Chapter 3
Violence Exposure and Mental Health States

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Introduction

The psychological impact of violence has received a great deal of attention, since the pervasive and multifarious nature of violence influences several different domains of mental health. The impact and consequences of violence on mental health are pervasive, with features of feelings of loss in the case of depression and features of assumptions that others and the outside world are dangerous and threatening in the case of anxiety. Depressive disorders tend to strike patients after an experience. By contrast, anxiety disorders may be caused by a wide variety of factors and be recognized by different symptoms, actual or anticipated. One main distinction between depression and anxiety in respect to violence may therefore be chronological; the event associated is imagined for the future or to have occurred in the past. In this chapter I review results from research on violence and depression and anxiety disorders, including PTSD.

Exposure to Violence

Violence has been recognized as a human rights problem for a long time, but the recognition of violence as a public health problem is more recent. In 1996, the 49th World Health Assembly adopted Resolution WHA49.25, declaring violence a major and growing public health problem. In 2002, The World Health Organization (WHO) defined violence as *the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community,*

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which either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation (Krug 2002), This definition of the WHO is important for public health and for the recognition of potential consequences of violence exposure. It is different from a legal definition inasmuch as this recognizes the intentionality of the violent act to harm–irrespective of the outcome it produces. The intention to harm is not necessarily associated with immediate obvious harm or death, but it includes the recognition of a potential impact that might become apparent years or even decades after the exposure to violence. Within this definition, health consequences of violence are not necessarily related to an immediate impact, but also potentially to a long term impact. Following this WHO definition of violence, various forms of exposure to violence are investigated in this chapter, such as politically motivated conflicts (e.g. wars, genocide); ecologically-based violence (e.g. exposure to heavy metals); the intentional use of physical force or power; group violence (e.g. community violence, family violence); and self-directed violence (e.g. suicide). Inclusion of the variety of forms of violence is particularly timely, as this knowledge may inform public health prevention and intervention strategies for individuals and population groups. Types of violence are physical violence, sexual violence and psychological violence.

This awareness is reflected by theoretical and empirical studies from an annual publication rate of under 10 in 1994 (year of the introduction of the previous to the last revision of the Diagnostic and Statistical Manual of Mental Disorders (*DSM*-IV)) to over 2,000 publications in 2012 (ISI Web of Science results assessed in January 2013). In this chapter I aim to review the knowledge resulting from these studies to better understand the pervasive impact of violence on psychopathology.

I argue that a long-term perspective is required in order to fully understand the impact of violence on mental health, and, simultaneously, to minimize the risk of underestimating its impact. This problem is known as the "length time bias" in cancer epidemiology. In this chapter, I will review currently existing knowledge focusing on the most widespread mental disorders such as depression and anxiety including post-traumatic stress disorder.

Critics on Research on Violence and Mental Health

Some researchers have argued that psychopathological symptoms are not related to violence exposure. This is not supported for at least 4 reasons. Early critiques argued that violence might be associated with psychopathological symptoms only in vulnerable individuals. A second level of critique has been based on the argument that reactions to violence vary so much across time, place and subgroups that they are not amenable to standardization and therefore standardized constructs of psychopathology would obscure as much as clarify the psychopathological impact of violence (De Jong 2003). A third level of critique insists on culturally-bound symptoms in the aftermath of violence (Miller et al. 2009). A fourth level of critique

argues that investigating the health impact of violence means defining human suffering as solely a physical, medical problem (Kleinman and Kleinman 1991; Kienzler 2008). However, recent studies contradict these critics by suggesting that psychopathology in nearly a third of the cases is attributable to individual's exposure to violence. (Kessler et al. 2010; Moffitt et al. 2007).

In January 2012, building on this knowledge, the American Academy of Paediatrics called on paediatricians to include knowledge from the basic health sciences, molecular biology, genomics, immunology, and neurosciences to inform strategies for children exposed to abuse early in life in their statement "Early Childhood Adversity, Toxic Stress, and the Role of the Paediatrician: Translating Developmental Science Into Lifelong Health" (Garner and Shonkoff 2012). This call aims at setting up a biologically-informed violence model including the recognition of a potentially neurotoxic environment resulting from violence in the form of social interactions and in the form of physical exposures.

Violence and Depression

Definition of Depression

Depression includes as a term depressive symptoms and depressive disorders. Depressive disorders are emotional dysregulations with feelings of sadness, hopelessness and shortened future which affect more than 350 million people worldwide (Kessler 2012). Depression in the Diagnostic and Statistical Manual IV from 1994, (p. 356) is specified in 7 types of disorders: major depressive disorder (MDD); dysthymic disorder; bipolar disorder; substance-induced disorder; mood disorder due to a general medical condition; adjustment disorder with depressed mood; and other psychiatric conditions in which depression can be a primary symptom. The criteria for depression includes depressed mood and/or loss of interest or pleasure in life activities for at least 2 weeks and at least 5 of the following symptoms that cause clinically significant impairment in social life, work, or other important areas of functioning almost every day. The symptoms of depression are depressed mood most of the day; diminished interest or pleasure in all or most activities; significant unintentional weight loss or gain; insomnia or sleeping too much; agitation or psychomotor retardation noticed by others; fatigue or loss of energy; feelings of worthlessness or excessive guilt; diminished ability to think or concentrate; and recurrent thoughts of death.

A consensus statement on depression underlines the high prevalence rates of depression across all cultures and nations, while recognizing that cultural differences exist in symptom presentation and prevalence estimates (Ballenger et al. 2001).

Exposure to Violence and Depression Among Children

Exposure to violence among young children is mainly caregiver violence (Kessler 2012; Lewis and Olsson 2011). Violence in all forms (e.g. domestic violence, community violence, and/or political) is largely associated with depression (Afifi et al. 2006; Molnar et al. 2001).

Violence Exposure and Depression Disorder Among Adolescents

Violence is a main risk factor for depression in adolescence. Using a US community-based sample of 2,345 adolescents (mean age 14 years at the time of violence exposure) in the home, schools and/or neighbourhood, psychiatric outcomes were assessed after 2 years using the Diagnostic Interview Schedule for Children. Authors categorize adolescents into 4 distinct groups: low violence, home violence, neighbourhood violence/traumatic news, and multiple settings of violence. Relative to adolescents in the low violence class, risk of MDD for adolescents in the home violence, neighbourhood violence, and multiple settings groups was 1.62, 1.47, and 2.44 times higher, respectively (p values <0.05) (Slopen et al. 2012). A second US study based on a sample of low-income African-American youth victims of violence reported higher levels of depressive symptoms than did non-victims (Fitzpatrick 1993). Another study from South Africa reported a cumulative trauma exposure effect on depression controlling for sex, with an increase in the number of violent events linearly associated with an increase in symptoms depression ($F((4,912)) = 2.77$, $P < .005$). Further knowledge on depression and violence among adolescents is built on research on adolescents from a variety of countries such as Brazil (Avanci et al. 2009) and Israel, documenting associations between exposure to community violence and rocket attacks (Henrich and Shahar 2008). However, the effects were small longitudinally (Henrich and Shahar 2013).

Comparing time of exposure and relative risk of having severe depressive symptoms studies suggest a higher risk for those abused before the age of 12 than for those abused after the age of 12 (Schoedl et al. 2010).

Violence Exposure and Depression Among Adults

An important finding of research studies on the relationship between exposure to violence and depression in adult life suggest that domestic violence, community violence and terrorism contribute to the burden of depression in adult life.

A meta-analysis of 17 studies on domestic violence (excluding emotional violence) and depression from 20 databases including participants from Australia, the USA, India, Nicaragua, South Africa and Sweden provides evidence of an association between violence exposure and incident depressive symptoms, with 12 of the reviewed 13 studies showing a positive association between violence exposure in adult relationships and depression (Devries et al. 2013). Studies on community violence in high risk communities suggest both a high exposure rates to violent events and a high prevalence rate of depressive depression, especially among women (Ribeiro et al. 2013). A recent meta-analysis provides further evidence that domestic violence is associated with depression (Devries et al. 2013). It seems that intimate partner violence (psychological, physical, and sexual) is the principal gender-related contributor to depression among women.

Depression is one of the most common adult outcomes of exposure to childhood sexual abuse. In a community-based survey of 564 young adults aged 18–22 years, 62.0 % of the sexually abused women met full criteria for depressive disorder (Teicher 2010; Kessler 2012a). Childhood abuse may influence severity, age and course of onset of depression (Lenze et al. 2008; Brown et al. 2009a, b). A study from Israel based on data from the World Mental Health Survey ($N = 4859$) found that childhood abuse was associated with lifetime depressive disorders ($OR = 1.7$).

Depression in adults is associated not only with domestic violence and child abuse but as well with exposure to war and genocide. Results from the National Comorbidity Survey (NCS) indicated that after adjusting for potential confounding influences, individuals who experienced combat were 2.12 times more likely to develop major depressive disorder. The risk of developing depression among Korean War veterans had been reported to be 5.45 times higher than in a comparison group. The prevalence of having major depression among veterans deployed during the Gulf War was 2 times greater than among veterans who were not deployed. Among Operation Iraqi Freedom (OIF) veterans the prevalence of depression was reported to be up to 17.4 %, with women at a higher risk than men. Risk for depression was associated with a lower military rank and with more combat exposure. In survivors of the 1994 genocide from Rwanda, almost 20 years after exposure, survivors reported more depressive symptoms compared to non survivors ($M = 20.7$ ($SD = 7.8$) versus $M = 19.0$ ($SD = 6.4$), $p < 0.05$) (Rieder and Elbert 2013).

Violence Exposure and Depression Among Older Individuals

Estimates of the prevalence of depressive symptoms among community dwelling people over 55 years vary markedly according to the population methods used (Saks 2002). Older individuals can be exposed to domestic violence, caregiver violence, as well as to the violence of neighbours, relatives, the larger

community and the violence of war. With a global increase in life expectancy, couples—bound together under their relationship—that age together under conditions of domestic violence, may frequently suffer from depression over their entire lives.

Violence Exposure and Anxiety

Anxiety

Anxiety is an emotional reaction which may be beneficial and adaptive in many situations; however anxiety can also become maladaptive and excessive and may negatively affect people in their day-to-day lives (Baxter et al. 2013; Carter et al. 2012). Anxiety may become pathological in cases where it is a persisting emotion even after the threat is over (Fergusson et al. 2008; Lansford and Deater-Deckard 2012). Pathological anxiety is characterized by persistent, excessive, and unrealistic worry about everyday things and mistrust. People with this disorder often expect the worst from the future and from other persons, even if there is apparently no reason for concern. Twelve separate anxiety disorders are defined in the *DSM*-IV as affecting adults. These are: Panic disorder with or without agoraphobia (main characteristic: occurrence of a panic attack linked with the fear of another attack); Phobias (main characteristic: intense and irrational fear of a specific object or situation that is so intense it can cause the individual to be compelled to go to great lengths to avoid it); Obsessive Compulsive Disorder (main characteristic: unwanted, intrusive, persistent or repetitive behaviors; Stress disorders (PTSD) and Acute Stress Disorders; Anxiety Disorders due to known physical cause; Anxiety Disorder not otherwise specified and Generalized Anxiety Disorder (GAD). GAD is the most prevalent disorder associated with violence (Lindal and Stefansson1993; Somers et al. 2006).

Anxiety disorders are associated with difficulties in concentrating, with irritability, muscle tension and sleep disturbances such as difficulty in falling or staying asleep as well as with restless and unsatisfying sleep. These symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning in daily life (Lepine 2002; Wittchen 2002; Kessler 2012).

Exposure to Violence and Anxiety Among Children

Exposure to violence among young children is mainly caregiver violence (Kessler 2012; Lewis and Olsson 2011). Anxiety may affect these children, and high levels of anxiety are likely to impact negatively on children's education, physical and psychological development, professional career and relationships (Kessler et al. 2010). In a study of anxiety disorders among children in China, India, Italy,

Kenya, the Philippines, and Thailand, it was found that more frequent physical punishment was related to more anxiety (Gershoff et al. 2010). In a study from Yemen, with a high rate of harsh punishment of children, was related to children's poor school performance and behavioural and emotional problems (Alyahri and Goodman 2008). In a recent study in N = 3, 744 adults (above 15 years) in Brazil, violence exposure was associated with major generalized anxiety disorder including children (OR = 1.71, 95.0 % CI = 1.45–2.78) (Ribeiro et al. 2013). According to this study from Brazil, 20.0 % of poor urban children have been exposed in the past 12 months to caregiver violence consisting of severe physical punishment by one of the parents. Another study from Brazil reported that 63.9 % of boys and 53.2 % of 6–13 year old girls were exposed to severe violence perpetrated by their mothers. Additionally, 42.4 % of the boys and 44.0 % of the girls were exposed to violence at school and 31.5 % of boys and 21.6 % of girls to violence in the community. It appears that the odds ratios for anxiety disorders were at least twice as high among children who had been exposed to caregiver violence than those who had not in most studies.

Studies estimate that physical violence alone affects between 10.0 and 25.0 % of children (Dutton et al. 2006). A representative study from the USA suggests that 3 in 5 children had at least some exposure to violence (including indirect exposure such as seeing an assault in the home, and psychological or emotional violence) (Finkelhor et al. 2005). It is more probable for younger children to be exposed to caregiver violence, especially to physical violence (e.g., slapping, beating with an object) and to psychological violence (e.g., yelling, name calling, threatening). Violence exposure in childhood contributes to anxiety later life e.g. to anxiety among adolescents (Afifi et al. 2006, 2009; Lewis et al. 2007).

As children grow older, they may be exposed to further types of violence, such as peer violence, witnessing violence, community violence, terror and wars. Witnessing violence was concurrently associated with anxiety among girls (Boyd et al. 2008). Especially, children from low and middle-income countries (LMICs) can be exposed to multiple violent adversities, placing these children at increased potential risk of psychological problems (Cortina 2013).

Exposure to Violence and Anxiety Among Adolescents

Exposure to violence among adolescents is mainly relational victimization by caregivers, by peers (e.g. bullying, physical fighting, and weapon use, sexual and physical assault) and community violence (CV) (Cisler et al. 2012; Turner et al. 2010). In the "US National Survey of Adolescents", 23.0 % of participants reported being exposed to CV (Haj-Yahia et al. 2013).

In a recent study it was suggested that more than half of the adolescents in the USA experienced some kind of physical violence in the past year (Finkelhor et al. 2005). In 2 cohorts of African American adolescents (N = 326; 54.0 % female; mean age = 12.1; SD = 1.6) and their maternal caregivers, significant direct effects

from emotional victimization but not from physical victimization were found (Taylor et al. 2013).

A study of adolescents from Belgium revealed that at least 54.0 % of adolescents had witnessed violence and at least 38.0 % had experienced such violence during adolescence (Vermeiren et al. 2002). A recent study conducted among Arab youth from Israel revealed that nearly all of the participants (99.8 %) reported that they had witnessed CV in their lifetime, and 64.0 % had experienced personal CV during their lives (Haj-Yahia 2013). As regards socioeconomic groups, youth violence has been found to be greater among lower socioeconomic groups (Selner-O'Hagan et al. 1998).

Violence Exposure and Anxiety Disorders Among Adults

Exposure to violence among adults is mainly domestic violence, community violence and political violence (Krug 2002).

In 1,209 nonclinical community dwelling adults (18–70 years; 45.0 % male), early life exposure to interpersonal violence differentially predicted higher self-reported anxiety symptom scores in both males and females. Adult trauma exposure did not significantly predict these symptom scores (Chu et al. 2013). Data from the 2005 Canadian Community Health Survey (12,481 respondents from the Canadian provinces of Manitoba and Saskatchewan) suggest a significant association between violence and anxiety disorders when controlling for demographic factors, family background, current SES and stressors (OR = 1.61; 95.0 % CI = 1.25–2.08).

Violence Exposure and Anxiety Disorders Among Older Individuals

Exposure to violence among older individuals is a recent research topic. Although violence against older persons is often considered in the context of care and dependency, several reviews have shown that violence in old age is mainly family violence including partner violence (Lindert et al. 2013). Community violence against older individuals seems to be less prevalent as older individuals tend to spend more time at home than adults.

Acierno conducted a survey of nearly 6,000 adults in the USA and found that 10.0 % of older individuals reported some form of violence. A study from 7 countries in Europe found prevalence rates between 0.0 % (Italy) and almost 40.0 % (Germany, Sweden, and Lithuania) (Lindert et al. 2013). A recent meta-analysis from Cooper, however, noted large discrepancies in prevalence rates across studies, mainly because of methodological reasons, such as instruments and time frame of the study under review (Cooper et al. 2008).

In a recent study on older individuals (50+) childhood sexual abuse was associated with increased levels of anxiety in old age adjusted for socio-demographic characteristics (AOR: 2.60; 95.0 % CI = 1.07–6.35) (Chou 2012). Violence exposure against older adults correlates with anxiety disorders in women across different countries and cultures. The odds ratios of anxiety symptoms were in Chile 3.2 times higher among older women who were exposed to psychological violence, and 9.7 times among older women who were victims of sexual violence when compared to older women who were not exposed.

Violence Exposure and PTSD

Definition of PTSD

PTSD deviates from other mental disorders in that it is defined in relation to a potentially etiologic event, the traumatic stressor e.g. violence. Herewith, PTSD is a "conditional" disorder. Even if controversies surround the condition criterion (criterion A) for the diagnosis of PTSD, violence is without doubt a type of event which fulfils criterion A. The definitions of PTSD in *DSM*-IV-TR specifies that exposure to a qualifying event entails *direct personal experience of an event that involves actual or threatened death or serious injury or threat to one's physical integrity;* The concept of the A criterion of PTSD has evolved since its introduction into the *DSM* in 1980. Since then, the underlying feature of PTSD is that symptoms of psychopathology are normal reactions to events such as human-made or natural disasters, serious accidents, or sudden death of a loved one or exposure to violence (assaults, war, genocide, terrorist attacks, etc.). The specific symptoms as reaction to serious life events have been specified since 1980 and in the *DSM*-V revision symptoms were reorganized.

In *DSM* V—building on *DSM* IV, PTSD is distinguished into the following clusters: cluster A includes the event like in the previous versions; cluster B includes reexperiencing; cluster C includes avoidance; cluster D includes negative alterations in cognitions and mood; and cluster E includes alterations in arousal and reactivity. All the new and revised symptoms in the *DSM* V for PTSD fall within the proposed criteria D and E. The new symptoms within criterion D include persistent distorted blame of self or others and pervasive negative emotional state (including fear, horror, anger, guilt, or shame). These symptoms are included based on the rationale that they are common in patients with PTSD, as well as in patients with mood and anxiety disorders.

It has been argued that PTSD is associated with increases in risk-taking behaviour, including risky sexual and driving behaviour, which has been investigated among adolescents. Finally, the *DSM*-IV D2 criterion of irritability or outbursts of anger has been revised to include irritable, angry, or aggressive behaviour and is now included under E1. The rationale is that, in addition to irritability, PTSD

predicts aggressive behaviour and violence, particularly among adolescents and veterans from some wars, but not from all wars (Friedman et al. 2011; Hinton and Lewis-Fernandez 2011; Scheeringa et al. 2011).

PTSD symptoms are associated with violence exposure in a broad range of studies (Silove et al. 2008; Tang and Fox 2001; Crescenzi et al. 2002; Chapman et al. 2012). The severity of the exposure to violence is directly related to PTSD symptom and severity (Seal et al. 2009; Goldberg et al. 1990; Green et al. 1990). This association has been found to be significant up to 50 years after war exposure among veterans (Roy-Byrne et al. 2004; Schlenger et al. 2007).

Violence Exposure and PTSD in Children

Although the condition is well established in adults, there is little research into PTSD in children and adolescents. The available research shows that children experience similar as well as different symptoms from adults. Research suggests the following symptoms of PTSD among 3 age groups of children: from birth to age 6, may get upset if their parents are not close by; have trouble sleeping; or have trouble with developmental tasks (e.g. toilet training, going to the bathroom); or they may demonstrate regressive behaviours such as enuresis. Children age 7–11 may act out the trauma through play, drawings, or stories. Children aged 12–18 years increasingly show symptoms more similar to adults with PTSD (Chowdhury and Pancha 2011; Cohen and Scheeringa 2009).

Research on violence exposure among children and PTSD has focused on sexual abuse and PTSD but increasing evidence suggests an exposure to multiple violent events (Brown et al. 2009a, b). In a study assessing multiple exposures to violence in children from birth to age 7, nearly one quarter of the study found that the children experienced PTSD (Crusto et al. 2010). Moreover, this study found a direct relationship between the number and the types of violent events and PTSD symptoms. In another study on preschool-children who were exposed to on-going missile attacks, 20.0 % of the children screened positive for PTSD (Kaufman-Shriqui et al. 2013). This research suggests that the impact of violence on psychopathology has an additive effect and the number of events is associated with an increasing risk for psychopathology.

Violence Exposure Among Adolescents and PTSD

PTSD is one of the most commonly reported mental ill health outcomes following violence exposure in adolescence, associated with family violence and community violence.

As regards family violence, in a study of 2,345 adolescents from a community-based sample in the USA (mean age of violence exposure 14 years) stress disorders

outcomes were assessed 2 years later using the "Diagnostic Interview Schedule for Children". The study quoted above (Fitzpatrick 1993), studying the relationship between chronic exposure to community violence and PTSD symptoms in a non-random sample of 221 low-income, 7–18 year-old African-American youth, found moderately high symptomatology, with 27.1 % meeting all 3 *DSM* Ill- R diagnostic criteria for PTSD.

Further violence exposure is associated with being a child soldier. Most of these child soldiers are between the ages of 15 and 18 years. Studies report point estimates for PTSD among adolescents from 27.0 to 97.0 % (Derluyn et al. 2004; Kohrt et al. 2008; Okello et al. 2007).

Violence Exposure Among Adults and PTSD

Among adults, PTSD is one of the most reported conditions following violence exposure in the family (e.g. domestic violence), in the community, resulting from war (as civilians or as soldier's deployment), political violence, genocide and distal violence as child abuse (Koenen et al. 2007) or as a result of several exposures.

A considerable body of research has demonstrated that women who are exposed to intimate partner violence by their male romantic partners are at substantially elevated risk for the development of PTSD (Dejonghe et al. 2008; Devries et al. 2013; Becker et al. 2010; Kessler 2012). The exposure rates differ between Whites, Blacks, Hispanics and Asians in the US general population. Data from structured diagnostic interviews with 34,653 adult respondents in the 2004–2005 wave of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) suggest that exposure and lifetime prevalence of PTSD is highest among African-Americans (8.7 %), intermediate among Hispanics and Whites (7.0 and 7.4 %) and lowest among Asians (4.0 %). In this study, African-Americans and Hispanics had higher risk of child maltreatment (Roberts et al. 2011). In a further study among economically disadvantaged urban-dwelling African-Americans from a Detroit household probability sample, lifetime sexual violence prevalence was 26.3 % for women and 5.1 % for men (Walsh et al. 2013).

There is a lack of data from studies focusing specifically on the victims exposed to physical violence by a perpetrator other than a family member. However, recent data from a longitudinal study at 4 points of time (T1 as soon as possible after the exposure, T2 3 months later, T3 after 1 year and T4 after 8 years) found that probable PTSD cases were 33.6 % at T1, 30.9 at T2, 30.1 % at T3 and 19.1 % at T4 (Johansen et al. 2013).

The short term impact of army deployment on PTSD rates is well known for decades. Most research on war, deployment and PTSD in adult life dates back to the time after the Vietnam conflict. Studies of recent conflicts suggest that combat-related PTSD afflicts between 4.0 and 17.0 % of US Iraq War veterans, and 3.0–6.0 % of returning UK Iraq War veterans. Current military personnel and veterans are at risk of developing serious mental health problems, including chronic PTSD. Deployment

itself to Iraq or Afghanistan was unrelated to PTSD although holding a combat role was associated with PTSD if deployed to Iraq (Osorio et al. 2012; Jones et al. 2012). The long-term health consequences of war service remain unclear There are data from WWII, despite burgeoning scientific interest. A longitudinal cohort study of a random sample of Australian Vietnam 36 years after the war revealed that veterans' general health was poorer and PTSD rates were higher. Systematic reviews investigating the rates of PTSD in deployed veterans found increased ORs of PTSD among deployed veterans compared to non-deployed veterans (Wright et al. 2013; Ikin et al. 2007). The range of PTSD differed between wars, from OR = 1.75 to 37.19 for veterans of the 1990–1991 Gulf War (Stimpson et al. 2003; Black et al. 2004); and from OR = 1.33 to 1.70 for soldiers from the Iraq war (Magruder and Shaw 2008; Al-Hamzawi et al. 2012) compared to those without exposure to war.

In post-conflict settings, studies report a high prevalence of PTSD (Silove et al. 2008; Mollica et al. 2004, 2013). As regards war and PTSD among civilians, a survey from 2008 indicates that 1 in 5 men and 1 in 3 women met diagnostic criteria for PTSD after the genocide in Rwanda. In a further study from Rwanda, as much as 37.0 % of populations exposed to armed conflicts (De Jong et al. 2003) showed PTSD symptoms. These findings were replicated among men and women from Rwanda (Munyandamutsa et al. 2012; Pham et al. 2004; Rieder and Elbert 2013), Cambodia (Sonis et al. 2009) and Nepal (Tol et al. 2010).

Regarding refugees, the impact of exposure to violent events and PTSD is suggested by several studies (Morina et al. 2013). On average, after 25 years post-exposure in Cambodia, the Khmer civilian population that experienced the Pol Pot genocide continues to suffer psychiatric morbidity and poor health (Mollica et al. 2013).

The most comprehensive study on genocide survivors is a set of meta-analyses (71 samples, 12,746 participants) suggesting that Holocaust survivors show more post-traumatic symptoms than individuals without Holocaust experience (d = 0.72, 95.0 % CI = 0.46, 0.98) (Barel et al. 2010).

In regards to the exposure to multiple violent events, a significant dose-response relationship was found, e.g. women who experienced both child abuse and rape were 17 times more likely to have probable PTSD compared to women who experienced one type of violence (Schumm et al. 2006). Victims with histories of repeated episodes of violence tend to present further symptoms which are not outlined in the *DSM*-IV and there is discussion about the need for further violence related diagnoses such as "Complex Post-traumatic Stress Disorder" (CPTSD) (Mcdonnell et al. 2013) or "Disorders of Extreme Stress not otherwise classified" (DESNOS) (De Jong et al. 2005; Van Der Kolk et al. 2005). DESNOS was conceptualized as encompassing 3 disorders: dissociative identity disorder, borderline personality disorder, and somatization disorder. Herewith, DESNOS is characterized by alterations in 6 areas of functioning: regulation of affect and impulses; attention or consciousness; self-perception; relations with others; somatizations; and changes in systems of meaning. This feature is supported by recent studies on adult's war victims from Kosovo (Morina and Ford 2008).

In adults, about twice as many women as men develop PTSD, even though men as a group are exposed to more traumatic events. The differences might be associated with the type of events, as women are more often exposed to personal violence (e.g. child abuse, intimate partner violence) and men more often to collective violence (war, community violence).

Violence Exposure Among Older Individuals and PTSD

PTSD in old age is associated with exposure to violence at early ages and in old age (Yehuda et al. 2007; Sagi-Schwartz et al. 2003).

Decades after World War II (WW II), prevalence rates of current PTSD among older Holocaust survivors varies from 39.0 to 55.0 %, and confirms that the negative effects of the exposure to genocide during childhood may last for decades (Favaro et al. 2006; Joffe et al. 2003; Yehuda et al. 1994). However, those who were younger than 5 years at exposure presented with less PTSD symptom severity than those who were older at exposure (Barenbaum et al. 2004). As regards to exposure, a significant difference between being directly exposed to violence in concentration camps and those in hiding was revealed (Yehuda et al. 1997). These studies results refer to the oldest old, not to the young old, which might explain the lack of association of early exposure and late life PTSD found in earlier studies. In a representative study ($N = 2426$) with a broad age range of respondents (14–93 years), prevalence rates of traumatic life events, PTSD, and partial PTSD were estimated. In the old group there were no gender differences in levels of PTSD and partial PTSD but age-group differences did appear: among persons older than 60, the prevalence rates of PTSD was 3.4 %, whereas the prevalence was estimated at 1.3 % among persons aged 14–29 years and 1.9 % among those aged 30–59 years. Partial PTSD exhibited the same age distribution, with 3.8 % in the elderly, 2.4 % in the middle-aged, and 1.3 % in young adults (Glaesmer et al. 2010). Research conducted with World War II (Bramsen and Van Der Ploeg 1999) and Holocaust survivors (Yehuda et al. 2009) indicate that symptoms of PTSD continue or that the onset of PTSD is delayed (Andrews et al. 2007). These late effects have been reported in 17 studies from several countries with large Holocaust survivor populations including Australia, the USA, Canada and Israel (Joffe et al. 2003; Clarke et al. 2004; Grossman et al. 2004). The life time prevalence rate among the Australian Holocaust survivor population is estimated at 39.0 % (Joffe et al. 2003).

Summary of Epidemiological Findings

Experiencing violence is associated with an increased risk of depression and anxiety disorders, including PTSD. I showed in this review that the impact of exposure to violence can reverberate throughout the lifetime and that the severity

may change over time. Accordingly, the impact of violence can best be understood from a developmental perspective.

Violence exposure might interfere with development and with developmental tasks such as developing attachment and trust to caregivers in childhood; of performing well in school in adolescence; of family relationship formation and taking responsibilities in adulthood and of life review in late life. The failure to complete developmental tasks may exacerbate symptoms of depression and anxiety at any point of time.

Several hypotheses explain the association between violence and depression and anxiety (e.g. vulnerability hypotheses, biological hypotheses, psychological hypotheses) and in combination.

Violence Exposure and Psychopathology: Vulnerability Explanations

Some researchers discussed the association between violence exposure and depression and anxiety suggesting that pre-existing psychiatric disorders may increase the risk of disorders following exposure to violence. Results from the Vietnam Era Twin Registry (VETR) study consisting of 8,169 male-male twin pairs in which both siblings served in military during the Vietnam era (May 1965 to August 1975), suggested that the association between depression and anxiety and violence in part reflects a familial vulnerability mediated by genetic factors.

One difficulty faced by investigators is that psychopathological changes may remain undetected for years.

Exposure to Violence and Psychopathology: Explanations from Neurosciences

Many individuals exposed to violence do not show symptoms on the phenotype level immediately after exposure; however biological effects might be found on the brain level.

Violence at key periods of the (synaptic) organization of the brain modifies the trajectories of these connections, leading to an incubation period, such that the effects of violence are not apparent at the time of adversity, but do emerge later. This can occur when the synaptic organization has been completed or when the synaptic organization is modifying because of age or environment-related changes. This suggestion is supported by studies showing protracted effects of early-life violence exposure that emerge at later life stages. It is thus conceivable that exposure to early adversity during a window of vulnerability sets into motion a series of events which lead to a heterotypic reorganization of emotions and

behaviour. Such a heterotypic reorganization may become apparent as psychopathological symptoms at any time in life.

Although PTSD and traumatic brain injury (TBI) are categorized as separate and discrete disorders, the boundary between them is sometimes indistinct. Their separation is based on the assumption that PTSD results primarily from psychological stress, while TBI is the consequence of an identifiable injury to the brain. This distinction is based on an antiquated polarity between mind and brain, and the separation of the 2 disorders often becomes arbitrary in day-to-day psychiatric practice and research (Andreasen 2011; Sherin and Nemeroff 2011).

Exposure to Violence and Psychopathology: Psychological Explanations

Violence may be related to liability to internalizing and/or externalizing psychopathology, depending on age of exposure, gender, cultural context and type of exposure. The internalizing dimension indicates liability to experience mood and anxiety disorders such as major depression, generalized anxiety disorder, panic disorder and social phobia. The externalizing dimension indicates liability to experience, substance disorder, conduct disorder, and antisocial personality disorder. The expression of the liability in determining symptoms may be associated with the context in which it occurs (Hinton and Lewis-Fernandez 2011).

Psychopathology associated with exposure to violence includes a variety of internalizing factors such as anxiety and depression and/or externalizing symptoms and disorders such as behaviour disorders. These symptoms may be found as an immediate reaction adaptive for the individual in the situation of exposure to violence. Adaptive reactions may occur in dreadful situations in which there are no way out, which results in a variety of psychopathological symptoms and/or mental disorders. Behaviour reactions may search for possible ways out of hopeless looking situations. Both internalizing and externalizing reactions are associated with the subjective feelings of power of the individual. In cases when the dreadful situation has passed, such internalizing or externalizing reactions may remain and become non-adaptive to the changes, to now no-longer dreadful environment. Both biological and neurobiological changes can be associated with adaptations to dreadful situations although such changes may not become apparent immediately after the exposure.

Issues for Further Research on the Effects of Violence

This chapter has focused primarily on the effects of exposure to violence and anxiety and/or depression. The effects of violence are multifarious and affect mental health of children, adolescents, adults and older people (Kendler et al. 2000; Bulik et al. 2001). A dose-response relationship between number of violent events and psychopathology may occur and the time points of the life course when violence occurs may be associated with different psychopathological outcomes; and the effects of violence exposure may be protracted at the symptom level. It appears the exposure to violence overrides both the effect of coping mechanisms and of predispositions, which modify the probability of psychopathology following violence exposure. In cases of exposure to stress of lower magnitude, coping mechanisms as well as predispositions increase or diminish the likelihood of developing psychopathology.

Conclusion

Violence is an important single contributing factor, if not **the** most important single factor, to depression, anxiety and PTSD. Possibly, the effect of violence on psychopathology has been underestimated because of the short time period in which it has been investigated. It may be that exposure to violence is an experience which has an effect, independent of subjective appraisal. This knowledge should help us to question the existing stress models (e.g. from Seyle) and the concept of resilience. This stress model is based on the knowledge of that time—without the knowledge from neurosciences. The concept of resilience might be a purely psychological model requiring revision due to recent information from neurosciences; violence exposure might be "toxic", having an effect for everybody.

A multidisciplinary violence model should be developed which not only relies on symptoms on the surface. Active on-going surveillance for violence exposure can lead to earlier mental health intervention. Primary prevention of violence is a paramount goal in face of the evidence of the huge burden of violence on hidden resulting from body changes and symptoms of psychopathology and the epidemic levels of violence.

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