also between the earlier survey cohort and the later<sup>55</sup>.

## Strengths

Generally speaking, a population-based foundation, undoubtedly gives a cross-sectional study a more robust basis for describing the hypothesized association between a family member being exposed to violence or threats of violence and severe health outcomes in their children (paper I), and for describing the potential association between self-reported violence exposure and ill health in young adults (paper II), and finally the possible association between self-reported violence exposure and ill health in an elderly population (paper III). Specifically, it is a strength to use a large population representative sample if the prevalence of violence exposure in the elderly population is considered low. A potential association could be difficult to reveal without a larger basis, with both sexes reporting and a comprehensive list of reported psychological and physical symptoms.

Another general strength was the ability to describe both sexes and the possibility to take into account different age periods (paper I to paper IV).

A favorable difference between earlier studies and papers II and III was the use of a comprehensive list of psychological and physical reported symptoms which enabled the researchers to cover a larger area of self-reported health.

In all papers (I to IV), men and women answering the questions about their health, or their children's health, did not do so because they had specifically been exposed to violence, but because they were answering a questionnaire about their general living conditions. In studies where specifically violence-exposed men and women have been interviewed, there may have been a greater bias from the situation.

Also, in all papers, the questions about abuse were restricted to incidents during the past year, limiting the response time window and minimizing potential recall bias.

Very few studies have considered the long-term health consequences of violence exposure in adolescence prospectively (Paper IV), which is a strength. The data generated from prospective studies is often considered stronger than data from cross-sectional and retrospective studies, largely because of the possibility to control for confounding variables. Prospective studies also reduce problems associated with recall bias, because subjects are not required to think back over long periods of time. It is beneficial, when investigating abuse or violence exposure in relation to health, to be able to control for previous possible abuse, health history, and upbringing. In paper IV, the most distinguishing strength was the possibility of controlling the past. Even after controlling for family upbringing related factors, behavioral factors, adolescent illness burden, and current exposure to violence there remained a significant relationship between adolescent exposure to violence and the adult health status of the women.

## Summarized conclusions

**Paper I:** This population-based study showed an increased risk of poorer physical and to some extent psychological health, among boys and girls aged 0-18, as reported by their mothers who had been exposed to violence.

**Paper II:** A strong association between young violence-exposed men and women and physical and mental ill health was demonstrated even after adjusting for possible confounders, especially for women. It is time to include questions about violence in public health questionnaires aimed at young people, and also to start asking about it more frequently in health care settings.

**Paper III:** The study provides representative results addressing an extensive negative health outcome panorama caused by fear of crime and exposure to psychological and physical abuse in elderly men and women.

**Paper IV:** In this prospective longitudinal study adult women exposed to violence in adolescence had raised odds ratios for ill health, measured as heavy illness burden, and poor self-rated health, after controlling for possible confounders. No such associations were found for men. These findings provided additional empirical support for the importance of policies and practices in identifying and preventing violence exposure in adolescence and young adulthood and in supplying treatments for adolescents exposed to violence, above all, the young women.

## Future research

To challenge the confines of knowledge in the research on violence exposure and ill health; prospective population-based studies should be the preferred method for doing research.

One of the areas that needs to be more thoroughly understood is the long-term mechanisms involved in violence exposure and ill health. An understanding of a potentially explanatory cumulative model, chain-of- risk model, or risk-clustering model would perhaps reveal the internal relationship between violence exposure and ill health.

Prospective studies repeating the findings of an association between violence exposure and ill health would strengthen the claim of a potential causal relationship between exposure to violence and ill health. Being able to show a possible relationship between violence exposure and chronic conditions such as diabetes, high blood pressure, or cancer would be welcome and further forward our knowledge.

Another step that would be interesting to pursue is to confirm parts of the model of understanding the association between exposure to violence and ill-health (Figure 6).

Gender differences are another area in need of more knowledge. All papers in this thesis have shown more or less pronounced gender differences in the ill-health responses to exposure to violence. Could the differences be explained by differences in violence exposure, internal stress coping processes, or frailty? Or maybe the answer is an interaction of many differences?

In trying to get the full picture, however, a life course perspective is necessary. From the cradle to the grave is in many ways an accurate expression of the point of attack that public health research needs to have if it is going to disentangle the connection between violence and deteriorated health through the life course.

As research constantly increases our knowledge, reality does not always convert newly gained insights into societal changes. Several policy initiatives for child protection have been introduced since the 1970s. Even so, researchers in Australia, Canada, New Zealand, Sweden, the UK, and the US have not recorded any consistent evidence for a decrease in indicators of child maltreatment. They have noted falling rates of violent death in a few age and country groups, but these decreases only coincided with reductions in admissions to hospital for maltreatment-related injury in Sweden and Canada<sup>240</sup>.

Public health workers should never give up, researching and struggling through policies or the handling of other societal changes.



## SVENSK SAMMANFATTNING

**Bakgrund:** Våld har alltid förekommit i vårt samhälle. Dess påverkan kan ses i olika former, i alla delar av världen. År 1996 antog WHO's "Forty-Ninth World Health Assembly" en resolution som förklarade att våldet är ett stort och växande folkhälsoproblem runt om i världen. Exponering för våld kan ta sig många uttryck, olika genom hela livet - förlust av autonomi, ekonomiskt utnyttjande, psykiskt och fysiskt försummelse eller missbruk - men alla typer har gemensamma egenskaper: användningen av destruktivt våld för att kontrollera andra genom att beröva dem säkerhet, frihet, hälsa och i alltför många fall, livet. Proportionerna av problemet kan vara epidemiska, särskilt bland utsatta grupper, med en förödande inverkan på individer, familjer, grannskap och samhället. Folkhälsoarbete kretsar kring hälsofrämjande och sjukdomsförebyggande åtgärder i befolkningen och folkhälsan är ett uttryck för hälsa hos befolkningen med hänsyn tagen till både nivån och fördelningen av hälsa.

**Metoder:** Tre olika datakällor användes, tre tvärsnittsstudier ("Liv och hälsa i Norrland" och "Hälsa på lika villkor 2004 och 2006") och en longitudinell ("Levnadsnivå undersökningen").

**Resultat:** Vi presenterar en bild av ett starkt samband mellan exponering för våld och ohälsa genom hela livsrymden. En studie visade en ökad risk för sämre fysisk och psykisk hälsa bland pojkar och flickor i åldrarna 0-18, rapporterat av mödrar som varit utsatta för våld. Vidare har ett starkt samband mellan dem som utsatts för våld och fysisk och psykisk ohälsa visats bland unga vuxna i åldern 18-25 år, även efter att ha kontrollerat för eventuella confounders. Även i en äldre åldersgrupp, fanns ett omfattande negativt panorama av hälsoutfall hos dem som upplevt rädsla för brott och/eller exponerats för övergrepp bland både äldre män och kvinnor (65-84 år). Slutligen, i ett försök att ytterligare skapa ett empiriskt stöd för sambandet mellan exponering för våld och ohälsa användes ett prospektivt longitudinellt material där resultaten visade att exponering för våld i senare tonåren var kopplat till ökad sjukdoms börda i vuxen ålder för kvinnor men inte män.

**Diskussion:** Exponering för våld bland både män och kvinnor är en viktig riskfaktor för ohälsa och bör få större uppmärksamhet i folkhälsoarbetet. Ett starkt samband mellan våld och olika hälsoutfall visades i olika tidsperioder genom hela livsrymden.



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## REFERENCES

- [1] Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R, eds. World report on violence and health. Geneva: World Health Organization 2002.
- [2] Max W, Rice DP, Finkelstein E, Bardwell RA, Leadbetter S. The economic toll of intimate partner violence against women in the United States. *Violence Vict.* 2004 Jun;19(3):259-72.
- [3] Waters HR, Hyder AA, Rajkotia Y, Basu S, Butchart A. The costs of interpersonal violence--an international review. *Health Policy.* 2005 Sep 8;73(3):303-15.
- [4] Jones AS, Dienemann J, Schollenberger J, Kub J, O'Campo P, Gielen AC, et al. Long-term costs of intimate partner violence in a sample of female HMO enrollees. *Womens Health Issues.* 2006 Sep-Oct;16(5):252-61.
- [5] Arias I, Corso P. Average Cost per person vicimized by an Intimate Partner of the Opposite Gender: A Comparison of Men and Women. *Violence and Victims.* 2005;20(4):379-91.
- [6] Wallace D, Wallace R. Scales of geography, time, and population: the study of violence as a public health problem. *Am J Public Health.* 1998 Dec;88(12):1853-8.
- [7] Socialstyrelsen. *Folkhälsorapport 2009.* Stockholm: Socialstyrelsen; 2009.
- [8] Danielsson M. *Public Health report 2009.* Västerås: Edita 2009.
- [9] Lundgren B, Elgstrand MB, Schaerström A. *Folkhälsans bestämningsfaktorer och indikatorer.* Stockholm: Statens Folkhälsoinstitut; 2005.
- [10] Heise L, Ellsberg M, Gottmoeller M. A global overview of gender-based violence. *Int J Gynaecol Obstet.* 2002 Sep;78 Suppl 1:S5-14.
- [11] Heise LLP, J. & Germain, A. *Violence Against Women: The Hidden Health Burden.* Washington D.C.: The World Bank; 1994.
- [12] Bruntland G. Preface to World report on violence and health. In: Dahlberg L, Krug E, Mercy J, Zwi A, Lozano R, eds. *World report on violence and health.* Geneva: WHO 2002.
- [13] Lundgren E, Heimer G, Westerstrand J, Kalliokoski A-M. *Captured queen-men's violence against women in "equal" Sweden - a prevalence study.* Stockholm: Fritzes Offentliga Publikationer 2002.
- [14] Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts CH. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet.* 2006 Oct 7;368(9543):1260-9.

- [15]Swahnberg K, Wijma B, Wingren G, Hilden M, Schei B. Women's perceived experiences of abuse in the health care system: their relationship to childhood abuse. *Bjog*. 2004 Dec;111(12):1429-36.
- [16]García-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts C. WHO Multi-country Study on Women's Health and Domestic Violence against Women. Initial results on prevalence, health outcomes and women's responses. Switzerland: Department of Gender, Women and Health; 2005.
- [17]Coker AL. Preventing intimate partner violence: how we will rise to this challenge. *Am J Prev Med*. 2006 Jun;30(6):528-9.
- [18]Coker AL, Flerx VC, Smith PH, Whitaker DJ, Fadden MK, Williams M. Intimate partner violence incidence and continuation in a primary care screening program. *Am J Epidemiol*. 2007 Apr 1;165(7):821-7.
- [19]Danielsson I, Olofsson N, Gadin KG. [Consequences of violence--a public health issue. Strong connection between violence/threat and illness in both women and men]. *Lakartidningen*. 2005 Mar 21-Apr 3;102(12-13):938-40, 42.
- [20]Danielsson I, Blom H, Nilses C, Heimer G, Hogberg U. Gendered patterns of high violence exposure among Swedish youth. *Acta Obstet Gynecol Scand*. 2009;88(5):528-35.
- [21]Duxbury F. Recognising domestic violence in clinical practice using the diagnoses of posttraumatic stress disorder, depression and low self-esteem. *Br J Gen Pract*. 2006 Apr;56(525):294-300.
- [22]Fathalla MF. When home is no longer safe: intimate-partner violence. *Lancet*. 2005 Dec 3;366(9501):1910-1.
- [23]Graham-Bermann SA, DeVoe ER, Mattis JS, Lynch S, Thomas SA. Ecological predictors of traumatic stress symptoms in caucasian and ethnic minority children exposed to intimate partner violence. *Violence Against Women*. 2006 Jul;12(7):663-92.
- [24]Haavet OR, Straand J, Hjortdahl P, Saugstad OD. Do negative life experiences predict the health-care-seeking of adolescents? A study of 10th-year students in Oslo, Norway. *J Adolesc Health*. 2005 Aug;37(2):128-34.
- [25]Herrenkohl TI, Hill KG, Hawkins JD, Chung IJ, Nagin DS. Developmental trajectories of family management and risk for violent behavior in adolescence. *J Adolesc Health*. 2006 Aug;39(2):206-13.
- [26]Häll L. Offer för våld och egendomsbrott 1978–2002. Stockholm; 2004.
- [27]Kivimäki M, Vahtera J, Elovainio M, Lillrank B, Kivimäki MV. Death or illness of a family member, violence, interpersonal conflict, and financial difficulties as predictors of sickness absence: longitudinal cohort study on psychological and behavioral links. *Psychosom Med*. 2002 Sep-Oct;64(5):817-25.

- [28]Melchior M, Moffitt TE, Milne BJ, Poulton R, Caspi A. Why do children from socioeconomically disadvantaged families suffer from poor health when they reach adulthood? A life-course study. *Am J Epidemiol*. 2007 Oct 15;166(8):966-74.
- [29]Rivara FP, Anderson ML, Fishman P, Bonomi AE, Reid RJ, Carrell D, et al. Intimate partner violence and health care costs and utilization for children living in the home. *Pediatrics*. 2007 Dec;120(6):1270-7.
- [30]Wickrama KA, Lorenz FO, Fang SA, Abraham WT, Elder GH, Jr. Gendered trajectories of work control and health outcomes in the middle years: a perspective from the rural Midwest. *Journal of aging and health*. 2005 Dec;17(6):779-806.
- [31]Keeling J. A community-based perspective on living with domestic violence. *Nursing Times*. 2004;100(11):28-9.
- [32]McMunn A, Bartley M, Kuh D. Women's health in mid-life: life course social roles and agency as quality. *Soc Sci Med*. 2006 Sep;63(6):1561-72.
- [33]Rivara FP, Anderson ML, Fishman P, Bonomi AE, Reid RJ, Carrell D, et al. Healthcare utilization and costs for women with a history of intimate partner violence. *Am J Prev Med*. 2007 Feb;32(2):89-96.
- [34]Sisley A, Jacobs LM, Poole G, Campbell S, Esposito T. Violence in America: a public health crisis--domestic violence. *J Trauma*. 1999 Jun;46(6):1105-12; discussion 12-3.
- [35]Suominen S, Vahtera J, Korkeila K, Helenius H, Kivimaki M, Koskenvuo M. Job Strain, Life Events, and Sickness Absence: A Longitudinal Cohort Study in a Random Population Sample. *J Occup Environ Med*. 2007 Sep;49(9):990-6.
- [36]Greenfield EA, Marks NF. Profiles of physical and psychological violence in childhood as a risk factor for poorer adult health: evidence from the 1995-2005 National Survey of Midlife in the United States. *Journal of aging and health*. 2009 Oct;21(7):943-66.
- [37]Greenfield EA. Child abuse as a life-course social determinant of adult health. *Maturitas*. 2010 May;66(1):51-5.
- [38]Kuh D, Ben-Shlomo Y. A life Course Approach to Chronic Disease Epidemiology. Oxford: Oxford Medical Publications 2004.
- [39]Kaplan GA, Baltrus PT, Raghunathan TE. The shape of health to come: prospective study of the determinants of 30-year health trajectories in the Alameda County Study. *Int J Epidemiol*. 2007 Jun;36(3):542-8.
- [40]Kuh D, Ben-Shlomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. *J Epidemiol Community Health*. 2003 Oct;57(10):778-83.

- [41]McMunn A, Bartley M, Hardy R, Kuh D. Life course social roles and women's health in mid-life: causation or selection? *J Epidemiol Community Health*. 2006 Jun;60(6):484-9.
- [42]Bao W, Srinivasan SR, Wattigney WA, Berenson GS. Persistence of multiple cardiovascular risk clustering related to syndrome X from childhood to young adulthood. The Bogalusa Heart Study. *Arch Intern Med*. 1994 Aug 22;154(16):1842-7.
- [43]Barker DJ. In utero programming of cardiovascular disease. *Theriogenology*. 2000 Jan 15;53(2):555-74.
- [44]Barker DJ, Shiell AW, Barker ME, Law CM. Growth in utero and blood pressure levels in the next generation. *J Hypertens*. 2000 Jul;18(7):843-6.
- [45]Davey Smith G, Shipley MJ, Batty GD, Morris JN, Marmot M. Physical activity and cause-specific mortality in the Whitehall study. *Public Health*. 2000 Sep;114(5):308-15.
- [46]Ben-Shlomo Y, Kuh D. A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *Int J Epidemiol*. 2002 Apr;31(2):285-93.
- [47]Ben-Shlomo Y, McCarthy A, Hughes R, Tilling K, Davies D, Smith GD. Immediate postnatal growth is associated with blood pressure in young adulthood: the Barry Caerphilly Growth Study. *Hypertension*. 2008 Oct;52(4):638-44.
- [48]Ben-Shlomo Y, Naqvi H, Baker I. Ethnic differences in healthcare-seeking behaviour and management for acute chest pain: secondary analysis of the MINAP dataset 2002-2003. *Heart*. 2008 Mar;94(3):354-9.
- [49]Bartley M, Plewis I. Does health-selective mobility account for socioeconomic differences in health? Evidence from England and Wales, 1971 to 1991. *Journal of health and social behavior*. 1997 Dec;38(4):376-86.
- [50]Hertzman C, Power C, Matthews S, Manor O. Using an interactive framework of society and lifecourse to explain self-rated health in early adulthood. *Soc Sci Med*. 2001 Dec;53(12):1575-85.
- [51]Lynch JW, Kaplan GA, Salonen JT. Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse. *Soc Sci Med*. 1997 Mar;44(6):809-19.
- [52]Pickles A, Maughan B, Wadsworth M. *Epidemiological methods in life course research*. Oxford: Oxford University Press 2007.
- [53]Surtees PG, Wainwright NW. The shackles of misfortune: social adversity assessment and representation in a chronic-disease epidemiological setting. *Soc Sci Med*. 2007 Jan;64(1):95-111.



- [54]Pollitt RA, Rose KM, Kaufman JS. Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review. *BMC Public Health*. 2005 Jan 20;5(7):7.
- [55]Hallqvist J, Lynch J, Bartley M, Lang T, Blane D. Can we disentangle life course processes of accumulation, critical period and social mobility? An analysis of disadvantaged socio-economic positions and myocardial infarction in the Stockholm Heart Epidemiology Program. *Soc Sci Med*. 2004 Apr;58(8):1555-62.
- [56]Dannefer D. Age, the life Course, and the sociological Imagination: Prospects for theory. In: Binstock RH, George LK, eds. *Handbook of Aging and the Social Sciences*. 7:th ed. Amsterdam: Academic Press 2011:3-16.
- [57]Lundberg O. Childhood conditions, sense of coherence, social class and adult ill health: exploring their theoretical and empirical relations. *Soc Sci Med*. 1997 Mar;44(6):821-31.
- [58]Galobardes B, Lynch JW, Smith GD. Is the association between childhood socioeconomic circumstances and cause-specific mortality established? Update of a systematic review. *J Epidemiol Community Health*. 2008 May;62(5):387-90.
- [59]Fors S, Lennartsson C, Lundberg O. Live long and prosper? Childhood living conditions, marital status, social class in adulthood and mortality during mid-life: a cohort study. *Scand J Public Health*. 2011 Mar;39(2):179-86.
- [60]Lundberg O. The impact of childhood living conditions on illness and mortality in adulthood. *Soc Sci Med*. 1993 Apr;36(8):1047-52.
- [61]Fors S, Lennartsson C, Lundberg O. Childhood living conditions, socioeconomic position in adulthood, and cognition in later life: exploring the associations. *J Gerontol B Psychol Sci Soc Sci*. 2009 Nov;64(6):750-7.
- [62]Lynch JW, Kaplan GA, Shema SJ. Cumulative impact of sustained economic hardship on physical, cognitive, psychological, and social functioning. *N Engl J Med*. 1997 Dec 25;337(26):1889-95.
- [63]Singh-Manoux A, Ferrie JE, Chandola T, Marmot M. Socioeconomic trajectories across the life course and health outcomes in midlife: evidence for the accumulation hypothesis? *Int J Epidemiol*. 2004 Oct;33(5):1072-9.
- [64]Haavet OR, Straand J, Saugstad OD, Grunfeld B. Illness and exposure to negative life experiences in adolescence: two sides of the same coin? A study of 15-year-olds in Oslo, Norway. *Acta Paediatr*. 2004 Mar;93(3):405-11.
- [65]Honkalampi K, Koivumaa-Honkanen H, Hintikka J, Antikainen R, Haatainen K, Tanskanen A, et al. Do stressful life-events or sociodemographic variables associate with depression and alexithymia among a general

population?--A 3-year follow-up study. *Compr Psychiatry*. 2004 Jul-Aug;45(4):254-60.

[66]Tosevski DL, Milovancevic MP. Stressful life events and physical health. *Curr Opin Psychiatry*. 2006 Mar;19(2):184-9.

[67]Skillgate E, Vingard E, Josephson M, Theorell T, Alfredsson L. Life events and the risk of low back and neck/shoulder pain of the kind people are seeking care for: results from the MUSIC-Norrtaälje case-control study. *J Epidemiol Community Health*. 2007 Apr;61(4):356-61.

[68]Vahtera J, Kivimäki M, Vaananen A, Linna A, Pentti J, Helenius H, et al. Sex differences in health effects of family death or illness: are women more vulnerable than men? *Psychosom Med*. 2006 Mar-Apr;68(2):283-91.

[69]Davis MC, Matthews KA, Twamley EW. Is life more difficult on Mars or Venus? A meta-analytic review of sex differences in major and minor life events. *Ann Behav Med*. 1999 Spring;21(1):83-97.

[70]Jordanova V, Stewart R, Goldberg D, Bebbington PE, Brugha T, Singleton N, et al. Age variation in life events and their relationship with common mental disorders in a national survey population. *Soc Psychiatry Psychiatr Epidemiol*. 2007 Aug;42(8):611-6.

[71]Cairney J, Krause N. Negative life events and age-related decline in mastery: are older adults more vulnerable to the control-eroding effect of stress? *J Gerontol B Psychol Sci Soc Sci*. 2008 May;63(3):S162-70.

[72]Spurgeon A, Jackson CA, Beach JR. The Life Events Inventory: re-scaling based on an occupational sample. *Occup Med (Lond)*. 2001 Jun;51(4):287-93.

[73]Elder GH, Jr. Time, Human Agency, and Social Change: Perspectives on the Life Course. *Social Psychology Quarterly*. 1994;57(1):4-15.

[74]Edleson JL. Children's Witnessing of Adult Domestic Violence. *J Interpers Violence*. 1999;14:839-70.

[75]Hornor G. Domestic violence and children. *J Pediatric Health Care*. 2005 Jul-Aug;19(4):206-12.

[76]Jernbro C, Svensson B, Tindberg Y, Janson S. Multiple psychosomatic symptoms can indicate child physical abuse - results from a study of Swedish schoolchildren. *Acta Paediatr*. 2012 Mar;101(3):324-9.

[77]Bair-Merritt MH, Blackstone M, Feudtner C. Physical health outcomes of childhood exposure to intimate partner violence: a systematic review. *Pediatrics*. 2006 Feb;117(2):e278-90.

[78]Koverola C, Papas MA, Pitts S, Murtaugh C, Black MM, Dubowitz H. Longitudinal investigation of the relationship among maternal victimization, depressive symptoms, social support, and children's behavior and development. *J Interpers Violence*. 2005 Dec;20(12):1523-46.

- [79] Schnitzer PG, Ewigman BG. Child deaths resulting from inflicted injuries: household risk factors and perpetrator characteristics. *Pediatrics*. 2005 Nov;116(5):e687-93.
- [80] Graham-Bermann SA, Seng J. Violence exposure and traumatic stress symptoms as additional predictors of health problems in high-risk children. *Journal of Pediatrics*. 2005 Mar;146(3):349-54.
- [81] Campbell JC, Lewandowski LA. Mental and physical health effects of intimate partner violence on women and children. *Psychiatr Clin North Am*. 1997 Jun;20(2):353-74.
- [82] Hazen AL, Connelly CD, Kelleher KJ, Barth RP, Landsverk JA. Female caregivers' experiences with intimate partner violence and behavior problems in children investigated as victims of maltreatment. *Pediatrics*. 2006 Jan;117(1):99-109.
- [83] Ackard DM, Neumark-Sztainer D. Date violence and date rape among adolescents: associations with disordered eating behaviors and psychological health. *Child Abuse Negl*. 2002 May;26(5):455-73.
- [84] Sundaram V, Helweg-Larsen K, Laursen B, Bjerregaard P. Physical violence, self rated health, and morbidity: is gender significant for victimisation? *J Epidemiol Community Health*. 2004 Jan;58(1):65-70.
- [85] Roberts TA, Auinger P, Klein JD. Intimate partner abuse and the reproductive health of sexually active female adolescents. *J Adolesc Health*. 2005 May;36(5):380-5.
- [86] Helweg-Larsen K, Kruse M. Violence against women and consequent health problems: a register-based study. *Scand J Public Health*. 2003;31(1):51-7.
- [87] Ruiz-Perez I, Plazaola-Castano J, Rio-Lozano MD. Physical health consequences of intimate partner violence in Spanish women. *Eur J Public Health*. 2007 Jan 23.
- [88] Coker AL, Davis KE, Arias I, Desai S, Sanderson M, Brandt HM, et al. Physical and mental health effects of intimate partner violence for men and women. *Am J Prev Med*. 2002 Nov;23(4):260-8.
- [89] Coker AL, McKeown RE, Sanderson M, Davis KE, Valois RF, Huebner ES. Severe dating violence and quality of life among south carolina high school students. *Am J Prev Med*. 2000 Nov;19(4):220-7.
- [90] Jewkes R. Violence against women: an emerging health problem. *Int Clin Psychopharmacol*. 2000 Nov;15 Suppl 3(3):S37-45.
- [91] Sorenson SB. Gender disparities in injury mortality: consistent, persistent, and larger than you'd think. *Am J Public Health*. 2011 Dec;101 Suppl 1(101):S353-8.

- [92]Holbrook TL, Hoyt DB, Stein MB, Sieber WJ. Gender differences in long-term posttraumatic stress disorder outcomes after major trauma: women are at higher risk of adverse outcomes than men. *J Trauma*. 2002 Nov;53(5):882-8.
- [93]Porcerelli JH, Cogan R, West PP, Rose EA, Lambrecht D, Wilson KE, et al. Violent victimization of women and men: physical and psychiatric symptoms. *J Am Board Fam Pract*. 2003 Jan-Feb;16(1):32-9.
- [94]Wareham J, Paquette-Boots. D. Gender Differences in Mental Health Problems and Violence Among Chicago Youth. *Youth Violence and Juvenile Justice*. 2011;9(1):3-22.
- [95]Carbone-Lopez K, Kruttschnitt C, Macmillan R. Patterns of intimate partner violence and their associations with physical health, psychological distress, and substance use. *Public Health Rep*. 2006 Jul-Aug;121(4):382-92.
- [96]Reid RJ, Bonomi AE, Rivara FP, Anderson ML, Fishman PA, Carrell DS, et al. Intimate partner violence among men prevalence, chronicity, and health effects. *Am J Prev Med*. 2008 Jun;34(6):478-85.
- [97]Melton HC, Sillito CL. The Role of Gender in Officially Reported Intimate Partner Abuse. *J Interpers Violence*. 2011 Dec 26;2011:26.
- [98]Campbell J, Jones AS, Dienemann J, Kub J, Schollenberger J, O'Campo P, et al. Intimate partner violence and physical health consequences. *Arch Intern Med*. 2002 May 27;162(10):1157-63.
- [99]Coker AL, Smith PH, Fadden MK. Intimate partner violence and disabilities among women attending family practice clinics. *J Womens Health (Larchmt)*. 2005 Nov;14(9):829-38.
- [100] Walton-Moss BJ, Manganello J, Frye V, Campbell JC. Risk factors for intimate partner violence and associated injury among urban women. *J Community Health*. 2005 Oct;30(5):377-89.
- [101] Staggs SL, Riger S. Effects of intimate partner violence on low-income women's health and employment. *Am J Community Psychol*. 2005 Sep;36(1-2):133-45.
- [102] Wenzel SL, Tucker JS, Elliott MN, Marshall GN, Williamson SL. Physical violence against impoverished women: a longitudinal analysis of risk and protective factors. *Womens Health Issues*. 2004 Sep-Oct;14(5):144-54.
- [103] Field CA, Caetano R. Ethnic differences in intimate partner violence in the U.S. general population: the role of alcohol use and socioeconomic status. *Trauma Violence Abuse*. 2004 Oct;5(4):303-17.
- [104] Diop-Sidibe N, Campbell JC, Becker S. Domestic violence against women in Egypt--wife beating and health outcomes. *Soc Sci Med*. 2006 Mar;62(5):1260-77.

- [105] Subramanian SV, Ackerson LK, Subramanyam MA, Wright RJ. Domestic violence is associated with adult and childhood asthma prevalence in India. *Int J Epidemiol*. 2007 Feb 28;36(3):569-79.
- [106] Temple JR, Weston R, Marshall LL. Physical and mental health outcomes of women in nonviolent, unilaterally violent, and mutually violent relationships. *Violence Vict*. 2005 Jun;20(3):335-59.
- [107] Bonomi AE, Thompson RS, Anderson M, Reid RJ, Carrell D, Dimer JA, et al. Intimate partner violence and women's physical, mental, and social functioning. *Am J Prev Med*. 2006 Jun;30(6):458-66.
- [108] Loxton D, Schofield M, Hussain R, Mishra G. History of domestic violence and physical health in midlife. *Violence Against Women*. 2006 Aug;12(8):715-31.
- [109] Eberhard-Gran M, Schei B, Eskild A. Somatic symptoms and diseases are more common in women exposed to violence. *J Gen Intern Med*. 2007 Dec;22(12):1668-73.
- [110] Alsaker K, Moen BE, Nortvedt MW, Baste V. Low health-related quality of life among abused women. *Qual Life Res*. 2006 Aug;15(6):959-65.
- [111] Mitchell C. The health impact of intimate partner violence. *J Calif Dent Assoc*. 2004 May;32(5):396-8.
- [112] Plichta SB, Abraham C. Violence and gynecologic health in women <50 years old. *Am J Obstet Gynecol*. 1996 Mar;174(3):903-7.
- [113] Rojas Y. Self-directed and interpersonal male violence in adolescence and young adulthood: a 30-year follow up of a Stockholm cohort. *Sociol Health Illn*. 2011 May 18;2011(18):1467-9566.
- [114] Hall BL, Kulig J, Grant Kalischuk R. Rural youth and violence: a gender perspective. *Rural Remote Health*. 2011 Jul-Sep;11(3):1716.
- [115] Sadeh N, Javdani S, Finy MS, Verona E. Gender differences in emotional risk for self- and other-directed violence among externalizing adults. *J Consult Clin Psychol*. 2011 Feb;79(1):106-17.
- [116] Wells S, Graham K, Tremblay PF, Magyarody N. Not just the booze talking: trait aggression and hypermasculinity distinguish perpetrators from victims of male barroom aggression. *Alcohol Clin Exp Res*. 2011 Apr;35(4):613-20.
- [117] Herttua K, Martikainen P, Vahtera J, Kivimäki M. Living alone and alcohol-related mortality: a population-based cohort study from Finland. *PLoS Med*. 2011 Sep;8(9):e1001094.
- [118] Smith SG, Breiding MJ. Chronic disease and health behaviours linked to experiences of non-consensual sex among women and men. *Public Health*. 2011 Sep;125(9):653-9.

- [119] Allareddy V, Allareddy V, Nalliah RP. Epidemiology of facial fracture injuries. *J Oral Maxillofac Surg*. 2011 Oct;69(10):2613-8.
- [120] Swahnberg K, Hearn J, Wijma B. Prevalence of perceived experiences of emotional, physical, sexual, and health care abuse in a Swedish male patient sample. *Violence Vict*. 2009;24(2):265-79.
- [121] Garre-Olmo J, Planas-Pujol X, Lopez-Pousa S, Juvinya D, Vila A, Vilalta-Franch J. Prevalence and risk factors of suspected elder abuse subtypes in people aged 75 and older. *J Am Geriatr Soc*. 2009 May;57(5):815-22.
- [122] Hildreth CJ, Burke AE, Glass RM. JAMA patient page. Elder abuse. *Jama*. 2009 Aug 5;302(5):588.
- [123] Lachs MS, Pillemer K. Elder abuse. *Lancet*. 2004 Oct 2-8;364(9441):1263-72.
- [124] Amstadter AB, Cisler JM, McCauley JL, Hernandez MA, Muzzy W, Acierno R. Do incident and perpetrator characteristics of elder mistreatment differ by gender of the victim? Results from the National Elder Mistreatment Study. *J Elder Abuse Negl*. 2011 Jan;23(1):43-57.
- [125] Cooper C, Selwood A, Livingston G. The prevalence of elder abuse and neglect: a systematic review. *Age Ageing*. 2008 Mar;37(2):151-60.
- [126] Phua DH, Ng TW, Seow E. Epidemiology of suspected elderly mistreatment in Singapore. *Singapore Med J*. 2008 Oct;49(10):765-73.
- [127] Watson D, Parsons S. Domestic abuse of women and men in Ireland: report on the national study of domestic abuse. Dublin: Stationary Office; 2005.
- [128] Bachman R, Dillaway H, Lachs MS. Violence Against the elderly: A Comparative Analysis of Robbery and assault Across Age and Gender Groups. *Research on Aging*. 1998;20(No. 2, March ):183-98.
- [129] Biggs S, Manthorpe J, Tinker A, Doyle M, Erens B. Mistreatment of older people in the United Kingdom: findings from the first National Prevalence Study. *J Elder Abuse Negl*. 2009 Jan-Mar;21(1):1-14.
- [130] Fritsch TA, Tarima SS, Caldwell GG, Beaven S. Intimate partner violence against older women in Kentucky. *J Ky Med Assoc*. 2005 Sep;103(9):461-3.
- [131] Fisher BS, Regan SL. The extent and frequency of abuse in the lives of older women and their relationship with health outcomes. *Gerontologist*. 2006 Apr;46(2):200-9.
- [132] Mosqueda L, Burnight K, Liao S. The life cycle of bruises in older adults. *J Am Geriatr Soc*. 2005 Aug;53(8):1339-43.
- [133] Lachs MS, Pillemer K. Abuse and neglect of elderly persons. *N Engl J Med*. 1995 Feb 16;332(7):437-43.

- [134] Dong X, Simon M, Mendes de Leon C, Fulmer T, Beck T, Hebert L, et al. Elder self-neglect and abuse and mortality risk in a community-dwelling population. *Jama*. 2009 Aug 5;302(5):517-26.
- [135] Schonfeld L, Larsen RG, Stiles PG. Behavioral health services utilization among older adults identified within a state abuse hotline database. *Gerontologist*. 2006 Apr;46(2):193-9.
- [136] Mosqueda L, Burnight K, Liao S, Kemp B. Advancing the field of elder mistreatment: a new model for integration of social and medical services. *Gerontologist*. 2004 Oct;44(5):703-8.
- [137] Abbey L. Elder abuse and neglect: when home is not safe. *Clin Geriatr Med*. 2009 Feb;25(1):47-60, vi.
- [138] Stafford M, Chandola T, Marmot M. Association between fear of crime and mental health and physical functioning. *Am J Public Health*. 2007 Nov;97(11):2076-81.
- [139] Clark CR, Kawachi I, Ryan L, Ertel K, Fay ME, Berkman LF. Perceived neighborhood safety and incident mobility disability among elders: the hazards of poverty. *BMC Public Health*. 2009;9(162):162.
- [140] Ajdukovic M, Ogresta J, Rusac S. Family Violence and Health Among Elderly in Croatia. *Journal of Aggression, Maltreatment & Trauma*. 2009;18:261-79.
- [141] Cisler JM, Amstadter AB, Begle AM, Hernandez M, Acierno R. Elder mistreatment and physical health among older adults: the South Carolina Elder Mistreatment Study. *J Trauma Stress*. 2010 Aug;23(4):461-7.
- [142] Anda RF, Felitti VJ, Bremner JD, Walker JD, Whitfield C, Perry BD, et al. The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci*. 2006 Apr;256(3):174-86.
- [143] Shaw BA, Krause N. Exposure to physical violence during childhood, aging, and health. *Journal of aging and health*. 2002 Nov;14(4):467-94.
- [144] Dube SR, Fairweather D, Pearson WS, Felitti VJ, Anda RF, Croft JB. Cumulative childhood stress and autoimmune diseases in adults. *Psychosom Med*. 2009 Feb;71(2):243-50.
- [145] Ramiro LS, Madrid BJ, Brown DW. Adverse childhood experiences (ACE) and health-risk behaviors among adults in a developing country setting. *Child Abuse Negl*. 2010 Nov;34(11):842-55.
- [146] Bair-Merritt MH, Feudtner C, Localio AR, Feinstein JA, Rubin D, Holmes WC. Health care use of children whose female caregivers have

- intimate partner violence histories. *Arch Pediatr Adolesc Med.* 2008 Feb;162(2):134-9.
- [147] Bair-Merritt MH, Jennings JM, Eaker K, Tuman JL, Park SM, Cheng TL. Screening for domestic violence and childhood exposure in families seeking care at an urban pediatric clinic. *J Pediatr.* 2008 May;152(5):734-6, 6 e1.
- [148] MacMillan HL, Wathen CN, Jamieson E, Boyle M, McNutt LA, Worster A, et al. Approaches to screening for intimate partner violence in health care settings: a randomized trial. *Jama.* 2006 Aug 2;296(5):530-6.
- [149] Bowen E, Heron J, Waylen A, Wolke D. Domestic violence risk during and after pregnancy: findings from a British longitudinal study. *Bjog.* 2005 Aug;112(8):1083-9.
- [150] Lagerberg D. A descriptive survey of Swedish child health nurses' awareness of abuse and neglect. II. Characteristics of the children. *Acta Paediatr.* 2004 May;93(5):692-701.
- [151] Murphy LM. Childhood and adolescent violent victimization and the risk of young adult intimate partner violence victimization. *Violence Vict.* 2011;26(5):593-607.
- [152] Boynton-Jarrett R, Ryan LM, Berkman LF, Wright RJ. Cumulative violence exposure and self-rated health: longitudinal study of adolescents in the United States. *Pediatrics.* 2008 Nov;122(5):961-70.
- [153] Brady SS. Lifetime community violence exposure and health risk behavior among young adults in college. *J Adolesc Health.* 2006 Oct;39(4):610-3.
- [154] Björ O, Malmer B. Teknisk Rapport; Liv och Hälsa. Sundsvall: Epidemiologiska enheten; 1998.
- [155] StatisticsSweden. Technical Report; Health on Equal Terms. Stockholm; 2004.
- [156] StatisticsSweden. Technical Report; Health on Equal terms. Stockholm; 2006.
- [157] Jonsson JO, Mills C, eds. *Cradle to grave*. York: Sociology Press 2001.
- [158] Fritzell J, Lundberg O. Health inequalities and welfare resources; Continuity and change in Sweden. Bristol: The Ploicy Press 2007.
- [159] StatisticsSweden. The Swedish Survey of Living Conditions; Design and methods, Technical report from ULF 1990-93. Stockholm; 2006.
- [160] Lundberg O, Manderbacka K. Assessing reliability of a measure of self-rated health. *Scand J Soc Med.* 1996 Sep;24(3):218-24.
- [161] Idler EL, Angel RJ. Self-rated health and mortality in the NHANES-I Epidemiologic Follow-up Study. *Am J Public Health.* 1990 Apr;80(4):446-52.



- [162] Zocchetti C, Consonni D, Bertazzi PA. Relationship between prevalence rate ratios and odds ratios in cross-sectional studies. *Int J Epidemiol*. 1997 Feb;26(1):220-3.
- [163] Pfeffermann D. The Role of Sampling Weights when Modeling Survey Data. *Int Stat Rev*. 1993;61:317-37.
- [164] Douglas AG, David M, Trevor BN, Martin Gj. *Statistics with confidence*. Second ed. Bristol: BMJ Books 2000.
- [165] Boström G. What does the non response mean in public health surveys?: Statens folkhälsoinstitut; 2010.
- [166] Lindén-Boström M, Persson C. A selective follow-up study on a public health survey. *The European Journal of Public Health* 2012;1-6.
- [167] Lundström S, Särndal cE. Calibration as a standard method for treatment of nonresponse. *J Off Stat*. 1999;15:305-27.
- [168] Särndal CE, Lundström S. *Estimation in surveys with nonresponse*. Chichester: John Wiley & Sons 2005.
- [169] Stickley A, Carlson P. Factors associated with non-lethal violent victimization in Sweden in 2004-2007. *Scand J Public Health*. 2010 Jun;38(4):404-10.
- [170] Pratchett LC, Pelcovitz MR, Yehuda R. Trauma and violence: are women the weaker sex? *Psychiatr Clin North Am*. 2010 Jun;33(2):465-74.
- [171] AIIPDV. Violence against Women: A Lifetime Spiral. 2006 [cited; Available from: <http://www.apiidv.org/violence/lifetime-spiral.php>
- [172] Levendosky AA, Leahy KL, Bogat GA, Davidson WS, von Eye A. Domestic violence, maternal parenting, maternal mental health, and infant externalizing behavior. *J Fam Psychol*. 2006 Dec;20(4):544-52.
- [173] Mahony DL, Campbell JM. Children witnessing domestic violence: a developmental approach. *Clin Excell Nurse Practi*. 1998 Nov;2(6):362-9.
- [174] Goodwin RD, Wickramaratne P, Nomura Y, Weissman MM. Familial depression and respiratory illness in children. *Arch Pediatr Adolesc Med*. 2007 May;161(5):487-94.
- [175] Flynn HA, Davis M, Marcus SM, Cunningham R, Blow FC. Rates of maternal depression in pediatric emergency department and relationship to child service utilization. *General hospital psychiatry*. 2004 Jul-Aug;26(4):316-22.
- [176] Minkovitz CS, Strobino D, Scharfstein D, Hou W, Miller T, Mistry KB, et al. Maternal depressive symptoms and children's receipt of health care in the first 3 years of life. *Pediatrics*. 2005 Feb;115(2):306-14.

- [177] Casey P, Goolsby S, Berkowitz C, Frank D, Cook J, Cutts D, et al. Maternal depression, changing public assistance, food security, and child health status. *Pediatrics*. 2004 Feb;113(2):298-304.
- [178] Weissman MM, Pilowsky DJ, Wickramaratne PJ, Talati A, Wisniewski SR, Fava M, et al. Remissions in maternal depression and child psychopathology: a STAR\*D-child report. *Jama*. 2006 Mar 22;295(12):1389-98.
- [179] Grassi-Oliveira R, Stein LM. Childhood maltreatment associated with PTSD and emotional distress in low-income adults: the burden of neglect. *Child Abuse Negl*. 2008 Dec;32(12):1089-94.
- [180] Friedman MJ SP. The relationship between trauma, posttraumatic stress disorder, and physical health. In: Friedman MJ CD, Deutch AY, ed. *Neurobiological and Clinical Consequences of Stress: From Normal Adaption to PTSD*. Philadelphia: Lippincott-Raven 1995:507-24.
- [181] Seng JS, Graham-Bermann SA, Clark MK, McCarthy AM, Ronis DL. Posttraumatic stress disorder and physical comorbidity among female children and adolescents: results from service-use data. *Pediatrics*. 2005 Dec;116(6):e767-76.
- [182] Linton SJ, Larden M, Gillow AM. Sexual abuse and chronic musculoskeletal pain: prevalence and psychological factors. *Clin J Pain*. 1996 Sep;12(3):215-21.
- [183] Linton SJ. A population-based study of the relationship between sexual abuse and back pain: establishing a link. *Pain*. 1997 Oct;73(1):47-53.
- [184] Linton SJ. A prospective study of the effects of sexual or physical abuse on back pain. *Pain*. 2002 Apr;96(3):347-51.
- [185] Riley JL, 3rd, Robinson ME, Kvaal SA, Gremillion HA. Effects of physical and sexual abuse in facial pain: direct or mediated? *Cranio*. 1998 Oct;16(4):259-66.
- [186] Campbell JC. Health consequences of intimate partner violence. *Lancet*. 2002 Apr 13;359(9314):1331-6.
- [187] Irwin M, Patterson T, Smith TL, Caldwell C, Brown SA, Gillin JC, et al. Reduction of immune function in life stress and depression. *Biol Psychiatry*. 1990 Jan 1;27(1):22-30.
- [188] Webster J, Creedy DK. Domestic violence. Screening can be made acceptable to women. *Bmj*. 2002 Jul 6;325(7354):44.
- [189] Stenson K, Posse B. [Routine questions on violence asked in maternal health services are justified]. *Lakartidningen*. 2004 Jan 29;101(5):401.
- [190] Wijma B, Heimer G, Wijma K. [Is it possible that the patient has been exposed to violence? Should we ask--and how?]. *Lakartidningen*. 2002 May 16;99(20):2260-1, 4.

- [191] Amstadter AB, Begle AM, Cisler JM, Hernandez MA, Muzzy W, Acierno R. Prevalence and correlates of poor self-rated health in the United States: the national elder mistreatment study. *Am J Geriatr Psychiatry*. 2010 Jul;18(7):615-23.
- [192] Olofsson N, Lindqvist K, Danielsson I. Fear of crime and psychological and physical abuse associated with ill health in a Swedish population aged 65-84 years. *Public Health*. 2012 Mar 1;2012:1.
- [193] Chandola T. The fear of crime and area differences in health. *Health Place*. 2001 Jun;7(2):105-16.
- [194] Kendall-Tackett K. The health effects of childhood abuse: four pathways by which abuse can influence health. *Child Abuse Negl*. 2002 Jun;26(6-7):715-29.
- [195] Finkelhor D. The victimization of children: a developmental perspective. *Am J Orthopsychiatry*. 1995 Apr;65(2):177-93.
- [196] Sachs-Ericsson N, Cromer K, Hernandez A, Kendall-Tackett K. A review of childhood abuse, health, and pain-related problems: the role of psychiatric disorders and current life stress. *J Trauma Dissociation*. 2009;10(2):170-88.
- [197] Finkelhor D, Ormrod RK, Turner HA. Polyvictimization and trauma in a national longitudinal cohort. *Dev Psychopathol*. 2007 Winter;19(1):149-66.
- [198] Huas C, Hassler C, Choquet M. Has occasional cannabis use among adolescents also to be considered as a risk marker? *Eur J Public Health*. 2008 Dec;18(6):626-9.
- [199] McEwen BS, Gianaros PJ. Central role of the brain in stress and adaptation: links to socioeconomic status, health, and disease. *Ann N Y Acad Sci*. 2010 Feb;1186:190-222.
- [200] Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention. *Jama*. 2009 Jun 3;301(21):2252-9.
- [201] Altemus M, Cloitre M, Dhabhar FS. Enhanced cellular immune response in women with PTSD related to childhood abuse. *Am J Psychiatry*. 2003 Sep;160(9):1705-7.
- [202] Cummings J, Pepler, D. & Moore, T. Behaviour problems in children exposed to wife abuse: Gender differences. *J Fam Violence*. 1999;14(2):133-56.

- [203] Bogat GA, Dejonghe E, Levendosky AA, Davidson WS, von Eye A. Trauma symptoms among infants exposed to intimate partner violence. *Child Abuse & Neglect*. 2006 Feb;30(2):109-25.
- [204] Howard DE, Feigelman S, Li X, Cross S, Rachuba L. The relationship among violence victimization, witnessing violence, and youth distress. *J Adolesc Health*. 2002 Dec;31(6):455-62.
- [205] Molitor C, Tolman RM. Gender and contextual factors in adolescent dating violence. *Violence Against Women*. 1998 Apr;4(2):180-94.
- [206] Harned MS. Abused women or abused men? An examination of the context and outcomes of dating violence. *Violence Vict*. 2001 Jun;16(3):269-85.
- [207] Shah A. Elderly suicide rates: a replication of cross-national comparisons and association with sex and elderly age-bands using five year suicide data. *J Inj Violence Res*. 2011 Jul;3(2):80-4.
- [208] Oliffe JL, Han CS, Ogrodniczuk JS, Phillips JC, Roy P. Suicide from the perspectives of older men who experience depression: a gender analysis. *Am J Mens Health*. 2011 Sep;5(5):444-54.
- [209] Zona K, Milan S. Gender Differences in the Longitudinal Impact of Exposure to Violence on Mental Health in Urban Youth. *J Youth Adolesc*. 2011 Mar 13;2011:13.
- [210] Wang J, Korczykowski M, Rao H, Fan Y, Pluta J, Gur RC, et al. Gender difference in neural response to psychological stress. *Soc Cogn Affect Neurosci*. 2007 Sep;2(3):227-39.
- [211] De Bellis MD, Keshavan MS, Beers SR, Hall J, Frustaci K, Masalehdan A, et al. Sex differences in brain maturation during childhood and adolescence. *Cereb Cortex*. 2001 Jun;11(6):552-7.
- [212] Schmithorst VJ. Developmental Sex Differences in the Relation of Neuroanatomical Connectivity to Intelligence. *Intelligence*. 2009 Mar;37(2):164-73.
- [213] Lenroot RK, Giedd JN. Sex differences in the adolescent brain. *Brain Cogn*. 2009 Feb;72(1):46-55.
- [214] Ditlevsen DN, Elklit A. The combined effect of gender and age on post traumatic stress disorder: do men and women show differences in the lifespan distribution of the disorder? *Ann Gen Psychiatry*. 2010;9(32):32.
- [215] Dube SR, Felitti VJ, Dong M, Giles WH, Anda RF. The impact of adverse childhood experiences on health problems: evidence from four birth cohorts dating back to 1900. *Preventive medicine*. 2003 Sep;37(3):268-77.

- [216] Winersjo R, Ponce de Leon A, Soares JF, Macassa G. Violence and self-reported health: does individual socioeconomic position matter? *J Inj Violence Res.* 2011 May 5;2011(5):122.
- [217] Power C, Graham H, Due P, Hallqvist J, Joung I, Kuh D, et al. The contribution of childhood and adult socioeconomic position to adult obesity and smoking behaviour: an international comparison. *Int J Epidemiol.* 2005 Apr;34(2):335-44.
- [218] Gluckman PD, Hanson MA. Living with the past: evolution, development, and patterns of disease. *Science.* 2004 Sep 17;305(5691):1733-6.
- [219] Sokolovsky J. The life course and intergenerational ties in cultural and global context. In: Sokolovsky J, ed. *The cultural context of aging: worldwide perspectives.* 3rd ed: Greenwood 2009.
- [220] Mishra G, Nitsch D, Black S, De Stavola B, Kuh D, Hardy R. A structured approach to modelling the effects of binary exposure variables over the life course. *Int J Epidemiol.* 2009 Apr;38(2):528-37.
- [221] Jovanovic T, Norrholm SD, Blanding NQ, Phifer JE, Weiss T, Davis M, et al. Fear potentiation is associated with hypothalamic-pituitary-adrenal axis function in PTSD. *Psychoneuroendocrinology.* 2009 Jul;35(6):846-57.
- [222] Woods SJ, Wineman NM, Page GG, Hall RJ, Alexander TS, Campbell JC. Predicting immune status in women from PTSD and childhood and adult violence. *ANS Adv Nurs Sci.* 2005 Oct-Dec;28(4):306-19.
- [223] Hegadoren KM, Lasiuk GC, Coupland NJ. Posttraumatic stress disorder Part III: health effects of interpersonal violence among women. *Perspect Psychiatr Care.* 2006 Aug;42(3):163-73.
- [224] Griffing S, Lewis CS, Chu M, Sage RE, Madry L, Primm BJ. Exposure to interpersonal violence as a predictor of PTSD symptomatology in domestic violence survivors. *J Interpers Violence.* 2006 Jul;21(7):936-54.
- [225] Sledjeski EM, Speisman B, Dierker LC. Does number of lifetime traumas explain the relationship between PTSD and chronic medical conditions? Answers from the National Comorbidity Survey-Replication (NCS-R). *J Behav Med.* 2008 Aug;31(4):341-9.
- [226] Knapp JF. The impact of children witnessing violence. *Pediatr Clin North Am.* 1998 Apr;45(2):355-64.
- [227] Mullender A. Children living with domestic violence. Adoption and fostering. 1996b;20(1):8-15.
- [228] Mullender A, Hague G, Imam U, Kelly L. Children's Perspectives on Domestic Violence. London: Sage 2002.

- [229] Macmillan R, Hagan J. Violence in the Transition to Adulthood: Adolescent Victimization, Education; and Socioeconomic Attainment in later Life. *Journal of research on adolescence*. 2004;14(2):127-58.
- [230] Holtrop TG, Fischer H, Gray SM, Barry K, Bryant T, Du W. Screening for domestic violence in a general pediatric clinic: be prepared! *Pediatrics*. 2004 Nov;114(5):1253-7.
- [231] Nygren P, Nelson HD, Klein J. Screening children for family violence: a review of the evidence for the US Preventive Services Task Force. *Ann Fam Med*. 2004 Mar-Apr;2(2):161-9.
- [232] Machin PMFD. *Quality of Life: assessment, analysis and interpretation*. New York: Wiley and Sons Ltd 2000.
- [233] Bowling A, Barber J, Morris R, Ebrahim S. Do perceptions of neighbourhood environment influence health? Baseline findings from a British survey of aging. *J Epidemiol Community Health*. 2006 Jun;60(6):476-83.
- [234] Campbell JC. Child abuse and wife abuse: the connections. *Md Med J*. 1994 Apr;43(4):349-50.
- [235] Ackard DM, Neumark-Sztainer D, Hannan P. Dating violence among a nationally representative sample of adolescent girls and boys: associations with behavioral and mental health. *J Gend Specif Med*. 2003;6(3):39-48.
- [236] Howard DE, Wang MQ. Psychosocial factors associated with adolescent boys' reports of dating violence. *Adolescence*. 2003 Fall;38(151):519-33.
- [237] Wijma B, Schei B, Swahnberg K, Hilden M, Offerdal K, Pikarinen U, et al. Emotional, physical, and sexual abuse in patients visiting gynaecology clinics: a Nordic cross-sectional study. *Lancet*. 2003 Jun 21;361(9375):2107-13.
- [238] Swahnberg K, Wijma K. Validation of the Abuse Screening Inventory (ASI). *Scand J Public Health*. 2007;35(3):330-4.
- [239] Swahnberg IM, Wijma B. The NorVold Abuse Questionnaire (NorAQ): validation of new measures of emotional, physical, and sexual abuse, and abuse in the health care system among women. *Eur J Public Health*. 2003 Dec;13(4):361-6.
- [240] Gilbert R, Fluke J, O'Donnell M, Gonzalez-Izquierdo A, Brownell M, Gulliver P, et al. Child maltreatment: variation in trends and policies in six developed countries. *Lancet*. 2012 Feb 25;379(9817):758-72.