The background of the entire page is a repeating pattern of female symbols (a circle with a vertical line and a horizontal crossbar) in a light gray color. The symbols are arranged in a grid-like fashion, overlapping slightly.

# Psychobiological correlates of rape in female adolescents

Iva Bicanic

<b>Cover</b>	Itch Creative Studio
<b>Sculpture on the cover</b>	'Rape of Proserpina' by Gian Lorenzo Bernini ©
<b>Layout</b>	Renate Siebes, Proefschrift.nu
<b>Printed by</b>	Ipskamp Drukkers B.V., Enschede
<b>ISBN</b>	978-90-393-6109-2

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# Psychobiological correlates of rape in female adolescents

Psychobiologische aspecten van verkrachting bij vrouwelijke adolescenten  
(met een samenvatting in het Nederlands)

## Proefschrift

ter verkrijging van de graad van doctor aan de  
Universiteit Utrecht op gezag van de rector magnificus,  
prof.dr. G.J. van der Zwaan, ingevolge het besluit van het  
college voor promoties in het openbaar te verdedigen  
op donderdag 13 maart 2014 des ochtends te 10.30 uur

door

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geboren op 31 juli 1972  
te Nijmegen

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Dit proefschrift werd (mede) mogelijk gemaakt met financiële steun van Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), Fonds Slachtofferhulp en Stichting tot steun aan Postacademisch Onderwijs in de Sociale Wetenschappen (PAOS-fonds).

*Aan mijn ouders*

I've got a magic charm  
That I keep up my sleeve  
I can walk the ocean floor  
And never have to breathe  
Life doesn't frighten me at all  
Not at all.

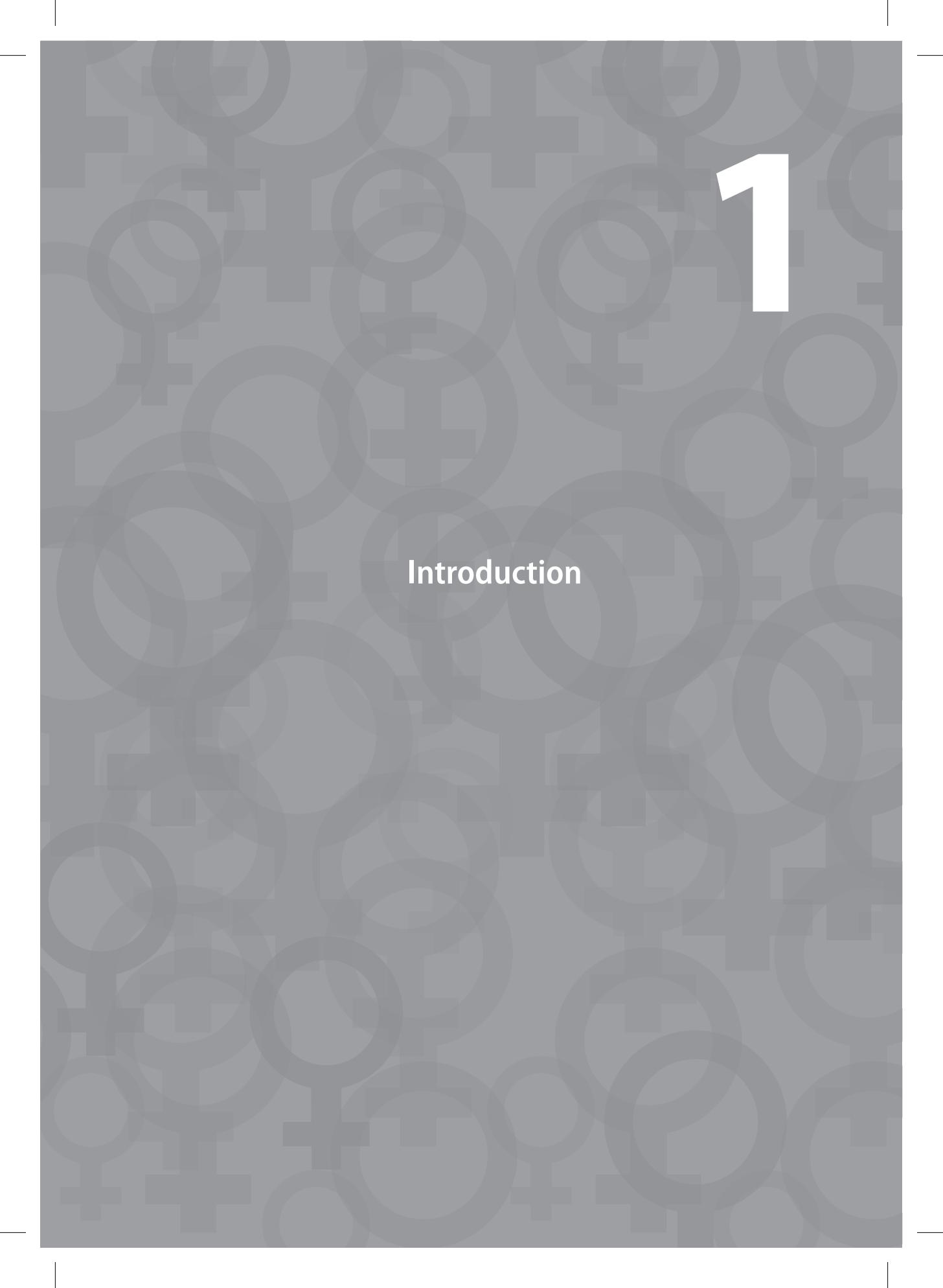
Poem by Maya Angelou (1978),  
*Life Doesn't Frighten Me*



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# 1

## Introduction

## INTRODUCTION

*Jane (15 years old) started chatting on the internet with an new boy called Tim. He was nice to her and she fell in love. They agreed to secretly meet in a park. The online romance quickly came to an end when Jane realized that Tim was an adult man who forced her into oral sex. She felt stupid and dirty afterwards and decided not to tell anyone. At nights, she suffered from nightmares. By day, she avoided being alone because of fears to be confronted with him.*

*Sandra (18 years old) agreed with her parents to not bike alone but to stay together with her friends when going back home after the school-party. Instead, she went on her own and was attacked by a stranger who raped her near the bike-road. Sandra managed to alarm people in the street who called the police. She was examined in the hospital by forensic personnel and received medication to prevent pregnancy and infections. After her parents calmed down, they persuaded her to report to the police.*

*Kathleen (16 years old) was into a four-month relationship with her boyfriend. One evening, they were watching a movie in his bedroom. When she rejected his attempts to have sex, he locked the door and lowered his voice. Kathleen became anxious by the sudden change in the atmosphere and felt unable to respond adequately when he forced her to have sex. Although she expressed her pain, he did not stop. She ended the relationship and tried hard not to think about what happened.*

When adolescents are confronted with situations such as those described above, they search for ways to deal with it. Frequently, they feel ashamed and guilty and try to forget what has happened. Avoidance coping strategies or attempts to reduce negative affect are common responses to stressful life events such as rape. In the literature on rape, single rape victims are underrepresented and adolescents occupy a relatively small place despite the fact that this age group is most at risk to be victimized by rape (Johnson, Morgan, & Sigler, 2007; Tjaden & Thoennes, 2006) and develop subsequent Post Traumatic Stress Disorder (McLaughlin et al., 2013).

The research described in this dissertation focuses on female adolescents' exposure to and recovery from rape, both psychologically and neurobiologically. The present chapter

provides a description of the background of the dissertation and an outline of the studies that it contains.

## **Defining rape**

For many people, the term ‘rape’ is associated with an image of a stranger, violently attacking his victim at night in an outdoor public place. However, the vast majority of rape incidents worldwide are committed by a known person in a private setting (Tjaden & Thoennes, 2006). For both judicial and psychological reasons, as well as for research purposes, it is important to define rape. According to the World Health Organization (Jewkes, Sen, & Garcia-Moreno, 2002, p. 149), sexual violence refers to: “any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic, or otherwise directed, against a person’s sexuality using coercion, by any person regardless of their relationship to the victim, in any setting, including but not limited to home and work”. This definition encompasses a broad spectrum of activities, ranging from forcible sex to being verbally pressured to engage in unwanted sexual activities. In this dissertation, the operational definition used for rape is more narrow: ‘an event that occurred without the victim’s consent that involved the use or threat of force in vaginal, anal or oral intercourse’ (Tjaden & Thoennes, 2006). This definition includes both attempted and completed rape.

Theoretically, rape can occur as a single event (type I trauma) or in a series such as multiple or chronic sexual abuse (type II trauma; Terr, 1991). In practice, subjects are often victimized by multiple victimization experiences, suggesting that the initial rape predisposes to revictimization. Many studies proved that the most robust risk factor for rape is prior sexual trauma (Classen, Palesh, & Aggerwal, 2005; Messman- Moore & Long, 2002; Humphrey & White, 2000; Elwood et al., 2011). For example, women who reported rape before the age of 18 were twice as likely to report being raped as an adult (Tjaden & Thoennes 2006). Additionally, the rates of sexual victimization in college have been estimated to be two to four times higher for women who had previously been victims of sexual violence as an adolescent (Humphrey & White, 2000). Recent studies of adolescent and adult rape victims have shown that close to 30% of rape victims experienced a new rape within less than one year (Littleton, Axsom, & Grills-Taquechel, 2009).

The consequence of this relationship of childhood or adolescence sexual trauma with revictimization is that many rape studies include victims of both childhood and

adolescence or adulthood abuse. When interpreting the results of these studies, a serious problem arises, because symptomatology assumed to be related to rape may actually reflect the combined effects of multiple trauma types. This issue also arises due to the co-occurrence of childhood sexual abuse with other types of abuse, such as neglect, and emotional and physical abuse (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Furthermore, much of the research on sexual victimization has focused on college and adult women. Due to the social and developmental differences between adult women and adolescent girls, generalizing the results to adolescents has to be done with care. Moreover, most research on adolescence rape uses a retrospective design and relies on adults' accounts of abuse that occurred during childhood or adolescence (Hanson et al., 2003; Smith & Cook, 2008; Staller & Nelson-Gardell, 2005). In order to capture what is unique about adolescent sexual assault, researching the experiences of recently-raped adolescents is optimal to ensure reliable data that is not confounded with unrelated factors. This dissertation focuses on (treatment-seeking) female adolescents who experienced a rape event during adolescence, but reported no prior chronic sexual abuse in childhood.

### **Prevalence of rape**

Adolescence is generally acknowledged to be a transitional period, characterized by major biological, psychological and social changes. Adolescents seek independence from parents and strive to fulfill social norms, rules and expectations to ensure social peer acceptance (Livingston, Hequembourg, Testa, & VanZile-Tamsen, 2007). One of the developmental tasks that adolescents are confronted with in the transition from childhood to adulthood is the establishment of interpersonal bonds beyond the family. In most cases, these peer interactions result in positive romantic or sexual experiences, although incidents of rape can occur. Draijer (1990) was the first who studied the national prevalence of sexual violence in the Netherlands; it appeared that one-third of the women had experienced some type of sexual violence before the age of 16. More recently, Dutch research among adolescents between 12 to 25 years of age revealed that 41% of girls and 4% of boys had experienced unwanted sexual contact, ranging from a kiss to penetration (De Graaf, Kruijjer, Van Acker, & Meijer, 2012). Another Dutch study among persons between 15 and 70 years of age showed that 2.6% of men and 11.7% of women experienced rape at least once in their lifetime (De Haas, Van Berlo, Bakker, & Vanwesenbeeck, 2012). These results from large prevalence studies show that sexual violence is a serious problem in the Netherlands, and are in line with results from studies in many other countries. Lifetime

prevalence of (attempted) rape among adult women in the Western world has been found to range from 15% to 23% (Rozee & Koss, 2001).

### **Impact of rape on mental and physical health**

The experience of a rape event is correlated to serious mental health problems, including anxiety disorder, substance abuse, major depression, suicidal ideation and suicide attempts (Rees et al., 2011; Zinzow et al., 2012; Fergusson, McLeod, & Horwood, 2013). Compared to victims of other trauma types, rape victims are at highest risk for developing Posttraumatic Stress Disorder (PTSD; Kessler et al., 1995) as described in the Diagnostic and Statistical Manual of Mental Disorders IV – Text Revision (American Psychiatric Association, 2000). PTSD includes reexperiencing the trauma in the form of unwanted thoughts, images, and dreams; avoidance of reminders of the trauma, such as certain situations or people; and increased arousal, such as the development of insomnia or a heightened startle response. Following rape, about one third to half of the victims suffers from acute PTSD within the first three months (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992); Elklit & Christiansen, 2010), and for many victims the disorder will become chronic causing significant distress for years after the rape (Kilpatrick, Edmunds, & Seymour, 1992; Breslau et al., 1998; Zinzow et al., 2012). Although PTSD is the best documented mental health consequence of exposure to rape, comorbid conditions such as depression, anxiety and substance use are also very common (Boudreaux, Kilpatrick, Resnick, Best, & Saunders, 1998; Kilpatrick, et al. 2003). The term complex PTSD is used to describe the presence of a variety of both DSM-IV Axis I and Axis II symptoms and disorders, mostly observed in victims of chronic sexual abuse in childhood (Herman, 1992; Cloitre et al., 2009).

Next to its effects on mental health, rape can also impact physical health, including general body trauma, anogenital injuries, sexually transmitted diseases (STD's) and unwanted pregnancy (Linden, 2011). Studies also confirm that rape is associated with chronic pelvic pain and pelvic floor dysfunction (Paras et al., 2009). With regard to post-rape sexual health behaviour, victims report a higher number of sexual partners (Fergusson et al., 2013), increased frequency of sexual activity (Deliramich & Gray, 2008) and decreased use of condom (Campbell, Self, & Ahrens, 2004). In adult women, the experience of rape doubles the chance of developing sexual problems (Lutfey, Link, Litman, Rosen, & McKinlay, 2008). The majority of studies on the consequences of sexual trauma focus on adult victims of childhood sexual abuse, suggesting that early age, frequency, and

duration predict problems in later adult life. Less is known about the impact of rape on sexuality and psychopathology of adolescents.

### **Treatment of PTSD**

The presence of PTSD symptoms is the primary reason for help-seeking after rape for victims in the United States (Amstadter et al., 2010). Among Dutch women who experienced sexual violence, 44.1% wanted professional help. Approximately half of these women actually did receive help (Van Berlo & Höing, 2006), suggesting that many victims may not use or receive help. It is of major importance to treat PTSD, as it is identified as a risk factor for new rape (Elwood et al., 2011) and found to be a mediator in the relation between the experience of rape and respectively adverse health outcomes (Seng, Clark, McCarthy, & Ronis, 2006) and sexual problems (Letourneau, Resnick, Kilpatrick, Saunders, & Best, 1996). Fortunately, effective treatments for PTSD are available. Several PTSD treatment guidelines recommend trauma-focused cognitive behavioral therapy (CBT) and eye movement desensitization and reprocessing therapy (EMDR) as the first line treatments (e.g., NICE, 2005; WHO 2013). These recommendations also account for children and adolescents (AACAP, 2010). Both CBT and EMDR are referred to as 'exposure-based' interventions, implying the presence of techniques to confront patients with their traumatic memories. Although comorbid conditions such as depression, anxiety and substance abuse are very common in PTSD, co-morbidity does not seem to be a good predictor of weak treatment effects. To the contrary, in patients with PTSD due to sexual trauma with co-morbidity a larger, rather than a smaller, effect-size was found after treatment (Olatunji, Cisler, & Tolin, 2010).

### **Management of acute rape**

One important prerequisite for the receipt of treatment for rape-related problems is disclosure. Although adolescents and young adult females are more likely to be raped than women in other age groups (Tjaden & Thoennes, 2006; De Haas et al., 2012), rape disclosure among these young age groups to formal services is uncommon (Hanson et al., 2003). General reasons not to disclose are fear, shame, mistrust, unawareness of being abused, but also ignorance of the existence and functioning of professional agencies (Crisma, Bascelli, Paci, & Romito, 2004; Priebe & Svedin, 2008). When rape victims choose to disclose, the timing may have important implications for post-rape recovery

as early disclosure of rape has been associated with improved health. For example, adult victims who disclosed within one month post-rape showed lower risk for PTSD and depression compared to non-disclosers and delayed disclosers (Ruggiero et al., 2004). Additionally, adolescents who waited longer than one month to disclose, were more than twice as likely as early disclosers to meet criteria for Major Depressive Disorder (Broman-Fulks et al., 2007).

In the first week post rape, victims may have a broader range of opportunities with regard to evidence collection and emergency medical care (Ullman, 1996; Ullman & Filipas, 2001). The consequence of delayed disclosure is that victims do not timely receive targeted post-rape care to help them deal with both the immediate psychological and medical consequences of rape. Also, when they disclose in a later phase, potential evidence may be lost.

In the Netherlands, most victims of sexual abuse do not know where to find specialized services (Höing, Van Engen, Ensink, Vennix, & Vanwesenbeeck, 2003) and for adolescents in particular, post-rape services in the Netherlands do not meet the required conditions (Melief, Verkuyl, & Flikweert, 2000). Prior research recommended the establishment of multidisciplinary rape centers in the Netherlands, because it appeared that Dutch rape victims needed more time to recover compared to victims in countries with established rape centers (Ensink & van Berlo, 1999). In a multidisciplinary rape management model, medical, forensic and psychological services are integrated, aimed at providing adequate care and performing forensic-medical examination under optimal conditions (Bramsen, Elklit, & Nielsen, 2009). The underlying assumption is that the multidisciplinary approach reduces chances for secondary victimization and improves mental recovery. There is evidence that coordinated assistance is more effective than a disorganized approach in two aspects: facilitating recovery from rape and increasing chances of apprehension of the offender (Campbell & Ahrens, 1998; Campbell, Patterson, Adams, Diegel, & Coats, 2008; Campbell, Patterson, & Bybee, 2012).

### **Hypothalamic Pituitary Adrenal-axis**

PTSD has been found to be associated with dysfunction of the Hypothalamic Pituitary Adrenal (HPA) axis, one of the key components in the body's stress system. Assuming that rape emerges as a serious stressor, the experience of rape will activate the HPA-axis. This activation will result in a release of, amongst others, cortisol and the sulphated

derivative of dehydroepiandrosterone (DHEAS) from the adrenal cortex. The 'attenuation hypothesis' states that after trauma, initial pituitary–adrenal hyperactivity is followed by hypoactivity when stress persists over a prolonged period of time (Fries et al., 2005; Trickett, Noll, Susman, Shenk, & Putnam, 2010), as indicated by hypocortisolism. In both young and adult victims of sexual abuse (with PTSD), hypocortisolism has been found (Meewisse, Reitsma, De Vries, Gersons, & Olf, 2007; Bremner, Vermetten, & Kelley, 2007; King, Mandansky, King, Fletcher, & Brewer, 2001). Lower levels of cortisol were in particular found in female PTSD patients and in sexually abused patients (Meewisse et al 2007; Olf, Langeland, Draijer, & Gersons, 2007). In women who previously had been assaulted, lower cortisol levels were found directly after the last rape, compared to raped women without such a history (Resnick, Yehuda, Pitman, & Foy, 1995). However, there are inconsistencies in the literature; PTSD as a result of sexual trauma in girls and women is also associated with higher cortisol levels (DeBellis et al., 1999), similar levels of cortisol (Kaufman et al., 1997; Duval et al., 2004) and an attenuation of the cortisol awakening response (Keeshin, Strawn, Out, Granger, & Putnam, 2013). For DHEAS, higher levels (Bremner et al., 2007; Kellner et al., 2010) have been found in sexually abused patients with PTSD. DHEAS and cortisol, both produced by the adrenal cortex, have different and often antagonistic effects (Chen & Parker, 2004).

Endocrine studies in patients with PTSD due to single rape are lacking. It is possible that the HPA axis is also dysregulated in this patient group, because a single traumatic event may induce a prolonged stress experience, due to recurrent memories and continuous appraisals of situations as being threatening (Baum, Cohen, & Hall, 1993). An increase of our understanding of the functioning of the biological stress system following single sexual trauma, could help us to improve treatment of rape victims. For example, if rape-related PTSD is characterized by lower hormonal levels, the addition of exogenous hormones may hypothetically reduce psychopathology. In addition, neuroendocrine parameters have hardly been studied in association with trauma-focused treatment outcomes. Some studies have focused on a heterogeneous group of adult PTSD patients, but lack the possibility to distinguish the unique effect of single (sexual) trauma on the biological stress system (Heber, Kellner, & Yehuda, 2002; Olf, De Vries, Guzelcan, Assies, & Gersons, 2007; Gerardi, Rothbaum, Astin, & Kelly, 2010).

## Rationale for this dissertation

The rationale for generating this dissertation comes from a) indications that many adolescents are confronted with rape; b) reports that rape can lead to serious and long-lasting consequences; c) the evidence that those who are victimized by rape, are at heightened risk to become revictimized; d) the view that single rape may be similar to chronic abuse in term of subsequent psychopathology and HPA-axis functioning; and e) the identification of several gaps in the multidisciplinary organization of post-rape care in the Netherlands. With this dissertation we aim to generate new insights of adolescents' exposure to and recovery from rape, both psychologically and neurobiologically, in order to promote the development of prevention and treatment strategies.

The studies described in this dissertation are conducted in the National Psychotrauma Center for Children and Youth (University Medical Center Utrecht). Data were collected from a longitudinal sample of 323 female adolescents aged 12–25 years over a period from 2005 until 2011. This sample is characterized by the experience of rape during adolescence and subsequent treatment seeking. All studies in this thesis, except for chapter 8, included subsamples from the longitudinal sample. The studies described in chapter 3, 6 and 7, represent collaborative efforts conducted with the Psychotrauma Center for Children and Youth, GGZ Rivierduinen in Leiden.

## General outline of this thesis

As little is known about adolescents' exposure to rape, **Chapter 2** starts with a description of demographic and (post-)rape characteristics of 323 adolescents between the age of 12 to 25 years, who have been victimized by rape and who have not been abused sexually in childhood. Then, we compare those who disclosed the rape event within one week post-rape (early disclosers) and those who disclosed after one week (delayed disclosers) with regard to the prevalence of medical help-seeking and police reporting and to levels of psychopathology. Moreover, we investigate which demographic and rape characteristics predict delayed disclosure.

In **Chapter 3** an uncontrolled study testing a cognitive behavior group therapy called STEPS is described. STEPS is designed to reduce rape-related symptomatology in adolescents, in particular PTSD symptoms. STEPS includes a parallel support group for parents. We investigate the effectiveness of this STEPS protocol and hypothesize that patients would report a significant improvement in rape-related symptomatology.

Included were 55 patients with a history of single rape, no prior sexual abuse and clinical levels of post-traumatic stress symptoms. These patients participated in an 8-week treatment with pre-, post-, and 6- and 12- follow-up assessments in two trauma centers.

**Chapter 4** compares sexual functioning and pelvic floor muscle functioning in 89 young adults, victimized by rape during adolescence, but with no history of chronic sexual, physical and/or emotional abuse in childhood, to 114 healthy non-victimized controls. Additionally, the mediating role of pelvic floor problems on sexual problems is investigated. All rape victims had been treated for PTSD with trauma-focused treatment, either EMDR or CBT.

**Chapter 5** presents a qualitative review of the literature published from 1990 to 2007 on the HPA-axis functioning in children and youth, who have been sexually abused. The aim of the review was to identify endocrine correlates of child sexual abuse. In adult victims of chronic sexual abuse, hypocortisolism is found. We hypothesize that for single rape victims, PTSD symptoms function as a chronic stressor leading to similar HPA-axis dysregulation. The objective of the study in **Chapter 6** is to assess HPA-axis functioning in 52 female adolescents with rape-related PTSD, but no prior sexual trauma, in comparison to 37 non-victimized controls by measuring salivary cortisol and DHEAS at 0, 15, 30, 45 and 60 minutes after awakening, both under basal conditions and after 0.5 mg dexamethasone administration. For subsample of this cross-sectional study, we investigate the HPA-axis functioning in relationship to trauma-focused treatment outcome (**Chapter 7**).

The National Psychotrauma Center for Children and Youth has been the instigating group for the establishment of the first Dutch Sexual Assault Center in the University Medical Center Utrecht in January 2012. This multidisciplinary center offers medical, psychological and police services to acute victims of rape. (Forensic) doctors, nurses, police and mental health workers collaborate 24/7 on one site to offer adequate care and to perform forensic exams under optimal conditions. **Chapter 8** describes the socio-demographic characteristics of 108 young and adult victims of acute rape and their use of professional services within one week post-rape provided by the sexual assault center. The goal of the study is to improve the current post-rape services.

The dissertation ends with a summary and discussion of the main results (**Chapters 9 and 10**). This final chapter also describes clinical implications of the study, and suggestions for future research.

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# 2

## Predictors of delayed disclosure of rape in female adolescents

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Submitted for publication.

**ABSTRACT**

Delayed disclosure of rape has been associated with impaired mental health; it is therefore important to understand which factors are associated with disclosure latency. The purpose of the present study was to compare demographic and (post-) rape characteristics and psychological functioning of early and delayed disclosers (i.e., more than one week post-rape) among adolescent rape victims, and to determine predictors for delayed disclosure. Data were collected using a structured interview and validated questionnaires in a sample of 323 help-seeking female adolescents (12–25 years), who were victimized by rape, but had no reported prior chronic child sexual abuse. In 59% of the cases, disclosure occurred within one week. Delayed disclosers were less likely to use medical services and to report to the police than early disclosers. No significant differences were found between delayed and early disclosers for psychological functioning and time to seek help. The combination of younger age (OR 2.05, CI 1.13–3.73), penetration (OR 2.36, CI 1.25–4.46), and closeness to assailant (OR 2.64, CI 1.52–4.60) contributed significantly to the prediction of delayed disclosure. The results point to the need of targeted interventions specifically designed to encourage rape victims to disclose early, thereby increasing options for access to health and police services.

## INTRODUCTION

Previous studies have shown that disclosure of a rape to formal agencies (e.g., police, (mental) health services) is not common (Wolitzky-Taylor et al., 2011; Fisher, Cullen, & Turner, 2000), especially when the rape is perpetrated by a date or acquaintance and involves victim's use of drugs and/or alcohol (Resnick et al., 2000; Wolitzky-Taylor et al., 2011). There is evidence to suggest that victims believe that professionals will not be helpful to them because their rape experience does not match stereotypical conceptions of rape, e.g., involving stranger, weapon and severe injury (Resnick et al., 2000; Patterson, Greeson, & Campbell, 2009). Accordingly, adolescents and young adults, who are more at risk to be victimized by rape than other age groups (Tjaden & Thoennes, 2006), may not receive targeted (mental) health care and may not report to police (Ruch, Coyne, & Perrone, 2000).

For reasons of (mental) health and public safety it is important to understand factors that are related to disclosure. Timing of disclosure may be a crucial factor, as early disclosers appear to be more likely than delayed disclosers to utilize appropriate medical care, and report to the police (Ullman & Filipas, 2001; Ahrens, Stansell, & Jennings, 2010). Conversely, adults who waited longer than one month to disclose the rape to other persons were more likely to suffer from Post Traumatic Stress Disorder (PTSD) and depression compared to early disclosers (Ruggiero et al., 2004). Additionally, adolescents who disclosed their rape experience after at least one month were found to be at higher risk for Major Depressive Disorder (MDD), and delinquency (Broman-Fulks et al., 2007).

Victim-assailant relationship appeared to be crucial in disclosure latency, with victims being at higher risk for delayed disclosure when they had a close relation with the assailant (Kogan, 2004, Rickert, Wiemann, & Vaughan, 2005; Koss, 1988). Contrarily, delayed disclosure is less common for victims of a stereotypical rape, i.e., rape by a stranger including a weapon and injury (Smith et al., 2000). One study found that victims of prior sexual trauma were more likely to postpone disclosure of a subsequent assault than those without prior victimization (Ullman, 1996; Smith et al., 2000). This, however, is in contrast with findings of Ahrens and colleagues (2010), who found no difference in rates of prior sexual trauma between early and delayed disclosers. Next, victim's age appeared a critical variable in predicting disclosure with younger children being at a higher risk than adolescents for delayed disclosure (Kogan, 2004). Hence, various rape- and victim-related characteristics were found to be associated with the timing of disclosure.

The majority of the aforementioned studies included college and adult female rape victims. It is important to examine rape disclosure latency in an age and sex group that is most at risk for rape victimization. So far, there was only one study in adolescents that aimed to identify factors that might influence disclosure latency (Kogan, 2004). It was found that age of onset, identity of the perpetrator, a familial relationship with the perpetrator, and a history of drug abuse in the household were related to the timing of disclosure. However, this study had some limitations, such as use of a nationally representative sample, interviews by phone and limited description of the relationship with the assailant. The present study uses a clinical sample of mental health care-seeking female adolescent victims of rape. The first aim of the present study was to compare demographic and (post-) rape characteristics among adolescent female rape victims, and their psychological functioning, between early and delayed disclosers. The second aim was to determine potential risk factors as predictors for delayed disclosure in adolescents, such as age, prior trauma, stranger rape, and victim-assailant relationship. Understanding the risk factors of late disclosure for adolescents may not only reveal possible causal mechanisms, but also possible targets for interventions that increase their opportunities for receiving timely post-rape services.

## **METHODS**

### **Subjects and data collection**

For this study, rape was defined as ‘an event that occurred without the victim’s consent that involved the use or threat of force in vaginal, anal or oral intercourse’ (Tjaden & Thoennes, 2006). The definition includes both attempted and completed rape; the term ‘completed’ referring to vaginal, oral, anal or multiple penetration. Based on the distribution of disclosure time in this sample, showing that 59% of the victims disclosed first within 1 week of the incident, victims were categorized into early and delayed disclosers with ‘early disclosers’ referring to those who disclosed the rape within one week.

The study was conducted at the Dutch National Psychotrauma Centre, which targets at psychological services for rape victims aged 12–25 years and their parents. Between May 2005 and December 2011, the centre received 621 phone calls concerning alleged rape victims from police authorities, (mental) health services, and self-referrals. In 178 cases, the phone call did not result in admission at the centre because of age limitations,

or motivational issues. In 108 cases, referrals were made to other centres because the index trauma was chronic childhood sexual abuse rather than adolescence rape. Of the 335 cases admitted to the centre, 12 were excluded for this study because of male gender, resulting in a final sample of 323 female adolescents with the index trauma being single rape. Referral sources for this final sample included police (33.7%), (mental) health services (40.7%), and self-referrals, i.e., adolescents or parents (25.6%).

Socio-demographic characteristics of the sample are presented in Table 2.1. Victim's age ranged from 12 to 25 years, with a mean age of 16.7 years ( $SD = 2.7$ ) and a median age of 16.1 years. Penetration, occurred in 79.6% of the cases. In 14.8% of the cases the victim reported a *prior* negative sexual experience in childhood or adolescence; penetration occurred in 41.3% of these cases. None of the victims reported prior chronic child sexual abuse. Relationship with the assailant was reported as: stranger (29.5%), (boy) friend (20.3%); acquaintance (19.1%); person met during nightlife (9.4%); second-degree relative (4.7%); person seen only once (4.7%); person from school (4.4%); person met on internet (3.8%); colleague (3.1%); or mentor (0.9%). Victims first disclosed after a mean 20.8 weeks ( $SD = 56.8$ , range 1–624 weeks), although 58.5% of the cases told within one week. First disclosure was to a friend (45.8%), parent(s) (17.1%), (ex) boy-friend (9.4%), family member (6.8%), professional (5.8%) or other adult (15.2%). With regard to post-rape services, of all victims 53.8% consulted a doctor for medical care and 51.4%

**Table 2.1** Demographic characteristics of adolescent rape victims ( $N = 323$ ) in valid percentages

	<i>N</i>	%
Dutch origin <sup>a</sup>	274	84.8
Education level <sup>b</sup>		
Low	182	58.0
Medium	76	24.2
High	56	17.8
Parents divorced	102	31.9
Lives at parental home	273	85.3
Current relationship	81	26.5
Prior negative sex	46	14.8

*Note.* <sup>a</sup> Dutch origin was defined as being a child from parents born in the Netherlands; <sup>b</sup> After 6 years of general primary school, at the age of 12 years, students enter low (4 years), medium (5 years), or high (6 years) secondary education level.

reported to the police. On average, victims were admitted to the centre 59.8 weeks ( $SD = 93.7$ , range 1–676) after the rape event. The mean score of the rape victims' Symptom Checklist-90 total score ( $M = 209.7$ ,  $SD = 61.8$ ) was comparable with previously reported data of psychiatric populations [ $M = 203.55$ ,  $SD = 61.60$ ;  $t(269) = 1.629$ ,  $p = .104$ ] and was substantially higher [ $t(269) = 24.297$ ,  $p < .001$ ] compared to the general population ( $M = 118.28$ ,  $SD = 32.38$ ; Arrindell & Ettema, 1986). For the Children's Depression Inventory, mean scores were in the clinical range ( $M = 17.2$ ,  $SD = 4.6$ ) and rape victims had significantly higher mean scores,  $t(230) = 15.923$ ,  $p < .001$ , in comparison to previously reported data of the general population of adolescent girls (Timbremont, Braet & Roelofs, 2008;  $M = 9.01$ ,  $SD = 6.45$ ).

## Procedure

All patients were evaluated at admission with a structured psychological assessment procedure, consisting of (I) a structured interview to obtain information about demographic and (post-)rape characteristics, and (II) self-report questionnaires to obtain information about mental health functioning. After the assessment procedure, most patients received either individual or group cognitive behavioural therapy (CBT), or Eye Movement Desensitization and Reprocessing (EMDR) with parallel parental support. Information from the interview was transcribed onto a form designed for this purpose. For each case, the following variables were reported and dichotomized or categorized for the purpose of the study:

### *Demographic and victim characteristics*

We inquired patients about their current age, educational level (lower, middle or higher), and whether they were from Dutch origin (yes in case of having parents born in the Netherlands). Those between 12–17 years were defined as younger adolescents and those between 18 and 25 years as being older adolescents. We also asked whether the patient was living with their parent(s) (yes/no) and whether the family structure was complete, i.e., whether the biological parents were living together (yes/no). Patients were then asked to describe prior negative sexual experiences (yes/no), and whether they have a current sexual relationship (yes/no).

### ***Rape characteristics***

Patients were asked when they experienced the rape event. The response was used to calculate the time since rape at admission. Next, patients were requested to describe the rape they had experienced. Their response was categorized into use of penetration (yes/no); group rape (yes/no); use of physical violence (yes/no), and use of threats verbally and/or weapon (yes/no). Then patients were interviewed about their relationship to the assailant, and whether the assailant was a known person (yes/no). The assailant was defined as a stranger when the victim had never contacted the assailant before. The responses were used to form a closeness category (yes in case of family, (boy)friend or mentor). Patients were also asked about the (estimated) age of the assailant (categorized into 12–17 years or > 18 years), and whether the victim had used alcohol prior to the rape (yes/no).

### ***Post-rape characteristics***

To assess disclosure history, patients were asked when they first told someone about the rape. The response was used to calculate the disclosure time and the help-seeking time. They were then asked to identify the person they first told about the rape. The responses were used to form the variable ‘disclosure to a peer’ (yes/no). At the end of the interview, patients were asked whether they had reported to the police after the incident (yes/no), and whether they had received any medical care after the incident (yes/no).

The study was performed in accordance with the precepts and regulations for research as stated in the Declaration of Helsinki, and the Dutch Medical Research involving Humans Subjects Act concerning scientific research. This Act was not applicable for the present study according to the Ethical Medical Committee of the University Medical Center Utrecht. Written informed consent was obtained from both adolescents and parents.

## **Measures**

### ***Posttraumatic stress***

The Children’s Responses to Trauma Inventory (CRTI; Alisic, Eland, & Kleber, 2006) was used, a 34 item questionnaire assessing severity of PTSD symptoms according to DSM-IV. The reliability of this instrument is good to excellent (Cronbach’s alpha .92 for total measure, .79 for Intrusion, .77 for Avoidance, .71 for Arousal) (Alisic & Kleber, 2010).

### ***Depression***

Children Depression Inventory (CDI; Kovacs, 1992; Timbremont & Braet, 2002) was used. The CDI is a 27 item questionnaire, assessing cognitive, affective and behavioural symptoms of depression. The Dutch CDI has a sufficient degree of internal consistency, with Cronbach's alpha ranging between .71 and .89 (Timbremont & Braet, 2002).

### ***Behavioural problems***

The Youth Self Report (YSR; Achenbach & Rescorla, 2001) was used, a questionnaire that evaluates the girl's perception of behavioural and emotional problems. The YSR yields standardized t-scores for internalizing and externalizing problem behaviour. The YSR has satisfactory convergent and discriminant validity (Bérubé & Achenbach, 2006). Cronbach's alpha ranges from .71 to .95. For the purpose of the study, only the total score was analysed.

### ***General psychopathology***

The Symptom Checklist-90-R (SCL-90; Arrindell & Ettema, 1986) was used, a 90 item questionnaire assessing present psychopathology. The total score has been shown to be a valid measure of general psychopathology. Cronbach's alpha ranges from .73 to .97.

## **Data analyses**

To compare demographic and (post-)rape characteristics between the early and delayed disclosers, chi-square tests were used. To compare multiple continuous psychological scores, MANCOVA was used with 'time since trauma' included as a covariate to correct for the potential influence of time since trauma.

Delayed disclosure was used as a dependent variable. The strength of the univariate associations between each potential risk factor and delayed disclosure was estimated by calculating odds ratio (OR) along with 95% confidence intervals (95% CI). To determine the combination of risk factors with the strongest association with delayed disclosure, each potential risk factor identified in the univariate analyses with a significant OR ( $p < .05$ ) was entered as a predictor variable into the multivariable model, using a stepwise forward (LR) logistic regression analysis with delayed disclosure as the outcome variable. The Hosmer-Lemeshow goodness of fit Chi-square was used to calculate how well the data fitted the model. For all statistical analyses, a  $p$ -value  $< .05$  was considered statistically significant.

All statistical analyses were conducted using SPSS (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.).

## RESULTS

### Differences between early and delayed disclosers

For demographic characteristic, no significant differences were found between early and delayed disclosers, except for age category with more younger adolescents (12–17 years) in the delayed disclosers group compared to the early disclosers group ( $\chi^2(1) = 6.96$ ;  $p = .008$ ). For rape-characteristics, significant differences between groups were found for the use of penetration, with more victims of penetration in the delayed disclosers group compared to the early disclosers group ( $\chi^2(1) = 5.37$ ;  $p = .02$ ). Also, the delayed disclosers group presented more victims of verbal and/or weapon threats than the early disclosers group ( $\chi^2(1) = 5.35$ ;  $p = .02$ ). Further, among the delayed disclosers more victims identified the assailant as a close person compared to the early disclosers ( $\chi^2(1) = 10.84$ ;  $p = .001$ ). Alcohol was used more often in the early disclosers group compared to the delayed disclosers group ( $\chi^2(1) = 20.24$ ;  $p < .001$ ).

With respect to post-rape characteristics, a significant smaller proportion of the delayed disclosers (15.9%) utilized medical services following the rape compared to the early disclosers (30.3%;  $\chi^2(1) = 5.32$ ;  $p = .02$ ). Likewise, a significantly smaller proportion of the delayed disclosers (14.6%) compared to the early disclosers (34.3%) reported the rape to the police ( $\chi^2(1) = 16.15$ ;  $p < .001$ ). Time since trauma at admission was significantly lower for early disclosers ( $M = 41.1$  weeks,  $SD = 79.4$ ) than for delayed disclosers ( $M = 82.9$  weeks,  $SD = 103.3$ ;  $t(314) = 4.06$ ,  $p < .001$ ). Mean time to seek help did not differ between groups,  $t(309) = 2.54$ ,  $p < .48$ . Excluding outliers ( $M \pm 3 SD$ ,  $N = 11$ ) did not change the outcome of this analysis. Both early and delayed disclosers scored in the highest level of psychological distress when compared to previously reported norm scores (CRTI, Alisic, Eland, Huijbregts, & Kleber, 2012; CDI, Timbremont et al., 2008; YSR, Achenbach & Rescorla, 2001; SCL-90, Arrindell & Ettema, 1986), but psychological functioning did not differ significantly between early and delayed disclosers ( $F(6,198) = 0.88$ ,  $p = .51$ ).

Table 2.2 shows the odds ratios with 95% confidence intervals for the associations between potential risk factors and delayed disclosure. Delayed disclosers, when compared to early disclosers, were significantly more likely to be in the younger age category (OR =

**Table 2.2** Demographic and (post-)rape characteristics by disclosure time (early vs delayed disclosers) and odds ratios for delayed disclosure

Demographic and (post-) rape characteristics	Early disclosure N = 185		Delayed disclosure (i.e. > one week post rape) N = 131		OR	95% CI
	N	%	N	%		
Age category						
Older	55	17.4	22	7.0		
Younger	130	41.1	109	34.5	2.10	1.20–3.65*
Dutch origin						
No	27	8.5	22	7.0		
Yes	158	50.0	109	34.5	0.85	0.46–1.56
Living with parent(s)						
No	29	9.2	16	5.1		
Yes	155	49.2	115	36.5	1.35	0.70–2.59
Complete family structure						
No	58	18.4	42	13.3		
Yes	127	40.3	88	27.9	0.96	0.59–1.55
Current sexual relationship						
No	127	41.8	97	31.9		
Yes	53	17.4	27	8.9	0.67	0.39–1.14
Prior negative sexual experience(s)						
No	152	49.4	110	35.7		
Yes	32	10.4	14	4.5	0.61	0.31–1.19
Known assailant						
No	56	17.7	36	11.4		
Yes	129	40.8	95	30.1	1.15	0.70–1.88
Close to assailant						
No	150	47.6	84	26.7		
Yes	35	11.1	46	14.6	2.35	1.40–3.93*
Group rape						
No	160	50.8	116	36.8		
Yes	24	7.6	15	4.8	0.86	0.43–1.71
Age assailant						
12-17	63	20.6	54	17.6		
>18	117	38.2	72	23.5	0.72	0.45–1.14
Use of penetration						
No	46	14.7	19	6.1		
Yes	136	43.5	112	35.8	1.99	1.10–3.60*

*Table 2.2 continues on next page*

**Table 2.2** *Continued*

Demographic and (post-) rape characteristics	Early disclosure N = 185		Delayed disclosure (i.e. > one week post rape) N = 131		OR	95% CI
	N	%	N	%		
Use of threats						
No	90	31.6	48	16.8		
Yes	76	26.7	71	24.9	1.75	1.09–2.82*
Use of physical violence						
No	130	42.6	82	26.9		
Yes	51	16.7	42	13.8	1.31	0.80–2.14
Victim's alcohol use						
No	72	33.5	69	32.1		
Yes	61	28.4	13	6.0	0.22	0.11–0.44*
Disclosure to peer						
No	74	23.9	65	21.0		
Yes	108	34.8	63	20.3	0.66	0.42–1.05

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Note. Seven participants were dropped from analyses due to missing disclosure time data.

2.10), to have experienced rape by a close person (OR = 2.35), to have been threatened verbally and/or by a weapon (OR = 1.75), and to have experienced a penetration (OR = 1.99). Delayed disclosers were also found to be less likely to have used alcohol prior to the rape (OR = 0.22). None of the other factors were found to be significant risk factors for delayed disclosure.

### Predicting delayed disclosure

A stepwise forward logistic regression analysis was conducted to predict delayed disclosure using 'younger age', 'close assailant', 'use of threats' and 'penetration' as predictors (Table 2.3). Victim's alcohol use was not entered in the analysis because of missing values for 33.4% of the cases. Use of threats was not a significant predictor in the model. A test of the full model against a constant only model was statistically significant, indicating that the predictors (i.e., younger age, close assailant, penetration) reliably distinguished between early and delayed disclosers ( $\chi^2(3) = 23.09, p < .000$ ). There were no significant interactions between the predictors. Nagelkerke's  $R^2$  of 10.5% suggests only a modest association

**Table 2.3** Logistic regression: risk factors associated with delayed disclosure among adolescent rape victims ( $n = 316$ )

Risk factor	B	SE	Wald	df	p-value	OR (95% CI)
Constant	-1.83	.41	20.01	1	.000	0.16
Closeness to assailant	.97	.28	11.74	1	.001	2.64 (1.52–4.60)
Penetration	.86	.33	6.96	1	.008	2.36 (1.25–4.46)
Victim's younger age	.72	.31	5.54	1	.019	2.05 (1.13–3.73)

Note. B = Beta coefficient; SE = standard error of coefficient; Wald test-statistic; df = degrees of freedom; OR (95% CI) = Odds ratio with 95% confidence interval.

between the predictors and delayed disclosure, although the model did show adequate fit to the data (Hosmer-Lemeshow  $\chi^2 (4) = 2.77, p < .60$ ). In total, 62% of the respondents were categorized correctly, using the three predictors that contributed significantly to the prediction of delayed disclosure: younger age category (OR 2.05, CI 1.13–3.73), penetration (OR 2.36, CI 1.25–4.46) and closeness to assailant (OR 2.64, CI 1.52–4.60).

## DISCUSSION

The results of this study show that, albeit no differences were found between delayed and early disclosers for psychological functioning and time to seek help, delayed disclosers were less likely to use medical services and to report to the police than early disclosers. Further, this study identified a number of factors related to the timing of rape disclosure, showing that delayed disclosers represented more young adolescents, victims of penetration, victims who were threatened, and those who were close with the assailant.

The finding that delayed disclosers are less likely to utilize medical services and report to the police than early disclosers, is in line with previous studies in adult women (Ahrens et al., 1996; Ullman & Filipas, 2001). It suggests that disclosure latency is important for public health and safety, as delayed disclosure may not only have implications for not receiving proper medical care, such as treating anogenital injuries and preventing the onset of STD and unwanted pregnancy (Linden, 2011), but may also impede the forensic investigation and apprehension of the assailant (Lacy & Stark, 2013).

Three variables were identified that successfully predicted delayed disclosure: younger age, penetration and a close person being the assailant. The finding that victim's age significantly predicted disclosure latency is in line with previous research showing that younger persons are at a greater risk for delayed disclosure when compared to their older counterparts (Kogan, 2004; Smith et al., 2000). Younger adolescents may be less able to overcome the barriers to disclose including factors as assailant tactics for maintaining secrecy, stigma that often accompanies rape and fear that their parents would consequently limit their freedom (Crisma, Bascelli, Paci, & Romito, 2004). Also, as victims approach adulthood, they may possess more information about their rights and options after victimization, and have more possibilities in their choice of disclosure recipients.

The use of penetration was found to make adolescents vulnerable to postpone disclosure. Arata (1998) found that more severe forms of sexual abuse were associated with less disclosure. Penetration may influence disclosure latency through a variety of mechanisms. It could be argued that more severe rape, indicated by the use of penetration, is more likely to be accompanied by extensive coercive use of tactics to maintain the victim's silence, with fear of reprisal possibly leading to the finding of delayed disclosure (Kogan, 2004).

Another factor that seems to make immediate disclosure of rape less likely is the closeness of the victim to the assailant, as indicated by the assailant being a (boy)friend, family member or mentor. This finding is consistent with previous studies showing that the closer the relationship between the victim and assailant, the less likely the young woman was to report this victimization to anyone (Wolitzky-Taylor et al., 2011, Rickert et al., 2005; Koss, 1988). The dynamics of intrafamilial abuse is often proposed as the explanation for delayed or non-disclosure (Kogan, 2004; Smith et al., 2000). In the present study however, only 5% of the assailants were identified as a family member. Most close relationships referred to (boy)friends, suggesting that a significant percentage of the sample experienced peer-peer victimization. This type of victimization is most likely to occur during adolescence, as compared to childhood and young adulthood, and greatly increases the risk for revictimization (Humprey & White, 2000). Hence, victims of rape by peers may be a target group for interventions promoting early disclosure.

The unexpected finding of delayed disclosers being less likely to have used alcohol prior to the rape may be explained by a cultural and legal difference between the United States (U.S.) and the Netherlands. Alcohol use in the U.S. is illegal before the age of 21 and adolescents may fear getting in trouble if they disclose drinking (Clements, Speck, Crane, & Faulkner, 2004).

Although the final model showed acceptable goodness of fit, the percentage of explained variance of delayed disclosure was modest. Thus, there are other variables predictive of delayed disclosure, for example assailant's use of alcohol or weaker support systems, that we have not assessed in this study. Beside this limitation, some other drawbacks of this study should be mentioned. First, a clinical sample was used with patients reporting high mean levels of psychological distress. This ceiling effect may explain why no differences were found between early and delayed disclosers on psychological functioning, contrary to prior studies (Broman-Fulks et al., 2007; Ruggiero et al., 2004). Second, results may not be generalizable, because the percentage of victims that consulted a medical professional and reported to the police was higher in our sample than in most studies (Zinzow, Resnick, Barr, Danielson, & Kilpatrick, 2012; Resnick et al., 2000; Hanson et al., 2003). Perhaps these differences could, at least partially, be explained by cultural differences such as openness regarding (negative) sexuality, but it could also be argued that stranger rape, representing 30% of our sample, leads to higher likelihood of help-seeking and police reporting, because of its association with higher acknowledgment of victim-status (Smith et al., 2000; Resnick et al., 2000). Beside these limitations a few strengths of the current study need to be noted. One strength is the unique set of adolescents, who presented at a mental health care center after a single rape event, but who reported no prior chronic sexual abuse in childhood. For 85% of the sample, the index trauma was a first time rape. Moreover, data were collected at a designated referral center for victims of rape, and therefore the sample is likely to represent the largest available clinical population of adolescent Dutch victims.

The findings of the current study, suggesting that delayed disclosers hold less options in terms of use of emergency medical care and evidence collection, have a number of practical implications. One of the strategies to enhance adolescents' willingness to disclose within the first week post-rape may be education campaigns in school and media, as ignorance is one of the reasons for adolescents not to disclose (Crisma et al., 2004). Education may include medical information on rape-related pregnancy and STDs, as well as the need of timely emergency contraception and prophylaxis, given that these concerns appear to be facilitators of medical help seeking (Zinzow et al., 2012). Also, practical information about optimal protection of DNA evidence, e.g. showering, clothing, eating and drinking, may increase awareness of opportunities in the early phase post-rape. Moreover, facts about the potential psychological impact of rape, such as PTSD and revictimization, but also information about evidence-based treatments (McLaughlin et al., 2013; Elwood et al.,

2011; Littleton & Ullman, 2013), may increase help-seeking behaviour at an early stage. Further, efforts to encourage early disclosure must consider peer-peer victimization as a primary factor, as most adolescents in this study experienced such type of victimization, and may not have initially defined the incident as rape leading to the finding of delayed disclosure.

In conclusion, the findings of the present study suggest that younger victims of a rape with penetration by someone close are at increased risk for delayed disclosure, and that delayed disclosers are less likely to use medical services and to report to the police. The results of the present study may assist clinicians and policy makers in understanding adolescence rape and help to develop interventions, specifically targeted to support adolescents to disclose in an early phase post-rape. Also, education may increase adolescents' willingness to disclose early, thereby increasing opportunities for access to health and police services. Another way to help improving the support of victims of rape is the implementation of multidisciplinary sexual assault centers (Bramsen, Elklit, & Nielsen, 2009), as these may be the most designated places to organize education campaigns and to offer integrated post-rape services on one location. Future research should investigate whether the availability of such centres increases the prevalence of police reporting and usage of medical care.

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# 3

## Rape-related symptoms in adolescents: short- and long-term outcomes after cognitive behaviour group therapy

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Submitted for publication.

## ABSTRACT

**Background:** Efficacy studies on treatment in adolescent victims of single rape are lacking, even though sexual victimization is most likely to occur during adolescence and despite the fact that adolescents are at risk to develop subsequent Post Traumatic Stress Disorder.

**Aim:** The aim of this prospective observational study was to evaluate the short- and long-term outcomes of an eight-session cognitive behaviour group therapy (STEPS) on rape-related symptomatology in female adolescents. STEPS includes psycho-education, trauma narrative, exposure in vivo, cognitive restructuring, and relapse prevention.

**Methods:** Fifty-five female adolescents with mental health problems due to single rape, but without prior sexual trauma, received STEPS while their parents participated in a support group. Subjects were assessed on post-traumatic stress and comorbid symptoms using self-report questionnaires prior to and directly after treatment, and at 6 and 12 months follow-up.

**Results:** Repeated measures analysis showed a significant and large decrease in symptoms of post-traumatic stress, anxiety, depression and behaviour problems directly after treatment, which maintained at 12 months follow-up. Time since trauma did not influence the results. Drop-out during STEPS was 1.8%.

**Conclusions:** The results potentially suggest that the positive treatment outcomes at short and long-term may be caused by STEPS. Future randomized controlled trials should confirm these promising effects.

## INTRODUCTION

The experience of rape is associated with the development of serious mental health disorders, most commonly DSM-IV-defined Acute Stress Disorder and Post Traumatic Stress Disorder (PTSD; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Rothbaum, Foa, Riggs, Murdock, & Walsh., 1992; Hansen, Armour & Elklit, 2012). The severe consequences of rape emphasize the need for effective treatment. Various types of exposure-based cognitive behaviour therapy (CBT; Vickerman & Margolin, 2009) and Eye Movement Desensitisation Reprocessing (EMDR; Rothbaum, Astin & Marsteller, 2005) have shown to be effective in reducing PTSD, anxiety and depression following rape. Typically, these studies involve adult women. In 8–14 year old children, trauma-focused CBT (TF-CBT) proves to be effective in reducing PTSD caused by sexual trauma (Deblinger, Mannarino, Cohen, & Steer, 2006; Avinger & Jones, 2007), especially when parents are involved in the treatment (Cohen, Deblinger, Mannarino, & Steer, 2004). The majority of the subjects in these studies were victimized by multiple (sexual) traumas often beginning in early life, making it impossible to differentiate between psychopathology due to early traumas or to recent sexual trauma.

Efficacy studies on treatment in adolescent victims of *single* rape are lacking, even though sexual victimization is most likely to occur during adolescence (Humphrey & White, 2000). Also, adolescents are most at risk to develop subsequent PTSD (McLaughlin, Koenen, Petuhkova, Sampson, Zaslavsky, & Kessler, 2013). Reducing PTSD symptoms is highly important, because they interfere negatively with school and social functioning. Moreover, victims are at an increased risk for subsequent sexual assaults when they do not recover from PTSD (Risser, Hetzell-Riggin, Thomsen, & McCanne, 2006).

For adolescent victims of a first rape with no prior sexual trauma, the STEPS cognitive behaviour group therapy protocol of 8 sessions with a parallel parents' group of 6 sessions was developed at the University Medical Center Utrecht (Bicanic & Kremers, 2007a; 2007b; 2007c). STEPS includes psycho-education, trauma narrative, exposure in vivo, cognitive restructuring, and relapse prevention. The objective of the present study was to assess rape-related symptomatology, such as PTSD, anxiety, and depression, as well as behavioural problems in adolescent female victims of a single rape both directly after STEPS treatment and at long-term follow-up. We hypothesized that rape-related symptoms would decrease significantly after STEPS, in particular directly after treatment, and that this gain would maintain at long-term follow-up.

## METHODS

### Subjects

Between 2005 and 2009, 193 female adolescents aged 13 to 18 years with rape-related mental health problems, were referred to two Dutch Psychotrauma Centers; one located in Utrecht and the other in Leiden. Referral sources included police, victim advocacy centers, schools, mental health centers, and self-referrals. Rape was defined as an event that involves the use or threat of force to penetrate the victim's vagina or anus by penis, tongue, fingers or object, or the victim's mouth by penis; the definition includes both attempted and completed rape (Tjaden & Thoennes, 2006).

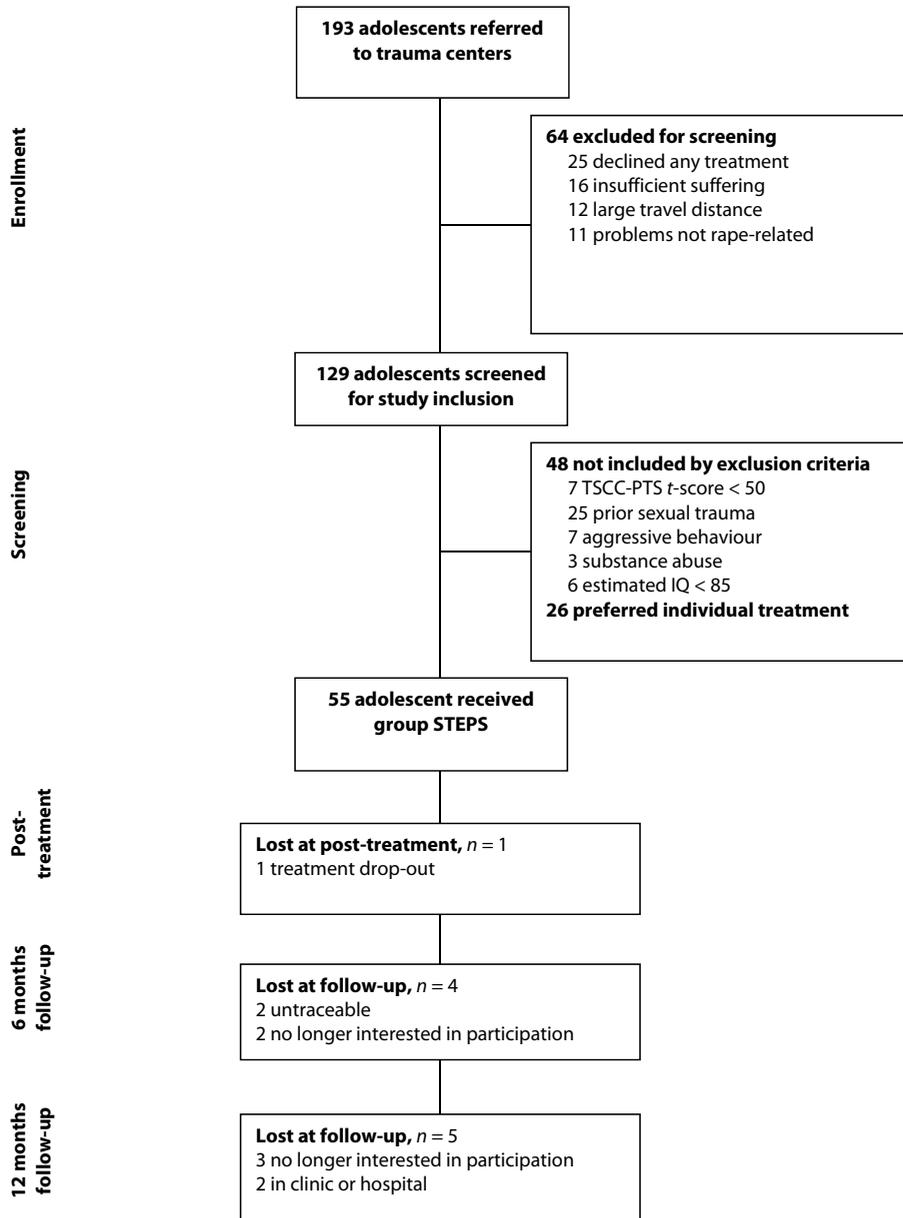
Of the 193 referred adolescents, 25 refused any treatment, 16 had psychological symptoms that did not require treatment, and 23 were referred to other settings because of large travel distance (12) or because the psychological problems were not related to the rape event (11). A total of 129 adolescents were screened for study inclusion. The subject flow chart from enrolment to study and follow-up is presented in Figure 3.1.

Inclusion criteria for STEPS group therapy include the experience of rape that occurred on one occasion with one or more perpetrators. Next to the event, a minimum *t*-score of 50 on the subscale Posttraumatic Stress (PTS) of the Trauma Symptom Checklist for Children (TSCC), defined as TSCC-PTS (Briere, 1996; Dutch translation by Bal, 1998) was required for inclusion into STEPS group therapy, implying minimum subclinical levels of post-traumatic stress symptoms based on normative data for the TSCC. Additionally, at least one parent had to participate in the parallel parents' group. Subjects were excluded for STEPS group therapy in case of prior sexual trauma; the perpetrator being a first degree family member; a TSCC-PTS *t*-score < 50; current extreme disruptive behaviour; active substance abuse disorder; active psychosis; estimated IQ < 85, or concurrent psychotherapy.

Of the 129 referred adolescents, 48 were excluded by exclusion criteria: *t*-score on the TSCC-PTS < 50 (7); prior sexual trauma (25); aggressive behaviour problems (7); substance use disorder (3); and estimated IQ < 85 (6). Of the 81 eligible adolescents, 26 were not motivated to participate in a group format. STEPS group therapy was applied in a final set of 55 adolescent girls and their parents.

The assessment and treatment protocols were identical at both study sites and were reviewed and approved by the institutional review boards at each center. Informed

adolescent and parental consent were required for admission to the study. The STEPS group therapists from Utrecht developed STEPS and trained the therapists in Leiden.



**Figure 3.1** Flowchart of enrolment, screening and follow-up.

## Measures

Information about the subjects' mental health functioning was obtained by self-report questionnaires. Questionnaires were completed before and after treatment, and at six and twelve months follow-up. The subjects completed the TSCC, a checklist for anxiety, depression, posttraumatic stress, anger, sexual problems and dissociation. Data on the TSCC suggest that internal reliability is adequate (Cronbach's alphas ranging from .77 to .89) and that convergent and discriminant validity indices are reported to be satisfactory (Bal & Uvin, 2009; Briere, 1996). For the purpose of the study, only the Anxiety, Depression and PTS scales were used for analyses.

Subjects also completed the Youth Self-Report of the Child Behaviour Check List (YSR; Achenbach & Rescorla, 2001; Dutch translation by Verhulst, van der Ende, & Koot, 1997), which evaluates the teenager's perception of behavioural problems. YSR is proven to be internally reliable (Cronbach's alphas ranging from .71 to .95), and convergent and discriminant validity are reported to be satisfactory (Bérubé & Achenbach, 2006). The YSR includes four broadband scales and nine narrow-band scales to assess child behaviour problems. For the purpose of the study, only the broadband scales of Internalizing, Externalizing and Total behaviour problems were included in the analyses.

At baseline, included subjects and their parents were evaluated with an assessment interview, including a detailed trauma history, information about the lifetime number and types of trauma, and an evaluation of trauma and perpetrator characteristics. To determine whether the subject experienced prior sexual trauma, the Childhood Unwanted Sexual Events List (Lange, 2004) was used.

## Treatment protocol

STEPS is a cognitive behaviour treatment protocol for adolescent girls with single rape-related problems and their parents (Bicanic & Kremers, 2007a). The protocol is available in Dutch and Danish. The name STEPS refers to the 'step-by-step' approach of the treatment. STEPS primarily aims to reduce PTSD symptomatology.

The main components of STEPS are (1) psycho-education about rape and its aftermath by psychotherapists as well as medical and forensic professionals, (2) repeated exposure to the traumatic memories by talking and writing about the rape event, (3) cognitive restructuring, (4) graded exposure in vivo to address behavioral avoidance and (5)

relapse prevention. The parallel parents' support group aims to reduce the parents' own level of stress and guiding parents in how to successfully support their child by sharing trauma-related feelings, providing psycho-education and reframing their own attribution errors. Parents are included in the STEPS protocol based on evidence that parents' understanding about the impact of events on their children is lacking, in particular on female adolescents, as well as parent-child communication about youth experience of upsetting events and its associated distress (Stover, Hahn, Im, & Berkowitz., 2010). Also, lower levels of parental emotional distress and stronger parental support predict a more positive treatment response (Cohen & Mannarino, 2000). STEPS consists of 8 weekly group sessions for four to five subjects and 6 weekly group sessions for the parents, each session lasting 120 minutes. Adolescents who miss more than one session are considered as treatment drop-outs. The group therapy is preceded by an individual session 0 to set up treatment goals. Every subject and every parent (couple) receive a personal exercise book (Bicanic & Kremers, 2007b; 2007c) with information about traumatic stress and coping, and instructions for homework (writing trauma narrative and graded exposure in vivo) of 30–60 minutes weekly. A week-by-week outline of the STEPS protocol is presented in Figure 3.2.

The STEPS protocol is designed to be used in a group format, but can also be applied for individual treatment. The benefits of connecting peers with similar experiences and problems in group treatment include decreasing feelings of isolation and stigmatization, increasing sense of being understood, and establishing a safe and encouraging environment to disclose the trauma narrative. Also, group intervention may be especially appropriate for adolescents who are at a developmental stage in which contact with peers is extremely important.

Although STEPS is similar to other existing trauma-focused interventions (Deblinger et al., 2006; Cohen et al., 2004) it is unique in the target group: adolescent girls 13–18 years and their parents. STEPS also has some specific characteristics in the inclusion of a police officer and a physician in the therapist-team. Additionally, the therapists provide targeted psycho-education with an emphasis on sexual education and sexual problems. The treatment length of STEPS is 8 sessions instead of the usual length in existing TF-CBT protocols (Cohen et al., 2004; Deblinger et al., 2006) of 12–16 sessions.

<i>Session-by-session outline of the STEPS protocol, girls' group</i>	
Session 1	group rules, graded exposure to trauma narrative (1), rationale STEPS
Session 2	trauma narrative (2), education rape, understanding cognitive triangle
Session 3	trauma narrative (3), rationale graded exposure in vivo
Session 4	graded exposure in vivo (1), education sex and sexual problems
Session 5	graded exposure in vivo (2), visit by physician
Session 6	graded exposure in vivo (3), education revictimization and future safety
Session 7	graded exposure in vivo (4), visit by police officers
Session 8	graded exposure in vivo (5), relapse prevention, evaluation
<i>Session-by-session outline of the STEPS protocol, parents' group</i>	
Session 1	sharing trauma narrative, education (impact of) rape, rationale STEPS
Session 2	understanding cognitive triangle after rape
Session 3	dysfunctional cognitions of parents
Session 4	education sexual problems, visit by physician
Session 5	education revictimization, visit by police officers
Session 6	relapse prevention, evaluation

**Figure 3.2** Session-by-session outline of STEPS protocol, girls' and parents' group.

### Data analyses

In order to evaluate changes in rape-related symptoms over time, a repeated measurement ANOVA was used. To check the potential influence of 'time since trauma', this variable was included in the repeated measures ANOVA as a covariate. Eta squared ( $\eta^2$ ) is used as effect size, where 0.0099 constitutes a small effect, 0.0588 a medium effect and 0.1379 a large effect (see Cohen, 1988, pp. 283). With concern to the preliminary effectiveness of STEPS, effect sizes (using Cohen's  $d$ , Cohen's  $d = M_1 - M_2 / s_{\text{pooled}}$ , where  $s_{\text{pooled}} = \sqrt{[(s_1^2 + s_2^2) / 2]}$ , Cohen, 1988, pp. 20-27) were calculated for pre- and post-treatment measurements ( $t_1$  and  $t_2$ , respectively), and for pre-treatment and 12 months follow-up measurements ( $t_1$  and  $t_4$ , respectively). When using the rules of thumb by Cohen (1992) for  $d$  we interpret 0.2 as a small effect, 0.5 as a moderate effect and 0.8 as a large effect. Analyses were performed using SPSS version 17.0. A hotdeck imputation technique,

predictive mean matching, (Rubin, 2004, p.168) was used to impute the missing data on the TSCC and YSR. As there was no structural underlying reason why data were missing, 'missing at random' (Schafer, 1997, pp. 10-13) was assumed for this data imputation.

## RESULTS

### Sample characteristics

STEPS group therapy was applied to fifty-five adolescent girls and their parents. This group did not differ from the subjects excluded for STEPS group therapy with regard to TSCC scores, age, and time since trauma. The majority of those excluded for STEPS group therapy received EMDR or individual STEPS.

At initial evaluation, the mean age was 16.0 years ( $SD$  1.4 yrs., range 13.5–18.9 yrs.). All girls were living with (one of) their parents and in 36% of the cases, the biological parents were divorced. Educational track of the girls was lower (58%), middle (21%) and higher (21%) level of secondary school. The rape experience was characterized by completed penetration (oral, vaginal, anal, or combined) in 87% of the adolescents and 39% of the girls reported physical violence coexisting with the rape. Regarding the identity of the perpetrator, 73% was known to the victim, mostly identified as an (ex-)boyfriend, date, or acquaintance. More than half of the perpetrators (53%) were under the age of 18 years. The mean time elapsed since trauma was 53.8 weeks ( $SD$  62.3 weeks, median 26.5 weeks, range 4–260 weeks). The majority of the victims first disclosed their narrative to a (boy)friend (64.5%), whereas only 17.7% first disclosed to the parent(s). A small number of adolescents (7%) had previously received trauma-specific treatment. None of the adolescents reported a history of childhood physical abuse or domestic violence. None of the adolescents were currently taking psychotropic medications.

### Evaluation of STEPS

#### *Changes over time*

Over all four measurements in time, 10.9% were missing data from questionnaires. Results for the non-imputed data set and the imputed data set were equal. We therefore decided to report the results for the imputed data set.

**Table 3.1** Results for the decrease of rape-related symptoms and descriptive statistics ( $M$  = mean,  $SD$  = standard deviation) per measurement wave ( $F$ ,  $p$ ,  $\eta^2$ ) and effect sizes (Cohen's  $d$ ) for pre- and post-treatment measurements ( $t_1$  and  $t_2$ ), and for pre-treatment and 12 months follow-up measurements ( $t_1$  and  $t_4$ )

Scale	$t_1$ $M$ ( $SD$ )	$t_2$ $M$ ( $SD$ )	$t_3$ $M$ ( $SD$ )	$t_4$ $M$ ( $SD$ )	$F$ ( $df_1, df_2$ )	$p$	$\eta^2$	Cohen's $d$ , $t_1-t_2$	Cohen's $d$ , $t_1-t_4$
TSCC Anxiety	55.7 (8.7)	50.6 (8.1)	44.5 (7.6)	44.7 (10.0)	34.1 (3, 162)	<.001	.39	0.61	1.17
TSCC Depression	53.6 (9.1)	48.1 (8.2)	43.8 (8.8)	43.1 (8.8)	42.3 (2.6, 140.9)	<.001	.44	0.63	1.17
TSCC PTS	60.0 (6.2)	50.9 (7.6)	44.7 (7.5)	43.8 (7.0)	99.6 (2.5, 135.2)	<.001	.65	1.31	2.45
YSR Internalizing	64.6 (8.0)	57.2 (10.0)	51.5 (12.6)	49.1 (13.7)	39.9 (3, 162)	<.001	.42	0.82	1.38
YSR Externalizing	54.6 (8.1)	53.2 (9.2)	50.8 (10.0)	49.0 (10.2)	8.9 (3, 159)*	<.001	.14	0.16	0.61
YSR Total	60.9 (6.8)	55.1 (9.2)	50.2 (11.0)	47.8 (11.4)	45.5 (3, 162)	<.001	.46	0.72	1.40

Note:  $N$  = 55 for all measurement waves as missing data was imputed for all scales and all measurement waves. TSCC = Trauma Symptom Checklist for Children ( $t$ -scores subscales range: anxiety 35–92; depression 37–85; posttraumatic stress 35–82); YSR = Youth Self Report ( $t$ -scores subscales range: internalizing 50–100; externalizing 50–100; total 50–100).  $t_1$  = pre-treatment,  $t_2$  = post-treatment,  $t_3$  = 6 months follow-up and  $t_4$  = 12 months follow-up. \* Test statistics given for model including time since trauma as a covariate.

In Table 3.1, the results of the repeated measurements ANOVAs, including effect sizes and one-sided  $p$ -values are presented, as well as the descriptive statistics for the four measurements in time on all scales. The results show a significant decline of PTS ( $F(2.5,135.2) = 99.6, p < .001, \eta^2 = 0.65$ ), anxiety ( $F(3,162) = 34.1, p < .001, \eta^2 = 0.39$ ), depression ( $F(2.6,140.9) = 42.3, p < .001, \eta^2 = 0.44$ ), and internalizing ( $F(3,162) = 39.9, p < .001, \eta^2 = 0.42$ ), and externalizing ( $F(3,159) = 8.9, p < .001, \eta^2 = 0.14$ ) symptoms over time. Effect sizes, expressed by  $\eta^2$ , vary between .65 for the TSCC-PTS subscale and .14 for the YSR externalizing subscale. Largest effect sizes were found for the TSCC subscales ( $\eta^2$  between .39 and .65).

We found no significant interaction-effect between 'time since trauma' and the four measurements in time for all scales ( $p$ -values ranging between .28 and .92, and  $\eta^2$  ranging between 0.01 and 0.02), except for YSR externalizing ( $F(3,159) = 3.38, p < .05, \eta^2 = 0.05$ ). As 'time since trauma' was no significant covariate in all other cases, it was left out of the reported analyses.

Effect-sizes of STEPS, expressed by Cohen's  $d$ , can be found in the final two columns of Table 3.1. Cohen's  $d$  was calculated for the effect of difference in symptomatology between pre- and post treatment ( $t_1$ - $t_2$ ) and for the effect of difference in symptomatology between pre-treatment and 12 months follow-up ( $t_1$ - $t_4$ ). We found large effects for all scales for the difference in symptomatology between  $t_1$  and  $t_4$  ( $d$  between 1.17 and 2.45), except for Externalizing problems of the YSR (where we found a medium effect of .61). The effect sizes for  $t_1$  and  $t_2$  ranged from moderate to large effects ( $d$  between .61 and 1.31). Again, the smallest effect was found for Externalizing problems of the YSR. The largest effect was found for PTS of the TSCC.

### **Drop-out and attendance**

All subjects, except for one (1.8%), completed the STEPS treatment. Of the completers, 72.2% ( $n = 39$ ) attended all 8 sessions, and 27.8% ( $n = 15$ ) attended 7 out of 8 sessions. In Figure 3.1, drop-outs during follow-ups are presented. At 12-months follow-up, questionnaires from 9 subjects were missing due to refusal to participate in follow-up (5), problems with tracing subjects (2), stay in hospital because of voluntary pregnancy (1) and stay in an inpatient clinic (1). No significant difference was found between 12-months follow-up subjects and non-completers on pre-treatment level of symptoms.

### ***Clinical relevance***

For the assessment of clinical relevance, we calculated the percentages of subjects whose score was still within (sub)clinical ranges on the TSCC-PTS (range 50–82) on the 12-month follow-up compared to pre-treatment. At pre-treatment, 100% of the subjects had a *t*-score of 50 or higher on the TSCC-PTS subscale, as this was an inclusion criterion for STEPS. At 12-months follow-up, no subject scored in the clinical range and 7 subjects (12.7%) scored in the subclinical range on the TSCC-PTS subscale.

## **DISCUSSION**

After STEPS, victims of single rape reported a significant decrease in symptoms of PTSD, anxiety and depression as well as internalizing and externalizing problems. The largest decrease in symptoms occurred between pre- and post-treatment, and this gain was maintained at 12-months follow-up. The treatment improvement appears to be statistically as well as clinically significant in that subjects' scores on standardized measures reached or approached normal ranges on multiple dimensions. Especially the PTSD symptoms decreased, whereas the smallest decrease occurred in externalizing problems. At 12-months follow-up, 12.7% of the subjects still scored in the sub-clinical range for posttraumatic stress symptoms, whereas no subject scored in the clinical range. Moreover, the drop-out rate was 1.8%. The results of this study in a well-described homogenous patient group with high compliance rates and long-term follow-up suggest that STEPS may be a promising treatment for adolescents with rape-related symptomatology.

Although a control group that did not receive STEPS was not included in this study, the improvement after STEPS may not be merely the effect of natural course in a selected group. Firstly, effect sizes were large and comparable to those in prior studies on children with sexual abuse-related PTSD symptoms (Deblinger et al., 2006; Cohen et al., 2004). Secondly, the repeated measurements ANOVAs showed that time since trauma was not a significant covariate in the outcome, except for the case of externalizing problems. These findings may indicate that the decrease in symptomatology are not simply due to the passing of time, but might be attributable to the STEPS intervention.

Although one third of the subjects who were offered the group treatment preferred an individual setting, it is noteworthy that 54 out of the 55 subjects who preferred a group setting, completed STEPS with high attendance. These results support STEPS as a highly feasible and acceptable treatment approach for adolescents and their parents. The low

attrition rate was somewhat surprising given the fact that adolescents are not easy to engage, the high intensity of the intervention, and average attrition rates of 20% reported in the literature regarding PTSD interventions (Hembree, Foa, Dorfan, Street, Kowalski, & Tu, 2003; Vickerman & Margolin, 2009). The low attrition rate may be attributed to (1) high group cohesion because of the small size of the groups, (2) the limited number of sessions; (3) the presence of a parallel parents' group, increasing the pressure for adolescents to attend; (4) the highly structured protocol and; (5) the highly motivated and dedicated therapists.

STEPS is similar to other established and proven effective programs, notably group-based trauma-focused cognitive behaviour therapy developed in the United States (Cohen et al., 2004; Deblinger et al., 2006) with respect to basic elements such as exposure in sensu and in vivo, cognitive restructuring and psycho-education. Minor differences are related to the targeted age group, treatment length, the involvement of medical and forensic professionals in the program and a focus on sexual education including (prevention of) sexual problems.

STEPS has been developed for the group of adolescents with psychological problems after single rape, but without prior sexual abuse. This group may not reflect a general group of rape victims, as rape is strongly related to a history of childhood sexual abuse and to sexual revictimization (Maker, Kemmelmeier & Peterson, 2001). Additionally, the results cannot be generalized to female adolescents who are victimized by chronic or multiple sexual abuse. Another limitation of the study is that treatment fidelity was not assessed nor was the benefit of the parental involvement. Despite the lack of information on the benefit of the parent support group, we recommend to involve parents in trauma-focused treatments because parental stress predicts posttraumatic stress in children (Alisic, Jongmans, van Wesel, & Kleber, 2011). Parents are educated about PTSD symptoms that are difficult to observe, such as avoidance and re-experiencing. Without explanation on stress symptoms, parents may misperceive behaviour changes as part of normal adolescence. A final limitation considered the absence of a clinical interview to determine the presence of PTSD and potential other Axis I disorders.

Despite these limitation, the results of the STEPS evaluation are promising: the effect sizes were large and the drop-out rate was low. However, with a median of time since trauma of 26.5 weeks, half of the sample was treated during a time when natural recovery may have occurred. Therefore, the encouraging findings need confirmation in future controlled studies on the effectiveness of STEPS, because it may be possible that the

treatment works especially well for more chronic symptoms, while the less chronic part of the sample showed considerable improvement on its own.

Based on (inter)national reports showing that adolescence is a life-time period of increased risk for sexual assault (Tjaden & Thoennes, 2006; De Haas, Van Berlo, Bakker & Vanwesenbeeck, 2012), as well as a period in life in which sexual assault can have devastating effects on the individual, it is important to identify effective treatment programs. STEPS may be one possible option to help adolescents and their parents to recover from the impact of single rape, especially because it seems a highly feasible CBT-based intervention. CBT is known as the first treatment of choice for PTSD in children and youth (NICE, 2005), but in recent years the effectiveness of EMDR for children is also revealed in more than 15 studies (Fleming, 2012). To best assess its (relative) effectiveness, STEPS should be compared to another exposure-based treatment condition such as EMDR in a randomized study design. High quality research with appropriate study designs is required to confirm the promising results from the current study and to ascertain the most effective and time-efficient treatment for this population, that is at high risk for revictimization (Humphrey & White, 2000).

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# 4

## **Pelvic floor muscle problems mediate sexual problems in young adult rape victims**

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*Journal of Sexual Medicine* (2013);  
10(8), 1978-1987.

## ABSTRACT

**Introduction:** Prior studies have addressed sexual abuse and sexual function in adult women. No studies have focused on the effect of adolescence rape on sexual functioning.

**Aim:** To investigate the effect of rape on sexual problems and on pelvic floor problems, as well as the mediating role of pelvic floor problems on sexual problems, in a homogenous group of victims of adolescence rape without a history of childhood sexual, physical and/or emotional abuse.

**Main outcome measures:** Sexual functioning and pelvic floor functioning were assessed using self-report questionnaires.

**Methods:** In this cross-sectional study, a group of 89 young women aged 18–25 years who were victimized by rape in adolescence, was compared with a group of 114 non-victimized controls. The rape victims were treated for PTSD three years prior to participation in the study.

**Results:** Three years post-treatment, rape victims were 2.4 times more likely to have a sexual dysfunction (lubrication problems and pain) and 2.7 times more likely to have pelvic floor dysfunction (symptoms of provoked vulvodynia, general stress, lower urinary tract, and irritable bowel syndrome) than non-victimized controls. The relationship between rape and sexual problems was partially mediated by the presence of pelvic floor problems. Rape victims and controls did not differ with regard to sexual activities.

**Conclusions:** Rape victims suffer significantly more from sexual dysfunction and pelvic floor dysfunction when compared to non-traumatized controls, despite the provision of treatment for PTSD. Possibly, physical manifestations of PTSD have been left unaddressed in treatment. Future treatment protocols should consider incorporating (physical or psychological) treatment strategies for sexual dysfunction and/or pelvic floor dysfunction into trauma exposure treatments.

## INTRODUCTION

The lifetime prevalence of attempted or completed rape is up to 20% for women worldwide (Jewkes, Garcia-Moreno, & Sen, 2002; Tjaden & Thoennes, 2006). Especially adolescent girls are at increased risk for rape, as they are engaged in exploring the fine boundaries of intimacy and sexuality, as part of normal adolescence. Consequently, the majority of victims are raped by a date or an acquaintance (Rickert, Wiemann, Vaughan, & White, 2004).

Rape is commonly associated with high rates of Post Traumatic Stress Disorder (PTSD), as described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000); 26–52% of rape victims develop PTSD at some point in their life (Walsh et al., 2012). Beside PTSD, adverse psychological effects of rape also include mood disorder, suicide attempts, anxiety disorder, substance abuse disorder and eating disorder (Rees et al., 2011; Faravelli, Giugni, Salvatori, & Ricca, 2004).

In addition, rape victims report to suffer from sexual problems that can persist for several years post-rape, such as fear of sex, arousal and desire problems (Van Berlo & Ensink, 2000), vaginismus and orgasm problems (Becker, Skinner, Abel, & Cichon, 1986). In adult women, the experience of rape doubles the chance of developing sexual problems (Lutfey, Link, Litman, Rosen, & McKinlay, 2008; Letourneau, Resnick, Kilpatrick, Saunders, & Best, 1996). Also, women who have been a victim of childhood sexual abuse experience more sexual problems in adult life, such as lack of sexual interest, orgasm problems, painful intercourse, or sexual dissatisfaction (Najman, Dunne, Pudrie, Boyle, & Coxeter, 2005; Loeb et al., 2002; Leonard & Follette, 2002). Moreover, they report more negative affect during sexual arousal than women without a history of childhood sexual abuse (Schloretdt & Heiman, 2003).

The majority of studies on the consequences of sexual trauma focus on adult victims of childhood sexual abuse, suggesting that early age, frequency, and duration predict sexual problems in later adult life. Also, in these studies, sexual abuse during childhood/adolescence and abuse during adulthood are often combined, making it difficult to distinguish unique consequences of abuse type on sexual problems. This issue also arises due to the co-occurrence of chronic sexual abuse with other types of abuse, such as emotional and physical abuse (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995).

PTSD is found to be a major mediator in the relation between the experience of rape and adverse health outcomes (Seng, Clark, McCarthy, & Ronis, 2006), and a direct predictor of

sexual problems (Letourneau et al., 1996). Moreover, studies confirm that sexual dysfunctions often co-occur with dysfunction of the pelvic floor (Espuña, 2009; Handa, Cundiff, Chang, & Helzlsouer, 2008). Hypothetically, PTSD (as an anxiety disorder) may manifest itself in a hypertonic pelvic floor, as part of a generalized protective defence mechanism, which in turn might act as a mediator in the relation between rape and sexual problems (Van der Velde, Laan, & Everaerd, 2001). PTSD can be effectively treated with trauma-focused treatments such as Eye Movement Desensitization and Reprocessing (EMDR) or Cognitive Behavior Therapy (CBT) (National Institute of Clinical Excellence, 2005). The present study focuses on a sample of rape victims who have been treated for PTSD.

The objective of the present study was twofold: (1) to investigate whether young adults, victimized by rape during adolescence, but with no history of chronic sexual, physical and/or emotional abuse in childhood, report more sexual problems in comparison to their non-victimized counterparts. And (2), to investigate whether these rape victims have more pelvic floor problems, and whether these pelvic floor problems mediate the relationship between rape and sexual problems.

## **METHODS**

### **Subjects and procedure**

In this cross-sectional study, two groups of young women were compared: those victimized by rape in adolescence versus those not victimized by rape (labelled as rape victims versus controls). Rape was defined as an event that involves the involuntary penetration of the victim's vagina or anus by penis, tongue, fingers or object, or the victim's mouth by penis (Tjaden & Thoennes, 2006). The definition includes both attempted and completed rape. As we were interested in the short term consequences of rape in adolescence on sexual functioning, we included women between 18 and 25 years old, assuming that this age group is sexually active. Controls were carefully screened for a history of sexual abuse or rape in order to create mutually exclusive groups.

Rape victims were recruited from those who were referred to the National Psychotrauma Centre (NPC) of the University Medical Centre Utrecht between 2006 and 2011. The NPC offers psychotherapeutic treatment to rape victims who have no history of childhood sexual, emotional and/or physical abuse. Between December 2011 and May 2012, 210 ex-patients, treated for rape-related PTSD, reached the age category of 18–25

years. All were approached (by phone) for participation. Of all rape victims, 46 could not be reached, and 21 victims showed no interest, resulting in 143 victims receiving an information letter. After reading this letter, 30 victims refused to participate. Of the 113 victims who received questionnaires, 89 questionnaires were returned with correctly signed informed consent papers. Age matched non-victimized adolescents were recruited at vocational training institutions and universities. After reading the information letter, 179 controls agreed to participate and received questionnaires. After the questionnaires were returned, 30 controls were lost as screen failures: 13 controls were too old and 17 controls had experienced sexual abuse in early life. Eventually, 114 questionnaires were returned with correctly signed informed consent papers. A final sample of 89 rape victims and 114 non-victimized controls were analyzed. Study procedures were approved by the Medical Ethics Committee of the University Medical Centre Utrecht.

## Measures

Information about age, education, religiosity, living situation, sexual orientation, and sexual behaviors was obtained by a self-developed questionnaire. Education was categorized as lower secondary, higher secondary or college/university. Information about trauma characteristics of the rape victims was retrieved from medical files.

*Sexual functioning* was measured using the Dutch version of the Female Sexual Function Index (FSFI) (Rosen et al., 2000; Ter Kuile, Brauer, & Laan, 2006). The FSFI consists of the following subscales: Desire, Arousal, Lubrication, Orgasm, Satisfaction and Pain. Lower scores on these scales are indicative of poor sexual functioning. The FSFI is a questionnaire designed for measuring sexual functioning in a heterosexual population, where intercourse is involved. Sexual functioning was therefore only measured in the subsample of sexually active heterosexual individuals. The questionnaire is widely used, and psychometric properties of the FSFI are good to excellent, with Cronbach's alpha ranging from .72 to .98.

*Pelvic floor functioning* was measured using the Amsterdam Hyperactive Pelvic Floor Scale - Women (AHPFS-W) (Laan, Lakeman, & Van Lunsen, manuscript in preparation), a questionnaire developed at the Department of Sexology and Psychosomatic Gynaecology of the Academic Medical Centre, Amsterdam. The questionnaire consists of 30 items, that are scored on a 5 point Likert scale with never and always as extremes. Items ask about physical complaints that are indicated as signs of pelvic floor hypertonicity,

such as pain during coitus, voiding problems, painful neck and shoulder stiffness, and irritable bowel symptoms (Laan, Lakeman, & Van Lunsen, manuscript in preparation). Factor analysis had indicated that the 30 items could be divided into 6 items reflecting Provoked Vulvodynia complaints (Cronbach's  $\alpha = .82$ ), 6 items relating to Stress Symptoms (Cronbach's  $\alpha = .80$ ), 4 items relating to Lower Urinary Tract Symptoms (Cronbach's  $\alpha = .82$ ), 4 items reflecting Irritable Bowel Symptoms (Cronbach's  $\alpha = .77$ ), 3 items reflecting Rectal Symptoms (Cronbach's  $\alpha = .73$ ), and 2 items related to Urinary Tract Infection Symptoms (Cronbach's  $\alpha = .75$ ) (Van Lunsen & Ramakers, 2002). Higher scores reflect more pelvic floor problems.

### **Statistical analyses**

The quantitative data were thoroughly explored for missing values; 0.45% of the data were missing. On approximation, the data were normally distributed, allowing application of parametric tests. Whenever the assumption of homogeneity of variances was violated, significance values and degrees of freedom for unequal variances were reported.

For comparison of rape victims and controls on demographic and sexual experience characteristics, independent samples *t*-tests were used when outcome variables were continuous and Pearson chi-square tests when variables were categorical.

In order to investigate whether rape victims and controls differed with regard to sexual functioning and/or pelvic floor functioning, two separate multivariate analyses of (co) variance were conducted, adjusted for the influence of potential covariate(s). Bonferroni corrections were applied to correct for multiple comparisons. The analyses with regard to sexual functioning were conducted in the group that was sexually active with a male partner.

To test whether pelvic floor problems mediated the relationship between being raped and sexual problems, regression analyses were conducted using Baron and Kenny's criteria for mediation (Baron & Kenny, 1986). The first criterion holds that the predictor variable (group) is significantly related to the outcome variable (sexual problems). Second, the predictor variable (group) must be significantly related to the potential mediator (pelvic floor problems). Third, the potential mediator (pelvic floor problems) must hold a significant relation to the outcome variable (sexual problems) after controlling for the effects of the predictor variable (group). Fourth, in order to have full mediation, the effect of the predictor variable on the outcome variable should drop to zero after controlling

for the effects of the potential mediator variable. When this effect does not drop to zero, but is in fact significantly reduced, partial mediation occurred. In order to test this fourth criterion of whether pelvic floor problems significantly mediated the relationship between group and sexual problems, the Sobel test of mediation (Sobel, 1982) was used. The Sobel test calculates whether the indirect effect, via the potential mediator variable, is significantly different from zero. In case mediation was established, the percentage of variance that the mediator explains in the relation between the predictor variable and the outcome variable was calculated. Influence of potential covariate(s) was controlled for by entering them in the first block of the regression analysis, and entering the predictor variable(s) in the second block. Statistical analyses were performed in SPSS version 19.0. Significance (two-tailed) was defined as  $p < .05$ .

## RESULTS

### Demographic characteristics

All participants were aged between 18 and 25 years; the average age of the rape victims was 20.9 years ( $SD = 1.9$ ) and the average age of the controls was 20.8 years ( $SD = 1.5$ ). Rape victims and controls differed on level of education, with rape victims being significantly less educated than controls.<sup>1</sup> They did not differ with regard to living situation; neither did they differ on religiosity. Demographic characteristics are presented in Table 4.1.

### Trauma characteristics

All rape victims experienced rape during adolescence. In the majority of the cases (78%) the trauma involved a completed rape, most particularly including penile-vaginal penetration. A minority was victimized by a stranger (25%). Less than half of the victims (44%) had prior positive experience with sexual intercourse. Of the victims, 20% experienced revictimization, defined as one or two more single events of rape in adolescence. On average 4.73 years ( $SD = 2.85$ ) had elapsed between trauma and participation in this study. All rape victims had been treated for PTSD with trauma focused treatment, either EMDR or CBT. The average time between treatment and participation was 3.32 years ( $SD = 1.75$ ). Trauma characteristics of the rape victims are presented in Table 4.2.

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<sup>1</sup> Education was therefore used as a covariate in further analyses.

**Table 4.1** Demographic characteristics and characteristics of sexual activities of the rape victims ( $N = 89$ ) and controls ( $N = 114$ ) in frequencies and percentages

	Rape victims		Controls		Test-value	
	<i>N</i>	%	<i>N</i>	%	$\chi^2$ ( <i>df</i> )	<i>p</i>
Education						
Lower secondary	5	5.6	-	-	11.22 (2)	.004
Higher secondary	36	40.4	32	28.1		
College / university	48	53.9	82	71.9		
Religiosity	27	30.3	44	38.6	1.50 (1)	.221
Living situation						
With parent(s)	58	65.2	65	57.0	2.10 (3)	.552
In student house	17	19.1	29	25.4		
With partner	12	13.5	15	13.2		
Other	2	2.2	5	4.4		
Sexual orientation						
Heterosexual	80	92.0	110	96.5	3.51 (2)	.173
Homosexual	1	1.1	2	1.8		
Bisexual	6	6.9	2	1.8		
Masturbation	35	40.2	60	53.1	3.26 (1)	.071
Kissing	68	78.2	95	83.3	0.86 (1)	.353
Petting	73	83.9	101	88.6	0.93 (1)	.334
Intercourse*	58	65.2	77	67.5	0.13 (1)	.722

Note. \* Hetero-sexual subjects who are sexually active (including penile-vaginal penetration;  $n = 58$  rape victims versus  $n = 77$  controls).

### Sexual functioning

Rape victims and controls did not differ in their sexual orientation; neither did they differ in sexual activities such as masturbation, kissing, petting and intercourse (see Table 4.1). Reasons for not being sexually active mentioned by respectively rape victims and controls, were having no partner (20 versus 18), no interest in sexual activity (5 versus 4), and fear of losing control (6 versus 1). Additional reasons for not being active mentioned by rape victims were fear of being touched in a sexual way (6) and anxiety for boys or men (3). Additional reasons mentioned by controls were religion based arguments (1) and being too young (1).

A between-group multivariate analysis of covariance was performed on the six domains of the FSFI and the total score, in the subsample of sexually active individuals (58 rape

**Table 4.2** Trauma characteristics of the rape victims ( $N = 89$ )

	<i>N</i>	%
Completed rape (including penetration)	69	77.5
Type of penetration		
No penetration	20	22.5
Vaginal	47	52.8
Oral	3	3.4
Vaginal + Oral	15	16.9
Vaginal + Anal	2	2.2
Vaginal + Oral + Anal	2	2.2
Perpetrator		
Stranger	22	24.7
Acquaintance	17	19.1
Boyfriend	16	18
Going out / party	11	12.3
Friend other than boyfriend	6	6.7
School or work	9	10.1
Internet	3	3.4
Other	5	5.6
Prior positive sexual experience	39	44.3
Revictimization	23	20.4

victims versus 77 controls). After adjusting for differences in education, the multivariate effect of group on sexual functioning was significant, showing more sexual problems for rape victims in comparison to controls (see Table 4.3). On a subscale level, differences were identified on the Lubrication and Pain subscales, with rape victims having more lubrication problems (mean difference = 0.497,  $p = .001$ ) and more pain (mean difference = 0.695,  $p < .001$ ). When using the clinical cut-off of 26.55 on the FSFI total score (Wiegel, Meston, & Rosen, 2005), 44.6% ( $n = 25/56$ ) of the rape victims were defined as sexual dysfunctional versus 19.5% of the controls ( $n = 15/77$ ). This difference was significant,  $\chi^2(1) = 9.87$ ,  $p < .01$ : rape victims had a 2.4 times higher prevalence of sexual dysfunction when compared to controls.

### Pelvic floor functioning

A between-subjects multivariate analysis of covariance was performed on the six domains of the AHPFS-W and the total score. After adjusting for differences in education, the

**Table 4.3** Multivariate analysis of variance of sexual functioning and pelvic floor functioning, adjusted for education

		<i>M (SD)</i>	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
<b>Sexual functioning (FSFI) *</b>						
<i>Multivariate test</i>						
Group			2.820	6.127	.013	.117
<i>Univariate tests</i>						
Desire	Rape victims	3.64 (0.86)	0.004	1.132	.949	.000
	Controls	3.69 (0.78)				
Arousal	Rape victims	4.61 (1.04)	2.849	1.132	.094	.021
	Controls	4.96 (0.83)				
Lubrication	Rape victims	4.99 (1.03)	12.018	1.132	.001	.083
	Controls	5.53 (0.58)				
Orgasm	Rape victims	4.05 (1.50)	1.961	1.132	.164	.015
	Controls	4.53 (1.27)				
Satisfaction	Rape victims	4.77 (1.26)	3.086	1.132	.081	.023
	Controls	5.11 (0.93)				
Pain	Rape victims	4.65 (1.23)	13.254	1.132	<.001	.091
	Controls	5.35 (0.92)				
Total	Rape victims	26.70 (5.02)	7.992	1.132	.005	.057
	Controls	29.16 (3.62)				
<b>Pelvic floor functioning (AHPFS-W) †</b>						
<i>Multivariate test</i>						
Group			8.385	6.194	<.001	.206
<i>Univariate tests</i>						
Provoked Vulvodynia	Rape victims	1.72 (0.64)	32.256	1.199	<.001	.139
	Controls	1.34 (0.31)				
Stress	Rape victims	2.19 (0.83)	14.937	1.199	<.001	.070
	Controls	1.76 (0.54)				
Lower Urinary Tract Symptoms	Rape victims	1.74 (0.78)	10.593	1.199	.001	.051
	Controls	1.38 (0.54)				
Irritable Bowel Syndrome	Rape victims	2.17 (0.93)	9.232	1.199	.003	.044
	Controls	1.75 (0.82)				
Rectal problems	Rape victims	1.14 (0.34)	0.980	1.199	.323	.005
	Controls	1.08 (0.21)				
Urinary Tract Infection	Rape victims	1.47 (0.69)	0.016	1.199	.898	.000
	Controls	1.43 (0.72)				
Total	Rape victims	10.42 (2.86)	17.289	1.199	<.001	.080
	Controls	8.74 (2.24)				

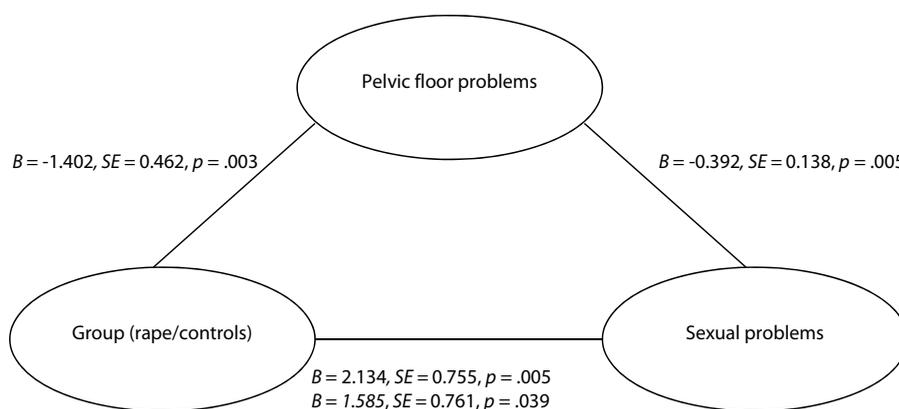
Note. FSFI Total range = 2–36; AHPFS-W Total range = 6–30; \* Subsample of hetero-sexual subjects who are sexually active (including vaginal penetration with penis;  $n = 58$  rape victims versus  $n = 77$  controls);

† All subjects ( $n = 89$  rape victims versus  $n = 114$  controls)

multivariate effect of group on pelvic floor functioning was significant, showing more pelvic floor problems for rape victims in comparison to controls (see Table 4.3). On a subscale level, differences were identified for Provoked Vulvodynia (mean difference = 0.397,  $p < .001$ ), Stress (mean difference = 0.382,  $p < .001$ ), Lower Urinary Tract Symptoms (mean difference = 0.306,  $p = .001$ ), and Irritable Bowel Syndrome Symptoms (mean difference = 0.384,  $p = .003$ ), with rape victims having more problems on all these domains. When using the clinical cut-off of 11.00 on the AHPFS-W total score (Laan, Lakeman, & Van Lunsen, manuscript in preparation), 33.7% ( $n = 30/89$ ) of the rape victims had pelvic floor hypertonicity versus 12.4% of the controls ( $n = 14/113$ ). This difference was significant,  $\chi^2(1) = 13.28$ ,  $p < .001$ : rape victims had a 2.7 times higher prevalence of pelvic floor dysfunction when compared to controls. Pelvic floor functioning did not differ between those who were sexually active and those who were not.

### Pelvic floor problems as a mediator

Regression analyses and the Sobel-test were performed to determine whether pelvic floor problems mediate the relationship between group and sexual problems. Adjustments were made for the influence of education. Figure 4.1 shows that criteria 1, 2 and 3 for mediation (Baron & Kenny, 1986) were met. The figure also shows that after controlling for the effect



**Figure 4.1** Mediation model pelvic floor problems, adjusted for education. Unstandardized regression coefficients and standard errors are presented. The italicized coefficient (1.585) is the effect of the predictor variable on the outcome variable after controlling for the effects of the mediator variable.

of the pelvic floor problems, the effect between group and sexual problems did not drop to zero. Therefore, full mediation was not indicated. Sobel's test of the indirect effects of group on sexual problems via pelvic floor problems was significant ( $Z = 2.074$ ,  $SE = 0.265$ ,  $p = .038$ ), confirming partial mediation. Pelvic floor problems explained 25.8% of the effect of group on sexual problems.

## DISCUSSION

The present study investigated sexual and pelvic floor functioning in victims of adolescent rape, without a history of childhood abuse, in comparison to non-victimized controls without psychopathology. The main finding is that rape victims are 2.4 times more likely to have sexual dysfunctions and 2.7 times more likely to have pelvic floor dysfunctions than controls, assessed three years after having received evidence-based treatment for rape-related PTSD. Moreover, the relationship between the rape event and sexual problems was partially mediated by the presence of pelvic floor problems.

The finding of sexual dysfunction in victims of adolescent rape, assessed four years after rape, is in line with results from studies in adult victims who were abused in childhood (Loeb et al., 2002; Leonard & Follette, 2002). In contrast to these studies in victims of childhood abuse, our findings suggest that sexual problems can arise relatively shortly after rape. Of the rape victims in our study, 44.6% were defined as sexually dysfunctional, versus 19.5% of the controls. Our finding that victims of adolescent rape were 2.4 times more likely to have a sexual dysfunction corresponds with results from Lutfey and colleagues (Lutfey et al., 2008) that victims of adolescent and/or adult sexual abuse were 1.9 times more likely to have sexual dysfunctions. Sexual problems most prevalent in our sample were lubrication problems and pain problems. The difference in prevalence of sexual dysfunction between those who were raped and those who were not can be explained by the priming effect the rape might have on future sexual experiences (Aronson, Wilson, & Akert, 2010). A population based study including 3,056 Dutch women (Kedde, 2012), showed a prevalence rate of sexual dysfunction of 43% in the group 15–24 year olds, including adolescents with and without sexual abuse histories. The most prevalent problems included lubrication, orgasm and arousal problems. In the subsample of women without a sexual abuse history the prevalence of sexual dysfunction was 21%, which is in line with the sexual dysfunctioning in our sample of non-traumatized controls. In the subsample of women with a history of abuse, no differentiation was made for age categories

or for various types of abuse, making it difficult to distinguish unique consequences of rape on sexual problems in adolescents.

The finding of pelvic floor dysfunctioning in adolescent rape victims may resemble results from studies in adult women who were abused as a child, showing strong associations between chronic pelvic pain and a history of sexual abuse (Meltzer-Brody et al., 2007; Walling et al., 1994). Additionally, a study by Ter Kuile and colleagues (Ter Kuile, Weijnenborg, & Spinhoven, 2010) showed that chronic pelvic pain is associated with sexual problems in adult women. Also abdominal pain due to irritable bowel syndrome and pain during pelvic examination appears to be linked to a history of sexual trauma (Weitlauf et al., 2008). Provoked vulvodynia symptoms, general stress symptoms, lower urinary tract symptoms and irritable bowel syndrome symptoms were most prevalent in our sample. All these symptoms are indicative for pelvic floor hypertonicity (Van Lunsen & Ramakers, 2002), as the AHPFS-W has shown to discriminate well between women with and without pelvic floor hypertonicity as objectified in a pelvic exam (Laan, Lakeman, & Van Lunsen, manuscript in preparation).

Evidence for the mechanism through which rape negatively affects sexual functioning is, as yet, unknown. Letourneau's learning model (Letourneau et al., 1996) suggests that the development and maintenance of sexual problems in rape victims happens through conditioning of negative affect in response to sexual activity and failure to extinguish this response by numbness and avoidance. Letourneau and colleagues found evidence for the mediating role of PTSD in the relation between rape and sexual problems. In our sample all victims were treated for rape-related PTSD with evidence-based treatment (National Institute of Clinical Excellence, 2005). Based on Letourneau's model, one would expect that reduction of PTSD is related to improvement in sexual functioning, as was found in a study by Schnurr and colleagues (Schnurr et al., 2009). The finding that sexual problems are much more prevalent in the rape sample than in the control sample, may suggest that reduction of PTSD is insufficient for protecting against the presence of sexual problems a few years later. We hypothesize that the majority of the victims were not sexually active at time of treatment, based on the fact that for over half of victims the rape (at age 16) was their sexual debut, and thus for the majority of rape victims sexual dysfunction may not have been present at time of treatment. The rape victims in our sample were equally sexually active at age 16 as adolescents in the general population (De Graaf, Kruijjer, Van Acker, & Meijer, 2012). In our sample, rape victims suffer more from lubrication problems and sexual pain than controls 3 years after treatment, suggesting that rape

negatively affects the sexual arousal response despite alleviation of PTSD symptoms. One explanation is that negative connotations associated with the rape attenuate the arousing properties of sexual stimuli and sexual activity. These negative connotations may not have been addressed properly in prior treatment or may not have been present at time of treatment. In addition, problems with lubrication have commonly been associated with pain problems, as friction during penetration will arise, resulting in painful penetration (Levin, 2003). Hypothetically, rape might indirectly exert its effect on sexual pain through problems with lubrication.

The higher prevalence of pelvic floor problems in rape victims suggests a relation between rape and pelvic floor hypertonicity. Evidence for the mechanism through which rape affects pelvic floor hypertonicity is lacking. We hypothesize that PTSD (as an anxiety disorder) may eventually manifest itself in a hypertonic pelvic floor, as part of a generalized protective defence mechanism (Van der Velde et al., 2001). It is possible that psychological symptoms of PTSD were properly treated with evidence based in trauma treatment, but that physical manifestations of PTSD were left unaddressed.

The relation between pelvic floor problems and sexual problems was shown before in a study by Handa and colleagues (Handa et al., 2008), showing associations between pelvic floor problems and reduced sexual arousal, infrequent orgasm and dyspareunia. Pelvic floor hypertonicity may directly affect sexual problems by impeding the blood flow to the genitals during sexual activity (Both, Van Lunsen, Weijenborg, & Laan, 2012). This mechanism possibly explains that pelvic floor hypertonicity partly mediated the relationship between rape and sexual problems.

Considering our findings that rape more than doubles the chance of subsequent sexual and pelvic floor dysfunctions, despite treatment for PTSD, professionals should assess potential sexual problems in rape victims, as well as to assess the presence of a history of sexual trauma in patients presenting with sexual problems. Especially in older adolescents, who are at fourfold risk of experiencing rape (Tjaden & Thoennes, 2006), early diagnosis of sexual problems is of paramount importance. In the treatment of sexual dysfunction and pelvic floor dysfunction, addressing the underlying cause is the first step. When sexual dysfunction is the result of sexual trauma, experts recommend that evidence-based exposure therapy for sexual trauma should be the first priority (Basson, Wierman, Van Lankveld, & Brotto, 2010). A recent case-study supports the notion that EMDR could be an effective treatment alternative for patients with vaginismus of traumatic aetiology (Torun, 2010). To date, there are only a few efficacy studies in the literature concerning

the treatment of sexual problems related to an underlying sexual trauma (Schnurr et al., 2009). When sexual problems persist after exposure treatment, it is common practice that basic treatment strategies for sexual dysfunction are applied, such as providing adequate information about the impact of sexual trauma on sexuality, about genital anatomy and physiology, and about the importance of acknowledging any fearful thoughts and associations that may (still) be related to sexual activity.

Professionals should help women in treatment to understand possible connections between past and current sexual functioning, particularly in regard to trust and being sexually vulnerable (Basson et al., 2010). In clinical practice, relaxation exercises of the pelvic floor, sensate focus exercises and step-wise exposure to sexual stimuli and experiences during which the woman remains in full control are used to (re)establish a sense of self-confidence such that hypervigilance may subside (Ter Kuile, Both, & Van Lankveld, 2010). As yet, only few controlled psychological treatment studies are available for women with sexual dysfunction related to rape. A recent study showed that mindfulness treatment in women with a history of child sexual abuse enhanced sexual feelings during sexual activity and reduced sexual distress (Brotto, Seal, & Rellini, 2012). The mindfulness intervention encouraged women to focus their moment-to-moment awareness on a greater range of stimuli during sexual activity, which is essentially what sensate focus exercises entail. Although controlled validation studies are lacking, there is common recognition for the efficacy of physical therapy in the integral treatment of pelvic floor problems and associated sexual dysfunction (Rosenbaum & Owens, 2008). Our data suggest that efforts should be made to develop integral trauma exposure treatments that *include* (physical or psychological) treatment strategies for sexual dysfunction and/or pelvic floor dysfunction, rather than separate modules following after one another.

To our knowledge, this is the first study that investigated sexual functioning and pelvic floor functioning in a sample of rape victims treated for PTSD, assessed relatively shortly after the rape event. A homogenous group of victims of adolescence rape was used, without a history of childhood sexual, physical and/or emotional abuse. The novelty aspect in this study concerns the mediating role of pelvic floor problems in the relationship between rape and sexual problems.

There are several limitations to the current study worth noting. The first issue addresses the generalizability of the results. There is a possibility that the patients are those with highest levels of psychopathology and thus constitute a selective group in the general population of rape victim. Results possibly don't generalize to untreated rape victims.

Furthermore, the results only apply to heterosexual individuals who have been sexually active within the past 4 weeks, as the FSFI is limited in its use. Moreover, it would be interesting to determine at what time-point after the rape event the sexual and pelvic floor dysfunction manifested itself. However, sexual functioning was assessed at only one time-point, and it is questionable whether longitudinal research would be ethically justified in such a vulnerable group. Finally, we have not assessed PTSD directly after treatment using a standardized protocol; therefore we have no measure of the successfulness of PTSD treatment. Possibly the successfulness of PTSD treatment could have had an effect on the relation between rape and sexual problems.

In conclusion, even after having been treated for PTSD, rape victims are 2.4 times more likely to have sexual dysfunction and 2.7 times more likely to have pelvic floor dysfunction 3 years post-treatment, when compared to non-traumatized controls. The relationship between rape and sexual problems is partially mediated by the presence of hypertonic pelvic floor problems.

In future research, attention should be paid to the time point of the establishment of sexual problems and/or pelvic floor problems. A prospective study design could provide information about the onset of the establishment of sexual and pelvic floor problems after rape. Finally, randomized controlled studies of treatments for sexual and pelvic floor dysfunction related to past sexual trauma should be conducted.

## Acknowledgements

The authors thank Astrid Kremers and Liesbeth Vos for their assistance in contacting the participants and in providing aftercare to those participants who needed help. This research was supported by grants from Stichting Kinderpostzegels Nederland, PAOS Fund and the Dutch Sexology Association (NVVS). They had no role in study design; in the collection, analysis and interpretation of the data; in the writing of the report; and in the decision to submit the paper for publication.

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## APPENDIX 4.1

### Amsterdam Hyperactive Pelvic Floor Scale – Women [AHPFS-W]

The questions below are about specific physical signs and symptoms. Some of these questions have a rather intimate character and you may find these hard to complete. Nevertheless it is important that you try to answer *all* questions as honestly as you can.

**Please indicate how often you experience the following signs and symptoms:**

*(Check at every question the box that best applies to you.)*

	1. Never	2. Sometimes	3. Regularly	4. Often	5. Very often	6. No sexual activity
1. Pain with vaginal penetration and/or a burning sensation after sexual intercourse						
2. Painful, burning, stinging spots or tears at the skin surrounding the vagina						
3. Pain or a burning sensation at the skin surrounding the vagina while sitting/ bike riding/wearing tight clothing						
4. A lack of vaginal lubrication during sexual intercourse						
5. Pain in the genitals during or after orgasm						
6. Pain upon deep thrusting of the penis during sexual intercourse						
7. Persistent feelings of genital swelling						
8. Cumbersome vaginal discharge						
9. Menstrual pain						
10. Abdominal pain not related to menstruation						
11. Abdominal cramps						
12. Alternating periods of diarrhea and constipation						
13. Constipation or feelings of incomplete defaecation						
14. Frequent urination (more than 10 times per 24 hr)						
15. Pushing or straining in order to be able to urinate						
16. Sudden, compelling urge to urinate (urinary urgency)						
17. Poor stream, hesitancy, terminal dribbling or incomplete voiding at micturition						
18. Urinary tract infections						
19. Bladder pain						
20. Pain in the area between vagina and anus (perineum)						
21. Anal pain						
22. Hemorrhoids						
23. Anal fissures or tears						
24. Pain in the tailbone						
25. Lower back pain						
26. Hyperventilation						
27. Teeth grinding						
28. Feelings of tightness in jaw muscles						
29. Headache						
30. Neck/shoulder pain						

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Note. For further questions regarding the AHPFS-W, please contact e.t.laan@amc.uva.nl.

# 5

## Neuroendocrine dysregulations in sexually abused children and adolescents: a systematic review

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*Progress in Brain Research* (2008);  
167, 303-306.

## **ABSTRACT**

Several studies provided evidence for neuroendocrine dysregulations in adults with a history of child sexual abuse. This review focuses on neuroendocrine studies in sexually abused children and adolescents, dating from 1 January 1990 to 1 January 2007 and obtained from a systematic Medline Indexed literature search to identify endocrine correlates of child sexual abuse. Results from studies on hypothalamic-pituitary-adrenal axis (re)activity showed to be inconclusive. Studies on the sympathetic nervous system provided evidence for a higher baseline activity of this system in sexually abused children and adolescents. Factors contributing to divergent outcomes will be discussed and suggestions for future research will be presented.

## INTRODUCTION

The body's major stress systems involve the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal (HPA) axis. In recent years, several neurobiological investigations have provided evidence for dysregulations of these systems in adults who have experienced sexual abuse in childhood, such as *lower* basal cortisol levels and *higher* adrenocorticotropin hormone (ACTH) response to psychological stressors. However, less attention has been paid to neurobiological research in sexually abused children and adolescents. More research is considered important since improved understanding of the correlates of child sexual abuse (CSA), both psychological and biological, may lead to better treatment options for children affected by CSA. The objective of this review is to evaluate systematically selected neuroendocrine studies in sexually abused children and adolescents specifically focussing at identifying endocrine correlates of CSA.

## METHODOLOGY

A Medline Indexed systematic literature search, limited to publications dating from 1 January 1990 to 1 January 2007, was performed for MeSH keywords “child abuse” OR rape OR “sex offenses” AND hydrocortisone OR catecholamines OR “neurosecretory systems” OR glucocorticoids OR corticotropin OR amylases OR “adrenal cortex hormones” OR “pituitary hormones” and for free text words “sexual abuse” OR “sexual trauma” OR “child abuse” OR rape OR “sex offenses” AND ACTH OR cortisol OR CRH OR “HPA axis” OR “hypothalamic-pituitary-adrenocortical axis” OR catecholamines. The search was limited to studies on children aged 0–18 years and resulted in 127 publications. A first selection of publications was performed by analysis of title and abstract by two independent reviewers. One hundred seventeen publications were excluded based on age of subjects (34), other biological parameters (26), other type of abuse or patient groups (15) and type of publications such as reviews (36) and letters or replies (6). Ten original publications were studied in detail. Finally, three studies were excluded since the number of sexually abused subjects was too small (< 17%), not being representative for the objective of this review.

## RESULTS

The selected studies focused on baseline functioning of the SNS system and on baseline HPA axis activity as well as reactivity to pharmacological challenge tests. Table 5.1 summarizes the primary results in each of the seven studies.

After administration of ovine corticotropin-releasing hormone (CRH), De Bellis et al. (1994a) measured *lower* adrenocorticotropin hormone (ACTH), but normal cortisol concentrations in 13 sexually abused girls aged 7–15, compared to 13 non-abused controls. Fifty-four percent of the sexually abused had dysthymia and histories of suicidal behavior, but no current Post Traumatic Stress Disorder (PTSD). In contrast, in a study by Kaufman et al. (1997), a challenge test with human CRH provoked a *higher* ACTH response and normal cortisol response in 13 depressed abused children aged 7–13, compared to 13 depressed non-abused and 13 healthy controls. Eight out of 13 depressed abused children also met criteria for PTSD and 10 were sexually abused. The contradictory findings between these two studies may be clarified by a subanalysis in the Kaufman study, revealing that ACTH hyperresponding to CRH only occurred in depressed abused children, who were exposed to chronic ongoing adversity. The CRH challenge was performed on the second day of a multitest psychobiological protocol. On the third day of the protocol, after exclusion of children with nausea, an L-5-Hydroxytryptophan challenge was performed, provoking a *higher* prolactin response and normal cortisol response in 10 depressed abused children, compared to 10 depressed non-abused and 10 healthy controls (Kaufman et al., 1998). In the last challenge study that was reviewed, 14 sexually abused adolescents with PTSD exhibited a *lower* ACTH response to 1 mg dexamethasone suppression test (DST) compared to 14 hospitalized controls (Duval et al., 2004). Cortisol response to DST was also lower in the sexually abused adolescents, but this difference did not reach statistical significance. Of the sexually abused subjects, two had comorbid major depressive disorder and 10 had depressive symptoms.

Unfortunately, findings from studies on baseline HPA activity are also inconsistent and actually do not allow comparison across studies because of methodological differences. Some studies found *higher* basal cortisol in sexually abused children and adolescents (De Bellis et al., 1999), others found *lower* basal cortisol (King, Mandansky, King, Fletcher, & Brewer, 2001) and again others found *normal* cortisol values (Kaufman et al., 1997; 1998; Duval et al., 2004). Additionally, for ACTH levels, some found *lower* basal evening levels (De Bellis et al., 1994a) and others found *normal* values (Kaufman et al., 1997; Duval et al., 2004).

**Table 5.1** Summary of the primary results in each of the seven studies

	Studies						
	De Bellis et al. (1994a)	De Bellis et al. (1994b)	Kaufman et al. (1997)	Kaufman et al. (1998)	De Bellis et al. (1999)	King et al. (2001)	Duval et al. (2004)
Number of cases	13	12	13	10	18	10	14
Females (%)	100	100	54	60	44	100	86
Mean age/age range in years	11.2/7–15	11.5/8–15	9.6/7–13	10.3/7–13	10.4/8–13	6.4/5–7	16.2/13–19
CSA (%)	100	100	77	77	83	100	100
PTSD (%)	0	8	83	50	100	10	100
Age of onset CSA (yr)	6.3 ± 2.4	6.3 ± 2.4	n.s.	n.s.	4.7 ± 3.0	n.s.	10.6 ± 3.9
Duration CSA	22.1 ± 26.6 months	22.1 ± 26.6 months	n.s.	n.s.	2.4 ± 1.8 yr	< 1 yr	n.s.
Time since CSA elapsed (yr)	4.7 ± 3.5	5.2 ± 3.5	n.s.	n.s.	n.s.	n.s.	5.6 ± 4.0
Baseline							
Cortisol	=	=	=	=	↑	↓	=
ACTH	↓		=				=
Catechol		↑			↑		
Prolactin				=			
Challenge test							
Cortisol	=		=	=			=
ACTH	↓		↑				↓
Prolactin				↑			

Note: n.s., not specified; ↑, significantly higher compared to controls; ↓, significantly lower compared to controls; and =, no difference compared to controls. Different challenge tests were used: oCRH in De Bellis et al. (1994a); CRH in Kaufman et al. (1997); L-5-hydroxytryptophan in Kaufman et al. (1998); and dexamethasone in Duval et al. (2004).

Results from SNS studies in sexually abused children and adolescents are more consistent. De Bellis et al. (1994b) found a group of 12 dysthymic sexually abused girls aged 8–15 to secrete significantly *higher* concentrations of urinary catecholamines compared to nine non-abused controls. Similar results were found in 18 prepubertal abused children with PTSD and a high degree of comorbid psychiatric disorders (De Bellis et al., 1999). This group, of whom 15 had experienced sexual abuse, secreted significantly *higher* concentrations of urinary dopamine and norepinephrine compared to non-abused patients with overanxious disorder (OAD) and to healthy controls. Urinary epinephrine was significantly *higher* in the PTSD group compared to the OAD group, but not to healthy controls.

## DISCUSSION AND CONCLUSION

Our goal to identify endocrine correlates of CSA from the existing literature is attained with limited success due to several reasons. First, it is difficult to identify subjects with exclusively *sexual* abuse experiences, since various types of abuse tend to coexist and chronic sexual abuse usually occurs in the context of affective neglect. With respect to this co-existence, it should be recognized that the HPA axis is under strong psychosocial regulation in early life (Gunnar & Donzella, 2002), a period when parental sensitivity and responsivity are being challenged and variations in parent-child relationships occur. Second, most studies did not specify sexual abuse variables that may affect outcome, such as severity, duration and frequency of the sexual abuse experiences, nature of the relation to the perpetrator, use of physical force, age at sexual abuse and years since the sexual abuse elapsed. Third, all studies were characterised by a small number of subjects and therefore had limited statistical power, which also limited the potential to examine age and gender effects. Fourth, not all studies have adequately considered confounding factors, such as exposure to chronic ongoing adversity, daylight, menstrual cycle, pubertal status, medication, awakening time, smoking and food intake. Furthermore, from the results it is not possible to state with certainty whether the biological findings reflect the effects of sexual abuse or of PTSD or even of comorbid psychopathology. In future research, samples of sexually abused children with and without PTSD – and preferably without comorbidity – should be included in order to better understand the relation between stress hormones and PTSD.

Finally, inconsistencies in the studies may be associated with the sampling method, such as type of assay procedure, time point of sampling, number of sampling days, number

of samples used for determining endocrine outcomes, sampling restrictions, sampling in plasma, urine or saliva and type of challenge test. Future studies can benefit from previous research by realizing uniformity in sampling and analytical procedures, so that results may be compared across studies.

In conclusion, this review showed that findings from studies to date on HPA axis (re)activity in sexually abused children and adolescents have been both varied and contradictory, possibly due to methodological shortcomings and the developmental status of the neuroendocrine system. Without the presence of a specific neuroendocrine profile in this group, it is not possible to draw conclusions to what extent the HPA-axis is affected in relation to CSA. Interestingly, from the limited data we can conclude that CSA appears to be related to higher catecholamine secretion, suggesting the presence of a higher baseline activity of the SNS.

To successfully identify abnormal endocrine profiles of CSA in future research, we suggest that larger studies should be performed in both sexually abused boys and girls, characterized by specification of sexual abuse variables, structural evaluation of PTSD and comorbid psychopathology, uniform sampling procedures and standardized methods for neuroendocrine assessments.

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# 6

## Salivary cortisol and dehydroepiandrosterone sulfate in adolescent rape victims with post traumatic stress disorder

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*Psychoneuroendocrinology* (2013);  
38(3), 408-415.

## ABSTRACT

**Background:** In chronic sexual abuse victims with Post Traumatic Stress Disorder (PTSD), the hypothalamic pituitary adrenal (HPA) axis can be dysregulated. In single rape victims, PTSD symptoms are hypothesized to function as a chronic stressor leading to similar HPA-axis dysregulation. The objective of the current study was to assess HPA-axis functioning in female adolescents with rape-related PTSD, but no prior sexual trauma, in comparison to non-victimized controls.

**Method:** Salivary cortisol and dehydroepiandrosterone sulfate (DHEAS) were measured in 52 female adolescent rape victims with PTSD and 37 healthy adolescents at 0, 15, 30, 45 and 60 minutes after awakening, both under basal conditions and after 0.5 mg dexamethasone administration.

**Results:** Compared to age-matched controls, adolescent rape victims with PTSD showed significantly reduced cortisol and DHEAS levels. No group differences for the effect of dexamethasone suppression were found. Both the event of rape and PTSD diagnosis, and not factors such as sleep duration, smoking, education or oral contraceptives, accounted for the neuroendocrine differences between rape victims and controls.

**Conclusions:** The results show evidence for a dysregulated HPA-axis in female adolescent victims of single sexual trauma with PTSD. The finding of hypocortisolism is consistent with endocrine dysfunctioning in chronic sexual abuse victims and may have clinical implications with regard to treatment possibilities.

## INTRODUCTION

The Hypothalamic Pituitary Adrenal (HPA)-axis has been widely studied in traumatized individuals, either with or without Post Traumatic Stress Disorder (PTSD), reflecting the need to comprehend the pathophysiological changes that occur in the biological stress system after trauma and to find clues for possible treatment of PTSD. It is hypothesized by Hellhammer and Wade (1993) that after trauma, the HPA-axis is initially hyperactive corresponding with the acute stress response. As a consequence, pituitary Corticotrophin Releasing Factor (CRF) receptors may down-regulate over the course of time. The authors assume that a normalization of hypothalamic CRF secretion at this point would result in a diminished Adrenocorticotrophin (ACTH) secretion, ultimately producing cortisol levels below the normal baseline. Analogue to this hypothesis, the more recent 'attenuation hypothesis' states that after trauma, initial pituitary-adrenal hyperactivity is followed by hypoactivity when stress persists over a long period of time (Fries, Dettenborn, & Kirschbaum, 2005; Trickett, Noll, Susman, Shenk, & Putnam, 2010), as indicated by hypocortisolism. Hypocortisolism refers to a relative deficiency of cortisol, possibly due to reduced adrenocortical (re)activity or enhanced negative feedback inhibition of the HPA-axis (Yehuda, Giller, Southwick, Lowy, & Mason, 1991).

In the context of trauma and stress, childhood sexual abuse emerges as a pronounced chronic stressor. HPA-axis dysregulation has been found in women with PTSD exposed to childhood sexual abuse, manifesting itself as hypocortisolism (Bremner, Vermette, & Kelley, 2007; Meewisse, Reitsma, De Vries, Gersons, & Olff., 2007) and cortisol hypersuppression in the dexamethasone suppression test (DST; Stein, Yehuda, Koverola, & Hanna, 1997; Newport, Heim, Bonsall, Miller, & Nemeroff, 2004). Another hormone secreted by the adrenal cortex in response to ACTH stimulation, dehydroepiandrosterone sulfate (DHEAS), has been shown to be increased in chronic sexual abuse victims with PTSD (Bremner et al., 2007; Kellner et al., 2010).

In sexually abused children and adolescents, increased cortisol levels (De Bellis et al., 1999), decreased cortisol levels (King, Mandansky, King, Fletcher, & Brewer, 2001), as well as similar levels (Kaufman et al., 1997; Duval et al., 2004) have been found, when compared to non-traumatized controls. These conflicting findings may be the result of methodological differences (Bicanic, Meijer, Sinnema, Van de Putte, & Olff, 2008).

Both in adult and adolescent victims of single sexual trauma, such as rape, endocrine studies are lacking. An increase of our understanding of the functioning of the biological

stress system following single sexual trauma, could help us to improve treatment of rape victims. We hypothesized that the HPA axis is dysregulated in adolescent victims of rape, because a single traumatic event may induce a prolonged stress experience, due to recurrent memories and continuous appraisals of situations as being threatening (Baum, Cohen, & Hall, 1993). The aim of this study was therefore to assess cortisol levels (in response to DST) and DHEAS levels in adolescent rape victims with PTSD in comparison to age-matched healthy controls. Based on findings in chronic sexual abuse victims, we hypothesized to find lower cortisol levels, higher DHEAS levels and an increased negative feedback inhibition (i.e. lower cortisol levels after DST) in the rape victims.

The novelty of this study is that the HPA-axis is studied in a homogenous group with regard to age, sex and type of trauma, i.e. rape on a *single* occasion during adolescence with no history of sexual, physical or emotional abuse. Previous endocrine studies in sexual trauma victims have not differentiated between those victimized by single, multiple or chronic sexual trauma. Differentiation is important as prior sexual trauma has been shown to affect the HPA-axis response to rape (Resnick, Yehuda, Pitman, & Foy, 1995).

## METHODS

### Subjects

Between April 2008 and November 2009, adolescent girls who experienced a single rape event were recruited into the study from consecutive referrals to the Psychotrauma Centre of the University Medical Centre in Utrecht and the Psychotrauma Centre for Children and Youth, GGZ Rivierduinen in Leiden. All rape victims presented themselves voluntarily at the participating centres for psychotherapeutic treatment of rape-related problems. Rape was defined as a single event that occurred without the victim's consent that involved the use or threat of force in vaginal, anal or oral intercourse. The definition includes both attempted and completed rape (Tjaden & Thoennes, 2006).

All rape victims were evaluated with a standardized psychological assessment procedure, consisting of (I) an assessment interview on trauma history, trauma characteristics, prior treatment, and lifetime number and types of trauma experienced (II), self-report questionnaires, and (III) the Dutch version of the Anxiety Disorders Interview Schedule - Children's version (ADIS-C; Silverman & Albano, 1996; Siebelink & Treffers, 2001), a

DSM-IV based, semi-structured clinical interview to determine the presence of PTSD and potential other psychopathology.

Included were those who experienced a single rape event at minimum four weeks post-rape. Of the 82 rape victims admitted, 21 were excluded because of: a history of sexual trauma ( $n = 11$ ); a history of physical or emotional abuse other than the single rape ( $n = 8$ ); presence of a somatic illness known to cause endocrinological changes ( $n = 2$ ). Eight eligible subjects refused to participate. This resulted in 53 participating rape victims.

Forty-two age-matched healthy controls, recruited from high schools and via personal contacts, were asked to fill out self-report questionnaires and a checklist to determine whether the subject experienced sexual trauma in the past. Three controls were excluded from participation, either because of corticosteroid medication ( $n = 2$ ) or the experience of prior sexual abuse ( $n = 1$ ). None of the remaining 39 controls reported a history of physical or emotional abuse.

Endocrine data were collected from 53 rape victims and 39 controls. One rape victim and two controls did not comply with the saliva sampling protocol, and were excluded from analysis. The final test population consisted of 52 rape victims and 37 controls.

The study was approved by the Medical Ethics Committee of the University Medical Centre Utrecht. All rape victims and controls, as well as their parents, provided written informed consent.

## Measures

### Questionnaires

Demographic data and level of education (based on the highest (completed) secondary school type) were collected through questionnaires. A checklist for traumatic experiences was used to rule out a history of sexual, physical and emotional abuse.

Rape victims filled out the Dutch version of the Children's Responses to Trauma Inventory, a 34 items questionnaire assessing severity of PTSD symptoms according to DSM-IV (Alisic, Eland, & Kleber, 2006). The reliability of this instrument is good to excellent (Cronbach's alpha .92 for total measure, .79 for Intrusion, .77 for Avoidance, .71 for Arousal) (Alisic & Kleber, 2010). Both rape victims and controls filled out the Dutch version of the Children Depression Inventory (CDI; Kovacs, 1992; Timbremont & Braet, 2002) and the Youth Self Report (YSR; Achenbach & Rescorla, 2001). The CDI is a 27-item self-report questionnaire, assessing

cognitive, affective and behavioural signals of depression. The Dutch CDI has a high degree of internal consistency, with Cronbach's alpha ranging between .71 and .89 (Timbremont & Braet, 2002). The YSR evaluates the girl's perception of behavioural and emotional problems. The YSR yields standardized t-scores for internalizing and externalizing problem behaviour. The YSR has acceptable internal reliability (Cronbach's alpha ranging from .71 to .95), and satisfactory convergent and discriminant validity (Bérubé & Achenbach, 2006).

### ***Hormone procedure and assay***

Awakening may be perceived as a mild physiological stressor for the HPA-axis, resulting in a rapid increase in cortisol post-awakening, referred to as the cortisol awakening response (CAR). The CAR is indicative of the HPA-axis responsivity (Wüst et al., 2000). Saliva was sampled directly after admission to the centre, but prior to being subjected to psychotherapeutic treatment. Subjects sampled saliva on two consecutive weekdays in their home environment with strict reference to awakening time (after 0, 15, 30, 45 and 60 minutes). Salivary cortisol and DHEAS were assessed under basal conditions on study day 1. In the evening of study day 1, subjects ingested 0.5 mg of dexamethasone according to the dexamethasone suppression test protocol (Carroll, 1982) to assess HPA-axis feedback sensitivity on study day 2.

Subjects were free to decide at what time to wake up, though not later than 9.00 am, and to follow their normal routine after awakening. They informed the researcher in advance about their individually scheduled awakening time. Personalized text message reminders were sent to each subject through mobile phone at their individually scheduled awakening time and at all following sampling time-points, to ensure compliance to the saliva sampling protocol (Broderick, Arnold, Kudielka, & Kirschbaum, 2004). Subjects were asked to register the exact times of collection of saliva samples in a log. If subjects woke up earlier than their expected awakening time, they agreed to start immediately with sampling and to send a text message to the researcher.

Saliva was sampled using the Salivette sampling device (Sarstedt, Etten-Leur, The Netherlands), a plastic tube containing a small cotton wool swab. Subjects were requested to chew gently on the swab. Also, they were asked not to eat, drink, smoke or brush teeth during the first hour after awakening. Subjects were instructed not to touch the samples with their hands.

Subjects kept the samples refrigerated at home directly after collection. From the home refrigerator samples were returned to the lab of the University Medical Centre Utrecht,

where they were immediately stored at  $-20^{\circ}\text{C}$  until time of assay. Samples were analysed in the laboratory of the Technical University of Dresden, Germany, using a time-resolved immuno-assay with fluorescence detection (DELFI), with all intra-individual samples in the same batch. The lab personnel were blinded to the clinical status of the subject and the study design. Intra- and inter-assay variability is 2.9–7.7 and 6.2–11.5 percent respectively.

The CAR is sensitive to confounding factors, such as smoking, use of oral contraceptives, and sleep related factors (Fries, Hesse, Hellhammer, & Hellhammer, 2009). Therefore, these factors, as well as elapsed time since trauma, were registered in order to check for potential influence on endocrine functioning.

### Statistical analyses

Extreme values of the endocrine measurements (absolute  $z$  scores  $> 3$  standard deviations) were removed per sample point. Together with the missing data this added up to 64 missing sample points (4.8% of the data). Subjects having three or more extreme values in their series of measurements were completely excluded from analysis ( $n = 1$  patient). Furthermore, 2 control participants suspected from non-compliance to sampling instructions, as identified by showing either negative slope in their CAR (Kupper et al., 2005) or non-suppression after dexamethasone administration, were excluded from the analysis.

On approximation the data were normally distributed, allowing application of parametric tests. ‘The area under the curve with respect to ground’ (AUC) was calculated to integrate data from the single endocrine measurements taken at 0, 15, 30, 45 and 60 minutes after awakening (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). The cortisol and DHEAS levels assessed during 60 minutes after awakening on day 1 were referred to as ‘cortisol’ and ‘DHEAS’ respectively. Cortisol levels assessed during 60 minutes after awakening on day 2 were referred to as ‘DEX cortisol’. The ‘awakening time’ and ‘bedtime’ was the self-reported time of awakening and going to bed, respectively, on day 1. The ‘sleep duration’ was the self-reported hours of actual nocturnal sleep on day 1.

For comparison of rape victims and controls to demographic, psychological and endocrinological characteristics, independent samples  $t$ -tests were used when outcome variables were continuous and Pearson chi-square test when variables were categorical. In order to examine association between endocrinological and psychological data, Pearson bivariate

correlation tests were used. In order to examine the association between endocrinological data and group (rape victims versus controls), sleep characteristics, education, smoking and oral contraception, multiple hierarchical regression analyses were performed, with group (i.e. rape victims or controls) being entered in the first block, sleep duration being entered into the second block, and education, smoking and oral contraception entered into the third block. Significance (two-tailed) was defined as  $p < .05$ .

## RESULTS

### Sample characteristics

All subjects, rape victims and healthy controls, were female adolescents. In 75 percent of the rape victims ( $n = 39$ ), the traumatic event involved a completed rape. Of the cases of completed rape, 61.5% ( $n = 24$ ) experienced vaginal penetration; 20.5% ( $n = 8$ ) experienced vaginal and oral penetration; 7.7% ( $n = 3$ ) experienced oral penetration; 5.1% ( $n = 2$ ) experienced oral and anal penetration; 2.6% ( $n = 1$ ) experienced anal penetration and 2.6% ( $n = 1$ ) experienced oral, anal and vaginal penetration. Elapsed

**Table 6.1** Demographic characteristics of rape victims ( $N = 52$ ) and controls ( $N = 37$ ). Means (95% confidence intervals) and/or percentages are presented.

	Rape victims	Controls	Test value ( <i>df</i> )
Age	16.1 (15.5–16.6)	15.6 (15.1–16.2)	$t(86) = 1.05$
Education			
Lower	51.9%	17.1%	$\chi^2(2) = 16.82^{***}$
Middle	30.8%	25.7%	
Higher	17.3%	57.1%	
Menstruation present	88.5%	78.4%	$\chi^2(1) = 1.66$
Age at menarche (in years)	12.4 (12.1–12.8)	12.8 (12.4–13.3)	$t(73) = 1.28$
Oral contraceptives	54.3%	13.5%	$\chi^2(1) = 14.82^{***}$
Medication use	26.9%	27.0%	$\chi^2(1) = 0.00$
Smoking	25.0%	5.4%	$\chi^2(1) = 5.92^*$
Sleep characteristics			
Bed time	2248h (22.28–23.08)	2239h (22.22–22.56)	$t(85) = 0.65$
Awakening time	706h (6.54–7.18)	649h (6.37–7.01)	$t(85) = 2.01^*$
Sleep duration	723h (6.58–7.47)	803h (7.45–8.22)	$t(83) = 2.70^{**}$

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

time between trauma and admission at the Psychotrauma Centres ranged between 4 and 344 weeks (*Median* = 23.5, *M* = 46.5, *SD* = 66.6). None of the rape victims underwent a psychopharmacological or psychotherapeutic treatment elsewhere prior to admission. Demographic characteristics of rape victims and controls are presented in Table 6.1. Compared to controls, rape victims used significantly more oral contraceptives, smoked significantly more cigarettes, had significantly lower education, woke up significantly later and had significantly shorter sleep duration. No significant differences were found for age, medication use, presence of menstrual cycle, age at menarche and bedtime.

### Psychological outcomes

All rape victims fulfilled criteria for PTSD according to the ADIS-C, although one girl lacked one symptom in the Reexperiencing cluster and one girl reported only mild interference with daily life functioning. Both of these girls however scored within the clinical range on the CRTI. Seventeen rape victims (33%) were diagnosed with comorbid dysthymic disorder (*n* = 12), major depression (*n* = 3) or both (*n* = 2). Scores on self-reported psychological questionnaires are presented in Table 6.2. All PTSD scores on the CRTI were within the (sub-)clinical range, indicating that severity of the post traumatic

**Table 6.2** Psychological scores and endocrine AUC levels of rape victims (*N* = 52) and controls (*N* = 37). Means (95% confidence intervals) are presented.

	Rape victims	Controls	Test value ( <i>df</i> )
PTSD symptoms (CRTI)			
Total DSM-IV score	57.06 (53.62–60.50)	-	-
Reexperiencing	16.36 (15.16–17.56)	-	-
Avoidance	23.80 (22.30–25.30)	-	-
Hyperarousal	16.86 (15.60–18.12)	-	-
Behavioural problems (YSR)			
Internalising problems	63.42 (60.29–66.55)	49.44 (46.28–52.61)	<i>t</i> (84) = 6.17 ***
Externalising problems	54.30 (52.03–56.57)	49.14 (46.51–51.77)	<i>t</i> (84) = 2.99 **
Total problems	60.16 (57.58–62.74)	49.86 (47.06–52.67)	<i>t</i> (84) = 5.38 ***
Depression (CDI)	16.31 (15.05–18.56)	6.00 (4.45–7.55)	<i>t</i> (83.8) = 7.58**
Endocrine AUC levels			
Cortisol	99.76 (88.06–111.45)	126.58 (115.87–137.28)	<i>t</i> (79) = 3.34 ***
DHEAS	23.71 (20.39–27.04)	30.67 (26.40–34.94)	<i>t</i> (77) = 2.64 *
DEX cortisol	4.91 (3.70–6.14)	5.84 (3.49–8.20)	<i>t</i> (74) = 0.77

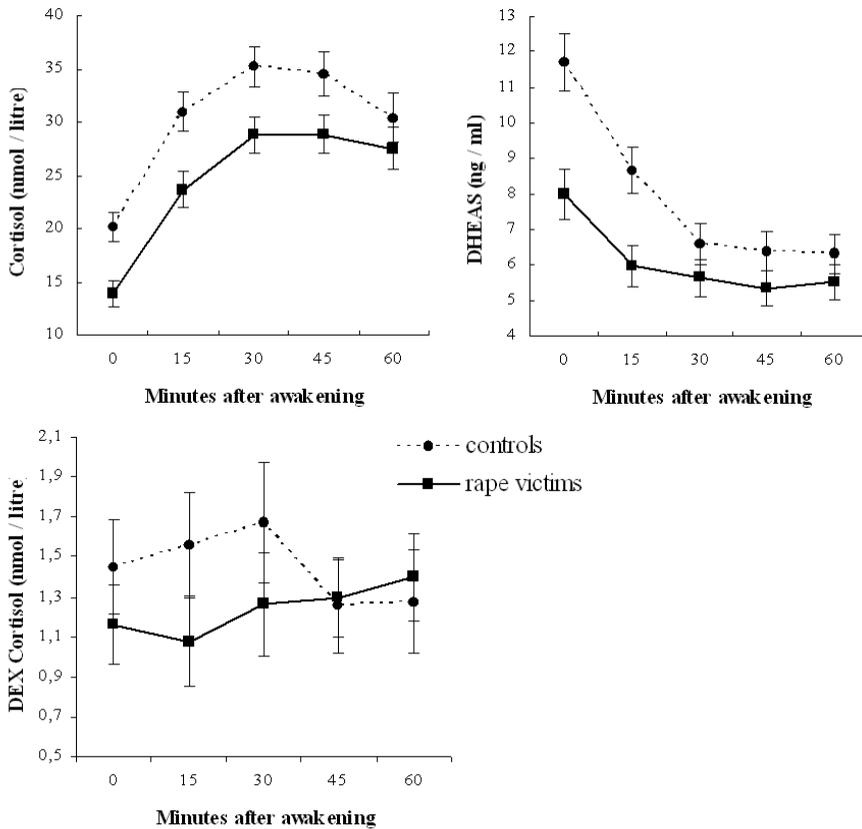
Note. \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001.

stress symptoms was high. Behavioural problems and depression symptomatology were higher in rape victims than in controls; controls scored in the non-clinical range.

### Endocrine levels post-awakening

Figure 6.1 shows mean levels of cortisol, DHEAS and DEX cortisol measured at 0, 15, 30, 45 and 60 minutes after awakening.

Rape victims had significantly lower cortisol and DHEAS levels than controls. Rape victims and controls did not differ significantly with regard to DEX cortisol levels. The statistical values of the results are presented in Tabel 6.2. No centre effect (UMC vs. Rivierduinen) was found on both psychological and endocrinological outcomes.



**Figure 6.1** Mean levels of cortisol, DHEAS, and DEX cortisol measured at 0, 15, 30, 45 and 60 minutes after awakening. Scores are presented separately for the rape victims ( $N = 52$ ) and the controls ( $N = 37$ ). Y-error bars denote 5% error variation.

Group factor (i.e. rape victims versus controls) was significantly associated with cortisol levels ( $\beta = -.38, p < .001$ ) and DHEAS levels ( $\beta = -.33, p < .001$ ). Adding sleep duration as a factor into the 2<sup>nd</sup> block of the model, did not significantly add to explaining the variance of cortisol levels ( $R^2$  change = .02,  $p = .28$ ) or DHEAS levels ( $R^2$  change = .01,  $p = .34$ ). Also, adding education, smoking and oral contraception as factors into the 3<sup>rd</sup> block of the model, did not significantly add to explaining the variance of cortisol levels ( $R^2$  change = .05,  $p = .38$ ), or DHEAS levels ( $R^2$  change = .08,  $p = .20$ ).

### Comorbid depression

In order to investigate any effect of comorbid psychiatric illness on cortisol and DHEAS, rape victims were split into those with ( $n = 17$ ) and those without ( $n = 32$ ) comorbid depression and/or dysthymic disorder according to DSM-IV criteria, using ADIS-C outcomes. Cortisol in rape victims with PTSD but without depression ( $M = 102.90$  nmol/litre,  $SD = 36.10$ ) did not significantly differ in cortisol from those with depression ( $M = 94.89$  nmol/litre,  $SD = 46.16$ ). Also, DHEAS in rape victims with PTSD but without depression ( $M = 24.06$  ng/ml,  $SD = 11.86$ ) did not significantly differ in DHEAS from those with comorbid depression ( $M = 23.56$  ng/ml,  $SD = 9.32$ ).

Using bivariate correlation tests in rape victims, we did not find a correlation between depression symptoms (as measured with the CDI) and cortisol levels (Pearson Correlation  $r = -.09, p = n.s.$ ) or DHEAS levels ( $r = -.10, p = n.s.$ ). We did not find a correlation between PTSD symptoms (as measured with the CRTI) and cortisol levels ( $r = -.07, p = n.s.$ ) and DHEAS levels ( $r = -.03, p = n.s.$ ).

### Time since trauma

We did not find a correlation in rape victims between 'time elapsed since trauma' and cortisol levels ( $r = -.21, p = n.s.$ ), DHEAS levels ( $r = -.05, p = n.s.$ ) and PTSD symptoms ( $r = .16, p = n.s.$ ).

## DISCUSSION

This study is the first study to investigate the HPA-axis in victims of single sexual trauma with PTSD in comparison to controls. The main finding is that rape victims show significantly lower levels of cortisol and DHEAS, assessed after awakening,

when compared to non-victimized controls without psychopathology. Moreover, these neuroendocrine differences were explained by both the event of rape and PTSD diagnosis and not by other plausible factors such as sleep duration, education, smoking or use of oral contraceptives.

The finding of hypocortisolism in adolescent rape victims is in line with results from studies in victims of chronic sexual abuse (Stein et al., 1997; Bremner et al., 2007; Meewisse et al., 2007; Kellner et al., 2010), suggesting that chronic stress, leading to HPA-axis dysregulation, may not only refer to the actual presence of a stressor during an extended period, but also to a long-lasting subjective sense of stress after rape. The stressor rape with subsequent PTSD symptoms potentially acts as a chronic stressor accounting for hypocortisolism.

The lower DHEAS levels, found in rape victims compared to controls, are inconsistent with previous studies showing elevated DHEAS in sexual abuse victims with PTSD (Bremner et al., 2007; Kellner et al., 2010). However, our findings support the hypothesis by Hellhammer and Wade (1993) that diminished ACTH secretion, assumed to result from normalization of hypothalamic CRF secretion after initial down-regulation, leads to producing cortisol as well as DHEAS levels below the normal baseline. Low DHEAS concentrations have been found in age-related illnesses (Chen & Parker, 2004) and neuropsychiatric conditions (Maninger, Wolkowitz, Reus, Epel, & Mellon, 2009). Historically, DHEAS has been considered to reflect chronic rather than acute response to the environment (Baulieu, 1996) corresponding to our hypothesis that PTSD symptoms function as a chronic stressor.

No differences were found between rape victims and controls in their post dexamethasone levels of cortisol. These results are in contrast with prior studies in adults (Stein et al., 1997), but in agreement with a prior study in adolescents (Lipschitz et al., 2003). It is possible that 0.5 mg is not the best dosage to assess the sensitivity of the HPA-axis in an adolescent age group, because both groups showed almost complete suppression. In future research, lower dosages of dexamethasone may be necessary to identify whether there is an enhanced negative feedback of the HPA-axis in rape victims in comparison with controls. The model of increased feedback sensitivity of the HPA axis as a mechanism of hypocortisolism needs further scrutiny.

Comorbid DSM-IV depression or dysthymic disorder could not explain the main findings. In our sample, no difference was found between rape victims with PTSD only and those

with PTSD and comorbid depression and/or dysthymic disorder arising after trauma. This finding is in accordance with a meta-analysis of the literature showing that the HPA-axis does not seem to be affected by depression when comorbid to PTSD (Yehuda et al., 1991; Meewisse et al., 2007). This may be explained by an overlap in symptoms; symptoms diagnosed as comorbid depression may actually reflect the construct of PTSD (O'Donnell, Creamer, & Pattison, 2004).

The 'time elapsed since trauma' varied substantially from 4 to 344 weeks, affecting the homogeneity of the group. However, this variable did not correlate significantly with endocrine measures or with PTSD symptomatology. Variability in the biological stress system is found across time after trauma, referred to as the 'attenuation hypothesis' (Trickett et al., 2010). This hypothesis implies that discrepant cortisol patterns in fact represent one neuroendocrine trajectory at different time-points in development. Timing is an especially critical element, as in this hypothesis hormonal activity is elevated at stressor onset but reduces as time passes. The absence of correlations between the variable 'time elapsed since trauma' and PTSD symptoms and endocrine outcomes respectively can be explained by the time-window that we used. The duration from the rape event to our assessment was on average 46 weeks, with a minimum of 4 weeks post-rape. In line with the attenuation hypothesis, it is possible that our sample, currently characterized by hypocortisolism in the morning, actually has had hypersecretion of cortisol directly after the rape. As we used a cross-sectional design, this issue can not be answered properly in this study. A longitudinal paediatric study after accidents did show evidence for HPA axis to change its direction over time (Pervanidou et al., 2007). The initially elevated evening salivary cortisol concentrations in PTSD patients at one month post-trauma, normalized after six months. To date, however, there is no evidence for a specific time point of the reversal into hypocortisolism.

This cross-sectional study distinguishes itself from previous studies examining HPA-axis functioning in sexual trauma victims with PTSD by focusing on a sample of adolescent girls whose sexual traumatic experience was limited to a single incident and who had no history of physical and emotional abuse. Strength of the study is the high compliance with sampling instructions, when compared to other studies (Halpern, Whitsel, Wagner, & Harris, 2012). Ninety five and 98 percent of the controls and rape victims respectively, can be considered as CAR responders, which is superior to the 'normal' responder rate of 75 percent (Wüst et al., 2000). This adds to the reliability of the endocrine measurements. It seems plausible that this high compliance resulted from the fact that subjects had been

sent personalized text message reminders by mobile phone, at times that they had to sample saliva. Text messaging is a means of common communication in the study's age group and its use served to comply with sampling instructions. Another strength is the careful assessment of psychiatric disorders with standardized clinical interviews.

A limitation of the study is that basal endocrine levels were measured during one day only. Ideally, basal salivary cortisol ought to be assessed on multiple days in order to obtain reliable cortisol measures (Hellhammer et al., 2007). However, it was considered that we would have serious concerns about dropout when following this standard. Therefore, we decided to limit the number of saliva collection days to two: one to measure basal cortisol levels and one to measure post-dexamethasone cortisol levels. We based our decision on findings from a study by Wüst et al. (2000) that there is a relatively high intraindividual stability over time for cortisol measures. A second limitation concerns the generalizability of the findings; the sample of rape victims was recruited from those voluntarily referred to a tertiary Psychotrauma Centre and might represent a sample that is more affected by PTSD symptoms than the general population of adolescent girls who were raped for the first time. A third limitation is the absence of BMI data; preliminary recent results suggest that there may be reduced cortisol levels during the day with increasing degree of adiposity (Hillman, Dorn, Loucks, & Berga, 2012). Finally, a topic left unaddressed in the current study, concerns the causal relation between rape, PTSD and neuroendocrine levels, as dysregulations may have pre-traumatic origins and could have served as a vulnerability factor in PTSD development.

In future neuroendocrine studies, efforts should be made to include sexually victimized subjects without PTSD to answer questions, such as whether dysregulations are related to the rape event or to the PTSD diagnosis. A prior study found that the responsivity of the HPA-axis to trauma reminders was higher in a group that experienced rape as the leading trauma in comparison to those who also experienced an equal number of traumatic incidences, but not rape, with equally high PTSD symptom severity (Gola et al., 2012). This finding supports prior findings that HPA axis alterations are found under certain conditions such as sexual abuse (Meewisse et al., 2007). Diversity in neuroendocrine studies may be explained by the type of the trauma rather than the number (single versus repetitive) of traumatic events.

The finding of decreased cortisol and DHEAS levels provides clues for possible treatment options for PTSD, such as the administration of low dose cortisol (De Quervain & Margraf, 2008) or 7-keto Dehydroepiandrosterone (Sageman & Brown, 2006), especially

for those who respond less to psychotherapy. Moreover, results suggest that exposure-based psychotherapy, resulting in trauma-related symptom reduction, may influence levels of salivary cortisol and DHEAS in PTSD patients (Olf, De Vries, Guzelcan, Assies, & Gersons, 2007; Gerardi, Rothbaum, Astin, & Kelley, 2010). In adolescent rape victims, the impact of exposure-based psychotherapy on endocrine outcomes should be examined in future studies to obtain more insight into the direction of the association between HPA-axis dysregulation and rape-related psychopathology.

In conclusion, the results show evidence for a dysregulated HPA-axis in adolescent rape victims with PTSD, expressed by lower cortisol and DHEAS levels post-awakening. The finding of hypocortisolism suggests that after a single rape event, PTSD may function as a chronic stressor, and is associated with biological dysregulations similarly as in chronic sexual abuse.

### Acknowledgements

The authors would like to thank the clinicians at the Psychotrauma Centre of the University Medical Centre Utrecht and the Psychotrauma Centre for Children and Youth, GGZ Rivierduinen Leiden for their assistance in the data-collection. This research was supported by a grant (017.002.112) from the Netherlands Organisation for Scientific Research (NWO).

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# 7

## Increased salivary cortisol and dehydroepiandrosterone sulfate in adolescents after treatment of rape-related PTSD

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Submitted for publication.

## ABSTRACT

**Background:** PTSD as a result of sexual trauma has been associated with dysregulation of the Hypothalamic Pituitary Adrenal (HPA) axis. In adolescent rape victims with PTSD, lower cortisol and lower Dehydroepiandrosterone Sulfate (DHEAS) have been found, but so far no studies have examined changes in HPA-axis functioning after treatment in this age group. Therefore, in this study we examined changes in psychological and HPA-axis functioning after trauma-focused treatment of adolescent rape victims with PTSD.

**Methods:** Twenty-one female adolescents with rape-related PTSD completed Cognitive Behavioural Therapy or Eye Movement and Desensitization Reprocessing. Their parents received parallel parent guidance. Basal salivary cortisol and DHEAS were assessed at pre- and post-treatment at 0, 15, 30, 45 and 60 minutes after awakening. Self-report questionnaires and a clinical interview were used to assess psychological functioning and presence of PTSD at pre- and post-treatment. Outcome data were compared with previously published data on psychological and endocrinological functioning of 37 non-traumatized controls.

**Results:** Post-treatment, PTSD and depression symptoms were significantly lower than at pre-treatment. PTSD diagnosis was no longer present in 86% of the patients. Significantly higher levels of DHEAS were found post-treatment. Non-significant increases in cortisol levels were observed. Post-treatment cortisol and DHEAS levels corresponded to levels of non-traumatized controls.

**Conclusion:** The findings suggest a normalization of the HPA-axis in adolescent rape victims after trauma-focused treatment with parallel parent guidance. Future randomized controlled trials should be conducted to confirm whether trauma-focused treatment is effective in changing HPA-axis functioning.

## INTRODUCTION

Rape is associated with serious mental health problems, most commonly Post Traumatic Stress Disorder (PTSD) (American Psychiatric Association, 2000). Around 50% of rape victims meet PTSD criteria at three months post-rape (Elklit & Christiansen, 2010). Female adolescents are at highest risk to be victimized by rape (Tjaden & Thoennes, 2006). The consequences of rape stress the need for effective treatment. Various types of trauma-focused treatments such as cognitive-behavioural therapy (CBT) (Vickerman & Margolin, 2009) and Eye Movement Desensitisation Reprocessing (EMDR) (Rothbaum, Astin, & Marsteller, 2005) have shown to be effective in reducing PTSD symptoms following rape in female adults. Both CBT and EMDR are recommended by NICE guidelines as evidence-based treatments of PTSD (National Institute of Clinical Excellence, 2005).

Although there are inconsistencies in the literature examining Hypothalamic Pituitary Adrenal (HPA) axis functioning in child and adult victims of sexual abuse, PTSD as a result of sexual trauma in girls and women is associated with dysregulation of the HPA axis, expressed by lower levels of cortisol (Bremner, Vermetten, & Kelley, 2007; Meewisse, Reitsma, De Vries, Gersons, & Olf, 2007; Bicanic et al., 2013), attenuation of the cortisol awakening response (Keeshin, Strawn, Out, Granger, & Putnam, 2013), higher levels of the sulphated derivative of dehydroepiandrosterone (DHEAS) (Bremner et al., 2007; Kellner et al., 2010), as well as lower DHEAS levels (Bicanic et al., 2013).

As little is known about the causal relationship between sexual trauma and biological dysregulations, one way to learn more about it is to investigate the changeability of HPA-axis functioning parallel to psychological functioning in the course of psychotherapy. Previous studies have shown that initially lower basal levels of cortisol and dehydroepiandrosterone (DHEA) increased after evidence-based treatment for PTSD (Heber, Kellner, & Yehuda, 2002; Olf, De Vries, Güzelcan, Assies, & Gersons, 2007). It was also shown that PTSD patients who normally present with an exaggerated cortisol response to a stressor (De Kloet, Vermetten, Rademaker, & Westenberg, 2012), reported a normalized response after exposure treatment (Gerardi, Rothbaum, Astin, & Kelley, 2010). All studies have focused on a heterogeneous group of adult PTSD patients lacking the possibility to distinguish the unique effect of single (sexual) trauma on the biological stress system. The aim of the present study was to investigate the HPA-axis functioning at pre and post-treatment in adolescents with PTSD, victimized by single rape and no prior (sexual) abuse. This study elaborates on our previous findings that adolescent rape victims with PTSD have lower cortisol and lower DHEAS levels compared to non-traumatized controls (Bicanic et al.,

2013). Based on these findings, it was hypothesized that initially lower levels of cortisol and DHEAS in rape victims would be normalized at post-treatment.

## METHODS

### Subjects

Between April 2008 and November 2009, female adolescents who experienced a single rape event were recruited into the study from consecutive referrals to the Psychotrauma Centre of the University Medical Centre in Utrecht and the Psychotrauma Centre for Children and Youth, GGZ Rivierduinen in Leiden. Those who experienced prior sexual, physical and/or emotional abuse were excluded. All rape victims were (self)referred for treatment of rape-related problems. Rape was defined as a single event that occurred without the victim's consent that involved the use or threat of force in vaginal, anal or oral intercourse. The definition includes both attempted and completed rape (Tjaden & Thoennes, 2006).

All rape victims were diagnosed with a standardized psychological assessment procedure, consisting of (I) an assessment interview on trauma history, trauma characteristics, prior treatment, and lifetime number and types of trauma experienced (II), self-report questionnaires, and (III) the Dutch version of the Anxiety Disorders Interview Schedule - Children's version (ADIS-C) (Silverman & Albano, 1996; Siebelink & Treffers, 2001), a DSM-IV based, semi-structured clinical interview to determine the presence of PTSD and potential other psychopathology.

Of the 52 rape victims who were included in the cross-sectional comparison study (Bicanic et al., 2013), 14 victims did not receive treatment in the participating centers, because of referral to out-patient clinics ( $n = 6$ ) or victim's rejection ( $n = 8$ ). At post-treatment, 12 victims refused to continue saliva sampling, resulting in a final sample of 26 rape victims with pre- and post-treatment endocrine measurements. Five victims provided unreliable measures due to noncompliance to the saliva sampling protocol (as described in the statistical analyses), resulting in a final test sample of 21 rape victims. This final test sample of victims ( $N = 21$ ) did not differ significantly in the pre-treatment psychological and endocrine scores compared to those not included ( $N = 31$ ).

Psychological and endocrinological data from 37 non-traumatized and age-matched controls (Bicanic et al., 2013), recruited from high schools, were used to make comparisons

with post-treatment data of the rape victims. These controls filled out self-report questionnaires and a checklist to determine whether the subject experienced past sexual, physical or emotional abuse. Controls were not screened for past or present psychiatric disorders. A history of sexual, physical and/or emotional abuse was defined as an exclusion criterion as well as the use of corticosteroid medication and the presence of a somatic illness known to cause endocrinological changes.

The study was approved by the Medical Ethical Committee of the University Medical Centre Utrecht. All subjects, as well as their parents, provided written informed consent.

## **Measures**

### ***Questionnaires***

Demographic data and information on level of education were collected through questionnaires. Educational level was based on the highest (completed) secondary school type. A checklist for traumatic experiences was used to rule out a history of sexual, physical and emotional abuse. Rape victims filled out the Dutch version of the Children's Responses to Trauma Inventory, a 34 items questionnaire assessing severity of PTSD symptoms according to DSM-IV (Alisic, Eland, & Kleber, 2006). The reliability of this instrument is good to excellent (Cronbach's alpha .92 for total measure, .79 for Intrusion, .77 for Avoidance, .71 for Arousal) (Alisic & Kleber, 2010). Victims and controls filled out the Dutch version of the Children Depression Inventory (CDI) (Kovacs, 1992; Timbremont & Braet, 2002) and the Youth Self Report (YSR) (Achenbach & Rescorla, 2001). The CDI is a 27-item self-report questionnaire, assessing cognitive, affective and behavioural signals of depression. The Dutch CDI has a high degree of internal consistency, with Cronbach's alpha ranging between .71 and .89 (Timbremont & Braet, 2002). Victims and controls also filled out the YSR. The YSR evaluates the girl's perception of behavioural and emotional problems and yields standardized t-scores for internalizing and externalizing problem behaviour. The YSR has acceptable internal reliability (Cronbach's alpha ranging from .71 to .95), and satisfactory convergent and discriminant validity (Bérubé & Achenbach, 2006).

### ***Hormone procedure and assay***

In rape victims, saliva was sampled directly before and directly after treatment. In controls, saliva was sampled cross-sectionally. Subjects sampled saliva on one weekday in their home environment with strict reference to awakening time (after 0, 15, 30, 45

and 60 minutes). Subjects were asked not to eat, drink, smoke or brush teeth during the first hour after awakening. Also, they were instructed not to touch the samples with their hands. Subjects were free to decide at what time to wake up, though not later than 9.00 am, and to follow their normal routine after awakening. They informed the researcher in advance about their individually scheduled awakening time. Personalized text message reminders were sent to each subject through mobile phone at their individually scheduled awakening time and at all following sampling time-points, to ensure compliance to the saliva sampling protocol (Broderick, Arnold, Kudielka, & Kirschbaum, 2004). Subjects were asked to register the exact times of collection of saliva samples in a log. If subjects woke up earlier than their expected awakening time, they agreed to start immediately with sampling and to send a text message to the researcher.

Saliva was sampled using the Salivette sampling device (Sarstedt, Etten-Leur, The Netherlands), a plastic tube containing a small cotton wool swab. Subjects were requested to chew gently on the swab.

Subjects kept the samples refrigerated at home directly after collection. From the home refrigerator samples were returned to the lab of the University Medical Centre Utrecht, where they were immediately stored at  $-20^{\circ}\text{C}$  until time of assay. Samples were analysed in the laboratory of the Technical University of Dresden, Germany, using a time-resolved immuno-assay with fluorescence detection (DELFI), with all intra-individual samples in the same batch. The lab personnel were blinded to the clinical status of the subject and the study design. Intra- and inter-assay variability is 2.9–7.7 and 6.2–11.5 percent, respectively.

### **Treatment protocol**

After assessment, victims were allocated within two weeks to either EMDR or CBT. The selection of treatment was not performed randomly, but based on patient request and needs, or on the availability of therapists. At post-treatment, victims were reevaluated using the earlier mentioned psychological and endocrine measures.

The EMDR procedure in the present study was applied according to the Dutch treatment manual (De Jongh & Ten Broeke, 2006) with age-appropriate modifications. EMDR is a treatment for traumatic memories and their sequelae requiring the patient to attend a distracting (or “dual attention”) stimulus while concentrating on the trauma memory (Shapiro, 2001). EMDR treatment consists of (1) Taking history and planning treatment;

(2) Explanation of and preparation for EMDR; (3) Preparation of the target memory. The patient is asked to focus on the worst moment of the rape memory in a multi-modal manner including image, thought, emotion, and physical sensation; (4) Desensitisation of the memory. The patient is asked to hold the target image in mind while concentrating on the stimulus for about 30 seconds, and to report what comes up, while guided by the clinician to refocus on that during further exposure to the distracting stimulus; (5) Guiding the patient to embrace a relevant positive belief regarding the event; (6) Identification and processing of any residual disturbing body sensations; (7) Closure of the session; (8) Re-evaluation. EMDR was provided a total of up to 6 hours.

CBT was applied by using the STEPS protocol for adolescents with rape-related PTSD and their parents, developed at the National Psychotrauma Centre of the University Medical Centre Utrecht (Bicanic & Kremers, 2007). CBT consists of (1) Psycho-education about rape and its aftermath; (2) Repeated exposure to the traumatic memories by writing and speaking about the trauma narrative. The trauma narrative is constructed over the course of several sessions by having the patient describe the trauma in detail including thoughts, feelings, images/sensations, and events as they occurred; (3) Cognitive restructuring; (4) Graded exposure in vivo to reduce trauma related avoidant behaviour, and (5) Relapse prevention. CBT consists of 8 weekly sessions.

Parent guidance was an integral part of both treatment conditions. Goals of the parent guidance were to resolve parents' own emotional upset about the child's traumatic exposure and to correct cognitive distortions that the parents may have had. Parents also received psycho-education and advice on enhancing appropriate parental support and affective expression. Parents' sessions were held parallel to victims' sessions and provided a total of up to 6 hours.

### **Statistical analyses**

Extreme values of the endocrine measurements (absolute  $z$  scores  $> 3$  standard deviations) in rape victims were removed per sample point and re-imputed together with the missing data (19 imputed sample points, 4.5 percent of the data). Victims having three or more extreme values in their series of endocrine measurements were excluded from analysis ( $n = 2$ ). Furthermore, 3 victims suspected from non-compliance to sampling instructions, as identified by negative slope in their cortisol awakening response (Kupper et al., 2005), were excluded from the analysis.

On approximation the data were normally distributed, allowing application of parametric tests. The 'area under the curve with respect to ground' (AUC) was calculated for cortisol and DHEAS to integrate data from the single endocrine measurements taken at 0, 15, 30, 45 and 60 minutes after awakening (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003).

Demographic characteristics were used for descriptive purposes. Paired sample *t*-tests were used for comparison of pre-treatment and post-treatment mean scores on PTSD symptoms, behaviour problems, depression symptoms and endocrinological measures. A one-sample *t*-test was used to compare mean post-treatment scores of the rape victims with mean scores of non-traumatized controls, as derived from our cross-sectional study (Bicanic et al., 2013). In this previous study, potential confounding variables, such as smoking, use of oral contraceptives, and 'elapsed time since trauma', did not exert an effect on endocrinological measures (Bicanic et al., 2013), and were therefore not corrected for in the analyses. Statistical analyses were performed in SPSS version 19.0. Significance (two-tailed) was defined as  $p < .05$ .

## RESULTS

### Sample characteristics

All subjects ( $N = 21$ ) were female adolescent rape victims ( $M_{\text{age}} = 15.9$  years,  $SD_{\text{age}} = 1.6$ ), who completed trauma-focused treatment. With regard to education, lower, middle and higher levels was attended by respectively 38.1, 42.9, and 19.0%. The majority of the victims (90.5%) had a menstrual cycle, with age at menarche being 12.3 years ( $SD = 1.3$ ). Of the rape victims, 52.6% used oral contraceptives; 23.8% used (non-corticosteroid) medication, and 23.8% smoked cigarettes. Victims did not differ from non-traumatized controls with regard to these background characteristics. None of the patients or controls used antidepressant medication.

In 17 cases (81%) the rape involved penetration. In 15 victims (71%), the rape was committed by a known perpetrator. With regard to type of treatment, 15 victims (71%) received CBT whilst 6 victims (29%) were treated using EMDR. Victims treated with CBT did not differ from victims treated with EMDR with respect to psychological and endocrine measures on pre- and post treatment.

The time elapsed between the rape and admission to the centre ranged between 4 and 344 weeks ( $M = 50.1$ ,  $SD = 80.3$ ). No correlation in rape victims was found between 'time since trauma' and cortisol levels ( $r = -.073$ ,  $p = \text{n.s.}$ ), DHEAS levels ( $r = -.114$ ,  $p = \text{n.s.}$ ) and PTSD symptoms ( $r = 0.247$ ,  $p = \text{n.s.}$ ).

### Psychological outcomes

At pre-treatment, all victims were diagnosed with PTSD according to DSM-IV and 6 out of 21 (29%) victims had comorbid depression and/or dysthymic disorder. On symptom level, victims scored in the (sub)clinical range at pre-treatment, indicating that severity of the symptoms was moderate to high. At post-treatment, 18 out of 21 (86%) victims no longer fulfilled the criteria for DSM-IV PTSD. On a symptom level, a significant decrease from pre- to post-treatment occurred with regard to PTSD, depression and internalizing behaviour problems. Although post-treatment scores of the rape victims were still significantly higher in comparison to scores of non-traumatized controls, this difference was clinically not relevant as mean scores were in the normal range (Bérubé & Achenbach, 2006). Pre- and post-treatment psychological scores as well as psychological scores of non-traumatized controls and the corresponding test statistics are presented in Table 7.1.

### Endocrine levels

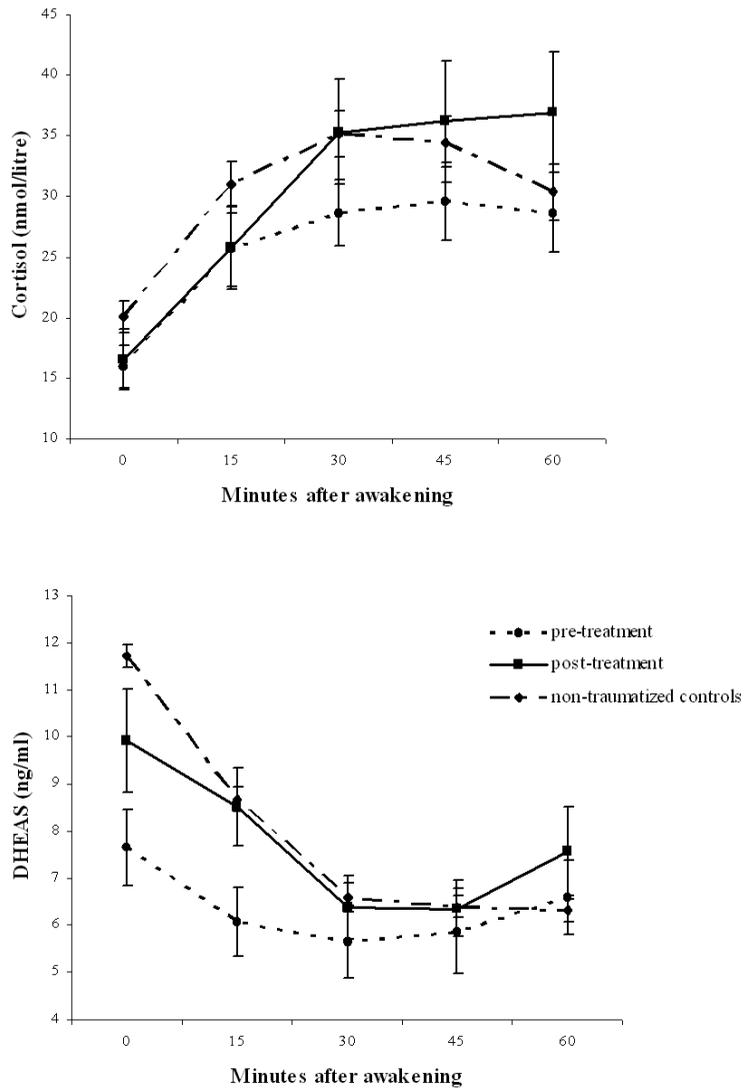
Figure 7.1 shows mean levels of cortisol and DHEAS measured at 0, 15, 30, 45 and 60 minutes after awakening of rape victims and non-traumatized controls. Scores of rape victims are presented separately for pre-treatment and post-treatment. Rape victims showed significantly higher DHEAS levels at post-treatment in comparison to pre-treatment. Differences between pre- and post-treatment cortisol levels did not reach significance. Both cortisol and DHEAS levels at post-treatment did not differ from values of non-traumatized controls. Pre- and post-treatment endocrine levels of rape victims as well as endocrine levels of non-traumatized controls and the corresponding test statistics are presented in Table 7.1.

Victims with comorbid depression did not differ from those without in terms of endocrine functioning. Victims who remitted from PTSD did not differ from non-remitters with regard to endocrine measures at post-treatment. Also, victims who remitted from PTSD did not differ from non-remitters with regard to rape characteristics, education or comorbidity at pre-treatment.

**Table 7.1** Psychological scores and endocrine AUC levels of rape victims (N = 21) at pre- and post-treatment, in comparison to non-traumatized controls (N = 37). Means (95% Confidence Intervals) are presented.

	Pre-treatment Rape victims	Post- treatment Rape victims	Non- traumatized controls <sup>a</sup>	Mean difference Pre- and post- treatment	Test value	Mean difference Post-treatment and non-traumatized controls	Test value
<b>PTSD symptoms (CRTI)</b>							
Total DSM-IV score	60.50 (56.20–64.70)	38.50 (34.05–43.30)	-	22.00 (16.34–27.66)	t(19) = 8.13, p < .001	-	-
Reexperiencing	17.75 (16.25–19.25)	9.60 (8.05–11.20)	-	8.15 (6.21–10.09)	t(19) = 8.79, p < .001	-	-
Avoidance	24.35 (22.45–26.40)	17.05 (14.70–19.20)	-	7.30 (4.65–9.95)	t(19) = 5.76, p < .001	-	-
Hyperarousal	18.30 (16.60–19.80)	11.85 (10.60–13.45)	-	6.45 (4.25–8.65)	t(19) = 6.14, p < .001	-	-
<b>Behavioural problems (YSR)</b>							
Internalising problems	63.10 (60.10–66.14)	55.29 (50.62–60.28)	49.44 (46.28–52.61)	7.81 (2.89–12.73)	t(20) = 3.31, p = .003	5.85 (.75–10.94)	t(20) = 2.40, p = .027
Externalising problems	54.19 (50.86–57.90)	51.95 (49.76–54.14)	49.14 (46.51–51.77)	2.24 (-.66–5.14)	t(20) = 1.61, p = .123	2.81 (.29–5.34)	t(20) = 2.32, p = .031
Total problems	60.38 (57.67–62.90)	53.95 (51.00–56.95)	49.86 (47.06–52.67)	6.43 (2.55–10.30)	t(20) = 3.46, p = .002	4.09 (.98–7.20)	t(20) = 2.75, p = .012
Depression (CDI)	16.81 (14.05–19.48)	10.05 (7.62–12.90)	6.00 (4.45–7.55)	6.76 (4.38–9.14)	t(20) = 5.92, p < .001	4.05 (1.12–6.97)	t(20) = 2.89, p = .009
<b>Endocrine AUC levels</b>							
Cortisol	106.08 (86.49–125.86)	124.05 (94.77–154.21)	126.58 (115.87–137.28)	17.97 (-5.30–41.24)	t(20) = 1.61, p = .123	2.53 (-28.96–34.03)	t(20) = .168, p = .869
DHEAS	24.72 (19.51–30.87)	30.00 (25.64–34.66)	30.67 (26.40–34.94)	5.28 (0.29–10.26)	t(20) = 2.21, p = .039	.70 (-4.50–5.89)	t(20) = .728, p = .782

Note. <sup>a</sup> Non-traumatized controls, as derived from Bicanic et al., 2013.



**Figure 7.1** Mean levels of cortisol and DHEAS, measured in rape victims and non-traumatized controls at 0, 15, 30, 45 and 60 minutes after awakening. Scores of rape victims are presented separately for pre-treatment and post-treatment. Y-error bars denote 5% error variation.

## DISCUSSION

In this study, we examined changes in psychological and HPA-axis functioning of female adolescents with rape-related PTSD before and after trauma-focused treatment with parallel parent guidance. The present study elaborated on our previous finding of lower cortisol and DHEAS in female adolescent rape victims as compared to non-traumatized controls (Bicanic et al., 2013). From pre- to post-treatment, a decrease in trauma-related symptoms was found as well as an increase in levels of DHEAS. For cortisol, such increase was not significant, although both cortisol and DHEAS levels at post-treatment corresponded to values of non-traumatized adolescents, suggesting restoration of the dysregulated HPA-axis.

With regard to psychological functioning, symptoms of PTSD and depression as well as internalizing behaviour problems decreased significantly, when measured after trauma-focused treatment with parallel parent guidance. Patients receiving either CBT or EMDR did not differ in treatment outcome. For PTSD diagnosis, 86% no longer fulfilled DSM-IV criteria after trauma-focused treatment. Both CBT and EMDR are recommended by NICE guidelines as evidence based treatments of PTSD (National Institute of Clinical Excellence, 2005).

With regard to endocrine functioning, DHEAS was significantly higher at post-treatment, which is in line with a prior study showing an increase in plasma DHEA in treatment-responders (Olf et al., 2007). Relatively higher DHEAS levels may reflect restoration rather than impairment and could play a role in resilience and successful coping with stress (Morgan et al., 2004; Maninger, Wolkowitz, Reus, Epel, & Mellon, 2009).

Although an increase at post-treatment for cortisol levels was found, which is in line with prior studies on changes in the HPA-axis following treatment (Heber et al., 2002; Olf et al., 2007), this increase from pre to post did not reach statistical significance. Possibly, cortisol responded slower than DHEAS to treatment. However, post treatment levels of cortisol and DHEAS were no longer different from the non-traumatized controls. The finding of increased cortisol and DHEAS levels, measured after trauma-focused treatment with parallel parent guidance and corresponding to normal endocrine values, can be interpreted as a normalization of the HPA-axis. Our previous study found no evidence for the influence of education, smoking, sleep duration, and the use of oral contraceptives on the HPA-axis (Bicanic et al., 2013). However, other factors associated with successful treatment may account for the findings. These include improved food-

intake, quality of sleep, physical and social activity, health status, and family coherence. Future studies should examine what factors or mechanisms play a role in normalizing the biological stress system.

The present study distinguishes itself from previous studies examining the link between PTSD improvement and endocrine changes following treatment, by selecting a homogenous group of female adolescents with PTSD whose traumatic experience was limited to a single incident of rape and no prior sexual, physical and/or emotional abuse. Apparently, the experience of a single rape results in psychological and biological dysregulations (Bicanic et al., 2013) that can be modified after trauma-focused treatment. Another strength of the study is the fact that cortisol was measured at multiple time-points with strict reference to time after awakening, which is a recommended means for reliably assessing cortisol levels (Wüst et al., 2000).

One limitation of the present study concerns the small number of subjects used, which decreases statistical power of this study. Secondly, follow-up measurements to determine the stability of the observed changes are lacking. Finally, with the current design we are unable to fully determine causal relations and unravel underlying mechanisms with regard to the effects of trauma-focused treatment on the HPA-axis.

The present study focused on baseline HPA functioning prior to and directly after being treated with CBT or EMDR. A next step would be to further examine the responsivity of the HPA axis directly after exposure in PTSD treatments, as it is known from earlier studies that the experience of sexual trauma can affect the dynamics of the biological stress system (Gola et al., 2012; Hamilton & Meston, 2011). Further research on successful treatment of PTSD needs scrutiny, as one third of victims do not recover after psychotherapy from PTSD due to sexual violence (Vickerman & Margolin, 2009). Evidence for dysregulation of the HPA-axis and changeability after treatment of PTSD provides clues for additional treatment options for PTSD (Hamilton & Meston, 2011), such as the administration of 7-keto Dehydroepiandrosterone (Sageman & Brown, 2006) or low dose cortisol (Aerni et al., 2004). Especially those who respond less to psychotherapy might benefit from combining both psychotherapeutic and pharmacological elements in the treatment of rape-related PTSD (Yehuda, Bierer, Pratchett, & Malowney, 2010).

In conclusion, a dysregulated HPA axis in adolescents with rape related PTSD (Bicanic et al., 2013) seems to return to levels of functioning comparable with non-traumatized controls after trauma-focused treatment and parallel parent guidance, suggesting

reversibility of the parameters of the biological stress system. As female adolescents are at high risk to be victimized by rape (Tjaden & Thoennes, 2006) and subsequently develop PTSD (Olf et al., 2007), it is of paramount importance to continue research in this area to improve our understanding of the psychological and biological correlates of rape.

## Acknowledgements

The authors would like to thank the clinicians at the Psychotrauma Centre of the University Medical Centre Utrecht and the Psychotrauma Centre for Children and Youth, GGZ Rivierduinen Leiden for their assistance in the data-collection.

This research was supported by a grant (017.002.112) from the Netherlands Organisation for Scientific Research (NWO). NWO had no further role in study design; in collection, analysis and interpretation of data; in writing of the report; and in the decision to submit the paper for publication.

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# 8

## Victims' use of professional services in a Dutch Sexual Assault Center

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Submitted for publication.

**ABSTRACT**

Prior research endorsed the establishment of sexual assault centres in the Netherlands, because of the potential benefit for victims' mental recovery. In 2012, the first Dutch sexual assault center was founded in the University Medical Center Utrecht. The aim of the center is to provide 24/7 coordinated and integrated services (i.e., medical, forensic, and psychological) at one location. The purpose of the present study was to describe demographic, background, and assault characteristics of victims seen at the center within one week post-assault, and their use of post-assault services in order to improve current services. From January 2012 to September 2013 prospective data of 108 patients were collected. The mean age was 21.3 years ( $SD = 9.8$ ). Most victims were female (91.7%). A large proportion of victims reported background characteristics known to increase risk for post-traumatic stress disorder (PTSD) and revictimization such as prior sexual abuse (32.4%), pre-existing use of mental health services (45.4%), and not living with both biological parents (61.7%). Most patients (88.9%) consulted the center within 72 hours post-assault. The uptake of services was high: 82.4% received emergency medical care, 61.7% underwent a forensic-medical exam, 34% reported to police and 82.4% utilized psychological services. To prevent revictimization and PTSD, current psychological services may potentially be improved with immediate trauma-focused treatments. Current forensic services may be improved with the use of standard top to toe forensic-medical examinations for both children and adults.

## INTRODUCTION

The experience of rape or sexual assault is affecting a considerable percentage of individuals in the Netherlands; 2.6% of men and 11.7% of women between 15 and 70 years reported a history of at least one rape in their lifetime (De Haas, Van Berlo, Bakker, & Vanwesenbeeck, 2012). Yearly, 0.4% of men and 2.3% of women older than 15 years are confronted with one or more sexual offences (Merens, Hartgers, & Van den Brakel, 2012). For women, 19% of these offences concern an attempted or completed rape.

Despite the potential negative impact of sexual assault on mental, sexual and physical health (Linden, 2011; Postma, Bicanic, Van der Vaart, & Laan, 2012; Rees et al., 2011), and the high risk for revictimization after assault (Littleton, Axsom, & Grills-Taquechel, 2009), evidence suggests that most victims do not utilize professional services and do not report the assault to the police (Campbell & Wasco, 2005; Wolitzky-Taylor et al., 2011). The only previous study that investigated post-assault services in the Netherlands demonstrated that victims recovered relatively slowly and that they were confronted with post-rape services at various locations with waiting-lists (Ensink & Van Berlo, 1999). However, victims who were provided with immediate and integrated services reported improved mental recovery. Based upon these findings, Ensink and Van Berlo (1999) recommended the establishment of multidisciplinary sexual assault centers in the Netherlands like those existing in the United States and Scandinavian countries (Bramsen, Elklit, & Nielsen, 2009; Campbell, Patterson, & Lichty, 2005). More recent evidence confirms our experiences in clinical practice that a coordinated assistance is more effective than a non-integrated approach in facilitating recovery from assault and increasing chances of the offender's apprehension (Campbell, Patterson, Adams, Diegel, & Coats, 2008; Campbell, Patterson, & Bybee, 2012). As a result, initiatives were undertaken to set up integrated services for victims of acute sexual assault.

In 2012, the first sexual assault center in the Netherlands was founded. This center is located at the Emergency Department of the University Medical Center Utrecht (UMCU) and offers 24/7 medical, forensic, and psychological services to anyone who believes he or she has been the victim of a recent (i.e., < one week) sexual assault. The available medical services aim to provide emergency medical care and subsequent follow-ups. The purpose of forensic services is to optimally perform the forensic examination within the time limits for evidence collection. The psychological services aim at reducing initial distress by means of 'watchful waiting' (National Institute for Clinical Excellence (NICE), 2005) as the intensity of acute psychological reactions may play a role in later recovery, with higher

levels of immediate distress associated with poorer outcome (Alisic, Jongmans, Van Wesel, & Kleber, 2011; Bryant & Panasetis, 2001). Watchful waiting is the recommended approach after a traumatic event as set out by the NICE guidelines, implying close monitoring of the patient without active treatment. In case of young victims, parents or caregivers are provided with parallel psychological services, based on evidence suggesting that high levels of parental stress predict Post Traumatic Stress Disorder in children (PTSD; Alisic, Jongmans, van Wesel, & Kleber, 2011).

To date, in total four centers in the Netherlands apply the above multidisciplinary approach in the management of acute assault, suggesting growing awareness of this approach among clinicians and policy makers (Goderie & Flikweert, 2012; Vanoni, Kriek, & Linneman, 2013). However, a good understanding of the characteristics of acute assault victims and their use of services is necessary to improve the current services. Therefore, the present study uses the patient database of the UMCU sexual assault center to describe victims' demographic, background and assault characteristics and their use of post-assault professional services (i.e., medical, forensic, and psychological services).

## **METHODS**

### **Subjects and data collection**

This study was conducted at the sexual assault center in the UMCU, which provides multidisciplinary post-assault services within one week post-assault. All patients who visited the center between January 2012 and September 2013, and gave informed consent were included in the present study. All information was anonymized, whilst specific details of the events were absent.

In the sexual assault center, patients are first triaged by a trained (forensic) nurse. Only patients who intend to report to the police go through a forensic-medical examination using an evidence sampling kit. Emergency medical care includes physical examination, documentation of injuries, provision of emergency contraception, and prophylactic treatment for sexually transmitted diseases (STDs) including HIV and hepatitis B and C. The (forensic) nurse informs the patient about medical follow-up services, such as HIV post-exposure prophylaxis (PEP) monitoring and side effect management, and testing of STDs, HIV, hepatitis B and C. One day after the visit a case-manager is appointed to all consenting patients to coordinate follow-up appointments and to contact pre-existing

mental health services. The case-manager is a mental health professional who is also responsible for the provision of psychological care according to the 'watchful waiting protocol' (NICE, 2005) in the first month following assault. If necessary, evidence based treatment for post-traumatic stress disorder (PTSD) is provided such as cognitive behavior therapy (CBT) or eye movement desensitization reprocessing (EMDR) therapy. If the victim is a child, parents or caregivers are offered parallel psychological support, but children at age 16 years or older can consent to services at the center without their parents being notified. In the UMCU, professionals involved in medical and psychological services use the same patient file.

Between January 2012 and September 2013, the sexual assault center received phone calls and emails from police (15%), (mental) health services (52.5%) or self-referrals (32.5%) concerning 659 (alleged) assault victims. Their mean age was 17.7 years ( $SD = 10.1$ ). Most victims were female (86.8%). In 252 cases (38.4%), the phone call resulted in admission to the UMCU for medical and/or psychological care. Specifically for this study, we included only admissions to the sexual assault center that were within one week post-assault. This were 108 cases.

## Measurements

Information about the patient (mental) health record generated at time of admission was encoded into the sexual assault center's database for the purpose of the present study.

Patient characteristics included gender, age, ethnicity, current living situation, family structure, use of pre-existing mental health services, intellectual disabilities, current pregnancy, current use of prescribed medication, prior sexual trauma and physical abuse, as well as whether being under Custody of Child Protection Services.

Assault characteristics included type of sexual assault, physical violence, victim's intake of alcohol and/or drugs prior to assault, assailant's gender, (estimated) assailants' age category, number of assailants, and relationship to the assailant.

Characteristics of post-assault services included prior use of the center, number of services used (maximal 3), time elapsed since assault (in days), use of emergency medical care, involvement of a medical specialist, (treatment of) assault-related physical injury, prescription of medication, diagnostics of STDs, involvement of police, use of forensic-medical examination, official report made to police, use of case-management, application of PTSD treatment, put under custody of Child Protection Services.

## Data analyses

To describe the population included, frequency counts and proportions were generated for categorical variables. Statistical analyses were conducted using SPSS (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.).

## RESULTS

Referral sources for the sample of 108 victims admitted to the center within one week post-assault, included police (61.9%), (mental) health services (27.6%), and victims themselves (11.5%).

### Patient characteristics

The demographic and background characteristics of the 108 patients are presented in Table 8.1. Age ranged from 3 to 59 years, with a mean age of 21.3 years ( $SD = 9.8$ ). The age group between 12 and 25 years accounted for 68.5% of the sample. A substantial number of the sample reported prior sexual abuse (32.4%), prior physical abuse (29.6%) and pre-existing mental health services (45.4%). One quarter (25.3%) was homeless or living in residential or foster care. Of the minors, 61.7% was not living with both biological parents.

### Assault and assailant characteristics

Assault and assailant characteristics are presented in Table 8.2. Penetrating assault occurred in 93.5% of the cases, and most victims (86.1%) were assaulted by male adults. Group rape occurred in 24.1% of the cases. The majority of victims (83.3%) knew their assailant, who was most often a peer or intimate person.

### Use of post-assault services

Post-assault service utilization was categorized into three types: medical, police (including forensic-medical exam) and psychological. Ten patients (9.3%) used one out of three services, 29 (26.9%) used two out of three services, and 69 (69.8%) used all three services. The majority of patients (88.9%,  $n = 96$ ) presented at the center within 72 hours post-assault, while 11.1% ( $n = 12$ ) presented at the center four to six days post-assault. Details of post-assault service utilization are presented in Table 8.3. Emergency medical care was

**Table 8.1** Demographic and background characteristics of the victims ( $N = 108$ ) at time of admission in frequencies and percentages

	<i>N</i>	%
Gender		
Female	99	91.7
Male	9	8.3
Age category		
< 12 years	7	6.5
12–17 years	40	37.0
18–25 years	34	31.5
> 25 years	27	25.0
Ethnicity <sup>a</sup>		
Western	95	88.0
Non-Western	13	12.0
Living situation		
Living with parent(s)	45	41.6
Living with partner	10	9.2
Living alone	17	15.6
Residential or foster care	21	19.3
Homeless	6	6.0
Missing	9	8.3
Prior sexual abuse	35	32.4
Prior physical abuse	32	29.6
Pre-existing use of mental health services	49	45.4
Pre-existing use of prescribed medication	53	57.6
Intellectual disability identified	15	16.2
Family structure – only minors included ( $n = 47$ )		
Complete	14	29.8
Incomplete due to divorce or death	29	61.7
Missing	4	8.5
Under custody of Child Protection Services	13	27.7

<sup>a</sup> Western was identified as the country of birth being Europa, United States or Australia.

utilized by 82.4% of the sample. All users of emergency medical care had experienced penetrating assault. Physical injury was reported by 23.1 % ( $n = 6$  genital;  $n = 19$  non-genital) of the patients, of which 32% ( $n = 8$ ) were in need of injury treatment. Of the 50 patients using PEP medication, 54% did not complete the treatment scheme because of: severe side effects ( $n = 3$ ); interference with other prescribed medication ( $n = 1$ ); assailant being diagnosed as HIV-negative ( $n = 2$ ); patient's perceived stress ( $n = 2$ ); ignorance

**Table 8.2** Assault and assailant characteristics reported by victims ( $N = 108$ ) at time of admission in frequencies and percentages

	<i>N</i>	%
Type of assault		
Vaginal	53	49.1
Oral	7	6.5
Anal	4	3.7
Multiple	37	34.2
No penetration	7	6.5
Presence of physical violence	32	29.6
Victim's use of alcohol/drugs	24	22.2
Gender		
Female	1	0.9
Male	107	99.1
(Estimated) age category		
Minors (< 18 years)	27	13.9
Adults	80	86.1
Number of assailants		
1	82	75.9
> 1	26	24.1
Victim-assailant relationship		
Peer <sup>a</sup>	25	23.1
Intimate	19	17.6
Stranger <sup>b</sup>	18	16.7
Human trafficking	12	11.1
Acquaintance	12	11.1
Professional	10	9.3
Family	6	5.6
Prostitution	3	2.8
Internet contact	3	2.8

<sup>a</sup> Peer refers to a non-romantic relationship with a similar-aged person.

<sup>b</sup> Stranger in case the victim had never contacted the assailant before.

about how to use the medication ( $n = 1$ ); patient's own indication of having low infection risk ( $n = 1$ ); unknown reasons ( $n = 17$ ). After pregnancy testing, it appeared that out of all fertile girls and women, one adult woman was pregnant.

For forensic services, 61.7% of the patients underwent a forensic-medical examination and 34% decided to officially report the assault to the police.

**Table 8.3** Details of post-assault services utilization (i.e., medical, police and psychological) by victims ( $N = 108$ ) in frequencies and percentages

	<i>N</i>	%
Prior use of the sexual assault center	4	3.7
<i>Medical services</i>		
Emergency medical care	89	82.4
Specialist involved (not mutually exclusive groups)		
Infectious disease specialist	69	63.8
Gynaecologist – only females included ( $n = 99$ )	12	12.1
Paediatrician – only minors included ( $n = 47$ )	36	76.6
Assessment of the presence of STDs (including Hepatitis C)	82	75.9
Medical interventions administered		
Antibiotics	74	68.5
Hepatitis B immunisation	69	63.8
HIV Postexposure Prophylaxis (PEP)	50	46.3
Emergency Contraception – only females included ( $n = 99$ )	36	36.4
<i>Forensic services</i>		
Police involvement	92	85.2
Forensic-medical examination	66	61.7
Official report to police	36	34.0
<i>Psychological services</i>		
Use of case-management	89	82.4
Receipt of PTSD treatment	42	38.9
Parallel psychological care for parents – only minors included ( $n = 47$ )	34	72.3

Case-management was provided to 82.4% of the cases. Relatively more minors and their parents ( $n = 42$ ) consented to a case-manager than adults ( $n = 47$ ). Evidence-based treatment of PTSD according to the Dutch multidisciplinary guidelines for the treatment of anxiety disorders (Van Balkom et al., 2013) was provided to 38.9% of the patients within two months post-assault. After the assault, four minors were placed under custody of Child Protection Services.

## DISCUSSION

The present findings showed that most victims presenting at a hospital-based sexual assault center within one week post-assault were females between 12 and 25 years, who experienced penetrating assault by a known male adult. The victims reported high

rates of prior victimization, pre-existing use of mental health services, use of prescribed medication and poor living conditions (i.e., housing and parental support). Their usage of post-assault services was high and one third decided to officially report to police. Considering that the sample consisted of severe cases with various needs, the application of the multidisciplinary approach seemed appropriate.

Although the Dutch approach towards the management of acute sexual assault victims has only recently changed from non-integrated to coordinated and integrated, the characteristics of the study population yielded results consistent with research in sexual assault centers in Denmark and United States (Avegno, Mills, & Mills, 2009; Brown, Du Mont, MacDonald, & Bainbridge, 2013; Ingemann-Hansen, Sabroe, Brink, Knudsen, & Charles, 2009). To this end, the present study confirms female gender and adolescence as the greatest risk factors for sexual assault (De Haas et al., 2012), which may reflect the lifestyles and circumstances of young women or their socialising with males.

A large proportion of victims reported past victimization and pre-existing use of mental health services. This outcome is in line with prior studies in acute assault victims (Brown et al., 2013; Elwood et al., 2011; Campbell, Keegan, Cybulska, & Forster, 2007). These characteristics, as well as the finding that most minors were not living with both biological parents, have been found to be associated with an enhanced risk of PTSD onset and revictimization (Walsh et al., 2012; Classen, Paresh, & Aggarwal, 2005; McLaughlin et al., 2013). Thus, recognition of these risk factors and application of appropriate psychological care is essential to prevent revictimization and facilitate mental recovery.

Seventy percent of the sample utilized all three (i.e., medical, forensic, psychological) services. This high percentage may reflect the needs associated with sequelae of sexual assault. The uptake of emergency medical care was high as pregnancy and STDs prevention are the two key acute threats to victims of sexual assault. General physical injury was observed in only one quarter of the cases. This percentage is lower than findings from prior studies (Riggs, Houry, Long, Markovchick, & Feldhaus, 2000). This may be explained by the relatively small number of stranger assault in the present study, which has been found to be associated with physical injury (Riggs et al., 2000). Several explanations are applicable to the finding that genital injury was observed in only 6% of the sample, while 94% reported penetration. The use of a colposcope was not routinely used, possibly resulting in less well documented genital injuries. It could be that the study population consisted of persons with sexual experience (Grossin et al., 2003), a finding in agreement with what is known about female physiology. On the other hand, low numbers of genital

injuries have been found in previous studies among children (Palusci, Cox, Shatz, & Schulze, 2006). Further, half of the patients using PEP medication did not complete the treatment scheme despite education on the use and side-effects of PEP. Therefore, concerted efforts should be taken to improve treatment compliance.

The finding that one third of the victims officially reported to police is higher than national report percentages of 10% (Merens et al., 2012). This may be explained by the fact that the police was the center's primary referral source, but it could also be argued that the coordination of services might have contributed to this higher percentage (Campbell et al., 2012). Close collaboration between different and trained disciplines has been found to prevent victim blaming (Campbell et al., 2012) and, consequently, empower victims in their decision to report the assault event to the police. Further research is needed to examine whether a multidisciplinary approach increases the frequency of police reporting in the Netherlands.

This study was set up to gain information about victims' characteristics and their use of services in order to improve current post-assault services. Although almost all patients utilized the available psychological services, it could be argued whether the care was appropriate. Watchful waiting relies on the assumption that most victims after a traumatic experience will improve without treatment within a few weeks. This is not to be expected in this sample considering the finding that many patients had risk factors for PTSD and revictimization, such as prior abuse, not living with both biological parents, and pre-existing use of mental health services suggesting the presence of mental health problems (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999; Elwood et al., 2011; Littleton et al., 2009; McLaughlin et al., 2013; Rees et al., 2011; Walsh et al., 2012). Moreover, PTSD (symptoms) have been found to mediate revictimization (Risser, Hetzel-Riggin, Thomsen, & McCanne, 2006). Thus, current psychological care may be improved with immediate evidence based treatments, e.g., CBT and EMDR therapy, focused on resolving traumatic memories. This notion is supported by recent evidence suggesting that PTSD symptoms should be targeted after sexual assault, because changes in PTSD symptoms is likely to influence subsequent changes in other psychological symptoms (Nickerson et al., 2012). To date, early CBT and EMDR therapy, showed some efficacy in the short term for assault victims (Foa, Zoellner, & Feeny, 2006; Tarquinio, Brennstuhl, Reichenbach, Rydberg, & Tarquinio, 2011). In the present study, 39% of the patients received either CBT or EMDR therapy, though not immediately. Longitudinal follow-up is necessary to reveal information about mental recovery rates and to identify the best time to start treatment.

The present study is considered a first step towards more elaborate data collection by describing victims' characteristics.

There are however some study limitations that should be mentioned. First, we suspect that reports of prior trauma are likely conservative, because patients were asked about their backgrounds without having an established relation yet with the involved professional. Second, the forensic-medical examination of children and adults was not performed in comparable ways. For adult victims, the focus of the forensic-medical examination is determined by victims' disclosure to the police about the event. Children were routinely assessed top to toe while adults were not, which may have resulted in less well documented injuries in adults (Ingemann-Hansen et al., 2009). Despite these limitations, this is the first study in the Netherlands that extensively described characteristics of victims, both minors and adults, and their use of post-assault services in a designated sexual assault center.

In conclusion, young women consulting a sexual assault center appeared to have background characteristics that put them at risk for the development of PTSD and revictimization. Therefore, appropriate psychological care is essential to prevent revictimization and to facilitate mental recovery. Possibly, current psychological services may be improved by immediately targeting PTSD symptoms with trauma-focused treatments. Improvement in forensic services may be achieved by performing standard top to toe forensic-medical examinations for both children and adults. Future research should investigate the potential benefit of sexual assault centers for (mental) health and the judicial process.

## Acknowledgements

The authors thank Riemke Postma for her assistance in the preparation of the manuscript. This research was supported by a grant from the Dutch Victims Support Foundation.

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# 9

## Summary and general discussion

## INTRODUCTION

The experience of rape as an adolescent is unfortunately affecting a considerable percentage of youth in the Netherlands and worldwide (De Haas, Van Berlo, Bakker, & Vanwesenbeeck, 2012; Tjaden & Thoennes, 2006) and may have longlasting deleterious effect interfering with mental, physical and sexual health up to adulthood (Linden, 2011; Postma, Bicanic, Van der Vaart, & Laan, 2012; Rees et al., 2011).

The research presented in this dissertation focuses on the psychological and neurobiological correlates of rape in adolescence, before and after treatment. The rationale for the project came from a) indications that adolescents are at increased risk for rape victimization; b) reports that the experience of rape can lead to serious (mental) health effects; c) evidence that rape victims are at heightened risk to become revictimized; d) the hypothesis that single rape may be similar to chronic abuse in terms of subsequent psychopathology and HPA-axis functioning; and e) the identification of gaps in the multidisciplinary organization of post-rape care in the Netherlands. The purpose of the dissertation is to generate an overview of adolescents' exposure to and recovery from rape, both psychologically and neurobiologically in order to promote the design of prevention and treatment strategies. The project specifically focuses on adolescent victims with single rape as the index trauma, who have not experienced prior chronic sexual abuse in childhood. The present chapter provides a summary of the main findings of the dissertation and a discussion of several cross-cutting issues.

## SUMMARY OF MAIN FINDINGS

### Description of a sample of treatment-seeking adolescent rape victims

From 2005 to 2011 descriptive and psychological data from 323 female adolescents aged 12–25 years ( $M = 16.7$ ,  $SD = 2.7$ ) were collected. For all adolescents, who were admitted at the Psychotrauma Center for Children and Youth in the University Medical Center Utrecht (UMCU) for mental health treatment, the index trauma was a single rape experienced during adolescence. In **Chapter 2**, we described demographic and (post-)rape characteristics of this sample as well as their psychological functioning. Despite the fact that the index trauma was limited to one rape event – victims of chronic sexual abuse in childhood were referred to other mental health centers – victims reported high levels of psychological distress, comparable to norm scores of psychiatric patients. Typically for

this clinical sample, the majority of victims experienced a completed rape by a known male person, who was not a family member. Victims who knew their assailant were most likely to describe the relationship as a friend, (ex-)boyfriend or acquaintance in the same age, also referred to as peer-on-peer sexual victimization. The finding in this clinical sample of one third being victimized by stranger rape is comparable to findings from a Dutch prevalence study in the Netherlands (De Haas et al., 2012). Prior research showed that victims of stranger rape tend to acknowledge their experience as rape more than victims of nonstereotypical rape and are more likely to seek help (Smith et al., 2000; Resnick et al., 2000).

### **Predictors of delayed disclosure of rape**

Also in **Chapter 2**, we categorised the sample in two subgroups of early disclosers (i.e., those who first disclosed the rape event within one week,  $n = 185$ ) and delayed disclosers (i.e., those who first disclosed the rape event after one week,  $n = 131$ ). First disclosure in our sample was most often to a peer friend, in line with previous studies (Fehler-Cabral & Campbell et al., 2013). Victims first disclosed after a mean time of 20.8 weeks ( $SD = 56.8$ , range 1–624 weeks). After comparison of these subgroups, delayed disclosers appeared to be less likely to use medical services and report to the police than early disclosers. This is also in line with prior studies showing that victims who disclose the rape within 72 hours, are more likely to report to the police and receive medical care (Ullman, 1996; Ullman & Filipas, 2001; Ahrens, Stansell, & Jennings, 2010). Delayed disclosure may not only have implications for not receiving timely medical care such as treating anogenital injuries and preventing the onset of Sexually Transmitted Diseases (STDs) and unwanted pregnancy (Linden, 2011), but may also preclude the forensic investigation, apprehension and conviction of perpetrators (Lacy & Stark, 2013). Further, early and delayed disclosers did not differ significantly on psychological functioning and time needed to seek help.

The results of the logistic regression analysis showed that younger adolescents,  $OR = 2.05$ , 95%  $CI = [1.13-3.73]$ , individuals who had experienced penetration,  $OR = 2.36$ , 95%  $CI = [1.25-4.46]$ ; and those raped by someone close,  $OR = 2.64$ , 95%  $CI = [1.52-4.60]$  were at significantly increased risk for delayed disclosure, and subsequently, for delayed receipt of post-rape medical and police services. However, the percentage of explained variance of delayed disclosure was low (10.5%); emphasizing the need for further research into other factors that may better predict disclosure time, such as assailant's use of alcohol, weaker familial support systems and expected negative social reactions upon disclosure.

### Treatment of psychological distress after rape

STEPS is a cognitive behavior therapy (CBT) for victims of single rape, including psycho-education, trauma narrative exposure, exposure in vivo, cognitive restructuring, and relapse prevention. CBT is the first treatment of choice for children with traumatic stress symptoms due to sexual trauma for well over a decade and has the most significant evidence base for the treatment of childhood PTSD (NICE 2005; WHO, 2013). STEPS can be applied individually or in a group. In **Chapter 3**, we evaluated STEPS group in an uncontrolled study. STEPS was administered in 55 female adolescents who suffer from mental health problems after a single rape and have otherwise no history of (sexual) trauma. They were admitted at the National Psychotraumacenter for Children and Youth and the Psychotrauma Center for Children and Youth GGz Rivierduinen in Leiden. They participated in a parallel support group. Rape-related symptomatology, assessed at pre- and post-treatment, and at six and twelve month follow-up, was examined in a repeated measures analysis. After STEPS, substantial improvement was found for different measures of psychological distress, which maintained at 12 months follow-up and appeared not to be affected by time since rape. These findings, together with a 2% drop-out rate which is low compared to average drop-out rates in PTSD treatments (20% in Hembree, Street, Riggs, & Foa, 2004), indicate the initial efficacy of group CBT for adolescent victims of single rape. However, with a median of time since trauma of 26.5 weeks, half of the sample was treated during a time when natural recovery may have occurred. Thus, it is possible that the treatment works especially well for more chronic symptoms, while the less chronic part of the sample would have shown considerable improvement on its own. To draw strong conclusions about effectiveness, a controlled study should be conducted. Adolescent sexual victimization predicts later victimization, and findings suggest that successful therapy may serve as a protective factor against further victimization (Humphrey & White, 2000).

In **Chapter 4**, sexual and pelvic floor functioning was assessed in young adults who have experienced a single rape in adolescence ( $n = 89$ ) and in non-victimized controls ( $n = 114$ ). All rape victims had been treated for PTSD with trauma-focused treatment, either Eye Movement Desensitisation Reprocessing (EMDR) or CBT. The average time between prior treatment and participation in this study was 3.32 years ( $SD = 1.75$ )

Despite receiving prior evidence based treatment for PTSD, participants were 2.4 times more likely to have a sexual dysfunction (lubrication problems and pain) and 2.7 times more likely to have pelvic floor dysfunction (symptoms of provoked vulvodynia, general

stress, lower urinary tract, and irritable bowel syndrome) than non-victimized controls. The relationship between rape and sexual problems was partially mediated by the presence of pelvic floor problems. Possibly, physical manifestations of PTSD have been left unaddressed in treatment. As we did not assess sexual and pelvic floor functioning during the first admission in the Psychotrauma Center, we do not know whether or not the sexual and pelvic floor problems were already present in adolescence before or shortly after the rape event. It is very well possible that these type of problems are either absent or hidden until adulthood. Attention should be paid in future research to the time point of the establishment of sexual problems and/or pelvic floor problems as well as to treatments for sexual and pelvic floor dysfunction related to past sexual trauma.

### **The biological stress system in victims of sexual trauma**

Rape is clearly a frightening event, that will activate the hypothalamic-pituitary-adrenal (HPA)-axis. In **Chapter 5**, we tried to identify endocrine correlates of child sexual abuse by reviewing the existing literature between 1990 and 2007 on the topic of sexual abuse and functioning of the biological stress system. Although studies on the sympathetic nervous system provided evidence for a higher baseline activity of this system in sexually abused children and adolescents, findings from reviewed studies on the HPA axis (re)activity were both varied and contradictory, possibly due to methodological shortcomings and the developmental status of the neuroendocrine system. First, it is difficult to identify subjects with exclusively sexual abuse experiences, since various types of abuse tend to coexist and chronic sexual abuse usually occurs in the context of affective neglect. Second, most studies did not specify sexual abuse variables that may affect outcome. Third, all studies were characterized by a small number of subjects and therefore had limited statistical power, which also limited the potential to examine age and gender effects. Finally, not all studies have adequately considered confounding factors.

In **Chapter 6**, the HPA-axis functioning of a homogenous sample of victims of single rape with PTSD ( $n = 52$ ) was compared to that of non-victimized controls ( $n = 37$ ) with consideration of confounding factors. Results show that adolescents with rape-related PTSD have lower cortisol and DHEAS levels compared to non-victimized controls, suggesting dysregulated functioning of the HPA-axis. The finding of hypocortisolism in adolescent rape victims is in line with results from studies in victims of chronic sexual abuse (Stein, Yehuda, Koverola, & Hanna, 1997; Meewisse, Rietsma, De Vries, Gersons, & Olf, 2007; Bremner, Vermetten, & Kelley, 2007; Kellner et al., 2010), suggesting that chronic stress, leading to HPA-

axis dysregulation, may not only refer to the actual presence of a stressor during an extended period, but also to a long-lasting subjective sense of stress in the aftermath of rape. The stressor rape with subsequent PTSD symptoms potentially acts as a chronic stressor accounting for hypocortisolism. In a subgroup of the cross-sectional study ( $n = 21$ ), psychological and neuroendocrine outcomes were measured following evidence based treatment for PTSD, i.e., EMDR or CBT. The results at post-treatment, described in **Chapter 7**, show that PTSD and depression symptoms were significantly lower compared to pre-treatment and that the PTSD diagnosis was no longer present in 86% of the patients. At post-treatment, a substantial increase was found for DHEAS levels in adolescent rape victims with PTSD, but not for cortisol levels. However, cortisol and DHEAS levels at post-treatment corresponded to levels of non-traumatized controls ( $n = 37$ ) described in **Chapter 6**. With the current design we are not able to determine causal relations and unravel underlying mechanisms with regard to the effects of trauma-focused treatment on the HPA-axis. Nevertheless, the findings suggest a normalization of the HPA-axis in adolescent rape victims after trauma-focused treatment. Future randomized controlled trials should be conducted to confirm whether trauma-focused treatment is effective in changing HPA-axis functioning.

### **The first Dutch Sexual Assault Center**

In January 2012, the first Dutch sexual Assault center was established in the University Medical Center Utrecht for acute rape victims aging 0–100 years. From January 2012 to September 2013 descriptive data from 108 acute rape victims were collected as well as data about their use of post-rape services in order to improve current post-assault services. The results, presented in **Chapter 8**, first show that most victims consulting a hospital-based sexual assault center within one week post-assault were females between 12 and 25 years, who experienced penetrating assault by a known male adult. Second, a substantial proportion of the sample reported risk factors for PTSD and revictimization (Walsh et al., 2012; Classen, Paresh, & Aggarwal, 2005; McLaughlin et al., 2013), such as prior victimization, pre-existing use of mental health services and not living with both biological parents. Therefore, appropriate psychological care is essential to prevent revictimization and facilitate mental recovery. Moreover, 70% of patients used all three services (i.e., medical, forensic, psychological), suggesting that patients' uptake of specialized post-rape services is significant. One third of the cases reported to the police, which is above national report percentages of 10% (Merens, Hartgers, & Van den Brakel, 2012). Possibly, to prevent the development of PTSD and revictimization, current

psychological services may be improved by immediately targeting PTSD symptoms with trauma-focused treatments. Improvement in forensic services may be achieved by use of standard top to toe forensic-medical examinations for both children and adults.

## GENERAL DISCUSSION

Previous studies have demonstrated that female adolescents are vulnerable for rape and subsequent revictimization and psychopathology, such as PTSD (Littleton, Axsom, & Grills-Taquechel, 2009; McLaughlin et al., 2013). The studies in this dissertation add to the existing literature that adolescence rape is correlated with high levels of psychological distress, neurobiological dysregulations and increased risk for problems with sexual and pelvic floor functioning. Also, younger adolescents who have experienced a completed rape by someone close appeared to be at risk for delayed disclosure of rape. Moreover, delayed disclosers were less likely to use medical services and to report to the police compared to early disclosers. Although 30% of the longitudinal sample ( $n = 323$ ) in Chapter 2 was victimized by a 'stereotypical' rape (e.g., stranger, weapon, injury), the majority experienced peer-on-peer sexual victimization, which is most likely to occur during adolescence, as compared to childhood and young adulthood, and is greatly increasing the risk for revictimization (Humphrey & White, 2000). In conclusion, rape during adolescence is a serious problem and efforts should be made to raise public awareness about its potential impact on (mental) health, but also about recovery and evidence based treatments such as CBT and EMDR.

### Clinical implications

In the Netherlands, most rape victims do not know where to find specialized services (Höing, Van Engen, Ensink, Vennix, & Vanwesenbeeck, 2003), and for adolescents in particular, services often do not meet the required conditions (Melief, Verkuyl, & Flikweert, 2000). Therefore, steps should be taken to improve current post-rape services in the Netherlands for adolescents, as they represent a critical window for intervention. One possible response to these gaps is the establishment of multidisciplinary sexual assault centers, as was suggested in prior research (Ensink & Van Berlo, 1999). The latter study demonstrated that victims of rape recovered relatively slowly and that they were confronted with post-rape services at various locations with waiting-lists (Ensink & Van Berlo, 1999).

The multidisciplinary approach consists of medical, psychological and forensic disciplines working together on one location with one or more persons coordinating services. There is evidence suggesting that a coordinated and integrated assistance is more effective than a non-integrated approach in two aspects: facilitating recovery from rape and increasing chances of apprehension of the offender (Campbell, Patterson, Adams, Diegel, & Coats, 2008; Campbell, Patterson, & Bybee, 2012). Recently, the awareness of the multidisciplinary approach in the management of acute rape has increased in the Netherlands among clinicians and policy makers (Goderie & Flikweert, 2012; Vanoni, Kriek, & Linneman, 2013). To date, multidisciplinary services for acute rape victims are available on four locations in the Netherlands. Results from a descriptive study among victims presenting at the sexual assault center in Utrecht showed that most victims were females between 12 and 25 years (Chapter 8), confirming that female gender and adolescence are the greatest risk factors for sexual assault (De Haas et al., 2012).

More centres may be needed to guarantee availability and accessibility throughout the Netherlands (see Figure 9.1). For comparison, Denmark has 8 sexual assault centers spread over the country and serving a population of approximately 5.4 million people (Bramsen, Nielsen, & Elklit, 2009). The supposed advantages of such a network of sexual assault centers are clarity for victims about where to go and reduced likelihood of victims dropping out of the system because they are frustrated by waiting-lists or large travel distance. A network also provides chances for campaigns to target those who are less likely to seek help, such as adolescents, males and ethnic minorities and to inform the general public about what post-rape services are helpful for (mental) health recovery. Among Dutch women who experienced sexual violence, 44.1% wanted professional help, but approximately half of these women also received help (Van Berlo & Höing, 2006). Thus, many victims did not receive help, although they felt a need for it. The possibility that this issue might be explained by lack of knowledge and experience of therapists, is worth consideration. There is evidence to suggest that only one third of patients with PTSD receive a trauma-focused treatment as recommended by international guidelines (Fernandez et al., 2007). Possibly, the availability of sexual assault centers may contribute in providing evidence based treatments and supporting its dissemination. It is of great importance that rape-related PTSD is treated effectively as there is evidence suggesting that PTSD symptomatology may enhance sexual assault victims' risk for revictimization via a number of mechanisms (Risser, Hetzel-Riggin, Thomsen, & McCanne, 2006).



**Figure 9.1** Conceptual network of (future) sexual assault centers in the Netherlands. CSG refers to Centrum Seksueel Geweld (= Sexual Assault Center).

### Considerations

Single rape victims are underrepresented in the literature. In general, rape is strongly related to a history of childhood sexual abuse and to sexual revictimization (Maker, Kemmelmeier, & Peterson, 2001; Littleton et al., 2009) and most studies on the psychological impact of sexual trauma include victims of multiple sexual victimisation. These studies rarely consistently describe the number and content of the negative sexual experiences that subjects were exposed to. Also, they often do not report the developmental period in which the event(s) took place, or the potential overlap of various types of sexual trauma. This makes it difficult to systematically and reliably explore relationships between type

of sexual trauma and symptomatology. In most studies, symptomatology assumed to be related to the index 'sexual trauma', may actually reflect the combined effects of multiple (sexual) traumas.

This dissertation focused on single rape victims. Its main findings – higher levels of psychological distress, hypocortisolism, and higher risk for sexual and pelvic floor problems compared to non-traumatized individuals – are comparable to results from previous research in chronic sexual abuse victims, suggesting that problems related to single rape are serious and should receive sufficient attention in prevention and treatment strategies. Moreover, taking into account that adolescent victimization predicts later victimization (Littleton et al., 2009), many of our patients may have experienced new rapes by now. Conversely, it appeared that a large proportion of rape victims who presented at the sexual assault center reported prior sexual trauma. So, perhaps single rape does not exist. As multiple sexual victimization is the norm rather than exception, it may be better to use the term 'first time rape' instead of 'single rape'.

### **Future research**

PTSD constitutes a major, individual, societal and economic burden on a yearly basis (Olf, Langeland, & Gersons, 2005). Prevention of PTSD gained much attention in recent decades, but at present, there is no clear evidence-based preventive intervention for acutely traumatized individuals (Sijbrandij, Olf, Reitsma, Carlier, & Gersons, 2006). Clinical guidelines and expert consensus mainly suggest what should not be done in the acute aftermath of trauma (NICE, 2005). At the same time, clinically and scientifically there is a call for new initiatives in early preventive interventions for trauma survivors. The relatively high risk to develop Posttraumatic Stress Disorder (PTSD) after rape with rates up to 40% (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992) justifies further research on early preventive interventions in rape victims. Prior studies in adults showed evidence supporting the effect of EMDR and a brief CBT intervention in the recovery after assault (Foa, Zoellner, & Feeny, 2006; Tarquinio, Brennstuhl, Reichenbach, Rydberg, & Tarquinio, 2011). Future treatment studies should include adolescents who are most at risk for rape and subsequent PTSD. One possibility would be to compare the relative effectiveness of EMDR versus a shortened version of individual STEPS. Both have specific advantages: EMDR poses minimal strain on patients, while STEPS is specifically designed for rape victims. Such study will also enhance research knowledge with regard to acute psychological relief, aftercare of rape victims and the alteration of traumatic memories.

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# 10

Samenvatting en  
algemene discussie

## INTRODUCTIE

Een verkrachting is helaas een ervaring die een aanzienlijk deel van de adolescenten ondergaat, ook in Nederland (De Haas, Van Berlo, Bakker, & Vanwesenbeeck, 2012; Tjaden & Thoennes, 2006). Het meemaken van een verkrachting kan negatieve en langdurige gevolgen hebben op de mentale, fysieke en seksuele gezondheid van slachtoffers (Linden, 2011; Postma, Bicanic, Van der Vaart, & Laan, 2012; Rees et al., 2011).

Het onderzoek in dit proefschrift richt zich op de psychologische en neurobiologische aspecten van verkrachting in de adolescentieperiode, voor en na traumabehandeling. Aan de basis van dit onderzoek liggen a) aanwijzingen dat adolescenten meer risico hebben dan personen uit andere leeftijdsgroepen om slachtoffer te worden van een verkrachting; b) indicaties dat het meemaken van een verkrachting kan leiden tot ernstige gevolgen voor de (mentale) gezondheid; c) aanwijzingen dat het meemaken van een verkrachting de kans op herhaald seksueel geweld (zgn. revictimisatie) verhoogt; d) de veronderstelling dat slachtoffers van trauma's zoals verkrachting en chronisch seksueel misbruik overeenkomsten hebben wat betreft psychopathologie en functioneren van het stress-systeem; en e) aangetoonde tekortkomingen in de multidisciplinaire zorg na een verkrachting in Nederland, in het bijzonder voor adolescenten.

Het doel van dit proefschrift is om een algemeen beeld te verkrijgen van de psychologische en neurobiologische aspecten van verkrachting in de adolescentie, zowel voor als na traumabehandeling. Het onderzoek richt zich specifiek op adolescente slachtoffers van eenmalig seksueel geweld, die niet eerder seksueel misbruik op de kinderleeftijd hebben meegemaakt. Ondanks dat er al veel psychologisch en biologisch onderzoek is verricht bij slachtoffers van seksueel misbruik, zijn adolescente slachtoffers van eenmalig seksueel geweld niet eerder psychobiologisch onderzocht. Dit hoofdstuk biedt een samenvatting van de belangrijkste resultaten van dit proefschrift en een discussie.

## SAMENVATTING VAN DE BELANGRIJKSTE RESULTATEN

### **Beschrijving van 323 adolescente slachtoffers van eenmalig seksueel geweld**

Tussen 2005 en 2011 zijn de demografische en psychologische data verzameld van 323 vrouwelijke adolescenten tussen 12 en 25 jaar oud, met een gemiddelde leeftijd van 16.7 jaar ( $SD = 2.7$ ), die psychische hulp zochten bij het Landelijk Psychotraumacentrum voor

Kinderen en Jongeren in het UMC Utrecht (UMCU) omdat zij slachtoffer waren van eenmalig seksueel geweld. Slachtoffers van chronisch seksueel misbruik werden verwezen naar andere GGZ-instellingen. Hulpzoekende mannelijke adolescenten meldden zich ook bij het centrum, maar de omvang van de groep was te klein om onderzoeksvragen te beantwoorden. **Hoofdstuk 2** laat de demografische- en traumakaracteristieken en het psychologisch functioneren van de geïncludeerde patiëntengroep zien. De groep scoorde hoog op psychologische klachten, vergelijkbaar met normscores van psychiatrische patiënten, dus ook terwijl het trauma een eenmalige negatieve seksuele ervaring betrof. De meerderheid had een verkrachting meegemaakt door een voor hen bekend mannelijk persoon, die geen familielid was. De relatie tot de dader werd meestal beschreven als zijnde een (ex)vriend of kennis in dezelfde leeftijdscategorie, ook wel bekend als ‘peer-on-peer sexual victimization’. Bijna een derde van de patiënten gaf aan door een onbekende te zijn verkracht, wat in lijn is met resultaten uit een recente Nederlandse prevalentiestudie (De Haas et al., 2012). Uit eerder onderzoek is bekend dat slachtoffers van een onbekende dader (het stereotype beeld van verkrachting) de gebeurtenis vaker als serieus beschouwen en daarom eerder hulp zoeken dan slachtoffers van een bekende dader (Smith et al., 2000; Resnick et al., 2000). De onthulling van de gebeurtenis werd meestal gedaan aan een vriend of leeftijdsgenoot, een uitkomst die in overeenstemming is met eerder onderzoek (Fehler-Cabral & Campbell, 2013). Slachtoffers onthulden na gemiddeld 20.8 weken ( $SD = 56.8$ , range 1 – 624 weken).

### Voorspellers voor vertraagde onthulling van een verkrachting

Tevens werd in **Hoofdstuk 2** de patiëntengroep ( $n = 323$ ) gecategoriseerd in twee subgroepen, te weten ‘vroege onthullers’ (personen die onthulden binnen één week na de verkrachting,  $n = 185$ ) en ‘vertraagde onthullers’ (personen die onthulden na één week,  $n = 131$ ). De vertraagde onthullers bleken, ten opzichte van de vroege onthullers, significant minder vaak medische hulp te zoeken en significant minder vaak aangifte te doen. Dit is in lijn met eerdere studies (Ullman, 1996; Ullman & Filipas, 2001; Ahrens, Stansell, & Jennings, 2010). Het vertraagd onthullen heeft mogelijk niet alleen implicaties voor het niet tijdig ontvangen van medische hulp (zoals de behandeling van anogenitale verwondingen, de preventie van Seksueel Overdraagbare Aandoeningen (SOA's), HIV en ongewenste zwangerschap (Linden, 2011)), maar hindert ook forensisch onderzoek, en daarmee de eventuele aanhouding en veroordeling van de dader (Lacy & Stark, 2013). Er werd geen significant verschil gevonden tussen vroege en vertraagde onthullers in psychologisch functioneren en de benodigde tijd om professionele hulp te zoeken.

De resultaten van de logistische regressie analyse van mogelijk voorspellende factoren lieten zien dat jonge adolescenten,  $OR = 2.05$ , 95%  $CI = [1.13-3.73]$ , adolescenten bij wie sprake was van penetratie  $OR = 2.36$ , 95%  $CI = [1.25-4.46]$ , en adolescenten die verkracht waren door een nabij persoon,  $OR = 2.64$ , 95%  $CI = [1.52-4.60]$  een verhoogd risico liepen op vertraagd onthullen, en daarmee ook op het later ontvangen van medische en forensische zorg. Echter, slechts 10.5% van de vertraagde onthulling wordt verklaard door deze factoren; dit benadrukt de noodzaak tot verder onderzoek naar andere factoren die het tijdsmoment van onthullen beter kunnen voorspellen, zoals het gebruik van alcohol door de dader en/of slachtoffer, een minder steunend familiesysteem en verwachte negatieve sociale reacties op de onthulling.

### **Behandeling van psychologische stress na seksueel geweld**

STEPS is een traumagerichte Cognitieve Gedragstherapie (CGT) voor slachtoffers van eenmalig seksueel geweld en hun ouders, bestaande uit psycho-educatie, narratieve exposure (schrijven en vertellen over de gebeurtenis), exposure in vivo (oefeningen om vermijdingsgedrag te verminderen), cognitieve herstructurering en terugvalpreventie. CGT is al langer dan een decennium de eerste behandelkeuze voor kinderen met een Post Traumatische Stress Stoornis (PTSS) (NICE 2005; WHO, 2013). STEPS kan individueel of in een groep worden toegepast. In **Hoofdstuk 3** hebben wij de STEPS-groepsbehandeling geëvalueerd in een ongecontroleerde studie, die werd uitgevoerd binnen het Landelijk Psychotraumacentrum voor Kinderen en Jongeren en het Psychotraumacentrum GGZ Kinderen en Jeugd Rivierduinen. STEPS is ingezet bij vrouwelijke adolescenten ( $n = 55$ ) met psychische problemen na eenmalig seksueel geweld, die geen verleden van seksueel trauma hadden. Hun ouders namen deel aan een parallelle begeleidingsgroep. Symptomen gerelateerd aan het seksueel geweld werden voor en na behandeling gemeten, alsook na zes en twaalf maanden na behandeling. Direct na STEPS werd voor de verschillende uitkomstmaten (posttraumatische stress, angst, depressie, internaliserende en externaliserende problemen) een substantiële verbetering vastgesteld, die behouden bleef bij twaalf maanden follow-up. Deze afname werd niet door 'tijd sinds trauma' beïnvloed. Samen met een slechts twee procent uitvalpercentage, wijzen deze resultaten voorzichtig in de richting van de effectiviteit van groeps-CGT voor adolescente slachtoffers van eenmalig seksueel geweld. Echter, de helft van de groep is behandeld in een periode waarin natuurlijk herstel plaats kan vinden. Het is daarom mogelijk dat de behandeling vooral goed werkt voor die patiënten met meer chronische symptomen, terwijl het minder chronische deel van

de groep ook zelfstandig zou kunnen herstellen. Om sterke conclusies over effectiviteit te kunnen trekken is een gerandomiseerde en gecontroleerde studie nodig. Verder onderzoek naar effectieve behandeling is bovendien essentieel, omdat onderzoek tot nu toe suggereert dat een succesvolle therapie kan dienen als een beschermende factor tegen revictimisatie (Humphrey & White, 2000).

In **Hoofdstuk 4** zijn het seksueel functioneren en de bekkenbodempunctie bepaald bij jongvolwassenen met een gemiddelde leeftijd van 20.9 jaar ( $SD = 1.9$ ) die als adolescent een eenmalige verkrachting hebben meegemaakt ( $n = 89$ ), en bij niet-getraumatiseerde controlepersonen ( $n = 114$ ). Alle slachtoffers waren in het verleden voor PTSS behandeld met CGT of Eye Movement Desensitisation Reprocessing (EMDR). De gemiddelde tijd tussen de traumabehandeling en de deelname aan deze studie betrof 3.32 jaar ( $SD = 1.75$ ). Ondanks eerdere behandeling bleken slachtoffers 2.4 keer zo vaak een seksuele disfunctie te hebben (met name lubricatieproblemen en pijn bij het vrijen) en 2.7 zo vaak bekkenbodempunctieproblemen te hebben in vergelijking met niet-getraumatiseerde controlepersonen. De kans op seksuele disfunctie bij de groep getraumatiseerde patiënten is mogelijk verhoogd door de aanwezigheid van bekkenbodempunctieproblemen, die een gevolg zijn van de verkrachting. Een mogelijke verklaring voor de bevindingen is dat de lichamelijke manifestaties van PTSS niet zijn meegenomen in de traumabehandeling. Aangezien patiënten niet zijn bevraagd over het seksueel functioneren en de bekkenbodempunctie op het moment van de oorspronkelijke aanmelding in het Psychotraumacentrum, is het daarnaast ook niet bekend of de seksuele- en bekkenbodempunctieproblemen al voor de verkrachting bestonden, of direct na de verkrachting zijn ontstaan. Het is aannemelijk dat dit type problemen afwezig of verborgen zijn tot in de volwassenheid.

### **Het biologisch stress-systeem van slachtoffers van seksueel trauma**

Een verkrachting is zonder meer een beangstigende ervaring die de “stress-as”, de hypothalamus-hypofyse-bijnier-as (HHB-as), activeert. In **Hoofdstuk 5** onderzochten wij de relatie tussen seksueel misbruik en het functioneren van het biologische stress-systeem bij kinderen en jongeren die seksueel misbruik hebben meegemaakt. Hiervoor hebben wij een review uitgevoerd van de bestaande literatuur over dit onderwerp gepubliceerd tussen 1990 en 2007. Wat betreft het functioneren van het sympathische zenuwstelsel is er duidelijk bewijs gevonden voor de aanwezigheid van een hogere baseline activiteit van dit systeem in seksueel misbruikte kinderen en adolescenten. De bevindingen uit onderzoek naar de HHB-as ((re)activiteit) zijn echter gevarieerd en tegenstrijdig, mogelijk als gevolg

van methodologische tekortkomingen en verschillen in het ontwikkelingsniveau van het neuroendocriene systeem van de slachtoffers. Ten eerste blijkt het lastig om proefpersonen te identificeren die uitsluitend seksueel misbruik hebben meegemaakt, aangezien chronisch seksueel misbruik vaak voorkomt in systemen waarbinnen ook affectieve verwaarlozing plaatsvindt. Ten tweede blijkt dat de meeste studies traumaspecifieke variabelen die invloed hebben op uitkomstmaten, niet hebben gespecificeerd of gemeten. Ten derde werden alle studies gekenmerkt door een kleine populatie en hadden dus een beperkte statistische zeggingskracht, wat tevens de mogelijkheden beperkte om de effecten van leeftijd en geslacht te onderzoeken. Tenslotte is niet in alle studies rekening gehouden met factoren waarvan bekend is dat zij het neuroendocriene systeem verstoren. De review is afgesloten met de aanbeveling om toekomstige biologische studies op eenduidige wijze uit te voeren.

In **Hoofdstuk 6** is het functioneren van de HHB-as in een homogene groep adolescente patiënten met PTSS als gevolg van een eenmalige verkrachting ( $n = 52$ ) vergeleken met die van niet-getraumatiseerde controles ( $n = 37$ ). De resultaten laten zien dat adolescenten met PTSS als gevolg van een verkrachting lagere niveaus van de stresshormonen cortisol en Dehydroepiandrosterone Sulfate (DHEAS) hebben dan niet-getraumatiseerde controle personen, hetgeen een dysregulatie van het functioneren van de HHB-as impliceert. De vaststelling van 'hypocortisolisme' bij adolescente slachtoffers van verkrachting komt overeen met resultaten uit onderzoek bij slachtoffers van chronisch seksueel misbruik (Stein, Yehuda, Koverola, & Hanna, 1997; Meewisse, Rietsma, De Vries, Gersons, & Olff, 2007; Bremner, Vermetten, & Kelley, 2007; Kellner et al., 2010). Dit suggereert dat de biologische ontregeling niet *per se* hoeft te verwijzen naar de werkelijke en langdurige aanwezigheid van een stressor, bijvoorbeeld de dader of (seksueel) geweld, maar dat dit het gevolg kan zijn van een eenmalig seksueel geweldservaring. Bij een subgroep van de patiënten die deelnamen aan de studie naar het basaal functioneren van de HHB-as ( $n = 21$ ) zijn ook direct na de traumabehandeling (CGT of EMDR) psychologische en neuroendocriene uitkomsten gemeten. De resultaten na de behandeling, beschreven in **Hoofdstuk 7**, laten zien dat de ernst van de PTSS en depressiesymptomen minder was dan voor de behandeling. Bij 86% van de patiënten kon na de behandeling geen PTSS diagnose meer worden vastgesteld. Na de behandeling werd tevens een significante verhoging van het DHEAS niveau gevonden vergeleken met de situatie voor de behandeling. Dit was niet significant het geval voor het cortisolniveau. Echter, wanneer we de biologische uitkomsten na behandeling vergeleken met de niveaus van cortisol en DHEAS van niet-getraumatiseerde controles ( $n = 37$ ), eerder beschreven in **Hoofdstuk 6**, dan bleken die vergelijkbaar (of 'genormaliseerd') te zijn. Met het toegepaste onderzoeksdesign is het niet mogelijk om causale verbanden vast te leggen en onderliggende mechanismen te ontrafelen

met betrekking tot de effecten van traumagerichte behandeling op de HHB-as. Desondanks suggereren de resultaten dat de HHB-as kan normaliseren na traumagerichte behandeling van PTSS. Gerandomiseerd en gecontroleerd onderzoek met herhaalde metingen van de stresshormonen is nodig om met zekerheid vast te stellen dat traumagerichte behandeling effectief is in de verandering van het functioneren van de HHB-as.

### **Het eerste Centrum Seksueel Geweld in Nederland**

In januari 2012 werd binnen het Universitair Medisch Centrum Utrecht het eerste Centrum Seksueel Geweld in Nederland opgericht voor acute slachtoffers van verkrachting ongeacht de leeftijd. In dit centrum werken medische, forensische en psychologische disciplines samen onder één dak. Vanaf januari 2012 tot en met september 2013 werden van 108 acute slachtoffers van verkrachting de demografische gegevens verzameld alsmede de gegevens over hun gebruik van de zorg na verkrachting, met als doel om het huidige aanbod van het centrum te verbeteren. De resultaten, weergegeven in **Hoofdstuk 8**, betreffen slachtoffers die zich binnen één week na de verkrachting meldden bij het Centrum Seksueel Geweld. De resultaten laten ten eerste zien dat de meeste slachtoffers meisjes en vrouwen zijn tussen 12 en 25 jaar, die een verkrachting hebben meegemaakt door een mannelijke volwassene. Ten tweede rapporteerde een substantieel deel van de groep dat zij eerder misbruik en mishandeling heeft meegemaakt, eerder gebruik maakte van hulpverlening en niet bij beide ouders woont. Van deze factoren is bekend dat zij het risico op PTSS en revictimisatie verhogen (Walsh et al., 2012; Classen, Paresh, & Aggarwal, 2005; McLaughlin et al., 2013). Daarom is adequate psychologische hulp essentieel voor deze patiëntengroep om herhaald slachtofferschap te voorkomen en psychisch herstel te bevorderen. Zeventig procent van de patiënten maakte, ondanks hun belaste voorgeschiedenis of huidige situatie, gebruik van alle drie de disciplines (medisch, forensisch en psychologisch), wat mogelijk betekent dat het geïntegreerde aanbod goed aansluit bij de behoeftes van slachtoffers. Een derde van de slachtoffers deed aangifte bij de politie. Dit percentage ligt hoger dan het landelijke percentage van 10% voor aangifte na een vermeend zedendelict (Merens, Hartgers, & Van den Brakel, 2012). Wat betreft verbeteringen in het aanbod van het centrum kan de psychologische hulp worden geïntensiveerd door het bieden van vroegtijdige traumagerichte behandelmethodes in plaats van ‘watchful waiting’. Verbetering van de forensische diensten kan onder andere bereikt worden door het inzetten van standaard top-tot-teen forensisch-medisch onderzoek voor zowel kinderen en jongeren als voor volwassenen.

## ALGEMENE DISCUSSIE

### Belangrijkste uitkomsten

Eerdere studies hebben al aangetoond dat vrouwelijke adolescenten kwetsbaar zijn voor het meemaken van een verkrachting en het ontwikkelen van daaropvolgende psychopathologie zoals PTSS (Littleton, Axsom, & Grills-Taquechel, 2009; McLaughlin et al., 2013). De studies in dit proefschrift dragen bij aan de bestaande literatuur dankzij de bevindingen dat adolescente vrouwelijke slachtoffers van eenmalig seksueel geweld vergeleken met niet-getraumatiseerde controle personen een hoge mate van psychologische stress rapporteren, en een ontregeld biologisch stress-systeem hebben, welke na trauma-behandeling lijken te normaliseren. Deze bevindingen komen in grote lijnen overeen met resultaten uit eerdere studies bij slachtoffers van chronisch seksueel misbruik. Hoewel bij 30% van de patiëntengroep ( $n = 323$ ) sprake was van een 'stereotypische' verkrachting (e.g., onbekende dader, dreiging met wapen, verwondingen), was bij het overgrote deel sprake van 'peer-on-peer sexual victimization'. Daarnaast bleken jongere adolescenten die verkracht zijn door een nabij persoon een hoger risico te hebben op een vertraagde onthulling van deze gebeurtenis dan oudere adolescenten of adolescenten die een aanranding hebben meegemaakt of verkracht zijn door een onbekende. In aanvulling daarop is gebleken dat de vertraagde onthullers minder vaak gebruik maakten van medische zorg en minder vaak aangifte deden, dan slachtoffers die binnen één week onthullen. Tevens blijken jongvolwassenen die als adolescent een eenmalige verkrachting hebben meegemaakt meer seksuele en bekkenbodemp Problemen te rapporteren dan niet getraumatiseerde controle personen. In een evaluatie van het hulpaanbod van het multidisciplinaire Centrum Seksueel Geweld in Utrecht bleek de meerderheid van de acute slachtoffers te bestaan uit vrouwelijke adolescenten tussen 12 en 25 jaar, die al eerder getraumatiseerd waren, bekend waren met eerdere hulpverlening en niet bij hun ouder(s) woonden. Deze combinatie van factoren maakt hen 'at risk' voor verwerkingsproblemen en revictimisatie, en rechtvaardigt de inzet van vroegtijdige traumabehandeling.

### Klinische implicaties

Verkrachting in de adolescentiefase kan een ernstig probleem zijn met gevolgen vergelijkbaar met die van herhaald of langdurig seksueel misbruik. Het is dan ook van groot belang om het publieke bewustzijn betreffende de potentiële impact van eenmalig seksueel

geweld op de (mentale) gezondheid, maar ook om de kennis over het psychisch herstel en effectief bewezen traumabehandelingen zoals CGT en EMDR, te vergroten. In Nederland weten slachtoffers van een verkrachting vaak niet waar zij gespecialiseerde hulpverlening kunnen vinden (Höing, Van Engen, Ensink, Vennix, & Vanwesenbeeck, 2003). De hulpverlening voldoet in het bijzonder voor adolescenten niet aan de gestelde maatstaven (Melief, Verkuyl, & Flikweert, 2000). Het zou goed zijn om het huidige hulpaanbod na seksueel geweld in Nederland te verbeteren. Een mogelijke weg daartoe is het opzetten van een multidisciplinair Centrum Seksueel Geweld conform het Rape Center model, wat al in eerder onderzoek is aanbevolen (Ensink & Van Berlo, 1999). Ensink en Van Berlo (1999) toonden aan dat Nederlandse slachtoffers van een acute verkrachting relatief langzaam herstelden. Dit werd gerelateerd aan het feit dat zij geconfronteerd werden met versnipperde hulpverlening op verschillende locaties, wachtlijsten en onvoldoende expertise.

De multidisciplinaire aanpak bestaat uit een samenwerking tussen de medische, psychologische en forensische disciplines op één locatie, met één persoon die de zorg coördineert. Eerder onderzoek in de VS toonde aan dat gecoördineerde en geïntegreerde hulpverlening meer effectief is dan een niet geïntegreerde aanpak op twee punten: het faciliteren van herstel na een verkrachting en het vergroten van de kans op aanhouding van de dader (Campbell, Patterson, Adams, Diegel, & Coats, 2008; Campbell, Patterson, & Bybee, 2012). In Nederland zijn hulpverleners en beleidsmakers steeds meer overtuigd geraakt dat een multidisciplinaire aanpak in de acute hulpverlening na een verkrachting van meerwaarde is voor slachtoffers (Goderie & Flikweert, 2012; Vanoni, Kriek, & Lineman, 2013). Op dit moment worden multidisciplinaire hulp en onderzoek direct na een verkrachting aangeboden op vier locaties in Nederland: Utrecht, Nijmegen, Limburg en Amsterdam (de laatste voor slachtoffers die (de intentie hebben om) aangifte (te) doen). Om de toegankelijkheid en beschikbaarheid van geïntegreerde hulp in heel Nederland te garanderen, zijn meer centra nodig (zie voorbeeld Figuur 10.1). Ter vergelijking, Denemarken heeft acht Centra Seksueel Geweld verspreid over het land en bedient daarmee een bevolking van ongeveer 5,4 miljoen mensen (Bramsen, Nielsen, & Elklit, 2009). De veronderstelde voordelen van een dergelijk netwerk van Centra Seksueel Geweld zijn duidelijkheid voor slachtoffers waar zij terecht kunnen in de acute fase, centralisatie van zorg, toegenomen kwaliteit van zorg door bundeling van expertise, en een verminderde kans dat slachtoffers zich aan hulp onttrekken vanwege frustratie over wachtlijsten en reistijden. Een netwerk biedt tevens kansen om gezamenlijk campagnes op te zetten gericht op groepen die minder snel hulp zoeken, zoals mannen en etnische



**Figuur 10.1** Voorstelling van potentieel landelijk netwerk van Centra Seksueel Geweld.

minderheden. Een andere groep die niet snel hulp zoekt bestaat uit adolescenten die het slachtoffer worden van een bekende dader, maar zichzelf niet als slachtoffer erkennen ('peer-on-peer sexual victimization'). Tevens kunnen campagnes het algemene publiek informeren over de professionele hulp na seksueel geweld. Van de Nederlandse vrouwen die seksueel geweld hebben meegemaakt, wilde 44% professionele hulp bij de verwerking, maar ongeveer de helft van deze vrouwen heeft ook daadwerkelijk hulp ontvangen in de GGZ (Van Berlo & Höing, 2006). Kortom, veel slachtoffers krijgen nu geen effectief bewezen traumabehandeling in Nederland, alhoewel ze deze wel willen. De mogelijkheid dat dit verklaard kan worden vanuit een gebrek aan kennis en ervaring van therapeuten,

verdient overweging. Dit zou dan niet alleen voor Nederland gelden. Ook in andere Europese landen zou slechts een derde deel van de patiënten met PTSS een traumagerichte behandeling volgens de internationale richtlijnen krijgen (Fernandez et al., 2007). De aanwezigheid van Centra Seksueel Geweld kan bijdragen aan het voorzien en verspreiden van evidence-based traumabehandeling. Het is van groot belang dat PTSS als gevolg van een verkrachting effectief wordt behandeld gezien de aanwijzingen dat de aanwezigheid van PTSS-symptomen het risico op revictimisatie, via verschillende mechanismen, verhogen (Risser, Hetzel-Riggin, Thomsen, & McCanne, 2006).

### Overwegingen

Slachtoffers van eenmalig seksueel geweld zijn ondervetegenwoordigd in de wetenschappelijke literatuur. Hoe kan dat worden verklaard? Over het algemeen is er een sterke relatie tussen seksueel geweld in de adolescentie, eerder seksueel misbruik in de kindertijd en seksuele revictimisatie in de volwassenheid (Maker, Kimmelmeier, & Peterson, 2001; Littleton et al., 2009). De meeste onderzoeken naar de psychologische impact van seksueel trauma includeren slachtoffers van meervoudige seksuele victimisatie. Deze studies beschrijven vaak niet consistent het aantal en de inhoud van de negatieve seksuele ervaringen waaraan slachtoffers zijn blootgesteld, noch rapporteren zij over de ontwikkelingsfase waarin de gebeurtenis(sen) plaats vonden, of de eventuele overlap van verschillende typen seksueel trauma. Dit maakt het moeilijk om op systematische en betrouwbare wijze de relaties tussen het type seksueel trauma en de symptomatologie te onderzoeken. In veel studies weerspiegelt de symptomatologie die wordt verondersteld verband te houden met de index 'seksueel trauma', de gecombineerde effecten van meervoudige (seksuele) trauma's.

Dit proefschrift richt zich op slachtoffers van een eenmalige verkrachting. De belangrijkste bevindingen – hoge niveaus van psychologische stress, 'hypocortisolisme' en een hoger risico op seksuele- en bekkenbodemp Problemen vergeleken met niet-getraumatiseerde individuen, maar ook verhoogd risico op vertraagde onthulling voor subgroepen – zijn vergelijkbaar met resultaten uit eerder onderzoek bij slachtoffers van chronisch seksueel misbruik. Dit impliceert dat problemen, gerelateerd aan een eenmalige verkrachting, ernstig zijn en voldoende aandacht behoeven in preventie- en behandlungsstrategieën. Mogelijk hebben – in aanmerking genomen dat seksueel geweld tijdens de adolescentie toekomstige victimisatie voorspelt (Littleton et al., 2009) – sommige van onze patiënten inmiddels opnieuw seksueel geweld meegemaakt. Andersom bleek dat een groot deel

van de slachtoffers van verkrachting die zich meldden bij het Centrum Seksueel Geweld eerder seksueel trauma rapporteerden. Wellicht bestaat het fenomeen van een 'eenmalige verkrachting' dus niet. Wanneer meervoudige seksuele victimisatie eerder de norm dan uitzondering is, dan verdient de term 'eerste verkrachting' misschien de voorkeur boven 'eenmalige verkrachting'.

### **Toekomstig onderzoek**

PTSS vormt een belangrijke, individuele, maatschappelijke en economische last (Olf et al., 2005). Preventie van PTSS heeft de laatste decennia veel aandacht gekregen, maar tot op heden is er geen heldere evidence-based interventie voor acuut getraumatiseerde personen (Sijbrandij, Olf, Reitsma, Carlier, & Gersons, 2006). Klinische richtlijnen suggereren voornamelijk wat hulpverleners niet moeten doen in de nasleep van het acute trauma (NICE, 2005). Tegelijkertijd is er in het klinische en wetenschappelijke veld behoefte aan nieuwe initiatieven op het gebied van vroegtijdige preventieve interventies voor traumaslachtoffers. Het relatief hoge risico om een PTSS te ontwikkelen na een verkrachting met percentages tot wel 40% (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992), en de verhoogde kans op PTSS onder vrouwelijke slachtoffers (Olf et al., 2007), rechtvaardigt toekomstig onderzoek naar vroegtijdige preventieve interventies bij slachtoffers van verkrachting. Eerdere studies bij volwassenen boden ondersteunend bewijs voor het effect van EMDR en een korte CGT- interventie in de herstelfase na verkrachting (Foa, Zoellner, & Feeny, 2006; Tarquinio, Brennstuhl, Reichenbach, Rydberg, & Tarquinio, 2011). Toekomstige behandelstudies zouden adolescenten moeten includeren die het grootste risico hebben om een (nieuwe) verkrachting mee te maken en daaropvolgend PTSS te ontwikkelen. Een mogelijkheid zou zijn om de relatieve effectiviteit van EMDR te vergelijken met een verkorte versie van de individuele STEPS. Beiden hebben specifieke voordelen: EMDR vormt een minimale belasting voor patiënten, terwijl STEPS speciaal ontworpen is voor slachtoffers van seksueel geweld. Een dergelijke studie zal tevens de kennis vergroten van acute psychologische hulp en van veranderingen van traumatische herinneringen.

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**Dankwoord  
(Acknowledgements)**

Wie mij kent, weet dat samenwerken en samenzijn mij gelukkig maakt. In mijn eentje vind ik er weinig aan. In de tijd dat ik aan dit proefschrift heb gewerkt (van 2006 tot 2013), heb ik geweldige en inspirerende mensen ontmoet en vrienden gemaakt. Daardoor kon ik werken ‘con amore’. In dit dankwoord wil ik allen bedanken voor de belangrijke rol die zij hebben gespeeld.

Op de eerste plaats bedank ik de vele **patiënten en ouders** die hulp zochten in het Landelijk Psychotraumacentrum voor Kinderen en Jongeren UMC Utrecht en het Psychotraumacentrum GGZ Kinderen en Jeugd Rivierduinen en bereid waren om in de verschillende studies te participeren. Ik heb veel van jullie geleerd over de impact van seksueel geweld en nog meer over veerkracht. Het verzamelen van speeksel, de vragenlijsten en sms’jes, het viel niet altijd mee voor jullie. Hartelijk dank voor jullie deelname. Deze dank geldt uiteraard ook voor alle **personen in de controlegroep**. Door jullie deelname was het mogelijk om meer te weten te komen over het onderwerp seksueel geweld. Ondanks de titel van mijn proefschrift mogen lezers de vele **jongens en mannen** die ook seksueel geweld meemaken, niet vergeten.

Mijn dank gaat uit naar mijn promotor **prof. Edward Nieuwenhuis** voor zijn vertrouwen in en waardering voor mij. Jouw gevoel voor humor is groot en heeft ons contact sterk bepaald. Mijn tweede promotor, **prof. Miranda Olff**, wil ik bedanken voor de waardevolle hulp bij het opzetten van het onderzoeksdesign, en het meedenken over en interpreteren van de biologische bepalingen. Dat was best een worsteling. Dankjewel dat je mij introduceerde in de werkgroep trauma en neurobiologie. Ook op het einde was je er weer om mij te stimuleren het proefschrift af te ronden.

Lieve **Elise van de Putte**, we kennen elkaar al 10 jaar. Jij blijft een bijzondere vrouw. Je bent een ongekend harde werker met veel kwaliteiten en ook nog passies buiten het werk; daar kan ik nog veel van leren. Als co-promotor stond je mij met je innemende persoonlijkheid en onmisbare energie vanaf de start van het onderzoek terzijde. Je liet me vrij, maar je was er altijd met goede raad, support en belangstelling. Dankjewel dat je mijn enthousiasme en eigenwijsheid hebt begrepen.

Geachte leden van de leescommissie: **prof. van Aken, prof. Kleber, prof. Lamers-Winkelman, prof. Woertman, prof. Elzinga**. Ik wil u hartelijk danken voor uw tijd om mijn manuscript te beoordelen en voor uw bereidheid om zitting te nemen in de oppositie. **Prof. Elklit**, thank you for your prompt response when I asked you to be one of my opponents at the graduation ceremony. I feel honored with your presence.

**Prof. Sinnema**, beste **Gerben**, jij was de persoon die mij aanspoorde om mee te dingen naar de NWO-Mozaïek subsidie. Kijk eens waar je advies in heeft geresulteerd. Dank voor het vertrouwen. Je deur stond altijd open voor mij, ook toen je met emeritaat ging.

Lieve **Astrid**, ik heb het telegram bewaard dat ik van jou ontving direct na de honorering van de NWO-subsidie. Daarin schreef jij onder andere: “Ik zal er voor de volle 100% voor je zijn”. Echte Astrid-taal. Er is sindsdien geen dag voorbij gegaan dat ik je steun moest missen. Ook toen jij je eigen praktijk kreeg en je verder ontwikkelde, was je er voor mij en streed jij voor een goede afronding van mijn proefschrift. Natuurlijk ben jij mijn Nimfje op de grote dag. Jouw vriendschap is een cadeau, dat ik diep koester. We hebben al zoveel mooie plekken gezien en grenzen gepasseerd; ik hoop dat er nog veel bijkomen. Fijn dat jij naast me staat op 13 maart.

Lieve **Sasja**, onze kinderen waren ons voor in het sluiten van vriendschap. Het was Den Treek die ons dichterbij elkaar heeft gebracht. Hoeveel kilometers woorden hebben we gerend denk je, in al die jaren hardlopen? Onze gelijkenis van binnen en buiten zijn de andere ingrediënten voor het ontstaan van een hechte vriendschap. Het voelt vertrouwd als David en Rosa bij jullie in hun tweede huis zijn, dankjewel daarvoor. Want daardoor zorgde je ook voor mij(n) (proefschrift). Nu is het af en voelt het goed dat ik mijn belofte aan je moeder ben nagekomen. Dat jij als jurist de cortisolartikelen hebt geredigeerd is hartverwarmend. Fijn dat je op je verjaardag naast mij wilt staan als paranimf.

Lieve **Riemke Postma**, jij bent de katalysator geweest in mijn proces van promoveren. We hebben bijna 2000 buisjes speeksel staan etiketteren, waanzin achteraf. Je was zelfs bereid om de kostbare vracht zelf naar het laboratorium van prof. Kirschbaum in Dresden te rijden en was net zo zuinig op de data als ikzelf. Duizend maal dank voor je enorme inzet en loyaliteit, die ik nooit zal vergeten.

Mijn helden, engeltjes en bondgenoten van het Landelijk Psychotraumacentrum voor Kinderen en Jongeren UMC Utrecht. Lieve **Annemieke van de Perk**, **Astrid Kremers**, **Arend Groot**, **Jet Strijker**, **Liesbeth Vos**, **Huib Rohof**, **Maike van Schaijk**, **Eva Alisic**, **Hanneke Snetselaar**, **Tielke Stroeken** en **Petra Klaassen**: ik ben heel trots op ons PTC. We zijn klein, maar sterk. Met humor en oog voor elkaar, werken we al 10 jaar in het PTC. Bedankt voor de vele STEPS-groepen die jullie hebben gedraaid, de ontelbare vragenlijsten die door jullie handen zijn gegaan, de koffie en sapjes, jullie flexibiliteit, de aanmoedigingen, knipogen, en schouderklopjes. Ik heb veel gelezen over ‘social support’ en ja, het is echt waar: dat maakt het verschil. Bedankt, want zonder jullie support was de afronding niet gelukt.

Vele handen maken licht werk. Beste stagiaires, dank voor jullie tomeloze inzet voor het PTC en mijn onderzoek: **Lieve Hehenkamp, Erika Hooft, Senior Ostadi, Riemke Postma, Tielke Stroeken, Sanne Rooijmans, Melanie Meijer, Juul Gouweloos, Arlette Ponsioen, Anouk Visser, Roos Huijbregts, Fleur Botman, Maïke Smets, Suzanne Brands, Luc Brassé, Femmy Boersma, Saya Berkhout, Annika Verhage en Hanske Jonker**. Sommigen van jullie zijn coauteur op een artikel geworden, of collega (in het PTC). Met de meesten van jullie heb ik een warm lijntje gehouden.

**Free Verloop**, op deze plek wil ik mijn dank uitspreken voor uw trouwe betrokkenheid bij het PTC. **Prof. Wim Wolters**, fantastisch dat de Weijers Stichting, die als doel heeft de pediatrische psychologie te bevorderen, het symposium mede mogelijk maakt.

Beste collega's van de **Afdeling medische psychologie en maatschappelijk werk**, beste **Jaap Huisman**. Veel dank voor jullie interesse, tips en betrokkenheid, in het bijzonder ben ik dat verschuldigd aan het **secretariaat** en aan **Patricia Schwencke**, die mij heeft geïntroduceerd in het UMC Utrecht.

Lieve **Carlijn de Roos**, met mijn vraag of Rivierduinen mee kon doen aan het onderzoek, ging je direct naar je directie. Het lukte en je kreeg jouw collega's zover om STEPS te gaan toepassen. In die tijd stond ik regelmatig met mijn koelbox in Leiden om speekselbuisjes op te halen. Ik ben jou en je collega's dankbaar voor de wezenlijke bijdrage aan mijn onderzoek. Inmiddels zijn we jaren verder en is een bijzondere vriendschap gegroeid met een humorrijke vrouw, waar ik veel waardering voor heb. Je hebt mij met ontelbare "hup hup's" naar de finish geleid en daar wil ik je hier voor bedanken.

Lieve **Ad de Jongh**, jij hebt mij in de laatste fase van het proefschrift als geen ander geholpen en stelde hogere eisen aan de kwaliteit van onze hoofdstukken dan ikzelf. Je bent een bijzonder mens. Dankjewel daarvoor, en voor jouw hint om het prachtige beeld van Bernini te gebruiken voor de omslag. Het is net echt. Het proefschrift is af, maar gelukkig liggen er nog vele projecten op ons te wachten. Het is een feest om met jou te werken en ik koester onze vriendschap.

Dank je **Ellen Laan**, voor jouw bijdrage aan mijn proefschrift. Je bent een lieve collega om mee samen te werken en een groot voorbeeld voor vrouwen in de wetenschap en de seksuologie. Ik kijk uit naar een volgend gezamenlijk onderzoeksproject.

Dankjewel **Mariken Spuij** (Universiteit Utrecht) en **Luuc Smit** (Hogeschool Zeeland) dat we jullie studenten mochten benaderen voor deelname als proefpersoon in de controlegroep in het onderzoek over seksuele problemen.

Beste **Floryt van Wesel** en **Arjen van Wijk**, redders in statistische nood. Bedankt!

Tijdens het werken aan dit proefschrift ben ik kwaliteiten, maar helaas ook vele tekortkomingen tegengekomen in de hulp aan slachtoffers van seksueel geweld in Nederland. Het vaststellen van deze tekortkomingen is de inspiratie geweest voor de totstandkoming van het Centrum Seksueel Geweld (CSG). De collega's die, samen met het PTC, vanaf het begin betrokken zijn bij het CSG Utrecht wil ik hier hartelijk danken voor de altijd fijne samenwerking: **Gerda van Dunschoten, Ellen Graauwmans, Tania Mudrikova, Hans Berghout, Cock Overhand, Carolien Bouwman, Mienetta Groenendaal, Elise van de Putte, Ingrid Russel, Lonneke van Duurling, Anne van der Biezen, Sandra Nootenboom, Ria Mulders, Emile Kruyt** en **Satish Moekoet**. Onze lijnen zijn sterk en kort: een mail of sms is al voldoende om in actie komen.

Binnen het UMC Utrecht zijn velen langs de lijn betrokken bij het PTC en het CSG: **Jaco van Hornsveld, Dylan de Lange, prof. Andy Hoepelman, prof. Huub van der Vaart, Ingrid van Dijk, Frederique van Berkestijn, Esther Veldhoen, Louis Bont, Tom Wolfs, Petra Eland, Elly Doorn, Geoffrey Brouwer, Marjolein van Leusden, Babette de Graeff** en **Annemarie Laeven**. Hartelijk dank voor je betrokkenheid.

Op het pad van de voorgenomen landelijke uitrol van het CSG heb ik moedige en ervaren mensen ontmoet, die ik hiervoor bij naam wil bedanken: **Janet ten Hoope, Paul van den Eshof, Walter van Kleef, Rinske van der Bij, Elza Zijlstra, prof. Toine Lagro-Janssen, Anne-Marie Niekamp, Carlijn de Roos, Marie-Jose van Hoof, Maaïke van de Graaf, Marianne van Staa, Lennie Staats, Martine Reukers, Marijke Eppink, Marion Kreyenbroek, Gerda de Groot, Anke van Dijke, Linda Terpstra, Hannie Heemstra, Fetzen de Groot, Astrid van de Laarschot, Loni Ris, Eveline van der Heijden, Corine de Wals, Janet van Bavel, Yvonne Velthuizen, Peter Brouwer, Esther Schoonebeek, Pim Scholte, Anita de Lorijn, Aafke van der Hoop** en **Femke Schuurmans**. Jullie visie op de multidisciplinaire samenwerking voor slachtoffers van seksueel geweld is inspirerend, en heeft mij geholpen bij het schrijven van de discussie van mijn proefschrift. Ik ben ervan overtuigd dat we ons doel – een landelijk netwerk van centra waar acute slachtoffers van verkrachting direct terecht kunnen voor goede zorg en onderzoek onder één dak – zullen halen met een lange adem, bundeling van krachten en kwaliteitscriteria. Dat de ministeries van Veiligheid & Justitie, en VWS bereid zijn om deze ontwikkeling te stimuleren is betekenisvol en ik wil dan ook staatssecretaris **mr. Fred Teeven, Erik Schreijen, Aaf Tiems** en **Klaske van der Meulen** bedanken voor hun inspanningen tot dusver. We kijken uit naar de start van het stimuleringsproject. Bedankt **Regioplan** en

**Verweij-Jonker Instituut** voor het waardevolle onderzoek naar de meerwaarde van CSG Utrecht en Nijmegen.

Fonds Slachtofferhulp wil ik bedanken voor de steun bij de totstandkoming van dit proefschrift en de voorgenomen landelijke uitrol CSG: **Ineke Sybesma, Carlo Contino, Dusjka Stijfhoorn** en **Sandra Scherpenisse**. Jullie geloven erin en daarom werkt het. Fantastisch dat jullie achter mij en de multidisciplinaire aanpak staan.

Dit proefschrift zou er ook niet zijn geweest zonder het **PAOS-fonds. Prof. Vroom** en **prof. de Ru**, we hebben ‘een lijntje’ zonder elkaar te hebben gezien. Dat is best bijzonder. Ik hoop u op 13 maart persoonlijk te mogen ontmoeten.

De leukste werkgroep van Nederland: Werkgroep Trauma en Neurobiologie. **Ellen Klaassen, Carien de Kloet, Ronald Rijnders, Mariel Meewisse, Ethy Dorrepaal, Kathleen Thomaes, Miranda Olf, Mario Braakman, Eric Vermetten, Mirjam van Zuiden, Joanne Mouthaan, Mirjam Nijdam, Mirjam Rinne, Geert Smid, Bernet Elzinga, Joop de Jonge, Arthur Rademakers, Elbert Geuze** en vele anderen. Het is heerlijk om vrijuit met jullie te bomen over resultaten en designs en te lachen tijdens de vaste etentjes achteraf. Via de werkgroep kwam ik in contact met **dr. Assies** en **Anja Lok**, die mij hielpen ‘het fenomeen DHEAS’ beter te begrijpen, waarvoor dank. **Thomas Rinne**, ik ben jou in het bijzonder dankbaar voor de uren die je in 2006 voor me hebt uitgetrokken om mijn onderzoeksvoorstel met jou te bespreken.

Rutgers WPF, het onderzoek dat binnen jullie organisatie wordt gedaan is van groot belang voor Nederland. **Stans de Haas**, ik hoop van harte dat jij en ik alsnog een publicatie kunnen schrijven. **Willy van Berlo**, het onderzoek van jou en Bernardine Ensink uit 1999 is een prachtig werk en beschouw ik als één van de bouwstenen voor het CSG. Het zou interessant zijn om het onderzoek anno 2014 te herhalen. Van Movisie wil ik graag **Ina van Beek** bedanken voor het betrokken raken bij het Partnership Aanpak Seksueel Geweld. Tevens dank aan **Lou Repetur**: laten we ons sterk blijven maken voor mannelijke slachtoffers van seksueel geweld. En bedankt **Bart Schrieken** voor de samenwerking in de periode dat de Interapy behandeling voor adolescenten en STEPS ontwikkeld werden.

Beste KP-ers in opleiding, **Hanna Rosbergen, Mareille Schalkx, Sue Ma, Rob de Jong, Chantal Markink, Lydia van Stijn, Anouk Citroen, Karlijn Eppink, Conny Neumann, Maria Katee, Marga Boorsma, Thessa Mous, Mischa Franck** en **Monique Lutt**. Hè hè, gaat ze nu dan eindelijk een keer mee lunchen in de pauze? Ja! Dank dat jullie mij mijn gang lieten gaan én mij tegelijkertijd steunden.

Wat een vondst, Taskforce Effectieve Traumabehandeling Kind en Gezin: **Margreet Visser, Carlijn de Roos, Ramon Lindauer, Trudy Mooren, Anke van Dijke** en **Renée Beer**. In kindertraumaland valt veel te beleven en het is strategisch dat we ons verenigd hebben. Samen staan we sterk. Ik kijk uit naar het voortzetten van onze samenwerking.

Beste redactieleden van het **EMDR Magazine**, de nummers 3 en 4 zijn ontwikkeld rondom deadlines voor dit proefschrift, waar jullie steeds rekening mee hielden. Heel tof, bedankt. We gaan samen nog veel mooie nummers maken.

Beste leden van het **Ntvp-bestuur**, bedankt voor de opgedane bestuurservaring en samenwerking in de periode van 2009 tot 2013. Veel succes met het certificeringstraject.

**Renate Siebes**, wat een geluk heb ik gehad met jou als vormgever. Ik kon alles met een gerust hart bij jou neerleggen op de meest bizarre tijden. Ik kan je bij iedereen van harte aanbevelen.

Beste mannen en vrouwen van de **Beveiliging**. Dank dat jullie over mij waakten in de nachten dat ik in het WKZ werkte.

Dear colleagues from Denmark: **prof. Ask Elklit, Rikke Bramsen, Anja Jensen, Ole Ingemann-Hansen, Louise Hjort Nielsen, Rikke Sophie Bak**. Thank you very much for our long-distance friendship and telling us the secret about 'the glue'. It works. The history of the Sexual Assault Center in Utrecht goes back to 2007, when we met Rikke Bramsen at the ESTSS in Opatija, Croatia. Luckily, many exchange visits between Utrecht and Aarhus followed. Rikke, I feel grateful for your attendance at the graduation ceremony.

**Prof. Rebecca Campbell**, your inspiring presentation at the International Rape Conference in 2010 is still in the memory of many of us. Thanks for sharing with us your vision on how to work effectively with different disciplines. We will not forget the quotes of Ani DiFranco: "I know there is strength in the differences between us, I know there is comfort where we overlap".

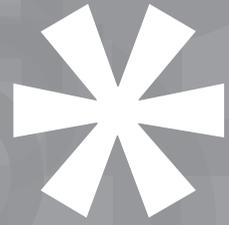
Mijn passie voor het onderwerp seksueel trauma is zonder twijfel ontstaan in het Kinder en Jeugd Trauma Centrum Haarlem. Dankjewel **Francien Lamers-Winkelman**, dat je mij hebt opgeleid en in contact hebt gebracht met andere inspirerende mensen in binnen- en buitenland. Mijn waardering voor jou is altijd groot geweest en de tijd bij jou heeft mij veel gebracht. Niet alleen kennis en gedrevenheid, maar ook een warme band met zeer gewaardeerde collega's **Janet van Bavel, Margreet Visser, Esther Verhees** en **Roset Hagens**.

Lieve **Lies**, Orion is ons nieuwe verbindingspunt vanuit Amersfoort en Pietermaritzburg. Dan maar zo... Ik zal je missen op 13 maart, maar het vooruitzicht op ons verblijf

in jullie paleisje maakt het gemis goed. Ik ben trots op je dat je je droom hebt verwezenlijkt. Lieve **Carlo**, je bent mijn trouwe vriend. Dankjewel dat je samen met **Sicco**, **Ruud** en **Leoniek** plaats hebt genomen in mijn persoonlijke leescommissie, die mij bediende van inhoudelijk commentaar. Lieve **Claradien**, friends forever. Lieve vrienden van het eerste uur: **Ruud & Marjolijn**, **Jaap & Carla**, **Geert & Mirry**, **Wouter & Inge**, dankjewel voor de band waarop ik altijd kan vertrouwen. Lieve **Esther** en **Roset**, alias 'de leukste dames', ik bof maar mooi met jullie en onze jaarlijkse traditie. Lieve **Meike** en **Elseline**, proost op 'une affaire du gout'. Mijn loopclubje, **Frank**, **Sasja** en **Robert**, dank voor jullie wijze raad, grappen en ideeën tijdens het jarenlange hardlopen. Lieve **Melanie**, petje af voor [www.kindenseksualiteit.nl](http://www.kindenseksualiteit.nl). Lieve **Wies & Bart**, **Hilde & Wieger**, **Inger & Bas**, **Frank & Mirjam**: jullie hebben mij menig maal geholpen als ik weer naar het WKZ ging om te werken. Onze kinderen hebben het altijd erg naar hun zin met jullie kinderen, dank voor de goede zorgen.

In mijn werk heb ik vooral ervaren hoe belangrijk support van familie is. Die heb ik zelf in ruime mate mogen ontvangen. Mijn grote dank gaat uit naar mijn lieve **tata i mama** die mij en mijn broer met onmetelijk veel liefde en bescherming hebben opgevoed. Dankzij jullie en de vanzelfsprekende structuur van thuis ben ik opgegroeid met optimisme en zelfvertrouwen. Dat is mijn 'magic charm, that I keep up my sleeve', waarmee ik heel veel aan kan. Lieve **Tim & Fen**, ik hoop dat in 2014 ook jullie wens uitkomt. Lieve **Geoff**, **Joke**, **Hannah** en **Oscar**, ik ben heel blij met jullie viertjes. Dear **Tihana**, thanks for being my favorite cousin. Dankjewel lieve **Dianne**, dat je altijd voor mij klaar staat, wat zou ik zonder jou moeten beginnen. In mijn gedachten is **Anton** er ook bij.

Liefste **Sicco**, ik heb het getroffen met jou. Jouw aanstekelijke gedrevenheid en vertrouwen in een goede afloop gaven mij moed om door te gaan op moeilijke momenten. Dankjewel daarvoor en voor je inhoudelijke support. Maar het grootste cadeau is de liefde die we elkaar en de kids al zo lang geven. Lieve **David** en **Rosa**, jullie hebben mij fantastisch geholpen met aftelkalenders, tekeningen van zonovergoten stranden en veel kroelen, dankjewel lieve schatten. Ik ben heel trots op jullie. Tijdens onze traditionele vrijdagmiddagborrel hebben we vaak gedold over de laatste regels van het dankwoord. "Eindelijk is mama er weer", "we kunnen nu weer uit eten/op vakantie gaan", etc. Maar nee... gelukkig hebben we weinig hoeven missen van elkaar. Onze goede gewoontes, grapjes en geluksmomenten waren er al die tijd. Ik heb jullie lief en ik kijk uit naar onze vakantie in Zuid-Afrika, waar we veel potjes Uno gaan spelen en mooie herinneringen gaan maken.



## Curriculum vitae

Iva Bicanic (1972) was born in Nijmegen, The Netherlands, where she grew up with her Croatian parents and brother. She received her secondary education at the Stedelijk Gymnasium in Nijmegen. In 1997, she graduated in Human Movement Sciences at the Vrije Universiteit Amsterdam. Since that time she got involved in treating victims of sexual abuse. She initially worked as a psychomotor therapist in the Children's and Youth Trauma Center in Haarlem under supervision of prof. Francien Lamers-Winkelman. Her interest in the field of psychotrauma further developed when she operated in refugee camps in former Yugoslavia. Iva was also a volunteer for 10 years at the Kindertelefoon Amsterdam and was closely involved in the treatment of victims of the Enschede Firework Disaster. Likewise, she is the co-author of treatment protocols developed for sexually abused children (Horizon) and adolescent victims of rape (STEPS), and has co-written three children's books about sexuality.

In 2002, Iva graduated in Psychology at the Vrije Universiteit Amsterdam. In 2005, she completed a 2-years post-graduate training at the University Medical Center Utrecht, Department of Pediatric Psychology, to qualify as a licensed healthcare psychologist ('gz-psycholoog'). Also in 2005, she received funding from the NWO Mosaic program for talented ethnic minority graduates. It is this very PhD grant that in 2006 has enabled the onset of the research described in this dissertation. The research was conducted at the National Psychotrauma Center for Children and Youth at the University Medical Center Utrecht. As the coordinator of this center since 2011, she combines coordinating activities with clinical work until today.

In 2012, the Sexual Assault Center for acute rape victims was founded at the University Medical Center Utrecht. Ever since, Iva is the center's coordinator, and the driving force behind the development of a national network of sexual assault centers. She regularly teaches about the topic of sexual trauma and the multidisciplinary approach in the management of rape. She is also member of the workgroup 'Trauma and Neurobiology', board member of the Dutch EMDR Association (VEN), and involved in the Taskforce 'Effectieve Traumabehandeling Kind en Gezin'. From 2009 until 2013, she was board member of the Dutch speaking Traumatic Stress Society and involved in the development of a certification program for professionals working with traumatized persons. In April 2012, she started a 4-years post-graduate training to become a clinical psychologist. Her next research project will focus on the effectiveness of EMDR in acute victims of rape.

Iva enjoys working, running and sunny holidays. She lives happily in Amersfoort with Sicco and their children Rosa (7) and David (10).



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