The Impact of Previous Adverse Childhood Experiences on Substance Use Disorders: A Narrative Review

Meilan Shuai

Beijing 21st Century School, Beijing, China
Daimi924@Outlook.com

Abstract: Adverse Childhood Experiences (ACEs) are globally pervasive, encompassing abuse, neglect, and family dysfunction before age 18, with enduring consequences for both physical and mental health. Recent studies further indicate that ACEs are a significant risk factor in the onset, development, and exacerbation of Substance Use Disorders (SUDs). However, the specific relationship between ACEs and SUDs, particularly the differences across age groups, has yet to be fully explored. This paper aims to examine the relationship between ACEs and SUDs through a systematic review and analysis of relevant literature, while also analyzing age-related differences. The findings indicate a positive correlation between ACEs and the severity of SUDs in the adolescents, adults, older adults, and sexual minority groups, with this relationship remaining consistent across different cultures and populations. However, due to the lack of effective and standardized ACEs assessment tools, the causal relationship between the two remains unclear. Future research should explore the causal mechanisms between ACEs and SUDs and standardize ACEs assessment tools.

Keywords: Adverse Childhood Experiences, Causal Relationship, Substance Use Disorder, Age Differences, Assessment Tools

1. Introduction

Early life experiences have gained increasing recognition for their lasting impact on an individual's health. Potentially traumatic events such as abuse, neglect, and household dysfunction before age 18, known as Adverse Childhood Experiences (ACEs), have been shown to have a significant impact on both physical and mental well-being. Earlier research suggests that ACEs are common worldwide. For example, a study involving 214,157 American adults found that more than 60% had encountered at least one ACE, while prevalence rates in adult populations from other countries ranged from 46.2% to 66.2% [1-3]. These early traumas are not only associated with various adult diseases but greatly elevate the risk of Substance Use Disorders (SUDs) [4]. Despite numerous studies exploring the relationship between ACEs and SUDs, several key issues remain unresolved. For example, the impact of ACEs on SUDs across different age groups, such as adolescents, adults, and older adults, may vary, and this relationship may differ based on cultural or population backgrounds. In addition, existing research primarily focuses on correlational analyses, lacking in-depth exploration of causal mechanisms, and the low standardization of ACEs assessment tools limits the generalizability and comparability of research findings. Thus, this paper aims to systematically explore the relationship between ACEs and SUDs by reviewing existing literature, with a particular emphasis on variations across age groups and cultural contexts. And a systematic search of databases such as PubMed and

Science Direct was conducted to identify English and Chinese literature published between 1997 and 2022, focusing on quantitative studies with diverse participant groups. By examining these studies, the link between ACEs and SUDs is investigated to identify high-risk groups and develop targeted prevention and treatment strategies to lessen the long-term adverse effects of ACEs on individual health.

2. Literature review

ACEs are commonly defined as potentially traumatic experiences occurring before the age of 18 [5]. In 1998, Felitti et al. introduced the concept of ACEs, defining them as exposure to environments characterized by psychological abuse, physical abuse, sexual abuse, or family dysfunction [6]. Common types of ACEs include physical, verbal, and sexual abuse, as well as family dysfunction, such as domestic violence, mental illness, substance use disorders, and criminal behavior within the household [7]. Furthermore, other studies have expanded the ACEs category to include physical and emotional neglect, parental divorce, bullying, prolonged financial hardship, the loss of family members or friends, and exposure to neighborhood violence [3, 8-11]. In recent years, increasing attention has been paid to the role of ACEs in the development of substance abuse and dependence [12]. Studies show that ACEs are widespread globally. For instance, a survey of 214,157 American adults revealed that 61.55% had encountered at least one ACE before age 18, while 24.64% had experienced three or more [1]. In studies from other countries, the prevalence of ACEs in adult populations ranged from 46.2% to 66.2% [2,3]. These data suggest that ACEs are highly prevalent among adults and adolescents across different countries and cultural contexts [13]. ACEs are not only important indicators of high morbidity rates but also have long-lasting impacts on the development and health of those who experience them [4, 14]. Data from the Centers for Disease Control and Prevention (CDC) indicate that 61% of U.S. adults have experienced at least one ACE, while 16% have encountered four or more. As a result, ACEs are recognized as a major risk factor for developing substance use disorders in adulthood [15].

3. Research method

This study is grounded in a review of the existing literature, selecting five representative studies for systematic analysis, comparison, and synthesis. The studies selected include those by Bryant et al., Bomysoad and Francis, Chang et al., Kim et al., and Zhu et al., published between 2019 and 2022. The research process consists of five stages. First, the research question is defined. Second, relevant literature is systematically searched. Third, studies are selected based on preset criteria. Fourth, data is organized and extracted. Finally, research findings are summarized and synthesized. Literature searches were conducted in databases such as PubMed and Science Direct, with search keywords including “Adverse Childhood Experiences,” “Substance Use Disorder,” “age differences,” and “cultural differences,” focusing on studies exploring the link between ACEs and SUDs. To ensure the rigor and transparency of the literature selection, this study established four inclusion criteria. The publications needed to be in English or Chinese, employ quantitative research methods, include diverse study populations, and be published between 1997 and 2022. The choice of English and Chinese literature was made because English is the universal language of scientific research, while including Chinese studies helps expand the diversity of the research population. And the five selected studies included adolescents, older adults, males, and females to ensure broad applicability of the findings. Also, the breadth of the study population is emphasized to reflect the characteristics of different groups. Due to the lack of previous comprehensive reviews in this field and the varying definitions of ACEs across generations, literature from the past 25 years (1997-2022) was selected for analysis. Through this systematic research method, this study aims to comprehensively explore

the relationship between ACEs and SUDs and provide theoretical and practical guidance for future research.

4. Results

Through a systematic analysis of five studies, this research reveals the relationship between ACEs and SUDs across different populations and their heterogeneity. As illustrated in Table 1, the studies included in the analysis cover elderly individuals, adults, adolescents, and sexual minority groups, providing diverse and representative study populations.

Table 1: Basic characteristics of included studies

Study Population	Sample Size	Age Range	Gender Distribution (Male/Female)	Number of ACEs Types	ACEs Measurement Tool	SUD Diagnostic Tool
Older Adults	11,386	55-75+	Male: 46%; Female: 54%	11 types	Physical, emotional, and sexual abuse, etc.	Alcohol Use Disorder and Associated Disabilities Interview Schedule [15]
Adults	1,501	18-59	Male: 47.4%; Female: 52.6%	10 types	ACE International Questionnaire (ACE-IQ)	66.2% reported at least one ACE [2]
Behavioral Health Patients	4,378	18-65+	Male: 40.53%; Female: 59.47%	10 types	Parental separation, physical neglect, emotional neglect, etc.	84.8% reported at least one ACE [5]
Adolescents	29,617	12-17	Male: 51%; Female: 49%	0-4+	Abuse, neglect, family dysfunction	Significant correlation between ACEs and SUDs [16]
Sexual Minority Groups	394	16+	100% Sexual Minority	0-4+	Abuse, neglect, family dysfunction	55.8% reported ACEs [17]

In the elderly population, a study using data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III) explored the patterns of ACEs and their relationship with depression and SUDs in a sample of 11,386 individuals aged 55 and above [15]. Through latent class analysis, it classified ACEs into four distinct patterns: high adversity, low adversity, childhood abuse, and parental substance abuse. The results indicated that older adults identified as having high adversity or childhood abuse were more susceptible to depression, while ACEs heightened the risk of SUDs indirectly by intensifying depressive symptoms. This highlights the enduring impact of early adversity on mental health and SUDs in later life, emphasizing the need for trauma-informed interventions. However, the cross-sectional design of the study and potential recall bias may limit the reliability of the findings.

In the adult population, a cross-sectional study in Macheng, China, examined the association between ACEs and health behaviors, chronic diseases, and mental health in a sample of 1,501 individuals aged 18 to 59 [2]. The study utilized the ACE International Questionnaire (ACE-IQ) to assess ACEs, and the results showed that 66.2% of participants had experienced at least one ACE, with an increase in ACEs scores significantly correlated with a higher risk of alcohol use, chronic diseases, depression, and post-traumatic stress disorder. The impact of different ACEs components on risk behaviors and health varied, with five ACEs categories showing particularly strong effects on depression. The study emphasized the significant and long-lasting impact of ACEs on adult health, highlighting the importance of identifying high-risk individuals and developing effective interventions.

Among behavioral health patients, a study of 4,378 individuals from a community health center in Connecticut explored the relationship between ACEs and SUDs [5]. Using a 10-item ACE scale, the study evaluated ACE exposure and found that 84.8% of participants had experienced at least one

ACE, while 49.1% had a score of 4 or higher. The presence of one or more ACEs was linked to a higher likelihood of developing SUDs, with parental substance abuse, physical abuse, and sexual abuse identified as the most significant risk factors. However, no clear dose-response relationship between ACEs and SUDs was found, and the relationship varied by gender and race/ethnicity. The study suggests further exploration of the heterogeneity of the relationship between ACEs and SUDs and its underlying factors.

In the adolescent population, a study examined the association between ACEs and mental health conditions among 29,617 adolescents aged 12 to 17 using data from the 2016-2017 National Survey of Children's Health [16]. It was found that approximately 46% of adolescents had no exposure to ACEs, while the most prevalent ACEs included parental divorce, economic hardship, and family substance abuse or mental illness. Experiencing ACEs substantially increased the risk of developing attention deficit/hyperactivity disorder, behavioral and conduct problems, depression, anxiety, and substance use disorders, with the likelihood rising in proportion to the number of ACEs encountered. The study underscored the necessity of early intervention to mitigate the long-term consequences of ACEs and advocated for the implementation of trauma-informed intervention programs across family, school, and community settings.

In the sexual minority population, a survey conducted in Beijing studied the relationship between ACEs and substance use behaviors in 394 sexual minority individuals [17]. The results showed that 55.8% of participants reported experiencing ACEs, and the prevalence of smoking, drinking, and substance use behaviors was higher than that in the general population. ACEs showed a strong link to substance use, with family dysfunction and abuse as key predictors. The study underscored the impact of ACEs on substance use behaviors among sexual minority groups and emphasized the need for early interventions and tailored strategies to mitigate substance use in this population.

5. Limitations and future prospects

Despite extensive research exploring the relationship between ACEs and SUDs and revealing the correlations between ACEs scores and various health outcomes, including links to leading causes of death among U.S. adults, several limitations remain in current studies [18].

Notably, study design limitations are significant, as many rely on cross-sectional approaches that cannot establish a causal link between ACEs and SUDs. Moreover, the reliance on retrospective self-reported data may result in underreporting or misreporting of ACEs, potentially compromising the accuracy of findings. Limitations in sample selection also exist. Research is largely concentrated in the U.S. and Asia, with limited data from European countries, constraining the generalizability and cross-cultural comparability of findings. Besides, some studies rely on small sample sizes or convenience sampling (e.g., clinical samples), which may further limit sample representativeness.

In addition, the measurement tools for ACEs have limitations. Existing studies mainly use ACE scales developed for adult populations, with limited validity evidence for use in children. Although some studies assess ACEs in children by asking parents, parental knowledge may be insufficient, or stigma may prevent accurate reporting, thus leading to an underestimation of ACEs prevalence. The study scope and inclusion criteria are also limited. Most research adopts narrow definitions of ACEs, neglecting other forms of abuse or neglect linked to SUDs. Furthermore, some studies examine only SUDs, neglecting other psychological disorders linked to ACEs, which limits a comprehensive understanding of their effects.

Future research should refine study designs, enhance sample diversity and representativeness, and develop standardized ACEs assessment tools adaptable to different age groups and cultural contexts. Longitudinal studies are essential for establishing causal links between ACEs and SUDs, while cross-cultural comparisons can provide valuable insights into the varying impacts of ACEs across different societal contexts. Future research should also examine the association between ACEs and other

mental health disorders to gain a more comprehensive understanding of their long-term effects and to guide the development of effective interventions [19].

6. Conclusion

This study demonstrates a significant association between ACEs and SUDs, with this relationship exhibiting diversity across different populations and life stages. ACEs not only increase the risk of SUDs but may also exacerbate the severity of substance use through mediating mechanisms such as mental health, emotional regulation, and social functioning. Although existing research has revealed the correlation between ACEs and SUDs, the causal mechanisms and long-term effects remain to be further explored. Future research should further explore the causal relationship between ACEs and SUDs and expand the cultural diversity of studies, particularly by incorporating data from Europe and other regions to enhance the generalizability of findings. Longitudinal study designs should be adopted to clarify the long-term effects of ACEs on SUDs, and standardized ACEs assessment tools suitable for different age groups and cultural contexts should be developed to ensure measurement accuracy and comparability. Besides, the interaction between ACEs and other mental health issues should be examined to gain a comprehensive understanding of their combined impact on individual health. This supports the development of targeted interventions to reduce the lasting impact of ACEs on individuals and society. And a deeper understanding of ACEs and SUDs can guide more effective strategies to mitigate their long-term effects.

References

[1] *Merrick, M.T., et al. (2018) Prevalence of Adverse Childhood Experiences From the 2011-2014 Behavioral Risk Factor Surveillance System in 23 States. JAMA Pediatr, 172(11), 1038-1044.*

[2] *Chang, X., et al. (2019) Associations between adverse childhood experiences and health outcomes in adults aged 18-59 years. PLoS One, 14(2), e0211850.*

[3] *Dube, S.R., et al. (2003) Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: the adverse childhood experiences study. Pediatrics, 111(3), 564-572.*

[4] *Hughes, K., et al. (2019) Adverse childhood experiences, childhood relationships and associated substance use and mental health in young Europeans. Eur J Public Health, 29(4), 741-747.*

[5] *Bryant, D.J., Coman, E.N. and Damian, A.J. (2020) Association of adverse childhood experiences (ACEs) and substance use disorders (SUDs) in a multi-site safety net healthcare setting. Addict Behav Rep, 12, 100293.*

[6] *Felitti, V.J., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med, 14(4), 245-258.*

[7] *Petruccelli, K., Davis, J. and Berman, T. (2019). Adverse childhood experiences and associated health outcomes: A systematic review and meta-analysis. Child Abuse Negl, 97, 104127.*

[8] *Dube, S.R., et al. (2002). Adverse childhood experiences and personal alcohol abuse as an adult. Addict Behav, 27(5), 713-725.*

[9] *Kiburi, S.K., et al. (2018). Adverse childhood experiences among patients with substance use disorders at a referral psychiatric hospital in Kenya. BMC Psychiatry, 18(1), 197.*

[10] *Mersky, J.P., Topitzes, J. and Reynolds, A.J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: a cohort study of an urban, minority sample in the U.S. Child Abuse Negl, 37(11), 917-925.*

[11] *Cronholm, P.F., et al. (2015). Adverse Childhood Experiences: Expanding the Concept of Adversity. Am J Prev Med, 49(3), 354-361.*

[12] *Leza, L., et al. (2021). Adverse childhood experiences (ACEs) and substance use disorder (SUD): A scoping review. Drug Alcohol Depend, 221, 108563.*

[13] *Ford, D.C., et al. (2014). Examination of the Factorial Structure of Adverse Childhood Experiences and Recommendations for Three Subscale Scores. Psychol Violence, 4(4), 432-444.*

[14] *Keyes, K.M., et al. (2014). Exposure to the Lebanon War of 2006 and effects on alcohol use disorders: the moderating role of childhood maltreatment. Drug Alcohol Depend, 134, 296-303.*

[15] *Kim, Y., et al.(2021). Adverse childhood experience patterns, major depressive disorder, and substance use disorder in older adults. Aging Ment Health, 25(3), 484-491.*

[16] Bomysoad, R.N. and Francis, L.A. (2020). Adverse Childhood Experiences and Mental Health Conditions Among Adolescents. J Adolesc Health, 67(6), 868-870.
[17] Zhu, B., et al. (2022). [Associations between adverse childhood experiences and adulthood substance use among lesbians]. Zhonghua Liu Xing Bing Xue Za Zhi, 43(2), 248-253.
[18] Murphy, S.L., et al. (2018). Mortality in the United States, 2017. NCHS Data Brief(328), 1-8.
[19] Johnson-Kwochka, A., et al. (2021). Development and examination of the attribution questionnaire-substance use disorder (AQ-SUD) to measure public stigma towards adolescents experiencing substance use disorders. Drug Alcohol Depend, 221, 108600.