

Alcohol consumption and pregnancy in American Indian and Alaska Native women: A scoping review of the literature

Women's Health
Volume 19: 1–7
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DOI: 10.1177/17455057231175799
journals.sagepub.com/home/whe



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Abstract

American Indian and Alaska Native communities have diverse cultures, histories, and contemporary experiences. Grouping them together masks the differences in health and lifestyle behaviors, chronic disease rates, and health outcomes among them. This is particularly true for data on drinking during pregnancy among American Indian and Alaska Native women. The goal of this article is to describe how generalizing findings from data gathered from often small, geographically specific samples, combined with inferior research methodologies, has led to misunderstandings about drinking among preconceptional and pregnant American Indian and Alaska Native women. We conducted a scoping review using PubMed and the “PCC mnemonic” (population, concept, and context) as our guide. Our search terms included the population (American Indian and Alaska Native women), concept (alcohol), and context (immediately before or during pregnancy) and focused on PubMed articles in the United States. Using these search terms, we uncovered a total of 38 publications and eliminated 19, leaving 19 for review. Methodologically (i.e. how data were collected), we found most previous research on prenatal or preconceptional alcohol use with American Indian and Alaska Native women used retrospective data collection. We also assessed who data were collected from and noted two groups: studies that sampled higher-risk women and those that focused on American Indian and Alaska Native women in specific geographic areas. Restricting data collection to higher-risk American Indian and Alaska Native women or conducting small studies in specific geographic areas has generated an incomplete and inaccurate picture of American Indian and Alaska Native women as a whole as well as those who consume alcohol. Data from select groups of American Indian and Alaska Native women may overestimate the true prevalence of drinking during pregnancy among this population. Updated and accurate data on drinking during pregnancy are urgently needed to inform the development of interventions and prevention efforts.

Keywords

alcohol, American Indian/Alaska Native, pregnancy, scoping review, women

Date received: 4 August 2022; revised: 25 April 2023; accepted: 27 April 2023

Introduction

More than 570 American Indian and Alaska Native (AIAN) Tribes have been federally recognized in the United States. Located in 36 states in both urban and rural locations, Native nations have diverse cultures, languages, contemporary experiences, and histories.¹ Adding to this diversity are state recognized Tribes, Tribes without federal or state recognition, and urban AIAN communities. Grouping these diverse communities into a single AIAN population,

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especially in national studies, masks important differences in health outcomes among them.² For example, movement of individuals between urban and rural areas—known as circular migration or residential mobility—can result in incomplete data, particularly in longitudinal research, where study designs might not adequately capture differences in characteristics that vary substantially in urban and rural settings.³ In addition, centuries of federal policy aimed at the destruction of the AIAN population through land and resource theft and forced assimilation into the broader US population has led, understandably so, to mistrust of the government, resulting in a lack of interest in or willingness to participate in research.⁴ National statistics for the AIAN population are, as a consequence, often incomplete or inaccurate.

This lack of comprehensive data is particularly true for assessing drinking in AIAN communities. The historical context is fraught with misconceptions that must be understood when assessing research and statistics on drinking among AIAN people. Prior to colonization by European settlers, AIAN people had virtually no experience with alcohol consumption.⁵ When alcohol was introduced by European colonists, AIAN Tribes had little time to develop social, legal conventions, or guidelines, as early traders quickly established a demand for alcohol by introducing it as a medium of trade.⁶ This deliberate and strategic use of alcohol for trade was eventually used as a “tool of diplomacy” in official dealings between the United States and Native nations and eventually as “a bargaining chip in the appropriation of traditional land holdings.”⁷ Once alcohol was introduced, “transient foreigners” were the only models of drinking behaviors for AIAN communities, which was problematic as excessive drinking was pervasive among the early European colonists.⁷ Soon after, stereotypes on excessive alcohol consumption among AIAN people emerged.

These stereotypes included a belief that biological differences were responsible for making AIAN people more prone to alcohol problems.⁸ This so-called “firewater myth” posited that “some hereditary peculiarity makes it impossible for Indians to drink without disastrous consequences.”⁹ This notion of a biological or genetic propensity for alcohol problems among AIAN people continues today,¹⁰ without a scientific basis but with serious consequences such as stereotyping, stigma, and discrimination.^{10–12} The “firewater myth” in part led to the passing of a federal law in 1832 that prohibited the sale of liquor to all AIAN people.⁸ This federal law was not rescinded until the early 1950s. Moreover, belief in biological vulnerabilities to alcohol has been associated with increased alcohol consumption, frequency of heavy drinking, and alcohol consequences among AIAN college students¹⁰ and greater drinking days among reservation dwellers.¹² The firewater myth highlights the power of negative stereotypes on actual behaviors.

Harmful stereotypes regarding drinking patterns with AIAN people evolved from alcohol research itself. A well-known example is the 1979 Barrow Alaska Study, which began with a community request to understand substance use and substance use treatment.^{13,14} To meet this need, university-based sociological researchers distributed a cross-sectional, multi-variable survey to Alaska Native adults in Barrow. The study found that 41% of the population considered themselves to be excessive drinkers, 60% felt badly about the consequences of their drinking, and more than half reported that drinking ultimately created severe problems with their family and spouse.^{13,14} One quarter were abstainers, and drinking in this community was described primarily as a social event.^{13,14} Ultimately, the study results were disseminated at a public Tribal meeting in Barrow and through a press release. Because of the press release, *The New York Times* ran a front-page article titled, “Alcohol Plagues Eskimos,” and the United Press International Wire Services distributed a press release announcing, “What we have Here is a Society of Alcoholics.”

In 1981, a formal statement made by the director of public health from Barrow at the Fifth International Symposium on Circumpolar Health in Copenhagen, Denmark condemned both the study and the news reports, stating, “The release of the questionable results of the study to a nationwide news source prior to informing the studied community is a classic example of researchers utilizing Indigenous people as so many laboratory specimens.”¹⁵ We offer the firewater myth and the Barrow Alcohol Study as examples of how alcohol policies and research have perpetuated stereotypes about drinking among AIANs. Contrary to these stereotypes, several rigorous studies document that drinking patterns among AIAN and White groups are similar^{16–20} and that consequences of excessive drinking, such as fetal alcohol syndrome, are not significantly higher in AIAN than non-AIAN groups.^{21,22}

The goal of this review is to describe, through examination of publications on drinking during the preconceptional and prenatal period, how data from small, geographically specific sample sizes and suboptimal research methodologies have led to misconceptions regarding alcohol consumption among AIAN populations. In particular, inaccurate data have reinforced historical stereotypes about AIAN people and alcohol use, while broader sociocultural and historical factors that may be related to alcohol use have been neglected.^{23,24} We conducted a scoping review since they are useful for examining emerging evidence or when the specific areas to address in a systematic review are unclear.^{25,26} Scoping reviews are recommended for examining how research is conducted on a certain topic over time, such as alcohol research with AIAN women, to summarize the evidence, and to identify knowledge gaps.^{26,27} As noted by others, scoping reviews are “particularly helpful when the

literature is complex and heterogeneous,²⁷ as we believe it is with AIAN communities, which are highly diverse with respect to geography and cultural. This scoping review synthesizes the research literature on drinking among AIAN women before and during pregnancy and makes the case that inaccuracies about alcohol use are especially evident for pregnant AIAN women.

Methods

In this review, we investigate the impact of how alcohol research has historically been conducted and its impact on our collective understanding of AIAN women's alcohol use. We used PubMed to conduct the scoping review, using the "PCC mnemonic" as our guide, per methodological recommendations on scoping reviews.²⁷ Our research terms—the inclusion criteria for the scoping review—included the population (AIAN women), concept (alcohol), and context (immediately before or during pregnancy). We included research articles focused on AIAN women in the United States rather than general samples of AIAN men and women or global Indigenous communities. We included research from US national samples in the Results section to compare data on AIAN women.

As a review of the existing literature, neither institutional review or other ethics board approval nor informed consent was required for publication. No data were shared per standard data practices.

Results

Using the search terms "American Indian Alaska Native, women, alcohol" in PubMed, we identified 38 publications. We eliminated 10 that were not focused on women, did not include references to pregnancy or the preconception period in the abstract, or did not include alcohol consumption behaviors, yielding 28 publications to read, summarize, and critique. After reading the publications, an additional nine were eliminated because they did not assess drinking behaviors related to pregnancy (i.e. did not collect or include data on actual use) but instead were preliminary reports on interventions developed for AIAN women. Our final review included 19 articles.

Because this was a scoping review, our abstraction focused on the sample population and data collection methods to inform gaps in knowledge. Methodologically (how data were collected), most previous research on prenatal or preconceptional alcohol use among AIAN women relied on retrospective data collection, such as through the Timeline Followback^{18–29} or the CAGE screening tools,^{30,31} which are used to survey participants about past binge drinking, usually within the last 30 days.^{32,33} Some studies collected data through qualitative methods that established the types of alcohol consumed, the number of individuals sharing alcohol, and the timeframe of drinking

episodes.^{18,32} Next, we were interested in who data were collected from and determined that the literature comprises two groups: (1) publications that sampled higher-risk AIAN women such as those who previously had or are currently at risk for an alcohol-exposed pregnancy and (2) publications that sampled AIAN women in circumscribed geographic areas and Tribal communities to examine alcohol use. As noted above, we included some data in the Results section below that originated from the literature search for the scoping review; these are presented to compare findings in AIAN women with other general samples of women.

Sampling higher-risk participants

While research often presents AIAN alcohol consumption as widespread or an epidemic, drinking among AIAN women is quite variable,^{16–35} with study results depending largely on who data are collected from. Data on drinking rarely emanate from general samples of pregnant or preconceptional AIAN women; more often, data are derived from vulnerable groups, such as women at high risk for an alcohol-exposed pregnancy, with a focus on preventing fetal alcohol syndrome. For example, one study noted that AIAN women from three Great Plains communities who were at risk for an unintended pregnancy consumed an average of 7.0 drinks per occasion and reported a mean of 7.9 binge drinking episodes in the past 90 days.³⁶ However, data were only collected from preconceptional women who were binge drinking and not from their counterparts who were not binge drinking.

In a study not centered on a high-risk subpopulation, among 661 AIAN women seen at one Indian Health Services prenatal clinic in the Great Plains, 16% consumed alcohol during pregnancy.³⁷ This figure is similar to national data from the Behavioral Risk Factor Surveillance System survey (2018–2020) that found that almost 14% of pregnant women from all races/ethnicities reported current drinking.³⁸ A clinic-based study in California that screened all preconceptional AIAN women established 33% were at risk for an alcohol-exposed pregnancy,^{39,40} defined as drinking four or more standard drinks per occasion and/or eight or more standard drinks per week and having vaginal intercourse with a man without an effective contraceptive method.⁴¹ While the California study did not include a non-AIAN comparison group, a national study in the United States estimated 75% of women who wanted to get pregnant as soon as possible reported drinking alcohol in the past month, putting them at risk for an alcohol-exposed pregnancy.⁴²

The most accurate comparison of prenatal alcohol consumption comes from a cohort study that recruited 2753 (56%) pregnant White women and 2124 (44%) pregnant AIAN women at five sites in North Dakota and South Dakota.^{18,29} Data on alcohol consumption (using the

Timeline Followback) and other health behaviors were collected three to four times throughout pregnancy. White women consumed alcoholic beverages during pregnancy more often than AIAN women (63% vs 52%) but AIAN women more often than White pregnant women engaged in binge drinking (41% vs 28%).¹⁸ Most drinking among both races occurred during the first trimester. Compared to their White counterparts, AIAN pregnant women also had a lower risk of drinking in the second and third trimesters and postpartum, but a higher risk of binge drinking in the first trimester.¹⁸

Sampling in geographic regions

Variability in drinking among AIAN women before and during pregnancy is also observed within US geographic regions. A study of 125 AIAN women from urban and rural areas near Anchorage reported 35% used alcohol during the first trimester of pregnancy, and 8% consumed alcohol beyond the first trimester.⁴³ This compares to data on the general US population from the Behavioral Risk Factor Surveillance System, which reported the prevalence of any alcohol use during pregnancy was 10%, and the prevalence of binge drinking was 3%.⁴⁴ However, the National Epidemiologic Survey on Alcohol and Related Conditions reported that White women displayed the highest prevalence of binge drinking during pregnancy (21%) and drinking in general (45%) among all racial and ethnic groups.⁴⁵ An analysis of the National Survey of Drug Use and Health also concluded that AIAN pregnant women had lower rates of alcohol use compared to other racial and ethnic groups.¹⁹ Regardless of race, excessive drinking during pregnancy often occurs during the first trimester before women find out they are pregnant. Most women stop drinking alcohol when they discover they are pregnant.⁴⁶

Rates of alcohol abstinence were also substantial among AIAN pregnant women,⁴⁷ with variation by geographic location. An analysis of data from the National Maternal and Infant Health Survey noted that 20% of pregnant urban AIAN woman reported drinking, although those who did drink consumed on average less than one drink per month.⁴⁸ Data collected by the Pregnancy Risk Assessment Monitoring System from five states documented that 89% and 87% of AIAN and White women, respectively, denied drinking alcohol during the last trimester of pregnancy.²⁰ Another investigation with 559 White and 259 AIAN women from South Dakota reported alcohol consumption in the last 3 months of pregnancy did not significantly differ between the groups (5% and 10%, respectively) after adjusting for demographic characteristics. The authors concluded their findings “challenge commonly held beliefs of elevated alcohol consumption among AIAN compared with other races.”¹⁷ Education, employment, and mental health were all protective against drinking before and during pregnancy in AIAN women.^{49,50} One national study

composed of respondents representing diverse races and ethnicities reported that the risk for alcohol-exposed pregnancy did not differ by race and ethnicity but was positively associated with level of education.⁴²

In addition, risky drinking prior to pregnancy has been found to influence continued drinking during pregnancy.⁵¹ A survey with 1436 non-pregnant AIAN women aged 16 and older selected at random from the Tribal rolls of four unspecified Tribal sites found that 40% were abstinent from alcohol in the last 12 months.³³ Data from the South Dakota Tribal Pregnancy Risk Assessment Monitoring System estimated that 43% of AIAN women from four states in the Great Plains (North Dakota, South Dakota, Nebraska, and Iowa) reported binge drinking in the 3 months prior to pregnancy.⁵² In contrast, a larger study with data from five states (Alaska, New Mexico, Oklahoma, South Dakota, and Washington) observed AIAN women were less likely to report pre-pregnancy alcohol use than White women (56% vs 76%).²⁰ Finally, data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project produced prevalence estimates of 59%–69% for lifetime abstinence, depending on the age group, among women aged 15–54 living in the Southwest. These statistics compare to a prevalence of lifetime alcohol abstinence of 29%–40% among AIAN women living in the Great Plains and of 36%–47% in the general US population.³⁴

Conclusion

Scoping reviews have limitations such as the possibility some relevant studies might have been overlooked.⁵³ Nonetheless, the publications highlighted in this scoping review suggest data are inadequate to conclude that AIAN women are at higher risk of alcohol use during pregnancy than women in the general US population. In addition, meaningful differences among AIAN communities have been observed regarding alcohol consumption. Limiting data collection to higher-risk AIAN women and conducting small studies in circumscribed geographic areas has led to incomplete and insufficient data on alcohol use during pregnancy among a broader segment of AIAN women. Data from the extant literature on highly selected subgroups or from retrospective or cross-sectional surveys have likely overestimated the true incidence and prevalence of drinking among AIAN women by not including those with no risk.⁵⁴ This flawed approach reinforces historical stereotypes about AIAN people and alcohol use, while broader sociocultural and historical influences that may be related to alcohol or substance use have been neglected.^{23,24} Future research should correct the shortcomings of the data collected in these ways, acknowledge the harm resulting from flawed methods, and develop rigorous data-driven public health interventions for AIAN women at risk for alcohol overuse.

Future studies might also consider the use of ecological momentary assessment which sends participants frequent

electronic messages and asks them to report behaviors in real time and in their natural environment.⁵⁵ Ecological momentary assessment has been used extensively to understand drinking behaviors in the general United States population.^{56–64} Data can be collected during risky times—such as evenings or weekends—as well as during non-drinking times to establish patterns and facilitators of drinking and abstinence.⁶² Ecological momentary assessment reduces retrospective recall bias and can produce rigorous data on binge drinking patterns (type of alcohol, precipitants of drinking, and situations in which risky drinking occurs).⁶² Although ecological momentary assessment has not been used with AIAN populations, it holds promise to tackle some of the methodological concerns regarding alcohol use among AIAN women.

This review underscores a pressing need for well-designed epidemiological studies that collect comprehensive data from AIAN women. A comprehensive national epidemiological assessment conducted among both urban and rural AIAN women will yield higher quality, more representative data on the true prevalence, incidence, and risk and protective factors of alcohol consumption among pregnant and non-pregnant AIAN women.⁶⁵ Appropriate methods and measures to estimate alcohol use will be critical to generating accurate epidemiological and surveillance data on consuming alcohol during pregnancy. Capturing predictors of drinking, determining context during non-drinking days and identifying both risk and protective factors for risky drinking among AIAN women can illuminate contextual variables and clarify risky drinking patterns.^{62,66} Finally, linking epidemiological data with community-led and community-engaged prevention and intervention efforts is essential to reduce adverse outcomes, especially consequences of binge drinking. As we show, available data on alcohol use among AIAN women come largely from retrospective surveys and small samples from disparate geographic regions and therefore lack information that is vital to intervention and prevention efforts.

In conclusion, this review highlights an urgent need for research on alcohol use during pregnancy among pregnant and pre-conceptual AIAN women. Improved research criteria and study designs lead to better quality data, which can generate more rigorous data on the prevalence and consequences of alcohol use during pregnancy. Future efforts should assess patterns of drinking and non-drinking days, identify facilitators of drinking and abstinence behaviors, be larger and more representative (i.e. in urban and rural settings), and include pregnant and pre-conceptual AIAN women along with relevant comparison groups. These data can inform a wide array of prevention and intervention efforts for pregnant AIAN women. Finally, interventions to prevent or reduce alcohol use during pregnancy should directly engage AIAN stakeholders and seek input on interest, need, benefit, and burden to the community. Community engagement and community-based participatory research with AIAN communities can significantly

improve study development, implementation, and community and health outcomes.^{67–69} Applying this approach, we can overcome many of the stereotypes in alcohol research with AIAN communities; furthermore, we can improve public health prevention and intervention efforts by collaborating with Tribal communities to best meet their interests and benchmarks of success.⁶⁸

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Author contribution(s)

Jessica D Hanson: Conceptualization; Project administration; Resources; Visualization; Writing – original draft; Writing – review & editing.

Michelle Sarche: Funding acquisition; Resources; Supervision; Visualization; Writing – review & editing.

Dedra Buchwald: Conceptualization; Funding acquisition; Project administration; Resources; Supervision; Visualization; Writing – review & editing.

Acknowledgements

The authors thank our tribal partners for their ongoing support and engagement in this work. They also thank Daniel Barker for revising the manuscript for publication.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health (NIH) under grant number P60AA026112. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Availability of data and materials

Not applicable.

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References

1. National Congress of American Indians. Tribal nations & the United States: an introduction, <https://www.ncai.org/about-tribes> (2020, accessed 1 June 2022).

2. US Department of Health & Human Services, Office of Disease Prevention and Health Promotion. Healthy people 2030, <https://health.gov/healthypeople/objectives-and-data/social-determinants-health> (accessed 18 July 2022).
3. Brokamp C, LeMasters GK and Ryan PH. Residential mobility impacts exposure assessment and community socioeconomic characteristics in longitudinal epidemiology studies. *J Expo Sci Environ Epidemiol* 2016; 26(4): 428–434.
4. Szlemko WJ, Wood JW and Thurman PJ. Native Americans and alcohol: past, present, and future. *J Gen Psychol* 2006; 133(4): 435–451.
5. Abbott PJ. American Indian and Alaska native aboriginal use of alcohol in the United States. *Am Ind Alsk Native Ment Health Res* 1996; 7(2): 1–13.
6. Beauvais F. American Indians and alcohol. *Alcohol Health Res World* 1998; 22: 253–259.
7. Frank JW, Moore RS and Ames GM. Historical and cultural roots of drinking problems among American Indians. *Am J Public Health* 2000; 90(3): 344–351.
8. Kavas AE, McFarland BH, Landen MG, et al. Survey of American Indian alcohol statutes, 1975–2006: evolving needs and future opportunities for tribal health. *J Stud Alcohol Drugs* 2008; 69(2): 183–191.
9. Leland J. *Firewater myths: North American Indian drinking and alcohol addiction*. New Brunswick, NJ: Alcohol Research Documentation, 1976.
10. Gonzalez VM and Skewes MC. Association of the firewater myth with drinking behavior among American Indian and Alaska Native college students. *Psychol Addict Behav* 2016; 30(8): 838–849.
11. Gonzalez VM, Burroughs A and Skewes MC. Belief in the American Indian/Alaska Native biological vulnerability myth and drinking to cope: does stereotype threat play a role. *Cultur Divers Ethnic Minor Psychol* 2021; 27(1): 37–46.
12. Gonzalez VM and Skewes MC. Belief in the myth of an American Indian/Alaska Native biological vulnerability to alcohol problems among reservation-dwelling participants with a substance use problem. *Alcohol Clin Exp Res* 2021; 45(11): 2309–2321.
13. Foulks EF. Social stratification and alcohol use in North Alaska. *J Commun Psychol* 1987; 5: 349–356.
14. Klausner S and Foulks EF. *Eskimo capitalists: oil, alcohol and social change*. Montclair, NJ: Allenheld and Osmun, 1982.
15. Foulks EF. Misalliances in the barrow alcohol study. *Am Ind Alsk Native Ment Health Res* 1989; 2: 7–17.
16. Cunningham JK, Solomon TA and Muramoto ML. Alcohol use among Native Americans compared to whites: examining the veracity of the “Native American elevated alcohol consumption” belief. *Drug Alcohol Depend* 2016; 160: 65–75.
17. Specker BL, Wey HE, Minett M, et al. Pregnancy survey of smoking and alcohol use in South Dakota American Indian and white mothers. *Am J Prev Med* 2018; 55(1): 89–97.
18. Ye P, Angal J, Tobacco DA, et al. Prenatal drinking in the Northern Plains: differences between American Indian and Caucasian mothers. *Am J Prev Med* 2020; 58(4): e113–e121.
19. Watt TT. Alcohol use and cigarette smoking during pregnancy among American Indians/Alaska Natives. *J Ethn Subst Abuse* 2012; 11(3): 262–275.
20. Hebert LE and Sarche MC. Pre-pregnancy and prenatal alcohol use among American Indian and Alaska Native and non-Hispanic white women: findings from PRAMS in five states. *Matern Child Health J* 2021; 25(9): 1392–1401.
21. May PA, Baete A, Russo J, et al. Prevalence and characteristics of fetal alcohol spectrum disorders. *Pediatrics* 2014; 134: 855–866.
22. Montag AC, Romero R, Jensen T, et al. The prevalence of fetal alcohol spectrum disorders in an American Indian community. *Int J Environ Res Public Health* 2019; 16: 2179.
23. Duran B. Indigenous versus colonial discourse: alcohol and the American Indian identity. In: Bird SE (ed.) *Dressing in feathers: the construction of the Indian in American popular culture*. New York: Westview Press, 1996, pp. 111–128.
24. Wendt DC, Hartmann WE, Allen J, et al. Substance use research with Indigenous communities: exploring and extending foundational principles of community psychology. *Am J Community Psychol* 2019; 64(1–2): 146–158.
25. Armstrong R, Hall BJ, Doyle J, et al. Cochrane update: “scoping the scope” of a Cochrane review. *J Public Health* 2011; 33: 147–150.
26. Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol* 2018; 18: 143.
27. Peters MDJ, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. *JBIM Evid Implement* 2021; 19: 3–10.
28. Dukes K, Tripp T, Petersen J, et al. A modified timeline followback assessment to capture alcohol exposure in pregnant women: application in the safe passage study. *Alcohol* 2017; 62: 17–27.
29. Odendaal H, Dukes KA, Elliott AJ, et al. Association of prenatal exposure to maternal drinking and smoking with the risk of stillbirth. *JAMA Netw Open* 2021; 4: e2121726.
30. Leonardson GR, Kemper E, Ness FK, et al. Validity and reliability of the audit and CAGE-AID in northern plains American Indians. *Psychol Rep* 2005; 97(1): 161–166.
31. Saremi A, Hanson RL, Williams DE, et al. Validity of the CAGE questionnaire in an American Indian population. *J Stud Alcohol* 2001; 62(3): 294–300.
32. Hanson JD, Nelson ME, Jensen JL, et al. Impact of the CHOICES intervention in preventing alcohol-exposed pregnancies in American Indian women. *Alcohol Clin Exp Res* 2017; 41: 828–835.
33. May PA and Gossage P. New data on the epidemiology of adult drinking and substance use among American Indians of the northern states: male and female data on prevalence, patterns, and consequences. *Am Ind Alsk Native Ment Health Res* 2001; 10(2): 1–26.
34. Beals J, Spicer P, Mitchell CM, et al. Racial disparities in alcohol use: comparison of 2 American Indian reservation populations with national data. *Am J Public Health* 2003; 93(10): 1683–1685.
35. Spicer P, Beals J, Croy CD, et al. The prevalence of DSM-III-R alcohol dependence in two American Indian populations. *Alcohol Clin Exp Res* 2003; 27(11): 1785–1797.

36. Hanson JD, Miller AL, Winberg A, et al. Prevention of alcohol-exposed pregnancies among nonpregnant American Indian women. *Am J Health Promot* 2013; 27: S66–S73.
37. May PA, Gossage JP, White-Country M, et al. Alcohol consumption and other maternal risk factors for fetal alcohol syndrome among three distinct samples of women before, during, and after pregnancy: the risk is relative. *Am J Med Genet C Semin Med Genet* 2004; 127C: 10–20.
38. Gosdin LK, Deputy NP, Kim SY, et al. Alcohol consumption and binge drinking during pregnancy among adults aged 18–49 years: United States, 2018–2020. *MMWR Morb Mortal Wkly Rep* 2022; 71: 10–13.
39. Montag AC, Brodine SK, Alcaraz JE, et al. Preventing alcohol-exposed pregnancy among an American Indian/Alaska Native population: effect of a screening, brief intervention, and referral to treatment intervention. *Alcohol Clin Exp Res* 2015; 39: 126–135.
40. Montag AC, Brodine SK, Alcaraz JE, et al. Effect of depression on risky drinking and response to a screening, brief intervention, and referral to treatment intervention. *Am J Public Health* 2015; 105(8): 1572–1576.
41. Cannon MJ, Guo J, Denny CH, et al. Prevalence and characteristics of women at risk for an alcohol-exposed pregnancy (AEP) in the United States: estimates from the national survey of family growth. *Matern Child Health J* 2015; 19(4): 776–782.
42. Green PP, McKnight-Eily LR, Tan CH, et al. Vital signs: alcohol-exposed pregnancies: United States, 2011–2013. *MMWR Morb Mortal Wkly Rep* 2016; 65: 91–97.
43. Khan BA, Robinson RF, Smith JJ, et al. Prenatal alcohol exposure among Alaska Native/American Indian infants. *Int J Circumpolar Health* 2013; 72: 20973.
44. Tan CH, Denny CH, Cheal NE, et al. Alcohol use and binge drinking among women of childbearing age: United States, 2011–2013. *MMWR Morb Mortal Wkly Rep* 2015; 64: 1042–1046.
45. Caetano R, Ramisetty-Mikler S, Floyd LR, et al. The epidemiology of drinking among women of child-bearing age. *Alcohol Clin Exp Res* 2006; 30: 1023–1030.
46. Muggli E, O’Leary C, Donath S, et al. “Did you ever drink more?” A detailed description of pregnant women’s drinking patterns. *BMC Public Health* 2016; 16: 683.
47. O’Connell JM, Novins DK, Beals J, et al. Disparities in patterns of alcohol use among reservation-based and geographically dispersed American Indian populations. *Alcohol Clin Exp Res* 2005; 29(1): 107–116.
48. Westphal LL. Prenatal alcohol use among urban American Indian/Alaska Native women. *Am Ind Alsk Native Ment Health Res* 2000; 9(3): 38–48.
49. Jorda M, Conant BJ, Sandstrom A, et al. Protective factors against tobacco and alcohol use among pregnant women from a tribal nation in the Central United States. *PLoS ONE* 2021; 16(2): e0243924.
50. Denny CH, Floyd RL, Green PP, et al. Racial and ethnic disparities in preconception risk factors and preconception care. *J Womens Health* 2012; 21(7): 720–729.
51. Naimi TS, Lipscomb LE, Brewer RD, et al. Binge drinking in the preconception period and the risk of unintended pregnancy: implications for women and their children. *Pediatrics* 2003; 111: 1136–1141.
52. Rinki C, Weng S and Irving J. *Tribal PRAMS statewide surveillance report, June–November 2007 births*. Rapid City, SD: Great Plains Tribal Chairmen’s Health Board, 2009.
53. Pham MT, Rajić A, Greig JD, et al. A scoping review of scoping reviews: advancing the approach and enhancing the consistency. *Res Synth Methods* 2014; 5(4): 371–385.
54. Popova S, Lange S, Shield K, et al. Prevalence of fetal alcohol spectrum disorder among special subpopulations: a systematic review and meta-analysis. *Addiction* 2019; 114(7): 1150–1172.
55. Shiffman S, Stone AA and Hufford MR. Ecological momentary assessment. *Annu Rev Clin Psychol* 2008; 4: 1–32.
56. Carreiro S, Newcomb M, Leach R, et al. Current reporting of usability and impact of mHealth interventions for substance use disorder: a systematic review. *Drug Alcohol Depend* 2020; 215: 108201.
57. Gurruch EM, Kenna GA and Leggio L. Use of novel technology-based techniques to improve alcohol-related outcomes in clinical trials. *Alcohol Alcohol* 2013; 48: 712–719.
58. Jones A, Remmerswaal D, Verveer I, et al. Compliance with ecological momentary assessment protocols in substance users: a meta-analysis. *Addiction* 2019; 114(4): 609–619.
59. Morgenstern J, Kuerbis A and Muench F. Ecological momentary assessment and alcohol use disorder treatment. *Alcohol Res* 2014; 36(1): 101–109.
60. Piasecki TM. Assessment of alcohol use in the natural environment. *Alcohol Clin Exp Res* 2019; 43(4): 564–577.
61. Serre F, Fatseas M, Swendsen J, et al. Ecological momentary assessment in the investigation of craving and substance use in daily life: a systematic review. *Drug Alcohol Depend* 2015; 148: 1–20.
62. Shiffman S. Ecological momentary assessment (EMA) in studies of substance use. *Psychol Assess* 2009; 21(4): 486–497.
63. Votaw VR and Witkiewitz K. Motives for substance use in daily life: a systematic review of studies using ecological momentary assessment. *Clin Psychol Sci* 2021; 9: 535–562.
64. Wray TB, Merrill JE and Monti PM. Using ecological momentary assessment (EMA) to assess situation-level predictors of alcohol use and alcohol-related consequences. *Alcohol Res* 2014; 36(1): 19–27.
65. Centers for Disease Control and Prevention. Case ascertainment, <https://www.cdc.gov/ncbddd/birthdefects/surveillance/manual/facilitators-guide/module-3/mod3-3.html> (2019, accessed 25 May 2022).
66. Kaplan BA and Koffarnus MN. Timeline followback self-reports underestimate alcohol use prior to successful contingency management treatment. *Alcohol Alcohol* 2019; 54: 258–263.
67. Hearod JB, Wetherill MS, Salvatore AL, et al. Community-based participatory intervention research with American Indian communities: what is the state of the science. *Curr Dev Nutr* 2019; 3: 39–52.
68. Rink E, Knight K, Ellis C, et al. Using community-based participatory research to design, conduct, and evaluate randomized controlled trials with American Indian communities. *Prev Chronic Dis* 2020; 17: E143.
69. Skewes MC, Gonzalez VM, Gameon JA, et al. Health disparities research with American Indian communities: the importance of trust and transparency. *Am J Community Psychol* 2020; 66: 302–313.