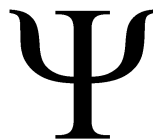




**DET PSYKOLOGISKE FAKULTET**



***Insomnia, Nightmare Frequency, and Nightmare Distress in Victims  
of Sexual Abuse: The Role of Abuse Characteristics and Perceived  
Social Support***

**HOVEDOPPGÅVE**

*profesjonsstudiet i psykologi*

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## Abstract

The aim of the present study was to investigate the role of abuse characteristics and perceived social support in self-reported insomnia, nightmare frequency and nightmare distress in victims of sexual abuse. *Method.* 460 sexual abuse victims in Norway completed a questionnaire assessing abuse characteristics, perceived social support, insomnia, nightmare frequency and nightmare distress, among other things. *Results.* Abuse involving intercourse was positively related to insomnia symptoms, while abuse duration was associated with fulfilment of the DSM-IV diagnostic criteria of insomnia. Abuse duration and having been threatened by the perpetrator were positively related to nightmare frequency, while threats and abuse involving intercourse were positively related to nightmare distress. Finally, perceived social support was negatively related to insomnia, nightmare frequency and nightmare distress. The results are discussed in relation to existing literature and theory.

Sexual abuse may be regarded as any sexual act to which the victim did not consent, could not consent, or was pressured or manipulated into consenting. The sexual act may comprise a range of behaviors such as touching and fondling, indecent exposure, intercourse, and attempted or completed rape. In a representative sample of Norwegian women, the prevalence of sexual abuse was found to be 14% (Schei, 1990). A review of epidemiological studies from 20 countries found a prevalence of 7-36% for women, and 3-29% for men (Finkelhor, 1994). Several methodological factors may explain the large variability in prevalence estimates across studies, such as different definitions of sexual abuse, sample characteristics, methods of data collection, and response rates (Briere & Elliot, 2002; Finkelhor, 1994; Vogeltanz et al., 1999).

The relationship between sexual abuse and psychological, interpersonal, and social problems is well documented. Studies and reviews have reported elevated prevalences of a variety of both short- and long-term symptoms in sexual abuse victims, for example post-traumatic stress disorder (PTSD) (Briere & Elliot, 2002; Kendall-Tackett, Williams, & Finkelhor, 1993; Molnar, Buka, & Kessler, 2001; Sarkar & Sarkar, 2005), suicidal ideation and/or behavior (Edgards & Ormstad, 2000), sexual dysfunctions, revictimization experiences (Beichtman et al., 1992; Paolucci, Genius, & Violato, 2001), sexualized behavior (e.g., seductive or sexually aggressive behavior, sexual play, masturbation or age-inappropriate sexual knowledge in children) (Beichtman, Zucker, Hood, DaCosta, & Akman, 1991; Wells, McCann, Adams, Voris, & Dahl, 1997; Wells, McCann, Adams, Voris, & Ensign, 1995), depression (Beichtman et al., 1992; Calam, Horne, Glasgow, & Cox, 1998; Paolucci et al., 2001), sleep disturbances (Bader, Schäfer, Schenkel, Nissen, & Schwander, 2007; Choquet, Darwes-Bornoz, LeDoux, Manfredi, & Hassler, 1997; Glod, Teicher, Hartman, & Harakal, 1997; Noll, Trickett, Susman, & Putman, 2006; Sadeh, Hayden, McGuire, Sachs, & Civita, 1993), reduced academic achievement, anger, aggression (Dubowitz, Black, Harrington, & Verschoore, 1993; Paolucci et al., 2001), somatic

symptoms/complaints (Barker-Collo, 1999; Choquet et al., 1997), poor self-concept, fear, anxiety (Beichtman et al., 1992; Fergusson, Boden, & Horwood, 2008), feelings of isolation and stigma, difficulties in trusting others, low self esteem (Finkelhor, 1990), nightmares, night terrors (Agargun et al., 2003; Cuddy & Belicki, 1992; Krakow, Schrader et al., 2002), self-destructive behavior, eating disorders (Edgardh & Ormstad, 2000; Mullen, Martin, Anderson, Romans, & Herbison, 1993), substance abuse (Goldston, Turnquist, & Knutson, 1989; Molnar et al., 2001; Mullen et al., 1993), and conduct/anti-social personality disorder (Fergusson et al., 2008).

The degree to which the symptoms can be attributed to the sexual abuse however, has been debated. Childhood sexual abuse for instance, occurs more frequently in children from disadvantaged family backgrounds (Fergusson et al., 2008; Molnar et al., 2001). In these cases, abuse often operates in concert with other pathogenic family and social circumstances which by themselves could contribute to the development of psychopathology, which raises the question of whether symptoms can be attributed solely to the sexual abuse (Bagley & Ramsay, 1986; Harter, Alexander, & Neimeyer, 1988; Mullen et al., 1993; Mullen, Martin, Anderson, Romans, & Herbison, 1994). A highly controversial contribution in this debate was a meta-analysis by Rind, Tromovitch and Bauserman (1998) in which the authors concluded that the negative impact of childhood sexual abuse had been highly overstated, and that poor adjustment following sexual abuse could not be explained by the abuse itself. Nevertheless, several studies have shown that sexual abuse exerts a unique contribution to adult psychopathology even after controlling for disadvantaged family backgrounds (Fergusson et al., 2008; Fleming, Mullen, Sibthorpe, & Bammer, 1999; Kendall-Tackett et al., 1993; Molnar et al., 2001; Mullen et al., 1993, 1994).

It has also been discussed whether the symptomatology reported by sexual abuse victims can be conceptualized as some kind of post-sexual abuse syndrome. However, no evidence of such a syndrome exists. Firstly, none of the abovementioned symptoms are specific to sexual

abuse, but are also commonly found in non-sexually abused psychiatric populations (Beichtman et al., 1991; Beichtman et al., 1992; Goldston et al., 1989). Secondly, no one symptom or constellation of symptoms clearly defines the majority of all sexual abuse victims (Mullen et al 1993). For example, although sexualized behavior and post-traumatic symptoms are the most frequently reported symptoms by sexual abuse victims (Goldston et al., 1989; Jumper, 1995; Kendall-Tackett et al., 1993; Paolucci et al., 2001), the majority of victims do not report such symptoms (Beichtman et al., 1991; Beichtman et al., 1992; Finkelhor, 1990; Kendall-Tackett et al., 1993). Thirdly, a relatively large percentage of abuse victims, ranging from 21-49% across different studies, are seemingly asymptomatic (Kendall-Tackett et al., 1993). A number of authors have therefore concluded that several different mechanisms and processes operate and account for the variety of outcomes seen among sexual abuse victims, and that sexual abuse is more likely to produce multifaceted effects rather than a specific sexual abuse syndrome (Browne & Finkelhor, 1985; Kendall-Tackett et al., 1993; Paolucci et al., 2001). Browne and Finkelhor (1985), and Finkelhor (1987) have proposed a comprehensive model representing the multifaceted effects view on the consequences of child sexual abuse. A brief description of their Traumagenic Dynamics Model of Child Sexual Abuse follows.

#### *The Traumagenic Dynamics Model of Child Sexual Abuse*

According to the traumagenic dynamics model, the consequences of child sexual abuse stem from the conjunction of four different trauma-causing factors, or *traumagenic dynamics*: *Traumatic sexualization, betrayal, stigmatization, and powerlessness*. The dynamics are experiences that create trauma by distorting the child's world view, self-concept, and affective capacities. The child's efforts to cope with the world through these distortions may result in psychological and behavioral problems. According to the model, each dynamic is associated with

different psychological impacts and behavioral manifestations. For example, the psychological impact of traumatic sexualization (e.g., conditioning of sexual activity with negative memories and emotions) may cause aversions to sexual intimacy, which may manifest as sex aversion and other sexual dysfunctions at the behavioral level. The psychological impacts of betrayal (e.g., the sexually abused child discovers that a person he/she trusted or were dependent on caused him/her harm) may be grief, depression, and mistrust, which may behaviorally manifest as aversion to close relationships, or perhaps the opposite; desperately seeking a redeeming relationship. Stigmatization (e.g., when the child experiences that the perpetrator or other people blame him/her for the abuse) may have psychological impacts like shame, feelings of guilt, and low self-esteem in the victim, which may behaviorally manifest as self-destructive behaviors, substance abuse, and suicide attempts. The psychological impact of powerlessness (e.g., having one's body territory invaded against ones wishes, and abuse involving threats and force) include anxiety, fear, and a lowered sense of efficacy, which may manifest as nightmares and sleep disorders at the behavioral level. Since different abuse experiences will involve each of the four dynamics to a various extent, the impact of sexual abuse on a child depends on the degree and combined effect of the four dynamics. Thus, the Traumagenic Dynamics Model foresees a wide range of different outcomes, and in so doing it provides a valuable framework for understanding the highly variable symptomatology seen in victims of child sexual abuse (for a comprehensive explanation of the model, see Finkelhor, 1987).

### *Research on factors influencing symptom severity*

#### *Abuse characteristics*

A great extent of research has been conducted in order to identify factors that influence symptomatology following sexual abuse. Many studies have focused on the role of specific abuse



characteristics as determinants of symptom severity. However, findings are contradictory. Some studies have found worse outcomes for victims who were abused by multiple perpetrators (Briere & Elliot, 2002; Briere & Zaidi, 1989; Steel, Sanna, Hammond, Whipple, & Cross, 2004), while others have found negative or no association between the number of perpetrators and psychological symptoms of distress (Kendall-Tackett et al., 1993). Likewise, a high number of abuse incidents have been associated with more trauma symptoms than a low number of abuse incidents in some studies (Briere & Elliot, 2002; Kendall-Tackett et al., 1993; Ruggiero, McLeer, & Dixon, 2000), but not in others (Dubowitz et al., 1993; Paolucci et al., 2001). Many report greater long-term harm for abuse involving oral or genital penetration (Beichtman et al., 1992; Briere & Elliot, 2002; Browne & Finkelhor, 1986; Fleming et al., 1999; Kendall-Tackett et al., 1993; Mannarino, Cohen, Smith, & Moore-Motily, 1991; Mullen et al., 1993, 1994), but others do not find support for this assumption (Paolucci et al., 2001). Some studies find greater long-term harm where the perpetrator is a father or a stepfather (Beichtman et al., 1992; Browne & Finkelhor, 1986; Harter et al., 1988; Mullen et al., 1994), while other studies do not (Briere & Elliot, 2002; Calam et al., 1998; Dubowitz et al., 1993; Fleming et al., 1999; Lynskey, 1997; Paolucci et al., 2001; Steel et al., 2004). Some authors report more negative outcome for abuse involving force or threats (Beichtman et al., 1992; Browne & Finkelhor, 1986; Calam et al., 1998; Kendall-Tackett et al., 1993), and for abuse of long duration (Beichtman et al., 1992; Kendall-Tackett et al., 1993; Ruggiero et al., 2000; Steel et al., 2004), whereas other authors do not find evidence for such associations (Calam et al., 1998; Fleming et al., 1999). Findings regarding the role of the victim's age at the abuse onset are also inconclusive (Beichtman et al., 1992; Calam et al., 1998; Fleming et al., 1999; Kendall-Tackett et al., 1993). Although some of the inconsistency may be explained by diverse symptom focus across different studies, the contradictory findings clearly suggest that no single abuse characteristic is consistently related to more severe outcomes,

and that factors other than abuse characteristics are likely to contribute to the vast differences in post-abuse symptomatology (Steel et al., 2004).

### *Social support*

Social support is thought to have beneficial effects both indirectly by buffering stress when a person is facing difficult times (buffering model), and directly by providing assistance, support and belongingness that can reduce activation/distress and increase life satisfaction irrespective of the presence of stressors (main effect model) (Caplan & Caplan, 2000; Cohen & Wills, 1985; Dalgard og Tambs, 1997).

Social support seems to be a central factor that can modify the effect of abuse characteristics on post-abuse symptomatology. Overall, the majority of studies find a positive effect of social support for the victim's recovery (Lynskey, 1997; Spaccarelli & Kim, 1995; Tremblay, Hébert, & Piché, 1999; Ullman, 1999). For example, sexually abused who report higher levels of social support seem to recover more quickly than those who report lower levels (Burgess & Holmstrom, 1978; Kendall-Tackett et al., 1993; Kimerling & Calhoun, 1994).

In some studies, social support even appears to be a more important factor than abuse characteristics. One study identified the quality of the caretaker/daughter relationship as the only significant predictor of behavioral and emotional problems in a sample of sexually abused girls, whereas no abuse characteristic could explain these differences (Hazard, 1995). Bal et al. (2005) found initial crisis support to directly influence symptoms of anxiety, depression, dissociation and post-traumatic symptoms in sexually abused adolescents measured both post-disclosure and at six months follow-up, while type or severity of the abuse could not account for significant proportions of the variance in these symptoms. Runtz and Schallow (1997) found no relationship between childhood sexual abuse and adult adjustment after taking social support into account.

Similar findings have been obtained by others (see for example Bal, Crombez, De Bourdeaudhuij & Van Oost, 2009; Conte & Schuerman, 1987; Parker, 1991)

Other studies highlight the role of both abuse characteristics and social background factors. For example, Mullen et al. (1993) found that sexually abused women coming from stable and satisfactory family backgrounds did not show more psychopathology than comparisons from similar backgrounds. However, further analysis revealed significantly more psychopathology than in comparisons in the instances where the abuse had involved penetration. This finding suggests that if the abuse is severe enough, it may have a long-term deleterious effect on mental health even among those coming from otherwise advantaged social backgrounds (Mullen et al., 1993).

Additional factors found to influence post abuse symptomatology are the victim's coping strategies, attribution styles, culture, and other people's reactions to the abuse (see for example Bal et al., 2009; Bal, De Bourdeaudhuij, Crombez, & Van Oost, 2005; Barker-Collo, 1999; Kendall-Tackett et al., 1993; Spaccarelli, 1997; Ullman, 1999; Ullman & Filipas, 2001).

## *Insomnia*

### *Definition and prevalence*

In the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994) the main diagnostic criteria for insomnia are difficulties initiating and/or maintaining sleep, or non-restorative sleep, that has lasted for at least one month, and that causes clinically significant distress or impairment in social, occupational or other important areas of functioning. Thus, insomnia is defined as both a nighttime and daytime problem.

Insomnia is a frequent symptom in the general population (Ohayon & Lemoine, 2004), but different epidemiological studies provide highly varying prevalence estimates. Idiosyncratic ways of defining insomnia contribute to these divergences. Reviewing 45 epidemiological

studies, Ohayon (2002) found a prevalence of 4.4- 6% when insomnia was defined according to the diagnostic criteria found in DSM–IV, 8-18% when it was defined as dissatisfaction with sleep quality or quantity, 9-15% when defined as having insomnia symptoms with daytime consequences, and prevalence rates of about 33% when insomnia was defined as having at least one of the DSM –IV inclusion criteria. The prevalence is higher among women and elderly (Ohayon & Lemoine, 2004). In the Norwegian general population the prevalence of insomnia is estimated to be 13.5% when defined as sleep onset difficulties and early morning awakenings (Sivertsen, 2009), and 11.7%, when defined as fulfilling both the nighttime and daytime DSM-IV diagnostic criteria (Pallesen et al., 2001).

#### *Consequences of insomnia*

Sleep is essential for survival, and disturbance of sleep is associated with several negative outcomes for the individual. For example, it may lead to daytime sleepiness, fatigue, mood disturbances, decreased performance, and attention, concentration and memory difficulties (Dahl, 1999; Morin, 1993; Ohayon & Lemoine, 2004). These consequences may in turn influence a number of important areas of functioning, including psychological, (Breslau, Roth, Rosenthal, & Andreski, 1996; Ford, 1989; Kales et al., 1984; Ohayon, 2002), social, occupational (Leger, Guilleminault, Bader, Levy, & Paillard, 2002), physiological, and quality of life (Krakow, Melendrez et al., 2002; Leger, Scheuermaier, Philip, Paillard, & Guilleminault, 2001; Schubert et al., 2002; Zammit, Weiner, Damato, Sillup, & McMillan, 1999). Additionally, insomnia has been found to predict sick leave (Sivertsen, Øverland, Bjorvatn, Mæland, & Mykletun, 2008), work disability (Sivertsen et al., 2006), accidents (Connor et al., 2002; Leger et al., 2002), and psychiatric disorders (Ford & Kamerow, 1989; Riemann & Voderholzer, 2003; Sivertsen, 2009).

Psychological distress and quality of life impairment seem to increase with insomnia severity (LeBlanc et al., 2007; Leger et al., 2001; Schubert et al., 2002), but this relationship is

most likely complex and bidirectional. For example, insufficient sleep may amplify a person's intrapersonal, social, and work related problems, which in turn may cause additional sources of distress, which consequently may lead to even more sleep difficulties for the individual, creating a vicious cycle of deterioration (Dahl, 1999; Vgontzas & Kales, 1999).

*Sleep difficulties in sexually abused*

A general finding is that sleep disturbances are common after traumatic events (Caldwell & Redeker, 2005). It is therefore not a surprise that sleep complaints are frequently reported by victims of sexual abuse (Bader et al., 2007; Beichtman et al., 1991; Beichtman et al., 1992; Briere & Runtz, 1987; Calam et al., 1998; Caldwell & Redeker, 2005; Krakow et al., 2000; Krakow et al., 2001; Sarkar & Sarkar, 2005). In a representative sample of Swedish youth, sexually abused girls reported more sleep disturbance than non-abused girls (Edgardh & Ormstad, 2000).

Similarly, rape victims reported more nightly awakenings, tiredness, and poor sleep quality compared to non-victims in a national representative sample of French secondary school children (Choquet et al., 1997). In a study by Noll et al. (2006), sexually abused adolescents reported higher rates of sleep disturbances than non-abused comparisons. In addition, the sleep disturbances were independent of any co-morbid PTSD or depression, in which sleep difficulties comprises one of several diagnostic criteria. Nisith et al. (2001) found moderate sleep difficulties in almost all areas of sleep functioning in rape victims, reflected in their Pittsburg Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) scores. The PSQI scores of sexually assaulted women have also been found to be at the same level or worse than scores of patients with specific types of sleep disorders (Krakow et al., 2001). Wells et al. (1995, 1997) found parents of sexually abused teenagers to report their children to have more difficulties falling asleep than did parents of matched non-abused teenagers. Similar findings were reported by Rimsza, Berg and Locke (1988). Using actigraphy measurements, Glod, Teicher, Hartman and

Harakal (2001) found longer sleep latency, more nocturnal activity, and lower sleep efficiency in sexually abused children compared to non-abused children. Goldston, Turnquist and Knutson (1989) studied the clinical records of girls receiving consecutive admissions to psychiatric services, and found more sleep disturbances among sexually abused compared to non-abused patients.

*Consequences of sleep difficulties in sexually abused.* Sleep difficulties have been associated with harmful coping strategies in victims of sexual abuse. In one study of rape victims, Nisith, Resick, and Mueser (2001) identified sleep disturbances as a unique predictor of using alcohol to cope with negative affects, while PTSD and depression symptoms were not significant predictors of alcohol use. Sleep disturbance has also been found to be a risk factor of later revictimization experiences in sexual abuse victims (Noll et al., 2006).

### *Nightmares*

Nightmares are long, frightening dreams involving threats to survival or security from which the sleeper awakens. Typically, the dream imageries happen during “rapid eye movement” (REM) sleep, are vivid, cause autonomic arousal and complete awakenings, and are recalled in detail by the person. In the general adult population, the prevalence of monthly nightmares is estimated to be 8-25% (Bearden, 1994; Bixler, Kales, Soldatos, Kales, & Healey, 1979), while the corresponding prevalences are 0.9-5.8% for weekly nightmares (Janson et al., 1995). The prevalence is higher in women than men (Nielsen, Stenstrom & Levin, 2006) and higher in younger than in older age groups (Chivers & Blagrove, 1999; Nielsen et al., 2006; Salvio, Wood, Schwarz & Eichling, 1992). Nightmares must be distinguished from *night terrors*, which are abrupt awakenings from non-REM sleep, accompanied by autonomic arousal and behavioural manifestations of intense fear. In night terrors, the individual typically does not fully awaken, but

returns to sleep, and can not recall the episode the following morning, with the exception of some fragments. The prevalence of occasional night terror episodes in adults is estimated to be about 2.2% (Ohayon, Guilleminault, & Priest, 1999)

#### *Consequences of nightmares*

Nightmares may interfere with sleep quality. Sleep consists of dynamically changing and progressive stages, and full restorative sleep depends on the patterning, timing and continuity of these stages during the night (Dahl, 1999). Most of our dreaming happens during REM-sleep. Waking up from a nightmare consequently disrupts REM sleep, and REM-sleep deprivation has been associated with fatigue, tiredness and emotional changes similar to those of having obtained insufficient sleep (Dahl & Lewin, 2002). However, the degree of distress experienced due to nightmares, and not their mere presence or frequency, seems to be a critical variable for whether nightmares cause psychological problems for the individual (Belicki, 1992a; Levin & Fireman, 2002; Wood & Bootzin, 1990).

#### *Nightmares in sexually abused*

Nightmares seem to be a problem for many victims of sexual abuse (Krakow, Tandberg, Barey, & Schriggins, 1995; Mannariono & Cohen, 1986), however, the degree to which they are related to the abuse seem uncertain. In a national representative sample, rape victims reported more nightmares than non-abused comparisons (Choquet et al., 1997). Cuddy and Belicki (1992) found almost double rates of nightmares, repetitive nightmares, and sleep terrors among sexually abused compared to non-abused female students. On the other hand, Wells et al. (1995, 1997) did not find a significant increase in nightmare frequency among sexually abused compared to non-abused and concluded that nightmares reported by abuse victims were not necessarily attributable to the abuse. Argagun et al. (2002) found higher rates of childhood traumatic experiences in

students who suffered from nightmares compared to students who did not. However, in that study trauma included sexual as well as physical and emotional stressors.

### *Factors associated with sleep difficulties in sexual abuse victims*

Few studies have looked specifically at the relationship between abuse characteristics and insomnia or nightmares. After reviewing the literature, Caldwell and Redeker (2005) concluded that this is a highly understudied topic. The same can be said about the role of social support in sleep difficulties among sexual abuse victims. Krakow et al. (1995) found higher nightmare frequencies in victims of rape compared to victims of non-rape sexual abuse. Heath, Bean and Feinauer (1996) found that the severity of sexual abuse (defined as ritualistic abuse and abuse involving intercourse) was the strongest predictor of sleep difficulties in a representative sample of sexual abuse victims. In contradiction, Noll et al. (2006) found that a subgroup of sexually abused adolescents who had experienced relatively less severe forms of sexual abuse (defined as shorter duration, older age of onset, little physical violence, or by a single perpetrator who was not their biological father) reported higher levels of long-term sleep difficulties and shorter sleep duration than subgroups who had experienced relatively more severe forms of abuse (defined as longer duration, physical violence, multiple perpetrators or the perpetrator being their biological father). The authors' explanation of this unexpected effect was that victims of less severe abuses may have appeared asymptomatic initially, and therefore did not get the relatively rapid help they needed in order to combat later disturbances. Still, this finding suggests that sleep difficulties may not be systematically related to the severity of the abuse. Gomez-Schwarz, Horowitz and Cardarelli (1990) found sleep problems to be significantly improved for the majority of a group of sexually abused children at 18 months follow-up. This finding is consistent with general results from longitudinal studies, which suggest that for the majority of sexual abuse victims,



symptoms diminish over time (Fergusson et al., 2008; Kendall-Tackett et al., 1993). On the other hand, Calam et al. (1998) found sleep problems in sexually abused children to increase over a two year period. With the exception of verbal threats and bribes, no abuse characteristics were related to the number of problems among the victims. None of the abovementioned studies included measures of social support.

### *The present study*

Sleep difficulties are often the reason why trauma victims seek treatment (Bader et al., 2007; Mellman & Davis, 1985). Given the importance of sleep for psychosocial functioning and well-being, early recognition of sleep difficulties is essential. Early recognition may in turn be facilitated by knowledge about whether any specific abuse characteristics are associated with a greater risk of sleep difficulties and/or nightmares. It is also important to investigate whether factors other than abuse characteristics are associated with differences in sleep difficulties and nightmares. Since several studies have found inverse relationships between social support and symptomatology in sexual abuse victims, it seems reasonable to expect that such relationships could also exist between perceived social support and sleep difficulties.

To summarize, research on the relationship between specific abuse characteristics and sleep difficulties is scant. The same is true for the role of social support on sleep difficulties in sexual abuse victims. Hence, the need for a clearer understanding on these topics is indisputable.

### *Aim and hypothesis*

The present study aims to investigate the role of both abuse characteristics and perceived social support in insomnia, nightmare frequency, and nightmare distress among victims of sexual abuse. It also aims to investigate the prevalence of insomnia, nightmares and nightmares distress in sexual abuse victims compared to other samples. Three hypotheses were set forth. Firstly,

based on Browne and Finkelhor's Traumagenic Dynamics Model, it was hypothesized that abuse involving penetration and threats would be positively related to insomnia, nightmare frequency, and nightmare distress. Due to the overall inconsistent findings regarding the role of abuse characteristics, no hypotheses were made for the other abuse characteristics. Secondly, it was hypothesized that perceived social support would explain significant proportions of variance in insomnia, nightmare frequency, and nightmare distress. Thirdly, it was hypothesized that the prevalence of insomnia, nightmares and nightmare distress would be higher in a sample of sexual abuse victims compared to other samples.

## Methods

### *Procedure*

The present study was a part of a larger investigation, in which four support centers for sexual abuse victims in Norway distributed a questionnaire consisting of several self-report instruments among their users. The questionnaire was administered together with a cover letter including information about the questionnaire, the purpose of the study, and the confidential and voluntary nature of participation. One reminder was sent to those who did not return the questionnaire after the first emission. All respondents signed informed consents. No individual incentives were given for responding, but recipients were informed that NOK 10 000 (1 US \$ equals approximately 5.9 NOK) would be donated to the center if the response rate exceeded 50%.

### *Ethics*

The investigation was approved by the Norwegian Social Science Data Services, the Norwegian Directorate of Health, and the Regional Committee for Medical and Health Research Ethics, Health Region West, Norway.

### *Participants*

In total, 460 victims of sexual abuse completed the questionnaire (432 women aged 18-73 years ( $M = 39.9$ ,  $SD = 11.8$ ), 23 men aged 18-58 years ( $M = 37.5$ ,  $SD = 13.1$ ), five did not indicate their sex). The modal marital status was single/divorced/widowed (51%), followed by married/cohabiting (49%). Modal occupational status was disability pensioned/rehabilitation (45.4%), followed by full time employment (26%), part-time employment (12.6%), student (9%), non-employed (3.7%), homemaker (1.8%), and retired (1.5%). Modal highest educational level achieved was some university or college degree (45.9%), followed by high school (24.7), primary and secondary school (15.2), and technical school (13.5). Modal income (in NOK) was 100 000-199 999 (38.6%), followed by 200 000- 299 999 (21.4%), 300 000- 399 999 (18.5%), and 0-99 999 (11.5%).

### *Measures*

*Bergen Insomnia Scale (BIS)*. BIS is a 6-item questionnaire assessing both nighttime and daytime symptoms of insomnia. The respondents indicate how many days per week during the past month they have experienced: 1) Sleep onset difficulties 2) nightly awakenings 3) early morning awakenings 4) feelings of not getting enough rest during the night 5) daytime tiredness/sleepiness affecting occupational or private life functioning, and 6) dissatisfaction with sleep. BIS can provide both a continuous score of insomnia problems (ranging from 0-42), and a categorical score according to the DSM-IV definition of insomnia (Pallesen et al., 2008).

*Assessment of nightmare frequency.* The respondents were instructed to provide an estimate of the amount of nightmares or disturbing dreams during the past month. Further, the instruction included an explanation of the difference between nightmares and night terrors. The questions were adapted from the Nightmare Frequency Questionnaire (Krakow et al., 2002)

*Nightmare Distress Questionnaire (NDQ).* The NDQ comprises 13 items. The respondents rate on a 5-point scale the degree of distress experienced by nightmares, and the consequences of nightmares on quality of life and daytime functioning. Higher scores indicate higher levels of nightmare distress (Belicki, 1992b).

*The Multidimensional Scale of Perceived Social Support (MSPSS).* The MSPSS is a 12-item questionnaire addressing perceived social support from friends, family and significant others (Zimet, Dahlem, Zimet, & Farley, 1988). Higher scores indicate higher levels of perceived social support.

#### *Demography*

Social and demographic questions assessed age, sex, parenthood, income, educational level, and marital- and occupational status.

#### *Abuse characteristics*

Assessment of sexual abuse included questions about the type of abuse (spanning from non-contact exposure to various types of intercourse and rape), the victim's age at the first abusive incident, duration of the abuse, relationship to the perpetrator(s), and whether the victim was threatened by the perpetrator(s) or not.

#### *Comparison with samples from other populations*

Insomnia symptoms in the current sample were compared to insomnia symptoms in a sample of 2645 respondents (1353 women, 1292 men) from the Norwegian general population

(Pallesen et al. 2008). In order to obtain a Norwegian comparison sample on the nightmare frequency and nightmare distress measurements, data were acquired from 315 psychology undergraduates (236 women, 76 men, 3 did not indicate sex) at the University of Bergen.

### *Statistical analyses*

For the purpose of the statistical analyses, dummy variables were created for three of the abuse characteristics: Type of abuse was categorized as either: 1) *Non-contact sexual behavior*, counting abuse involving peeking or exposure, being exposed to pornographically material and/or sexual talk or behavior without any physical contact, 2) *Sexual acts without penetration*, including touching/fondling with breasts or genitalia, being forced to masturbate others and/or repetitive movements mimicking intercourse towards own body, or 3) *Sexual abuse with penetration*, including abuse that involved penetration of fingers, objects or genitalia in the victims anus or vagina, and/or penetration of genitalia in the victims mouth, with or without the use of force. Next, the variable *Parental perpetrator* was created as an expression of whether the perpetrator was a parental figure (parent, step-parent or foster parent; coded as “1”) or not (coded as “0”). Finally, the variable *Threat* was created according to whether the victim had experienced being threatened by the perpetrator (coded as “1”) or not (coded as “0”).

Hierarchical multiple regression analyses were performed with the dependent variables *Insomnia*, *Nightmare frequency*, and *Nightmare distress*. Independent variables included *Age*, *Sex*, *Age at first abusive incident*, *Duration of abuse*, *Perpetrator*, *Threat*, *Perceived social support*, and *Abuse category* (*Non-contact sexual behavior*, *Sexual acts without penetration*, and *Sexual abuse with penetration*). *Sexual acts with penetration* comprised the reference category. Hierarchical regression was used to assess the ability of abuse characteristics to predict insomnia, nightmare frequency and nightmare distress after controlling for the influence of age and sex, and

further to assess whether perceived social support would be predictive of insomnia, nightmare frequency, and nightmare distress above and beyond the demographical variables and the abuse characteristics. Preliminary analyses were conducted to ensure no violations of assumptions concerning linearity, normality, and multicollinearity. When comparing two samples on variables measured with interval or ratio scales t-tests for independent samples were conducted. When comparing two samples on categorical data chi square analyses were conducted. In the latter cases Yates continuity correction were used when the categorical variable had two levels only.

#### *Comparison with samples from other populations*

*Insomnia.* Independent samples t-tests were carried out in order to compare insomnia symptoms in the sexual abuse sample with the general population sample. Samples were divided into four age categories (18-29 yrs, 30-44 yrs, 44-59 yrs, and 60-80 yrs). As men constituted no more than 5.1% of the sexual abuse sample, only women (both in the abuse and in the general population sample) were included in the comparisons.

*Nightmare Frequency and Nightmare Distress.* Independent sample t-tests were performed to assess differences in nightmare frequency and nightmare distress in the two samples. Additionally, because of demographical differences between the two samples, hierarchical regressions were carried out to see whether *Group* (sexually abused vs. students) would be significantly related to nightmare frequency and nightmare distress after controlling for age and sex.

## Results

### *Insomnia*

Results are shown in *Table 1*. The predictors *Age* and *Sex* were entered at step 1 of the regression analysis, explaining 0.0% of the variance in insomnia ( $F(2, 363) = .24, p = .79$ ). After *Abuse category*, *Age at first abusive incident*, *Duration of abuse*, *Parental perpetrator*, and *Threat* were entered at step 2, the total variance explained by the model was 8.1% ( $F(8, 357) = 3.93, p < .001$ ). *Non-contact sexual behavior* was significantly and negatively related to insomnia whereas *Threat* was significantly and positively related to insomnia. After *Perceived social support* was entered at step 3, the total variance explained was 13.6% ( $F(9, 356) = 6.2, p < .001$ ), explaining an additional 5.5%. In this final model, *Perceived social support* and *Non-contact sexual behavior* were both significantly and negatively associated with insomnia.

Next, a logistic regression was performed to assess the impact of abuse characteristics and social support on the likelihood of fulfilling the *DSM-IV* diagnostic criteria of insomnia. The model contained the same predictor variables as used in the hierarchical regression analysis. 79.1% of the participants fulfilled the diagnostic criteria of insomnia. The full model containing all predictors was not statistically significant ( $\chi^2(df=10, N=352) = 14.78, p = .14$ ), indicating that it was not able to distinguish between participants who did and did not fulfill the criteria. As a whole, the model explained between 4.1% (Cox and Snell R square) and 6.5% (Nagelkerke R Square) of the variance in insomnia diagnosis, and correctly classified 80.4% of cases. As shown in *Table 2*, *Duration of abuse* was significantly and positively associated with insomnia diagnosis, whereas *Perceived social support* was significantly and negatively associated with insomnia diagnosis

### *Nightmare frequency*

The results are displayed in *Table 3*. *Age* and *Sex* were entered at step 1, explaining 2.7% of variances in nightmares ( $F(2, 356) = 4.86, p < .01$ ). *Age* was significantly and negatively

related to nightmares. After the entry of the abuse characteristics at step 2, the total variance explained by the model was 12.9% ( $F(8, 350) = 6.47, p < .001$ ), explaining an additional 10.2% of the variance in nightmares after controlling for age and sex. *Age* was significantly and negatively related to nightmares, while *Duration of abuse* and *Threat* were significantly and positively related to nightmares. When *Perceived social support* was entered at step 3, the total variation explained was 14.9% ( $F(9, 349) = 6.81, p < .001$ ), explaining an additional 2.1% of the variance after controlling for age, sex and abuse characteristics. In this model, *Threat* and *Duration of abuse* was significantly and positively related to nightmares, while *Age* and *Perceived social support* were significantly and negatively related to nightmares.

#### *Nightmare distress*

Step 1 included the predictors *Age* and *Sex*, which explained 0.0% of the variance in nightmare distress ( $F(2, 341) = 0.37, p = .69$ ). When the abuse characteristics were entered at step 2, the total variation explained was 11.0% ( $F(8, 335) = 5.17, p < .001$ ). *Sexual acts without penetration* and *Age at first abusive incident* were negatively related to nightmare distress, whereas *Duration of the abuse* and *Threat* were positively related to nightmare distress. After the entry of *Perceived social support* at step 3, the total variance explained was 12.8% ( $F(9, 334) = 5.47, p < .001$ ), explaining an additional 1.8% of the variance after controlling for age, sex and abuse characteristics. As shown in *Table 4*, *Threat* was significantly and positively associated with nightmare distress, while *Non-contact sexual behavior*, *Sexual acts without penetration*, and *Perceived social support* were significantly and negatively associated with nightmare distress.

#### *Comparison with other samples*

##### *Insomnia*



As shown in *Figure 1*, insomnia symptoms were significantly more common in the sexual abuse sample compared to the general population sample. This was true for all age categories (age 18-29:  $t(150) = -9.6, p < .001$ , age 30-44:  $t(284) = -10.48, p < .001$ , age 45-59:  $t(192) = -9.13, p < .001$ , age 60 and above:  $t(24) = -3.64, p < .01$ ).

Next, the two samples were compared according to the percentage fulfilling the DSM-IV diagnostic criteria of insomnia. As shown in *Figure 2*, the likelihood of fulfilling the diagnostic criteria was significantly higher in the sexual abuse sample compared to the general population sample. In age category 18-29, 83.5% of the sexual abuse sample fulfilled the criteria, compared to 39.8 % of the population sample ( $\chi^2 (df = 1, n = 253) = 41.6, p < .001$ ). In age category 30-44, 78.3% of sexually abused and 40.7% of the population sample fulfilled the criteria ( $\chi^2 (df = 1, n = 579) = 65.7, p < .001$ ). In age category 45-59, 78.4% of the sexually abused and 35.7 % of the population sample fulfilled the criteria ( $\chi^2 (df = 1, n = 542) = 68.9, p < .001$ ). Among people aged 60 and above, 77.3% of sexually abused fulfilled the criteria, compared to 36.0% of the population sample ( $\chi^2 (df = 1, n = 339) = 13.1, p < .001$ ).

#### *Nightmare Frequency and Nightmare Distress*

As *Figure 3* displays, the number of monthly nightmares was significantly higher in the sexual abuse sample ( $M = 5.4, SD = 9.2$ ) compared to the student sample ( $M = 1.4, SD = 2.6$ ),  $t(521) = 8.7, p < .001$ . As shown in *Figure 4*, nightmare distress was significantly higher in the sexual abuse ( $M = 21.5, SD = 10.5$ ) compared to the student ( $M = 9.4, SD = 7$ ) sample,  $t(728) = 18.6, p < .001$ . Hierarchical regression analyses with predictors *Age*, *Sex* (1= women, 2 = men) and *Group* (1 = sexual abuse sample, 2 = student sample) were performed. Step 1 included the predictors *Age* and *Sex*, which explained 1.3% of the variance in nightmare frequency ( $F(2, 717)$

= 0.4,  $p = .01$ ). After the entry of *Group* in step 2, the total variation explained was 7.5% ( $F(3, 716) = 20.4, p = .001$ ). *Group* was significantly and negatively related to nightmare frequency ( $\beta = -.36, p < .001$ ), as was *Age* ( $\beta = -.13, p < .05$ ). For nightmare distress, *Age* and *Sex* explained 16.5% of the variance ( $F(2, 698) = 70.2, p = .001$ ). After the entry of *Group* in step 2, the total variation explained was 30.8% ( $F(3, 697) = 105.0, p = .001$ ). *Sex* was significantly and negatively related to nightmare distress ( $\beta = -.12, p < .001$ ), meaning that women reported more nightmare distress than men. *Group* was also significantly and negatively related to nightmare distress ( $\beta = -.54, p < .001$ ). In other words, group remained a significant predictor of both nightmare frequency and nightmare distress after controlling for age and sex.

### *Discussion*

The present study examined the role of abuse characteristics and perceived social support in insomnia, nightmare frequency, and nightmare distress in victims of sexual abuse. To the best of the author's knowledge, this is the first study to investigate this relationship using validated questionnaires in a relatively large sample of sexual abuse victims. Results show that those who had experienced abuse involving penetration reported more insomnia symptoms than those who reported non-contact sexual abuse. Additionally, abuse duration was positively related to the risk of fulfilling the DSM-IV diagnostic criteria of insomnia. Duration of the abuse, as well as abuse related threats, was positively associated with nightmare frequency. Those who had received threats also reported more nightmare distress than those who did not report threats, while non-contact abuse and sexual abuse without penetration were related to reporting less nightmare distress. Finally, results showed that lower levels of perceived social support were related to higher levels of insomnia, nightmares and nightmare distress. Below, findings regarding abuse

characteristics are discussed for each of the outcome measures, while findings concerning perceived social support are discussed collectively.

### *Insomnia.*

In all, 79.6% of the current sample fulfilled the DSM-IV diagnostic inclusion criteria of insomnia. This greatly exceeds the percentage in the general population sample, indicating that insomnia is a widespread problem among sexual abuse victims. This finding has clinical implications. Mental health professionals should address insomnia problems in sexually abused clients, and be prepared to provide treatment techniques where needed. Since insomnia has been linked to a wide range of negative outcome in both general (Morin, 1993; Ohayon & Lemoine, 2004) and sexual abuse (Nisith et al., 2001; Noll et al., 2006) samples, interventions should be emphasized.

Abuse duration was the only abuse characteristic associated with an increased likelihood of fulfilling the diagnostic criteria. This finding contradicts results from Calam et al. (1998), who found no association between abuse duration and sleep difficulties, and Noll et al. (2006) who found more sleep difficulties in victims of abuse of shorter duration. This could mean that abuse duration is not a consistent predictor of sleep difficulties. However, the discrepancy may also be explained by differences in sample characteristics across the studies. While the present study used a sample consisting of people who had been abused across a wide range of age groups, both Calam et al. and Noll et al. used samples consisting exclusively of children and adolescents who had been abused at ages 16 or below. It is likely that people in the latter samples had overall shorter abuse durations because of their relatively lower age compared to the present sample. Thus, the differential findings could be due to a restricted range in abuse duration in the study of

Calam et al. (1998) and Noll et al. (2006), making potential effects of longer durations difficult to detect.

Consistent with predictions, those who had experienced abuse involving physical contact or penetration reported more insomnia symptoms than those reporting non-contact sexual abuse. This finding is in line with the Traumagenic Dynamics Model's notion that having one's bodily territory invaded may manifest behaviorally as sleep problems. It is also consistent with the study of Heath et al. (1996), in which more severe abuse was the strongest predictor of sleep difficulties in a representative sample of sexual abuse victims. Thus far, several convergent findings point toward that abuse involving penetration is associated with higher levels of sleep difficulties compared to abuse in which penetration did not occur.

Age and sex did not correlate with insomnia in the present study, which may seem contradictory to numerous studies reporting more insomnia in women and elderly (Ohayon, 2002; Ohayon & Lemoine, 2004). The lack of correlation may be explained by low variability due to the commonness of insomnia symptoms in the sample. In addition, 94.9 % of the respondents were women, making the range of this predictor very restricted.

Contrary to expectations, having experienced threats was not related to reporting more insomnia symptoms. In other words, the current study does not seem to provide support to the Traumagenic Dynamics Model's notion that threats are associated with sleep problems. However, threats were significantly and positively related to insomnia symptoms before perceived social support was entered in the final step of the hierarchical regression analysis. This finding indicates that perceived social support may act as a buffering factor that reduces the impact of threats on insomnia symptoms in sexual abuse victims.

*Nightmare frequency and nightmare distress.*

Compared to the student sample, sexual abuse victims reported more than fourfold as many monthly nightmares, and had more than twice as high nightmare distress score, suggesting that nightmares and nightmare distress are frequently encountered by sexual abuse victims.

Age was negatively associated with reporting more nightmares, which is in line with numerous studies (Chivers & Blagrove, 1999; Nielsen et al., 2006; Salvio et al., 1992).

Consistent with predictions, having been threatened by the perpetrator was associated with reporting more nightmares. This finding is in line with Browne and Finkelhor's (1985) Traumagenic Dynamics Model, in which nightmares are one of the expected consequences when the dynamic of powerlessness was prominent in the abuse. Hence, the current finding seems to provide support to the Traumagenic Model's notion that threats are associated with nightmares. It also appear consistent with the study of Calam et al. (1998), in which nightmares were common in sexually abused children, and where threats was positively related to overall problems. On the other hand, Calam et al. (1998) did not look at the role of threats on nightmares in particular. Consequently, the present finding can not be directly compared to their study. The finding that abuse duration was positively related to nightmare frequency is contradictive to the findings of Noll et al (2006), who found abuse of shorter duration to be related to more sleep difficulties and shorter sleep duration than abuse of longer duration. However, the study of Noll et al. did not include measures of nightmares, which limits the degree to which the two studies can be compared.

Results did not support the prediction that abuse involving penetration would be associated with a higher nightmare frequency. Thus, the current study did not provide support to the Traumagenic Dynamics models' notion that having ones body territory invaded will manifest behaviorally as nightmares.

It is noteworthy that although abuse involving penetration was not related to nightmare frequency, it did seem to play a role in the degree of distress experienced by nightmares. Consistent with predictions and the Traumagenic Dynamics model, abuse involving penetration and having experienced threats were both associated with reporting more nightmare distress. Given that nightmare distress has been associated with psychological disturbances (Belicki, 1992a, Levin & Fireman, 2002), the current finding may be clinically relevant. Health professionals should be attentive to that sexually abused clients may experience distress related to nightmares, especially if the client was threatened by the perpetrator and when the abuse involved penetration.

Taken together, the findings regarding the role of abuse characteristics in insomnia, nightmare frequency and nightmare distress show that none of the abuse characteristics were systematically related to worse outcome. This is in line with overall accumulated findings showing an incapability of distinct abuse characteristics to reliably predict symptom severity following sexual trauma. Still, abuse involving penetration, the presence of threats, and abuse of longer duration were apparently associated with more severe outcomes compared to the other abuse characteristics, overall.

### *Perceived Social Support*

In the present study, lower levels of perceived social support were related to higher levels of insomnia, nightmares and nightmares distress. Because of their correlational nature, these associations are hard to substantiate. For example, it could be that low levels of perceived social support caused the sleep difficulties. In this case, a low support level could be a preexisting feature that increased the individual's vulnerability to developing sleep difficulties following abuse, corresponding to an indirect effect of social support. Also, the sleep difficulties could be a

result of not recognizing any support subsequent to the abuse regardless of the prior support level, corresponding to a direct effect of social support. However, it could also be that the sleep difficulties led to lower levels of perceived social support, as sleep difficulties may have a negative impact on social life. Moreover, both the sleep difficulties and perceived social support levels could be a result of other factors, making the correlation between them spurious.

Regardless of the nature of the relationship, the current finding is consistent with numerous studies linking higher levels of social support to less severe symptomatology in sexual abuse victims (Bal et al., 2005; Kendall-Tackett et al., 1993). A potential implication of this finding is that sexual abuse victims should be encouraged to seek support from their friends, family or significant others following abuse, since perceived support from such sources possibly could reduce the degree of sleep difficulties. Interventions could aim to increase the victim's ability to obtain and utilize social support (Ullman, 1999). However, since negative social reactions following disclosure of abuse is associated with increased psychological symptomatology, (Ullman, 1996), interventions should also educate victims about potential negative social reactions from others, and how to deal with these (Ullman, 1999). Nonetheless, more research on the nature of the association between perceived social support and sleep difficulties in sexually abused is necessary before any guidelines can be presented.

#### *Limitations and future directions*

The current study has a few limitations that should be considered when interpreting the findings. Firstly, the sample consisted exclusively of users of support centers for sexual abuse victims, who may not be representative of the sexually abused population in general. For instance, it could be that users of the centers suffered from more post-abuse distress than were non-users. Also, the sample consisted almost exclusively of women, which may further limit the

representativeness of the sample. To address these limitations, future investigations should ideally use sexual abuse samples from the representative general population, as was done by Heath et al. (1996). Secondly, the response rate was fairly low (32.7%). This makes the generalizability of the findings to all users of the centers uncertain, since responders might differ from non-responders in systematic ways (Rogelberg & Stanton, 2007). Thirdly, the use of a student comparison sample for the nightmare data is debatable, even though age and gender were controlled for in the analyses. To enable more meaningful comparisons, the sexual abuse sample should be compared to a representative sample from the general population. Finally, because of the cross-sectional design of the study, findings do not permit inferences of causality. For instance, it can not be determined whether sleep difficulties were a symptom or cause of low perceived social support, or whether this relationship was merely spurious. In this regard, follow-up or longitudinal designs are essential. As the current study comprised the first phase of a longitudinal investigation, research questions in the next phase of the study should focus on the relationship between predictors at time 1 and outcomes at time 2 in order to identify some possible causal links.

The present study also has several strengths. It has made a novel contribution by investigating the role of both abuse characteristics and perceived social support in insomnia, nightmare frequency and nightmare distress in a relatively large sample of sexual abuse victims. Furthermore, standardized measurements and comparison samples were used for all of the outcome measures.

### Conclusions

In conclusion, the present study showed that insomnia, nightmares, and nightmare distress were common symptoms among sexual abuse victims. Consistent with existing literature, no abuse characteristics were systematically related to worse outcome. Still, the presence of threats,



abuse involving penetration, and abuse of longer duration seemed more pertinent than the other abuse characteristics. The present study seem to provide support to the Traumagenic Dynamics Models notion that threats and having ones bodily territory invaded are related to sleep difficulties and nightmares, however the effect was not consistent across all of the outcome measures. Finally, results suggest that perceived social support may play an important role in insomnia, nightmare frequency and nightmare distress among sexual abuse victims, providing preliminary data for future inquiry.

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## Appendices

## Appendix I Tables

Table 1. Hierarchical Regression Analysis for Variables Predicting Insomnia

		$\beta$
Step 1	Age	.02
	Sex <i>1=female, 2=male</i>	.03
Step 2	Age	.01
	Sex <i>1=female, 2=male</i>	.02
	Non-contact sexual behavior <sup>1</sup>	-.14 **
	Sexual acts without penetration <sup>1</sup>	-.10
	Age at first abusive incident	-.01
	Duration of abuse	.11
	Perpetrator <i>1= parent figure 0= other</i>	-.03
	Threat <i>1= threat 0= no threat</i>	.12 *
Step 3	Age	-.05
	Sex <i>1=female, 2=male</i>	-.02
	Non-contact sexual behavior <sup>1</sup>	-.14 **
	Sexual acts without penetration <sup>1</sup>	-.08
	Age at first abusive incident	-.01
	Duration of abuse	.07
	Perpetrator <i>1= parent figure 0= other</i>	.03
	Threat <i>1=threat 0= no threat</i>	.10
Perceived social support	-.25 ***	

Note.  $R^2 = .00$  for Step 1;  $\Delta R^2 = .08$  for Step 2 ( $p < .001$ );

$R^2 = .14$  for Step 3,  $\Delta R^2 = .06$  ( $p < .001$ ).

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

<sup>1</sup>Sexual abuse with penetration comprised the reference group.



Table 2.  
Logistic Regression Analysis for Variables Predicting Insomnia Diagnosis

	Unadjusted	95% C.I. <sup>1</sup>	Adjusted	95% C.I.
Sex				
<i>Female</i>	1,00			
<i>Male</i>	1.51	0.44-5.26	0.72	0.18-2.29
Age	0.95	0.97-1.02	0.99	0.97-1.02
Sexual abuse with penetration	1,00			
Sexual acts without Penetration	1.56	0.72-3.56	2.19	0.92-5.22
Non-contact sexual behavior	1.79	0.79-4.05	2.27	0.85-6.07
Age at first abusive incident	0.85	0.93-1.05	0.99	0.92-1.07
Duration of abuse Perpetrator	1.04 *	1.00-1.07	1.03	0.99-1.08
<i>Other</i>	1,00			
<i>Parent figure</i>	0.86	0.46-1.59	0.95	0.46-1.97
Threat				
<i>No threats</i>	1,00			
<i>Threats</i>	1.43	0.90-2.29	0.88	0.48-1.61
Perceived social support	0.98 *	0.96-1.00	0.98	0.96-1.00

\*p<.05

<sup>1</sup> shows 95% confidence interval for regression coefficient.

Table 3. Hierarchical Regression Analysis for Variables Predicting Nightmare Frequency

		$\beta$	
Step 1	Age	-.16	**
	Sex <i>1=female, 2=male</i>	.00	
Step 2	Age	-.18	***
	Sex <i>1=female, 2=male</i>	-.02	
	Non-contact sexual behavior <sup>1</sup>	-.10	
	Sexual acts without penetration <sup>1</sup>	-.06	
	Age at first abusive incident	-.04	
	Duration of abuse	.14	**
	Perpetrator <i>1= parent figure 0= other</i>	.08	
	Threat <i>1= threat 0= no threat</i>	.16	**
Step 3	Age	-.22	***
	Sex <i>1=female, 2=male</i>	-.04	
	Non-contact sexual behavior <sup>1</sup>	-.10	
	Sexual acts without penetration <sup>1</sup>	-.05	
	Age at first abusive incident	-.04	
	Duration of abuse	.12	*
	Perpetrator <i>1= parent figure 0= other</i>	.08	
	Threat <i>1= threat 0= no threat</i>	.15	**
	Perceived social support	-.15	**

Note.  $R^2 = .03$  for Step 1;  $R^2 = .13$  for Step 2,  $\Delta R^2 = .10$  ( $p < .001$ );  
 $R^2 = .15$  for Step 3,  $\Delta R^2 = .02$  ( $p < .01$ ).

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

<sup>1</sup>Sexual abuse with penetration comprised the reference group.

Table 4. Hierarchical Regression Analysis for variables Predicting Nightmare Distress

		$\beta$	
Step 1	Age	-.05	
	Sex <i>1=female, 2=male</i>	.01	
Step 2	Age	-.06	
	Sex <i>1=female, 2=male</i>	-.03	
	Non-contact sexual behavior <sup>1</sup>	-.11	*
	Sexual acts without penetration <sup>1</sup>	-.11	*
	Age at first abusive incident	-.06	
	Duration of abuse	.13	*
	Perpetrator <i>1= parent figure 0= other</i>	.01	
	Threat <i>1= threat 0= no threat</i>	.16	**
Step 3	Age	-.09	
	Sex <i>1=female, 2=male</i>	-.05	
	Non-contact sexual behavior <sup>1</sup>	-.11	*
	Sexual acts without penetration <sup>1</sup>	-.11	*
	Age at first abusive incident	-.06	
	Duration of abuse	.10	
	Perpetrator <i>1= parent figure 0= other</i>	.01	
	Threat <i>1= threat 0= no threat</i>	.15	**
	Perceived social support	-.15	**

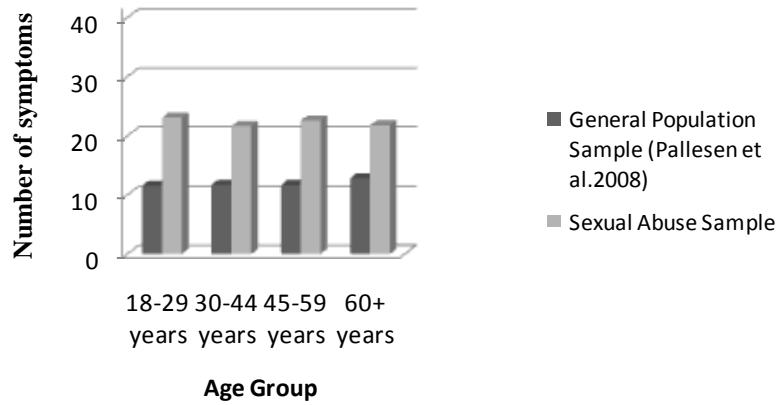
Note.  $R^2 = .00$  for Step 1;  $\Delta R^2 = .11$  for Step 2 ( $p < .001$ );  $R^2 = .13$  for Step 3,  $\Delta R^2 = .02$  ( $p < .01$ ).

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

<sup>1</sup> Sexual abuse with penetration comprised the reference group.

Appendix II Figures

**Figure 1. Insomnia Symptoms in Women from Sexually Abused vs. General Population Sample**



**Figure 2. Percentage of women fulfilling the DSM-IV Diagnostic Criteria**

