Assessing American Indian Traditional Ceremonial Practices and Substance Use Behaviors in an Urban, Multi-Tribal Setting: Results from a Community Survey

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Abstract: American Indian and Alaska Native (AI/AN) communities have relied on traditional ceremonial practices (TCPs) for survival and resilience for generations. Research examining the role of TCPs on wellness in urban, multi-tribal communities, however, has only recently emerged over the last several decades. This study explored the association between TCP-related variables and substance use in an urban AI/AN community in Montana. Specifically, participant knowledge, attitudes, and beliefs (KAB) regarding TCPs, their level of intent to participate in TCPs, and past year substance use were measured. This cross-sectional study used survey data from 194 AI/AN adults (66% female, 5% nonbinary; M age = 44). Positive KAB toward TCPs was found in 56.4% of respondents. Greater level of intent to participate in TCPs was found in 36.7% of respondents. Multivariate logistic regression showed individuals with positive KAB were less likely to report past year alcohol [adjusted odds ratio (AOR): 0.49; 95% confidence interval (95% CI): 0.26, 0.93] or other drug use (AOR: 0.30; 95% CI: 0.11, 0.76). Individuals who reported a greater level of intent to participate in TCPs were also less likely to report past year alcohol (AOR: 0.51; 95% CI: 0.26, 0.98) or other drug use (AOR: 0.31; 95% CI: 0.08, 0.91). The findings highlight a need for further examination of the potential effectiveness of substance use interventions for urban AI/AN adults that incorporate TCP-related factors.

INTRODUCTION

American Indian and Alaska Native (AI/AN) communities have successfully relied on long-held traditional ceremonial practices (TCPs) to survive and heal from historical traumas, such as forced relocation and boarding schools, for generations (Brave Heart et al., 2011, 2016; Hartmann & Gone, 2014). Despite millennia of practice-based evidence, however, TCP-based substance use interventions are often deemed lacking an evidence base due to a paucity of academic research (Venner et al., 2021; Komro et al., 2023; Hunter et al., 2024). A national movement toward accepting only Western scientific evidence of effectiveness culminated with the development of the National Registry of Effective Prevention Practices (NREPP), in 1996, and its 2006 successor, the National Registry of Evidence-based Programs and Practices (Hennessy et al., 2006). AI/AN scholars, along with many other voices, drew attention to the inequity and lack of representation of cultural knowledge reflected in many NREPP interventions (Lucero, 2011). Additionally, NREPP-required criteria—such as reliability and validity of measures, intervention fidelity, missing data, and attrition—pose considerable challenges for AI/AN communities due to small population sizes and tribal heterogeneity (Walters & Simoni, 2009; Smith, 2021).

Reliance on evidence-based programs, whether culturally adapted or not, does not appear to have solved the crisis of substance use in AI/AN communities. Although the 2022 National Survey on Drug Use and Health found that lifetime alcohol use was lower among AI/AN participants than non-Hispanic Whites, AI/AN adults (18 years or older) reported the highest prevalence of heavy drinking for any identified race (Center for Behavioral Health Statistics and Quality [CBHSQ], 2023). AI/AN adults also reported the highest prevalence of both lifetime and past year illicit drug use—including marijuana, methamphetamine, and opioids—of any other race (CBHSQ, 2023). The COVID-19 pandemic added to the substance use crisis, with AI/AN communities experiencing the greatest drug overdose death rate (drug overdose deaths per 100,000) of any racial or ethnic group in the United States between January and September 2020, according to the CDC (Panchal et al., 2021).

As community-informed and community-led research approaches become more common, studies are beginning to highlight the potential for TCP-based interventions to prevent or decrease substance use within AI/AN communities (Jernigan et al., 2020; Dickerson et al., 2020; Chase-

Begay et al., 2023). Emerging research is finding that this approach may also be effective in urban AI/AN communities, which are often more heterogeneous in terms of tribal affiliation and acculturation (Wright et al., 2011; Tonigan et al., 2020; Dickerson et al., 2021). However, not enough information is available on the generalizability of TCP-based interventions within urban AI/AN populations. There have been no studies, for example, assessing the potential effectiveness for this type of substance use programming among urban AI/AN communities in the state of Montana.

Nationally, just over three percent of the population identifies as AI/AN alone or in combination with one or more racial group (Office of Minority Health, 2025). More than 70% of AI/AN people live in urban, non-reservation settings across the United States (Norris et al., 2012). However, Montana is a largely rural state, and the proportion of AI/AN people living in urban, non-reservation settings is closer to half (Health Resources and Services Administration, 2021). AI/AN people living in Montana's urban towns often retain strong relations and ties to a home reservation, including through cultural practices (Montana Office of Public Instruction, 2015).

There are five federally funded Urban Indian Health Organizations (UIHOs) located in Montana, the second highest concentration within any state after California (Indian Health Service, n.d.). To better understand TCPs and, more importantly, the potential acceptability of a TCP-based substance use intervention, a survey was conducted as part of a larger research study with AI/AN clients from one Montana UIHO. This study reports the findings of the survey and presents implications for the planning and development of future work to decrease substance use within this population.

METHODS

The 6 Rs of Indigenous Research—**R**espect, **R**elationship, **R**epresentation, **R**elevance, **R**esponsibility, and **R**eciprocity—guided the approach of this study (Tsosie et al., 2022). Meetings between the first author and AI/AN staff members at the UIHO—specifically the director of behavioral health and the behavioral health clinical supervisor—informed the conceptualization and design of this project. Study approval was received from both the UIHO board of directors and the Indian Health Service (IHS) National Institutional Review Board, protocol number N20-N-03.

Project Model

Prior to the COVID-19 pandemic, the community survey was conceptualized to measure self-reported rates of participation in TCP activities and past year substance use behaviors. However, the COVID-19 pandemic created a situation in which many community-based TCP activities were cancelled for several years in an effort to limit the spread of the SARS-CoV-2 virus. Accordingly, the research team adapted the survey measures to include construct measures that could approximate for direct participation in TCPs — a participant's knowledge, attitudes, and beliefs (KAB) regarding TCPs, their self-reported access to TCPs, and their self-reported intent to participate in TCPs.

The resulting COVID-adapted project model drew on several existing theories. The foundational tenet for this project is *Reziliency* (Belcourt-Dittloff, 2007). Adapted from Resilience Theory (Richardson, 2002), *Reziliency* was developed by an American Indian psychologist for application in both reservation and urban American Indian communities. It is a strengths-based framework that encompasses the positive factors, approaches, and methods used within AI/AN communities when faced with experiences of adversity or trauma that create an environment for individuals to demonstrate resilience (Belcourt-Dittloff, 2007). *Reziliency* informed the current study design through the emphasis and inclusion of asset-, rather than deficit-based, scales related to cultural and ceremonial practices.

Because the study did not measure direct participation in TCPs due to COVID-related prevention protocols, the research team drew on the theories of Reasoned Action and Planned Behavior (McEachan et al., 2016). These frameworks have been successfully applied to prior public health work with American Indian participants (Dippel et al., 2017; Dobbs et al., 2019). The theories include components related to KAB as well as intent (Steinmetz et al., 2016). Behavioral intention, in particular, is the step just before behavior in the models and has been shown to be a valid predictor variable, moderated by intention strength and stability (Conner & Norman, 2022). Based on these theoretical concepts, the research team developed the following COVID-responsive project model (Figure 1).
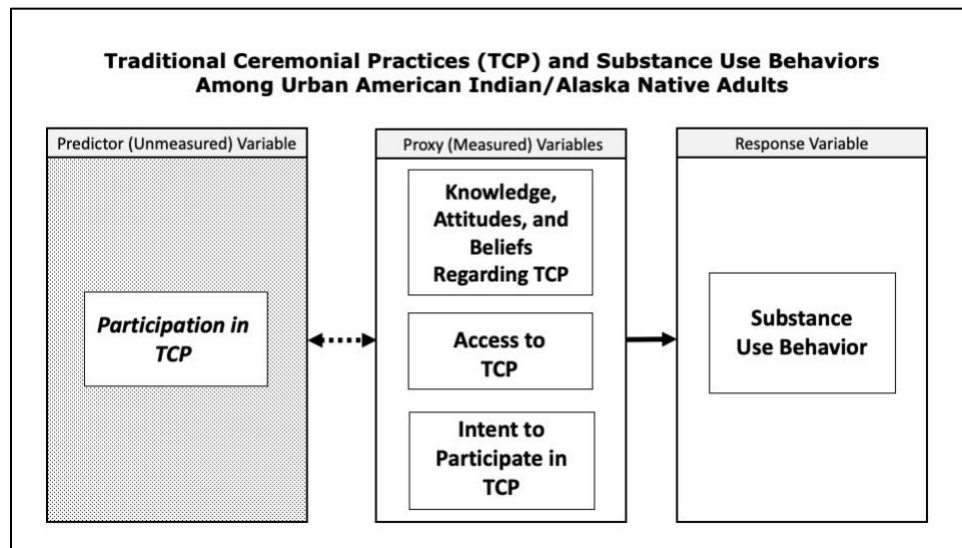
Figure 1. COVID-adapted project model showing the anticipated association between the predictor, proxy, and response variables. Dashed line represents unmeasured relationships; solid line represents measured (proxy) relationships.

Survey Development

In discussions between the lead author and UIHO staff, a concern was raised about the potential for survey fatigue. In addition to the current study and a need for a general community health assessment survey, the UIHO had also been approached by a graduate student seeking to conduct a community survey on intimate partner violence (IPV). Instead of three separate surveys, UIHO leadership decided, and the research team agreed, to combine the three survey topics (health assessment, TCPs, and IPV) into one general questionnaire.

Substance Use Measures

In partnership with the UIHO behavioral health leadership, select substance use measures were drawn from the National Survey on Drug Use and Health to capture data on needs and concerns as defined by, and relevant to, the target community. Specifically, respondents were asked about their past year use of (1) alcohol, (2) marijuana, (3) methamphetamine, (4) inhalants, and (5) prescription medications (in a way not directed by a medical provider).

TCP Measures

Knowledge, Attitudes, and Beliefs. A review of the literature was performed to inform the selection of scales or items aimed at measuring TCP-related constructs. A COVID-19 Indigenous Needs Assessment instrument that included a protective factor scale for TCP

(Indigenous Wellness Research Institute, n.d.) was adapted for this study to measure participant attitudes, knowledge, and beliefs (KAB) regarding TCP. The scale includes 13 items asking respondents about the importance of factors such as attending ceremonies, using traditional medicines, and seeking help from tribal elders, among others. Responses for this measure were collected on a 4-point Likert scale ranging from very important to not at all important.

Access. The research team could not find any prior published or unpublished studies using a scale that measured access to TCP. The team developed a novel scale for measuring access that included four items: (1) If I want to participate in ceremonies or traditional practices, I have people who will support me in doing so (family, friends, elders, etc.); (2) If I am invited to a ceremony or other traditional practice, I am confident that I will know what to do or how to act (e.g. when to talk, songs to sing, what to wear); (3) In my community, access to ceremony is largely based on who you are connected to (reverse coded); and (4) I would like to attend ceremonies in my community, but don't feel like I can because they don't reflect my own tribal practices (reverse coded). The access scale was provided to two American Indian clinical psychologists for feedback before pilot testing. Responses for this measure were collected on a 5-point Likert scale ranging from strongly agree to strongly disagree.

Intent. The research team could not find any prior published or unpublished studies using a scale that measured intent to participate in TCP. The team developed a novel scale for measuring intent that included five items: (1) Once COVID is no longer an issue or I feel safe again, I will participate in ceremonies or other traditional practices; (2) I will participate in ceremonies or other traditional practices, regardless of COVID; (3) If I am dealing with a physical illness, I will include ceremony or other traditional practices in my treatment; (4) If I am dealing with mental or emotional problems (e.g., depression, anxiety, stress), I will include ceremony or other traditional practices in my treatment; and (5) If a ceremony is taking place but is not part of my own tribal practices, I will still attend. The research team added Item 5 specifically because the study was surveying an urban, multitribal community—increasing the likeliness of tribal heterogeneity compared to reservation settings. The intent scale was provided to two American Indian clinical psychologists for feedback before pilot testing. Responses for this measure were collected on a 5-point Likert scale ranging from extremely likely to extremely unlikely.

The research team, in consultation with UIHO staff and three cultural advisors identified by the UIHO decided against a constrained definition of the terms "ceremony" or "traditional ceremonial practices" in the survey questionnaire. Instead, language was included that described

TCPs and identified examples of ceremonies—including sweat lodge, Native American Church (NAC), pipe ceremony, naming ceremony, and coming of age ceremony. But participants were ultimately able to respond based on their own definition of ceremony as informed by their respective tribal nations.

Covariates

The full survey questionnaire also included measures related to general health status, IPV, positive childhood experiences (PCEs), AI/AN identity, and sociodemographic variables including age, gender, education level, and household income (See Supplemental File for full survey). Health status was assessed using the SF-12, which has been previously validated among AI/AN populations (Edwards et al., 2012). PCEs were assessed using a scale from the Wisconsin Behavioral Risk Factor Survey (Bethell et al., 2019). AI/AN identity was assessed using a 3-item scale: (1) Being a member of my particular Native American tribe/People is an important part of my identity; (2) Being Native American in general is an important part of my identity; and (3) When I talk about Native Americans, I usually say "we" rather than "they." Responses were recorded using a 5-point Likert scale, ranging from strongly disagree to strongly agree.

Pilot Testing

Before deploying the survey to the community, it was pilot tested with ten AI/AN individuals who were purposively selected for diversity in representation of the target population based on age, gender, level of education, and role within the AI/AN community. The pilot testing sample was comprised of five females, four males, and one Two Spirit individual, and included college students, elders, AI/AN professionals, and a traditional practitioner. Pilot test participants were asked to take the survey on their own and then participate in an interview with a member of the research team to provide feedback on questionnaire items for clarity, perceived relevance, and cultural appropriateness. Additionally, the survey was reviewed by three cultural advisors identified by the UIHO. Final modifications to the instrument were made by the research team based on feedback from the pilot testers and cultural advisors before being distributed to the community.

Sample

Via an electronic health records (EHR) system, UIHO staff identified eligible participants. Inclusion criteria were: (1) AI/AN adults (18 years and older); (2) currently living in one of two

counties served by the UIHO; and (3) at least one interaction with the UIHO within the last three years. An "interaction" included any medical, dental, or behavioral health appointment, along with participation in any health promotion events or activities where contact information was collected. Based on these criteria, EHR records generated 275 e-mail addresses and 504 physical addresses for 779 unduplicated urban AI/AN adults. Due to HIPAA privacy restrictions, the sampling frame was developed and retained by the UIHO, and all survey invitations were sent by UIHO staff on behalf of the research team.

Between September and November 2021, an e-mail invitation and four follow-up e-mails were sent to potential survey participants via the UIHO Qualtrics account (Qualtrics, 2020). From the original set of 275 e-mail addresses, 33 email addresses bounced or could not be delivered and one individual opted out of receiving emails, for a total of 241 potential electronic respondents. In October 2021, 504 paper survey packets were sent out. From this original set, 76 packets were returned as undeliverable and four were returned because the individual was deceased, for a total of 424 potential paper respondents.

Survey Procedure

Potential respondents received an invitation sent out by UIHO staff, either electronically or on paper, to complete the final survey questionnaire (Supplemental File). Email invitations included a link to complete the survey questionnaire online. Participants who received an electronic invitation were allowed to stop and start the survey via a unique link. The Qualtrics platform tracked which e-mail addresses had completed the survey, to inform follow-up requests, but did not link individual survey data to e-mail addresses. Mailed invitations included an option to complete the survey online, using an included link or QR code, or via mail using a postage-paid return envelope The paper invitations included a unique Participant Code. Each individual was assigned a 5-digit code that was automatically generated during the printing process. To avoid response duplication, if the respondent chose to complete the survey online, the Participant Code needed to be entered as part of the survey. Paper responses were entered into Qualtrics by a research team member and reviewed for accuracy by the lead author before analysis.

Both the paper and electronic versions of the survey included a description of the survey content and information on informed consent at the beginning of the questionnaire. Participants were notified that their responses were anonymous, that they could choose to skip any question(s), and that the first 200 respondents would receive a $30.00 Amazon gift card in gratitude for their

participation. The paper survey included a separate form that respondents could fill out indicating how they would like to receive their incentive payment—via e-mail or U.S. postal mail—along with their contact information. These forms were not attached to survey responses and were filed and maintained in a separate location. Online participants were given the opportunity to click a link at the end of the survey that would take them to a separate form where they could provide their e-mail address for electronic delivery of the incentive payment.

Both the consent language and the amount and mode of the incentive payments were approved by the IHS National Institutional Review Board.

Statistical Methods

Measures

Outcome measures were binary, in which *0* was used to indicate no reported substance use and *1* indicated substance use. TCP variables were dichotomized based on their Likert scale values. Participants were assigned a *0* for the KAB scale if their mean score reflected "Not At All Important" or "A Little Important" or a *1* if their mean score reflected "Fairly Important" or "Very Important." Participants were assigned a *0* for the access scale if their mean score reflected "Strongly Disagree," "Disagree a Little," or "Neither Agree nor Disagree" or a *1* if their mean score reflected "Agree a Little" or "Strongly Agree." Participants were assigned a *0* for the intent scale if their mean score reflected "Extremely Unlikely," "Somewhat Unlikely," or "Neither Likely nor Unlikely" or a *1* if their mean score reflected "Somewhat Likely" or "Extremely Likely." While this approach is common with Likert scale data (Harpe, 2015), cut-point effects were investigated to test the validity of the results comparing against using median and upper quartile values. No indication was found that the significance of the association increases or decreases according to the cut-point.

Data Analysis

All analyses were conducted using RStudio software (RStudio Team, 2020). Proportions of past year substance use, KAB, access, and intent were estimated using Chi-square tests. Model building for logistic regression was accomplished through a purposeful selection process (Zhang, 2016). First, bivariate analyses were performed for each type of substance use outcome with each TCP measure and individual covariates. Any variables that were either significant predictors (returning a *p* value < 0.05) or that individually influenced the odds ratio by 10% or more in either

direction, regardless of significance, were retained for further analysis. Models including the remaining variables were refined by evaluating the effect of dropping a given variable (ANOVA p-value < 0.05) to find the most parsimonious model for each outcome variable.

RESULTS

There was a cumulative response rate of 32% for all survey modes. There was a 26% response rate for the 424 individuals contacted via U.S. mail, with 68 respondents mailing a completed survey packet and 42 respondents completing the survey online. There was a 42% (102/241) response rate for the individuals contacted via e-mail and completing the survey online. Of the 212 completed surveys, two were excluded because the respondents did not currently live in one of the target counties, and 16 were excluded due to incompleteness, resulting in 194 survey responses included in the final analysis. The average time to complete the survey online was 17.25 minutes (Range: 5.5 – 65 minutes).

Cronbach's Alpha

To assess internal validity of the survey questionnaire, a Cronbach's alpha test was performed on each TCP measurement scale. As expected, the modified KAB scale adapted from a previously employed instrument showed high internal consistency ($\alpha = 0.93$). The intent scale also showed acceptable internal consistency ($\alpha = 0.85$). The access scale, however, did not show acceptable internal consistency ($\alpha = 0.44$) and was removed from final analyses.

Demographics

Table 1 shows characteristics of the sample by reported substance use. All respondents identified as American Indian, Alaska Native, or Indigenous. Tribal heterogeneity was present in the sample; there were 38 different tribal nations reported as part of various tribal affiliations, and 62% of respondents reported affiliation with at least one tribe located in Montana. Females comprised 66% of respondents in the sample and 5% identified as Two-Spirit or nonbinary. Young adults (18-29 years) made up 24% of the sample, 47% were adults (30-55 years), and 29% were elders (56 years or older). The study took place in a college town, which may explain why education among the sample is higher than would be expected in other parts of the state. Only 17.5% had a high school diploma or less, 32.5% had completed some college, and 50% had a

college degree. Despite high levels of education, 46% of respondents reported an annual household income below $30,000, 29% between $30,000 and $60,000, and 25% more than $60,000.

Table 1
Select characteristics of survey respondents (N = 194) by reporting of past year substance use

Variable	N^a (%)^b	Alcohol (n = 123)^c	Marijuana (n = 101)^c	Other drugs (n = 24)^c
Age				
Young adult (18-29)	47 (24.2%)	33 (70.2%)	**33 (70.2%)**	8 (17.0%)
Adult (30-55)	91 (46.9%)	59 (64.8%)	**48 (52.7%)**	13 (14.3%)
Elder (56+)	56 (28.9%)	31 (55.4%)	**20 (35.7%)**	≤ 5
Gender				
All female genders	129 (66.5%)	83 (64.3%)	67 (51.9%)	15 (11.6%)
All male genders	56 (28.9%)	34 (60.7%)	29 (51.8%)	6 (10.7%)
All nonbinary genders	9 (4.6%)	6 (66.7%)	≤ 5	≤ 5
Education				
HS diploma or less	34 (17.5%)	23 (67.6%)	22 (64.7%)	9 (26.5%)
Some college	63 (32.5%)	43 (68.3%)	34 (54.0%)	6 (9.5%)
Associate or bachelor's degree	70 (36.1%)	38 (54.3%)	35 (50.0%)	7 (10.0%)
Graduate degree	27 (13.9%)	19 (70.4%)	10 (37.0%)	≤ 5
Annual Household Income				
< $30,000	89 (45.9%)	**47 (52.8%)**	49 (55.1%)	**17 (19.1%)**
$30,000 - $59,999	57 (29.4%)	**42 (73.7%)**	29 (50.9%)	**≤ 5**
$60,000+	48 (24.7%)	**34 (70.8%)**	23 (47.9%)	**≤ 5**
Health Status				
Better health	78 (40.2%)	55 (70.5%)	37 (47.4%)	≤ 5
Average to poorer health	116 (59.8%)	68 (58.6%)	64 (55.2%)	19 (16.4%)
Native American Identity				
Stronger Native identity	142 (73.2%)	86 (60.6%)	77 (54.2%)	17 (12.0%)
Limited Native identity	52 (26.8%)	37 (71.2%)	24 (46.2%)	7 (13.5%)
Positive Childhood Experiences				
0 – 2 PCEs	32 (16.5%)	22 (68.8%)	19 (59.4%)	8 (25.0%)
3 – 5 PCEs	77 (39.7%)	50 (64.9%)	46 (59.7%)	8 (10.4%)
6 – 7 PCEs	85 (43.8%)	51 (60.0%)	36 (42.4%)	8 (9.4%)

Bolded associations significant at the 0.05 level. *P* values determined by χ^2 test when all cells > 5, else Fischer's Exact test.
[a]Unweighted frequency from the sample.
[b]Column percentages may not add up to 100% due to rounding.
[c]Percentage of variable category *N* reporting substance use.

Knowledge, Attitudes, Beliefs, and Intent

More than half of the respondents reported positive KAB related to TCPs (Table 2). Participants who reported more positive KAB reported lower proportions of all types of substance use. Just over one-third of respondents reported a greater level of intent to participate in TCPs.

Participants who reported a greater level of intent to participate in TCPs reported lower proportions of all types of substance use.

Table 2
Frequency of substance use by knowledge, attitudes, and beliefs (KAB) and Intent

Variable	N^a (%)^b	Alcohol N^a (%)^c	Marijuana N^a (%)^c	Other drugs N^a (%)^c
KAB				
More positive KAB	106 (54.6%)	61 (57.5%)	51 (48.1%)	8 (7.5%)
Less positive KAB	88 (45.4%)	62 (70.5%)	50 (56.8%)	16 (18.2%)
Intent				
Greater intent	71 (36.6%)	41 (57.7%)	33 (46.5%)	≤ 5
Less Intent	123 (63.4%)	82 (66.7%)	68 (55.3%)	20 (16.3%)

Bolded associations significant at the 0.05 level. *P* values determined by χ^2 test when all cells ≥ 5, else Fischer's Exact test.
[a]Unweighted frequency from the sample.
[b]Column percentages may not add up to 100% due to rounding.
[c]Percentage of variable category *N* reporting substance use.

Substance Use Behavior

Past year alcohol use was reported in 63.4% of the sample, compared to a national prevalence among AI/AN adults (18+ years) of 61.0% (CBHSQ, 2023). Due to small cell values, illicit drug use categories (methamphetamine, inhalants, and prescription medications used in a way not directed by a medical provider) were combined for analyses. Illicit drug use (excluding marijuana) was reported in 12.4% of the sample, compared to the AI/AN adult national prevalence of 11.4% (CBHSQ, 2023). Notably, marijuana use was reported in 52.1% of the sample—almost 1.5 times the 2021 national prevalence for AI/AN adults of 37.6% (CBHSQ, 2023). These results are not unexpected, however, as they are in line with the geographic region of the study. Missoula County, which is home to a large university and has a longstanding liberal attitude toward marijuana use, reports some of the greatest marijuana use in the state (Walker et al., 2024). Additionally, recreational cannabis was legalized in the state during the study period, which has been associated with increased marijuana use rates (Steinberg et al., 2021; Walker et al., 2024).

Logistic Regression Analysis

Bivariate Analyses

At the bivariate level, significant associations were found between both age and household income with select substance use behaviors. Young adults in the sample were more likely to have

used marijuana in the past year compared to elders. Individuals with household incomes of $30,000 or greater were more likely to have consumed alcohol within the past year. Individuals with household incomes less than $30,000 were more likely to have used other drugs (methamphetamine, inhalants, or prescription medication misuse) in the past year.

Relationships between TCP and Substance Use

After adjusting for age and income, logistic regression showed significant associations between the TCP predictor variables and both alcohol and other drugs. Individuals in the sample with more positive KAB were significantly less likely to report alcohol (Adjusted Odds Ratio [AOR]: 0.49; 95% Confidence Interval [CI]: 0.26, 0.93) or other drug use (AOR: 0.30; 95% CI: 0.11, 0.76) in the past year, although confidence intervals were wide (Table 3). Individuals in the sample who reported greater intent to participate in TCP were also significantly less likely to report alcohol (AOR: 0.51; 95% CI: 0.26, 0.98) or other drug use (AOR: 0.31; 95% CI: 0.08, 0.91) in the past year, with accordingly wide confidence intervals. While respondents in the sample who reported more positive KAB or greater levels of intent to participate in TCPs were also less likely to report marijuana use in the past year, these associations were not statistically significant.

Table 3
Crude and adjusted odds ratios for substance use according to knowledge, attitudes, and beliefs (KAB) regarding, and intent to participate in (intent), traditional ceremonial practices

	PAST YEAR SUBSTANCE USE		
	Alcohol OR (95% CI)	**Marijuana** OR (95% CI)	**Other Drugs**[a] OR (95% CI)
KAB			
CRUDE			
Less Positive KAB	Ref	Ref	Ref
More Positive KAB	0.57 (0.31, 1.03)	0.70 (0.40, 1.24)	0.37 (0.14, 0.88)*
ADJUSTED[b]			
More Positive KAB	0.49 (0.26, 0.93)*	0.65 (0.35, 1.18)	0.30 (0.11, 0.76)*
Intent			
CRUDE			
Less Intent	Ref	Ref	Ref
Greater Intent	0.68 (0.37, 1.25)	0.70 (0.39, 1.26)	0.31 (0.09, 0.86)*
ADJUSTED[b]			
Greater Intent	0.51 (0.26, 0.98)*	0.67 (0.36, 1.26)	0.31 (0.08, 0.91)*

[a]Includes methamphetamine, inhalants, and prescription medications not used as directed by a medical provider
[b]Adjusted for age and annual household income
*Significant at the 0.05 level

DISCUSSION

To our knowledge, this is the first study to quantitatively explore the association between TCP indicators and substance use behaviors in an urban AI/AN community in Montana. The findings that protective factors of TCP may be associated with lower levels of substance use align with studies in other urban AI/AN communities that examined participation in TCPs along with substance use behaviors. For example, a 2021 randomized control study out of southern California found that participation in Drum-Assisted Recovery Therapy for Native Americans was associated with fewer alcoholic drinks per day and lower odds of marijuana use among participants, although the finding did not remain significant at 6-month follow-up (Dickerson et al., 2021). Another study of AI/AN adults in northern California found that participation in a culturally adapted holistic system of care was associated with a significant decrease in alcohol and other drug use (Wright et al., 2011).

Within the target community, 54.6% of the sample reported positive KAB regarding TCPs and 36.7% reported a greater level of intent to participate in TCPs. Participants who reported more positive KAB or greater intent to participate in TCPs were significantly less likely to report alcohol or other drug use in the past year. This finding aligns with previous studies exploring TCPs and substance use in both urban and reservation settings (Rowan et al., 2014; Liddell & Burnette, 2017; Chase-Begay et al., 2023). TCPs are generally holistic in nature, addressing all aspects of an individual (i.e., physical, mental, emotional, and spiritual health) (Gone, 2021). In their systematic review, for example, Herron and Venner (2022) highlight research showing how cultural elements, such as spirituality and Indigenous healing traditions, serve as important pathways for trauma recovery among American Indians.

This is especially salient given what is known about the association between trauma and substance use among AI/AN peoples. Recent research highlights the profound impact of historical trauma on substance use among AI/AN communities. Skewes and Blume (2019) found that both historical and contemporary racial trauma were widely recognized by American Indian key informants as root causes of substance use disorders, describing substance use as a symptom of collective grief, loss of identity, and the lingering effects of colonization. Similarly, Gameon and Skewes (2021) examined the role of historical trauma thoughts among American Indian individuals with current substance use problems and found that frequent engagement with these thoughts—especially when not accompanied by high trauma symptoms—was associated with

better substance use outcomes. While the earlier study emphasizes historical trauma as a driving force behind substance use disparities, the later study suggests that culturally grounded reflection on historical trauma—potentially delivered via the context of TCPs, for example—may serve as a protective factor, offering a more nuanced understanding of its role in recovery.

The complex role of AI/AN identity in this study is also of note. In contingency table analyses, AI/AN identity was highly associated with both KAB and level of intent. During the model-building process, the Identity variable did not significantly influence odds ratios during bivariate analysis. This could be the result of high collinearity between the variables. However, as noted in Table 1, substance use outcomes did not differ significantly based on stronger AI/AN identity but, as noted in Table 2, substance use did differ significantly based on KAB and intent. This may potentially highlight a difference between racial identity and cultural identity, but more research is needed to better expound on this finding.

In the study sample, adults (30–55 years) and younger adults (18–29 years) were generally more likely to report substance use than elders (56 years or older). Households with higher incomes were more likely to report alcohol use, and households with lower incomes were more likely to report using marijuana and other drugs. These findings align with prior work exploring age, income, and substance use both nationally and with AI/ANs (Kerr et al., 2009; Cummings et al., 2011; Pacek et al., 2015; Chhatre et al., 2017).

An important note for discussion is the developmental life-course perspective (Kuh et al., 2003). The study results indicate that respondents with more positive KAB or greater levels of intent to participate in TCPs are less likely to report substance use. While this may provide indication of a protective effect, it is not clear whether enculturation *after* initial substance use would be effective—i.e., whether this knowledge can inform only prevention efforts or also treatment efforts. More work is needed to better understand the potential for both TCP-based substance use *prevention* and *treatment* interventions to be effective.

Implications

The study findings have several important implications. First, they suggest that positive KAB and greater levels of intent to participate in TCP may be protective, even absent exposure and actual participation in ceremonies. Efforts to decrease substance use among AI/ANs living in urban settings in Montana potentially may be more effective if they include components that aim to increase participants' KAB or level of intent to participate in TCPs. In the current study,

increases in TCP variables were associated with decreases in self-reported substance use behaviors. AI/AN communities draw on generations of practice-based evidence that help guide TCPs and their potential effectiveness (Brave Heart et al., 2016; Herron & Venner, 2023). However, more work needs to be done to better understand whether and how TCPs can be incorporated appropriately into prevention and treatment efforts, especially in settings with greater tribal heterogeneity. It would also be important to better understand if there are particular factors associated with TCPs—be they physical, mental, social, or spiritual—that drive this association.

To accomplish this, public and private payers need to provide funding and support for AI/AN community-led implementation and evaluation of TCP-based interventions. The current study provides preliminary data about KAB and intent, rather than programming, primarily because the UIHO did not have funding to implement broad TCP-based services. Once this type of programming is supported—and implemented via community-led and culturally reflective methods—future research could explore effectiveness and help inform best practices for this and other urban AI/AN communities.

Additionally, the results highlight the need for more research to better understand community-wide prevalence of substance use, particularly marijuana, within the study population. The potential adverse effects of chronic, non-medical marijuana use include cardiovascular problems, cognitive impairment, and mental illness (Hall & Degenhardt, 2009, 2014). The high prevalence of marijuana use in the study sample may lead to disproportionate disease burden in the future, if not adequately understood or addressed. There is an almost universal stigma against many kinds of substance use (Yang et al., 2017), and a particular stigma around AI/AN people and alcohol use (Gonzalez & Skewes, 2018). Marijuana and cannabis, however, have a reputation for being all-natural or even beneficial (Nalven et al., 2022; Baral et al., 2024). Future research could better explore both the reasons why marijuana use may be frequent among this population and possible interventions to reduce rates of marijuana use.

Limitations

Because there is no single sampling frame of all AI/AN individuals in the target community, the research team took the approach of drawing from the UIHO's EHR system to identify potential participants. The sampling frame was the largest available and included about one-fourth of the total AI/AN census population for the area. The cross-sectional survey design also has limitations, including recall bias, response bias, and social desirability. Attempts to reduce

bias included asking for both exposure and outcome information over the same time period, taking steps to make the survey easily accessible, providing appropriate financial compensation upon completion, and not only making the survey anonymous but including language throughout the questionnaire reminding participants of their anonymity.

We recognize that the moderately-sized sample limited our ability to detect statistically significant findings for some of the identified protective factors of KAB and Intent. Post-hoc power analysis suggested that we would have required over 1,000 survey respondents to detect ORs of 0.7 or lower. Nevertheless, our findings across several substances suggested consistently protective effects for KAB and Intent despite the wide confidence intervals.

The survey scales were developed by the research team via a literature review, discussion, feedback, and consensus process. However, the KAB, Access, and Intent scales did not undergo full psychometric testing and validation. It is also important to note that these data come from a broader survey that included questions related not only to substance use but also intimate partner violence (IPV), which might have caused distress to some respondents and/or led to lower completion rates. The survey included a list of both IPV and substance use counseling resources—including some that are AI/AN-specific and others that are available 24 hours a day—as well as trigger warnings letting respondents know what kind of questions to expect and an option to skip the entire IPV section if they were uncomfortable.

Because the questionnaire measured KAB and intent, rather than behavior, it is not possible to know how many respondents will actually participate in TCPs when provided the opportunity. Research indicates that an important moderator of the association between intent and behavior is the strength of the intention (Conner & Norman, 2022). To address this, the intent variable was dichotomized at the upper quartile of scale score, rather than the median, to capture those individuals with the greatest likelihood of actual TCP participation in the intent category.

Finally, it is unclear to what extent, if any, the generalizability of the results from this study may be to other urban AI/AN communities nationally. While tribal heterogeneity is more common in urban, off-reservation settings, each urban community experiences their own historical and political influences as to who relocated there, at what time, and for what purpose. It may be more likely that the knowledge derived from this study will generalize more appropriately to other urban communities throughout Montana or other Rocky Mountain states, for example, than locations such as California or New York. More research is needed to better understand the generalizability of studies between urban AI/AN populations in the United States overall.

CONCLUSION

Within the target population of an urban, multi-tribal AI/AN community in Montana, this study was able to identify proportions of KAB and level of intent to participate in TCPs among the respondents, which showed a measurable association with substance use behaviors. AI/AN communities, including urban multi-tribal communities, possess inherent strengths and assets that can be leveraged in efforts to reduce substance use. While rigorous epidemiological investigation of prevention or treatment interventions that draw on culturally centered approaches, such as TCPs, is not yet prolific in the literature, this represents a promising opportunity for future research and evaluation.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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