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## Original Research

# Is there a relationship between adverse childhood experiences and problem drinking behaviors? Findings from a population-based sample

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## ABSTRACT

**Objectives:** The study investigated the relationships between adverse childhood experiences (ACEs) and heavy and binge drinking, stratified by gender.

**Study design:** Population-based cross-sectional study.

**Methods:** Data were retrieved from 2012 Behavioral Risk Factor Surveillance System. Over 39,000 individuals from five states were included in the study. Multiple logistic regression models were used to analyze the weighted data to determine factors associated with heavy and binge drinking for men and women. Each model included ACEs and controlled for sociodemographic variables, depression and smoking status. Bonferroni method was used to correct multiple comparisons.

**Results:** Only a few relationships between ACEs and problem drinking were observed. Among men, living with a drug abuser as a child was significantly associated with both heavy and binge drinking compared to men who did not reside with a drug abuser as a child. Childhood verbal abuse was linked with men's binge drinking compared to men who were not verbally abused as children. Among women, none of the nine ACEs examined in the study were associated with their heavy drinking. Only one ACE, verbal abuse, was found to be correlated with binge drinking, compared to women who did not experience childhood verbal abuse. In addition, we did not find the hypothesized, step-wise, graded relationship between the number of ACEs and heavy and binge drinking. However, the risk of heavy drinking was greater if the individual was exposed to four or more childhood adversities among both men and women.

**Conclusion:** Study hypotheses were only partially supported. Future studies should unpack the interplay among gender, socio-economic status, ACEs, and problem alcohol consumption.

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## Introduction

Problem alcohol consumption, such as heavy and binge drinking, engenders significant public health and socio-economic consequences. Heavy drinking, typically defined as consuming 15 drinks or more per week for men and eight drinks or more per week for women,<sup>1</sup> is known to be a causal factor in many health conditions, such as pancreatitis,<sup>2</sup> liver cirrhosis,<sup>3</sup> epilepsy,<sup>4</sup> cardiovascular diseases,<sup>5,6</sup> type 2 diabetes,<sup>5,7</sup> infectious diseases,<sup>8,9</sup> and liver, pancreatic, and breast cancers.<sup>10,11</sup> Binge drinking, defined as having five or more drinks for men or four or more drinks for women on a single occasion,<sup>12</sup> is positively associated with a range of acute and chronic adverse consequences, including impaired driving,<sup>13,14</sup> intentional and unintentional injuries,<sup>15</sup> unintended pregnancy,<sup>16</sup> high blood pressure, stroke, and other cardiovascular diseases,<sup>17</sup> liver disease,<sup>18</sup> and HIV and other sexually transmitted infections.<sup>19,20</sup> In the United States, excessive drinking is a leading cause of premature mortality, accounting for nearly 1 in 10 deaths among adults.<sup>21</sup> The World Health Organization estimated that 3.3 million global deaths were attributed to alcohol every year.<sup>22</sup> Moreover, problem alcohol consumption is also significantly related to mental health problems<sup>23</sup> and often affects the health and well-being of others.<sup>24,25</sup> Clearly, there is a significant socio-economic cost of problem alcohol consumption to individuals and society.<sup>21,26,27</sup>

Many of the consequences related to heavy and binge alcohol use vary by gender. Compared to women, men consume alcohol more frequently, in greater amounts, engage in more binge drinking,<sup>28</sup> and are more often diagnosed with alcohol disorders.<sup>29</sup> Aggression,<sup>30</sup> drunk driving,<sup>31</sup> and incidents involving police<sup>32</sup> are more prevalent among men consuming large amounts of alcohol than women. High alcohol consumption is related to higher rates of traumatic injuries and death,<sup>33,34</sup> and men who committed suicide are more likely to have higher levels of alcohol in their system.<sup>35</sup> Male heavy and binge drinking is significantly associated with physical and sexual assault and intimate partner violence.<sup>36</sup> In addition to other health risks, men are also more prone to prostate cancer as a result of heavy alcohol use.<sup>37</sup>

Women become intoxicated with fewer drinks compared to men, and when women drink the same amounts as men, they experience more harmful consequences resulting from blackouts and passing out compared to men.<sup>38,39</sup> Women who drink heavily or binge drink are more vulnerable to alcohol-related sexual assault compared to women who do not consume alcohol.<sup>40,41</sup> Heavy and binge-related alcohol consumption among women also increases their risk of unprotected sex, unplanned pregnancies, and poor pregnancy outcomes, such as miscarriage, stillbirth, and fetal alcohol syndrome.<sup>42</sup> Women who consume higher levels of alcohol have a greater risk of breast cancer and are more sensitive to brain damage resulting from alcohol use compared to women who do not consume alcohol.<sup>11</sup>

## ACEs and problem drinking

Researchers have studied the etiology of heavy and binge drinking. One of the factors that has been researched

extensively is adverse childhood experiences (ACEs), which are understood as traumatic experiences that took place before the child reaches the age of 18 years old.<sup>44,45</sup> These experiences, such as child abuse and neglect and family dysfunctions, are shown to be critical to public health promotion and prevention as they increase the likelihood of poor mental and physical health and risky behaviors throughout the life course.<sup>46</sup> The ACE study has particular relevance to public health initiatives, which draw on this research to promote health and prevent illness and injury. In general, the risk of alcohol problems tends to be significantly higher for people who report ACEs compared to those who do not. Both community and large-scale studies in the United States,<sup>44–53</sup> Canada,<sup>54</sup> Australia,<sup>55,56</sup> and the Philippines<sup>57</sup> show strong, positive correlations between alcohol problems and different types of ACEs, including childhood physical abuse (CPA),<sup>44–46,48,54</sup> childhood sexual abuse (CSA),<sup>49,50,55,56,58</sup> neglect,<sup>44,45,57</sup> verbal abuse,<sup>44–46,53</sup> domestic violence,<sup>44–46,53,57</sup> household substance abuse,<sup>44–46,53</sup> household mental illness,<sup>44–46,53</sup> parental separation/divorce,<sup>44–46,51,57</sup> and incarcerated household members.<sup>44–46,57</sup> Studies also indicate a strong, graded relationship between the number of adversities experienced in childhood and the likelihood of alcohol abuse in adulthood.<sup>44–46,51</sup> Specifically, the relationship between the number of reported ACEs and alcohol problems is much stronger among individuals with four or more ACEs.<sup>44,45</sup>

## *The relationship between ACEs, problem drinking, and gender*

While both men and women who experience ACEs have an increased risk of alcohol problems,<sup>58,59</sup> some studies suggest that they appear to have different, sometimes conflicting patterns. Population-based surveys in the United States<sup>50</sup> and Canada<sup>54</sup> indicate that the risk of self-reported alcohol problems is significantly higher among men with CPA and CSA than that among their female counterparts. However, in two large-scale Australian surveys, women with a history of CSA appeared to have significantly greater risk of alcohol abuse than men.<sup>55,56</sup>

## *The present study*

Notably, most gender-specific studies to date that examine the relationship between childhood trauma and alcohol use focus on the roles of CPA and CSA, but not other types of childhood adversities. Moreover, findings of studies that examine the relationship between ACEs and heavy and binge drinking between men and women have shown inconsistent results. Given these issues, the present study aims to extend the literature on ACEs and problem drinking and provide a gender-specific analysis based on recent, population-based data. The study has the following hypotheses: for both men and women, there is a positive relationship between each type of ACE and heavy drinking (hypothesis 1.1) and binge drinking (hypothesis 1.2); and there is a graded relationship between the number of ACEs and heavy drinking (hypothesis 2.1) and binge drinking (hypothesis 2.2).

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