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Child Sexual Abuse as a Longitudinal Predictor of Sleep in Adulthood: Exploring the
Role of Perceived Stress as a Mediator

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Degree to be awarded: MPH

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Abstract

Child Sexual Abuse as a Longitudinal Predictor of Sleep in Adulthood: Exploring the
Role of Perceived Stress as a Mediator

By Shuchita Jhaveri

Child sexual abuse has been linked to a variety of long-term health outcomes, including
mental health effects such as anxiety and sleep disturbances. There is a dearth of research
on the impact of child sexual abuse and adult sleep using nationally representative
longitudinal data. Additionally, studies on the role of perceived stress as a pathway
between child sexual abuse and sleep disturbances are also scarce. The objective of this
study is to explore a mediation model for the relationship between child sexual abuse and
sleep in adulthood by studying perceived stress as the mediator. This study is based on
the National Longitudinal Study of Adolescent to Adult Health publicly available dataset.
The independent variable was a dichotomous measure created based on child sexual
abuse by a parent, caregiver or other adult reported retrospectively in waves 3 and 4. The
mediator was a perceived stress scale based on data from wave 4 using four stress
variables, each measured on a four point Likert scale (range 0 – 16, alpha = .71). Sleep
data for the two outcomes of falling asleep and staying asleep were obtained from wave
4. Structural equation modeling was conducted to test the mediating effects of perceived
stress on the relationship between child sexual abuse and adult sleep. In this analytical
sample, 730 (14.4%) participants experienced child sexual abuse. Compared to those with
no experiences of child sexual abuse, participants who reported child sexual abuse had
higher mean scores on perceived stress (5.8 versus 4.6, p<.001), difficulty in falling
asleep (1.46 versus 1.06, p<.001), and difficulty in staying asleep (1.63 versus 1.23,
p<.001). The structural equation modeling showed that perceived stress statistically
significantly mediates the relationship between child sexual abuse and sleep. The
proportion mediated by stress in the relationship between child sexual assault and falling
asleep is 0.35. The proportion mediated by stress in the relationship between child sexual
abuse and staying asleep is 0.26. Findings from this study reinforce previous research
while suggesting perceived stress in adulthood as an important pathway through which
child sexual abuse may lead to sleep problems in young adulthood.

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INTRODUCTION

Child Sexual Abuse (CSA)

Child sexual abuse can result in an array of physical and psychological consequences. Child sexual abuse has been linked to a variety of immediate and long-term health effects including mental health disorders, behavioral disorders, systemic disorders, and many other chronic conditions (Wilson, 2010). A history of child sexual abuse also puts victims at risk for revictimization, drug dependence, and premature death (Lind et al., 2016). The rates of revictimization are nearly twice to three times as likely for individuals who have experienced child sexual abuse than those who haven't (Papalia, 2017). Many studies are looking into child sexual abuse and some have even proposed professional preconceptions as a major barrier to monitoring child sexual abuse. Although girls are more likely to experience child sexual abuse, there is a notion that boys aren't as affected which results in underreporting (Mathews et al., 2016).

Child sexual abuse is known to have lasting impacts that can influence an individual's wellbeing into adulthood. Research has shown that child abuse also carries on to where the abused become the abuser. Women who were sexually abused as a child are more likely to grow up and abuse their own children in the future (Renner et al., 2015). Victims of child sexual abuse are also more likely to engage in high risk behaviors in their adulthood such as gambling, forming unhealthy relationships, and risky sexual behaviors (Cashmore & Shackel, 2013).

Child sexual abuse is also known to influence sleep patterns, and many studies have explored the relationship between gender and child sexual abuse (Steine, 2012; Steine, 2019).

Sleep Deprivation

Lack of sleep has been shown to be a major public health issue. Insufficient sleep can result in mental disorder, somatic disorders, and loss of daytime functioning. All while accruing cost for society (Steine, 2019). The impacts of sleep are dire in children. Sleep is essential for physical and mental wellbeing in children and can impact their behavior and ultimately their education. This sets the stage for difficulties in succeeding and forming relationships (Chase & Pincus, 2011).

The struggle with sleep deprivation and its consequences don't stop in childhood. More than a third of adults in the US don't get enough sleep with clinically relevant sleep disturbances affecting 25.3% of the population. Lack of sleep may result in long term consequences such as increased risk for obesity, diabetes, and certain types of cancer (How Does Sleep Affect Your Heart Health, 2018). Some studies have even looked into sleep deprivation as a mediator between anxiety and depression (Li et al., 2018). Chronic sleep deprivation can seriously impair brain function and productivity. As sleep contributes to decreased focus and productivity, the economic burden increases. In fact, the United States has some of the highest economic burden from sleep deprivation in the world, with 2.28% of the GDP going towards costs related to sleep deprivation (Hafner et al., 2016).

Purpose and Importance

There is increasing research related to general adverse childhood events as a link to sleep disorders. Some studies have looked at child sexual abuse and found that these individuals often have difficulty with sleep onset, staying asleep, and nightmares (Lind et

al., 2016). However, there is a dearth of research on the impact of child sexual abuse and adult sleep using nationally representative longitudinal data. Although there have been studies that show traumatic experiences may lead to stress, and that stress can contribute to sleep issues, there is also a need to better understand the specific pathways through which child sexual abuse impacts sleep later in life in order to identify areas for intervention. In particular, exploring the role of perceived stress as a mediating factor between child sexual abuse and sleep disturbances. We hypothesize that perceived stress mediates the association between CSA and sleep disturbances.

METHODS

Database

For this study, we used data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) which is a nationally representative dataset that began data collection in 1994 and is still actively being collected. This data follows the same cohort of individuals from grades 7-12 into their adulthood. The survey that are administered take place at school or home and assess the behaviors and environments of the individuals in the cohort. New questions are added for data collection with each wave. It was funded by five grants from the Eunice Kennedy Shriver National Institute of Child Health and Human Development with additional funding from federal agencies and foundations. Add Health is not the largest and most comprehensive longitudinal survey of adolescents (Add Health, 2020).

Data Collection Method

We pulled data from Add Health waves 1, 3, and 4. Wave 1 referred to grades 7-12, and years 1994-1995. Wave 3 referred to ages 18-26 and years 2001-2002, and wave 4 referred to ages 24-32 and year 2008. For our testing variables, we chose child sexual abuse, perceived stress, and sleep. A dichotomous variable was created for child sexual abuse using retrospective reports on child sexual abuse prior to age 18 by parent, caregiver, or other adult from data from waves 3 and 4. A perceived stress scale was created using data from wave 4. Perceived stress scale was based on four items assessing ability to handle problems in the past 30 days on a five-point Likert scale with 0 being never and 4 being very often. The final scale ranged from 0 to 16. Sleep data was obtained from wave 4 for two outcomes independently, difficulties falling asleep and staying asleep. Both sleep outcomes were also measured on a 5-point Likert scale with 0 being never in the past 4 weeks and 4 being 5 or more in the last week. For mediation, structural equation modeling was conducted and controlled for age, gender, race, physical abuse, and neglect. To test for reliability, correlations between the perceived stress variables were ran along with Cronbach's alpha. Tables of the Likert scales are seen below in tables 1 and 2. Throughout the research, STATA 16/MP was used for statistical analysis.

Stress Likert Scale	
0	Never
1	Almost never
2	Sometimes
3	Fairly often
4	Very often

Table 1: Stress Likert Scale

Sleep Likert Scale	
0	Never in the past four weeks
1	Less than once a week
2	1 or 2 times a week
3	3 or 4 times a week
4	5 or more times a week

Table 2: Sleep Likert Scale

RESULTS

When testing variables for reliability against one another, values between 0 and 0.5 show moderate size correlation. The perceived stress item of "confident to handle problems" tested against "things going your way" produced reliability of 0.42 with a p-value less than 0.001. The perceived stress item of "unable to control things in life" tested against "things going your way" produced reliability of 0.35 with a p-value less than 0.001. The perceived stress item of "difficulties are piling up" tested against "things going your way" produced reliability of 0.38 with a p-value less than 0.001. The perceived stress item of "unable to control things in life" tested against "confident to handle problems" produced reliability of 0.32 with a p-value less than 0.001. The perceived stress item of "difficulties are piling up" tested against "confident to handle problems" produced reliability of 0.30 with a p-value less than 0.001. The perceived stress item of "difficulties are piling up" tested against "unable to control things in life" produced reliability of 0.50 with a p-value less than 0.001. Based on these findings, we can conclude that there is appropriate item correlation to create the stress scale. The values from the reliability analysis are represented in table 3 below. Alpha value, which was 0.71, is also in the acceptable range and shows moderate reliability.

Perceived Stress Items	1	2	3	4
1. Things going your way	1			
2. Confident to handle problems	0.42***	1		
3. Unable to control things in life	0.35***	0.32***	1	
4. Difficulties are pilling up	0.38***	0.30***	0.50***	1

Table 3: Testing reliability of the perceived stress variables.
***p<0.001

Looking at some demographic information, of the 5,071 participants in the dataset, 730 (14.4%) participants experienced child sexual abuse. In terms of gender, more females struggled with child sexual abuse than males with 19.8% of all females having experienced child sexual abuse compared to 8.1% of all males. A greater proportion of participants who reported CSA also experienced physical abuse and neglect. The values from the demographic analysis are represented in table 4 below.

Characteristics		Total Sample	CSA (14.4%)
Gender***			
	Female	50.5%	19.8%
	Male	49.5%	8.1%
Race/Ethnicity			
	White	63.1%	13.9%
	African American	21.9%	14.7%
	Hispanic	10.4%	16.6%
	Other	4.6%	14.2%
Physical Abuse***			
	No	62.2%	9.3%
	Yes	37.8%	25.3%
Neglect***			
	No	58.0%	9.7%
	Yes	42.0%	22.0%
Mean Age (SE)		N/A	21.78 (0.09)

*Table 4: Demographic data for individuals who experienced child sexual abuse. ***p<0.001*

Based on the mediation model for the first outcome, falling asleep, our hypothesis was confirmed, and perceived stress mediated the relationship between child sexual abuse and trouble in falling asleep. The direct relationship between child sexual abuse and falling asleep is 0.28. The indirect relationship between the two variables is 0.15. This brings the total relationship to 0.43, and the proportion mediated by stress in the relationship between child sexual abuse and sleep is 0.35. This shows that a part of the relationship

between CSA and falling asleep can also be explained by the mediator, perceived stress. A diagram illustrating the mediation model for falling asleep is seen in figure 1 below (values in parenthesis are standard error that that respective relationship). A table highlighting the proportion mediated by perceived stress on falling asleep along with standard errors and p-values for each relationship is seen in table 5 below.
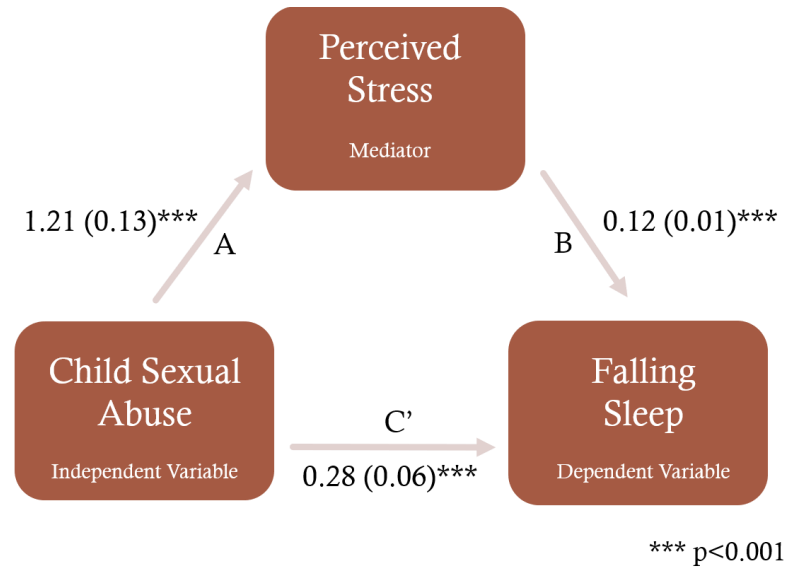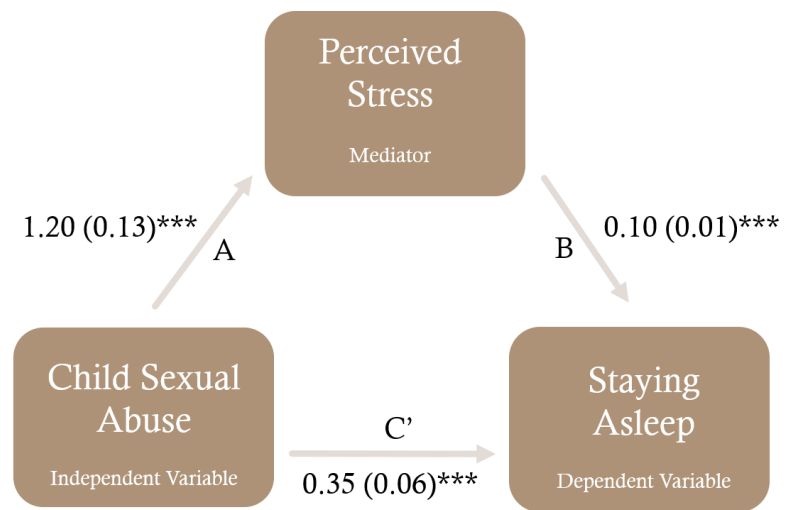

*** p<0.001

Figure 1: Model studying the mediation of perceived stress on child sexual abuse and falling asleep

	Unstandardized β	SE	p-value
Indirect	0.15	0.02	<0.001
Total	0.43	0.06	<0.001
Proportion Mediated = 0.35			

Table 5: Proportion mediated by perceived stress on falling asleep

Based on the mediation model for the second outcome, staying asleep, our hypothesis was confirmed, and perceived stress mediated the relationship between child sexual abuse and trouble in staying asleep. The direct relationship between child sexual abuse and staying asleep is 0.35. The indirect relationship between the two variables is 0.12. This

brings the total relationship to 0.47, and the proportion mediated by stress in the

relationship between child sexual abuse and sleep is 0.26. This shows that a part of the

relationship between CSA and staying asleep can also be explained by the mediator,

perceived stress. A diagram illustrating the mediation model for staying asleep is seen in

figure 2 below (values in parenthesis are standard error that that respective relationship).

A table highlighting the proportion mediated by perceived stress on falling asleep along

with standard errors and p-values for each relationship is seen in table 6 below.

*** p<0.001

*Figure 2: Model studying the mediation of perceived
stress on child sexual abuse and staying asleep*

	Unstandardized β	SE	p-value
Indirect	0.12	0.02	<0.001
Total	0.47	0.06	<0.001
Proportion Mediated = 0.26			

*Table 6: Proportion mediated by perceived
stress on staying asleep*

DISCUSSION

Based on the findings, we can conclude that perceived stress is a pathway through which child sexual abuse may influence adult sleep disturbances. Findings from this study reinforce previous studies while expanding research by suggesting a pathway for the relationship between child sexual assault and sleep disturbance. Looking at the public health significance, individuals who have experienced CSA may have adult sleep issues which may result in long-term effects such as cardiovascular disease, mental health disorders, and cognitive impairment. This in turn may impact an individual's economic productivity.

Strengths and Areas for Improvement

A few strengths of the study include the use of a nationally representative longitudinal data with a fairly large sample size which allowed us to study across developmental periods and through the life course. This data is continuously being collected with wave 5 being recently released, and leaves opportunity for future studies, particularly regarding temporality of events. Evaluating mediation within structural equation modeling as opposed to the Barron and Kenny approach helped us produce more accurate findings with no need for bootstrapping. However, this study is not without limitations. Considering that we pulled both stress and sleep variables from wave 4, we do have issues regarding temporal precedence. Additionally, recall bias may be an issue as child sexual abuse was based on retrospective reports in waves 3 and 4.

CONCLUSION

This research touched on a topic of great public health significance. Individuals who experience child sexual abuse may have adult sleep issues. These sleep issues may result in cognitive impairment or other long-term effects such as obesity, psychiatric conditions, and cardiovascular disease which may hinder individuals' economic productivity.

In addition to contributing to the public health sector, this research also holds potential to contributing to the field of clinical medicine. In the clinical setting, if a patient presents with trouble falling asleep or staying asleep, it may be worthwhile to ask about child sexual abuse when conducting a patient history. Patients may be internalizing childhood adverse experiences which could be causing their physiologic sleep impairment. Asking these patients about child sexual abuse in the patient history has the potential to change the course of treatment by suggesting a more psychologic approach. Furthermore, early detection and intervention has the potential to improve patient outcomes by preventing a downstream of health conditions and promoting holistic health (mental, physical and social wellbeing).

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