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Patient Perceptions of Three Substance Use Screening Tools for Use During Pregnancy

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Abstract

Objectives The purpose of this study was to understand pregnant women's perceptions of three validated substance use screening tools and identify a preferred tool for use during pregnancy. The three screening tools studied included the 4P's Plus, the NIDA Quick Screen/ NIDA-Modified Alcohol, Smoking and Substance Involvement Screening Test, and the Substance Use Risk Profile-Pregnancy Scale.

Methods A total of 493 cognitive interviews were completed with a diverse sample of pregnant women presenting to two obstetrics practices in Baltimore, MD from January 2017 to January 2018. This study served as a qualitative companion to a larger study comparing the accuracy and acceptability of substance use screening tools in prenatal care. After completing each screening tool, participants were asked their perceptions of the tool and to choose their preferred tool. Interviews were recorded, transcribed verbatim, coded, and analyzed using NVivo software.

Results The plurality of participants (43.4%) reported they preferred the 4P's Plus. Fewer participants preferred the NIDA Quick Screen (32.5%) and the SURP-P (24.1%). Participants felt that the 4P's Plus was both comprehensive and concise. While many participants felt that disclosure of substance use would vary by individual, participants also suggested that when screening is confidential, includes questions about a patient's background, and administered by a non-judgmental provider, pregnant people may be more likely to answer honestly.

Conclusions for Practice The 4P's Plus is a promising and acceptable substance use screening tool for use in prenatal care. Clinicians can use several methods to increase acceptability of substance use screening and encourage disclosure of prenatal substance use.

Keywords Pregnancy · Prenatal care · Substance use · Qualitative research · Screening

Significance Statement

Early identification of prenatal substance use is critical to providing appropriate care for pregnant people using substances. However, a lack of consensus persists on an accurate, acceptable tool assessing illicit drug use, alcohol use, and prescription drug misuse to administer during prenatal care. This research identifies the 4P's Plus as a promising and acceptable substance use screening tool for use in prenatal care and suggests methods to increase acceptability of substance use screening and prenatal substance use disclosure. The research also provides insights into pregnant women's preferences around substance-use screening which can be used to develop patient-centered prenatal care practices.

Introduction

Substance use during pregnancy is an important public health concern. The use of illicit drugs, tobacco, alcohol, and some prescription drugs during pregnancy is associated with negative health consequences for pregnant people and infants (National Institute of Mental Health, 2020). In 2018, 11.6% of pregnant women reported the use of tobacco products in the past month, 9.9% reported alcohol use, and

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5.4% reported illicit drug use in the United States (Substance Abuse & Mental Health Services Administration, 2019). Early and accurate identification of prenatal substance use is critical to providing appropriate care and mitigating negative health effects of substance use.

The American College of Obstetricians and Gynecologists recommends universal substance use screening at the first prenatal visit in partnership with the pregnant woman, yet a lack of consensus persists on a recommended screening tool for illicit drug use and prescription drug misuse during pregnancy (American College of Obstetricians and Gynecologists (ACOG), 2017; World Health Organization (WHO), 2014; U.S. Preventive Services Task Force (USPSTF), 2020). The accuracy and acceptability of a screening tool among prenatal providers and the pregnant people who undergo screening is critical. Research shows that pregnant people's perspectives of substance use screening and their comfort with the screening process influence their disclosure of substance use and engagement in prenatal care (Roberts & Nuru-Jeter, 2010; Stone, 2015). Furthermore, understanding pregnant people's substance use screening preferences can improve care through the development of patient-centered practices that are reflective of patient needs and values.

This study investigates pregnant women's perspectives on three substance use screening tools to determine which is most acceptable. The three screening tools include the 4P's Plus, the NIDA Quick Screen/NIDA-Modified Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), and the Substance Use Risk Profile-Pregnancy Scale (SURP-P). These tools were chosen because they are brief, screen for multiple substances, and have been validated with a pregnant population (WHO, 2014; Chasnoff et al., 2005; Humeniuk et al., 2008; Yonkers et al., 2010). This study serves as the second qualitative complement (the first being a focus group study among prenatal care staff) to a larger prospective, cross-sectional study in Baltimore, MD assessing the accuracy of three screening tools compared to biologic testing in identifying substance use among 500 pregnant women, the results of which are detailed elsewhere (Coleman-Cowger et al., 2019; Trocin et al., 2020).

Methods and Setting

Detailed methodology of this study has been published elsewhere (Coleman-Cowger et al., 2018); as such, only a summary will be provided here. A total of 493 cognitive interviews were completed with a consecutive sample of pregnant women presenting to two obstetrics practices in Baltimore City from January 2017 to January 2018. Seven interviews were not completed because of interruptions during the study intake process. Given the qualitative nature of this data, we followed the COREQ criteria for reporting qualitative research (Tong et al., 2007). Demographic characteristics of the study sample from each practice varied (Table 1). Prior to the study at Practice A, universal screening was conducted with interview, but not urine drug testing. Practice B had universal screening (non-validated tools) with interview and urine drug testing. This study was approved by the Institutional Review Boards of Battelle Memorial Institute and University of Maryland, Baltimore, and was performed in accordance with the ethical standards consistent with the 1964 Declaration of Helsinki and its later amendments.

Participants were approached by research staff during a routine prenatal visit and met parent study eligibility criteria. All participants provided their informed consent prior to their inclusion in the study. Using a pilot-tested semi-structured interview guide in a private clinic room, interviewers asked participants about their perceptions of each screening tool (presented in a random sequence; see Table 2), to choose their preferred tool, and explain their reasoning. Interviewers also asked about factors that would make substance use screening more likely to encourage honest responses from

Table 1 Sample demographics

Characteristics	Both practices (n = 500)	Practice A (n = 175)	Practice B (n = 325)	P-value
Age in years, mean (SD)	27.8 (0.23)	30.5 (0.34)	26.4 (0.28)	< 0.001**[a]
Race/Ethnicity, % (n)				
African American/Black	71.3% (352)	37.0% (64)	87.7% (288)	
Asian	3.1% (15)	8.1% (14)	0.3% (1)	
Caucasian/white	20.9% (103)	47.4% (82)	6.5% (21)	
Hispanic/Latino or Chicano	1.0% (5)	1.2% (2)	0.9% (3)	
Puerto Rican	0.2% (1)	0.6% (1)	0% (0)	
Multiple	3.0% (15)	5.8% (10)	1.6% (5)	
Some other group	0.6% (3)	0% (0)	0.9% (3)	

Percentages may not total 100% due to rounding

[a]Two sample t-test for comparing age differences between participants in Practice A and B

Table 2 Pregnancy drug screening tools

Screener	Questions
SURP-P[a]	1. Have you ever used marijuana?
	2. How many alcoholic drinks have you consumed in the month before knowing you were pregnant?
	3. Do you feel the need to cut down on your alcohol or drug use?
NIDA Quick Screen-ASSIST	
Quick Screen[b]	1. In the past year, how often have you used the following? a. Five or more alcohol drinks in a day for men or 4 or more alcohol drinks in a day for women, b. Tobacco products, c. Prescription drugs for non-medical reasons, and d. Illegal drugs
ASSIST[c]	1. In your lifetime, which of the following substances have you used? (response options of yes or no);
	2. In the past three months, how often have you used the substances you mentioned? (response options of never, once or twice, monthly, weekly, and daily or almost daily for items 2–5)
	3. In the past three months, how often have you had a strong desire or urge to use (each substance)?
	4. (During the past three months, how often has your use of (each substance) led to health, social, legal or financial problems?
	5. During the past three months, how often have you failed to do what was normally expected of you because of your use of (each substance)?
	6. Has a friend or relative or anyone else ever expressed concern about your use of (each substance)?
	7. Have you ever tried to control, cut down or stop using (each substance)?
	8. Have you ever used any drug by injection?

4P's Plus questionnaire not included because it is covered by copyright. The researchers purchased a license to administer to participants

[a]Scoring involves classifying the number of alcoholic drinks consumed in the month before pregnancy as none versus any, and then counting the number of affirmative items. Negative responses for all items yields a low-risk individual, one affirmative response yields a moderate risk individual, and two or three affirmative responses yield a high-risk individual

[b]Response options for each substance are: never, once or twice, monthly, weekly, and daily or almost daily. For purposes of validation, both the Quick Screen and ASSIST were given to all participants to complete

[c]Substances assessed are: tobacco products; alcohol; cannabis; cocaine; amphetamine-type stimulants (ATS); sedatives and sleeping pills (benzodiazepines); hallucinogens; inhalants; opioids; and "other" drugs

pregnant people. Participants were provided with a paper copy of each tool to refer to if needed. Each interview took 5–15 min on average and was audio recorded.

Both interviewers were female research assistants (RAs), trained in cognitive interview methods and protection of human subjects by senior Battelle staff, and held at least a bachelor's degree. One interviewer identified as Black and the other identified as white. Interviewers had no relationship with study participants prior to study commencement, and participants had no knowledge about the researcher past their involvement as an RA on this study. Interviewers did not have lived substance use disorder experience. Interview recordings were transcribed verbatim by a professional consultant. Due to recorder malfunction, nine interviews were summarized using interviewers' handwritten notes. A team of experienced qualitative researchers developed a codebook using an inductive/deductive approach that drew from the cognitive interview guide and an initial review of a subset of transcripts (Table 3). The lead researcher coded and conducted thematic analysis on the data using NVivo 12 software. Themes emerging from NVivo-generated coding reports were identified and differences between practices were noted (Table 4). Content analysis of each interview indicated which screening tool was preferred. Descriptive analyses comparing the frequencies of tool preferences and chi-square tests comparing preferences at each practice were completed.

Results

Of the three screening tools studied, the plurality of participants (43.4%, n = 211) reported a preference for the 4P's Plus, followed by the NIDA Quick Screen/ASSIST (32.5%, n = 158) and the SURP-P (24.1%, n = 117) (Table 5). This overall ranking of screening tool preference in the full sample was consistent with the ranking determined when considering only the subset of participants who tested positive for one or more substances via urine or hair testing ($p = .38$) and at each practice. However, significant differences ($p < 0.01$) were observed in preferences between practices (Table 6). A significantly higher proportion of Practice A participants preferred the 4P's Plus ($p < 0.01$) and a significantly higher proportion of Practice B participants preferred the SURP-P ($p < 0.01$). The data help to explain these preferences in screening tools and provide insights on how to

Table 3 Codebook

Category/code	Description
Screening tool	Coding category to identify comments about specific screening tools
4P's Plus	All comments related to 4P's Plus
NIDA Quick Screen/ASSIST[a]	All comments related to NIDA Quick Screen/ASSIST
SURP-P[b]	All comments related to SURP-P
Preferred screening tool	Coding category to identify participants' selection of their preferred screening tool
4P's Plus	All comments related to 4P's Plus as a preferred screening tool
NIDA Quick Screen/ASSIST	All comments related to NIDA Quick Screen/ASSIST as a preferred screening tool
SURP-P	All comments related to SURP-P as a preferred screening tool
Why preferred	Comments related to why the participant prefers a specific screening tool, including positive and negative comments or why the participant did not prefer other screening tools
Screening tool likes	Comments on what participants liked about a screening tool
Screening tool dislikes	Comments on what participants disliked about a screening tool
Screening recommendations	Coding category to identify participant suggestions on how to make the substance use screening process more comfortable and/or encourage honest answers from pregnant women
Recommendations related to screening tool	Comments related to participants' suggestions to make screening tools more comfortable to answer or facilitate substance use disclosure (e.g., related to tool questions, response options, etc.)
Recommendations related to interviewer	Comments related to participants' suggestions on how to administer screening tools to make them more comfortable to answer or facilitate substance use disclosure (e.g., related to interviewer demeanor, consent process, setting, etc.)

[a]NIDA-modified alcohol, smoking and substance involvement screening test

[b]Substance use risk profile-pregnancy scale

Table 4 Screening tool likes and dislikes: major themes

Screening tool	Likes	Dislikes
4P's Plus	Brief	Confused by different time frames in questions
	Comprehensive	Difficult to remember certain time frames
	Clear/understandable	"None/any" response options
	Questions about parents' and partners' substance use	Subjective questions
NIDA Quick Screen/ ASSIST[a]	Comprehensive	Too long
	Time frames of questions	
	Brief when skip pattern prompted	Response options too broad
	Clear explanation and examples of substances	
SURP-P[b]	Brief	Not comprehensive
	Clear/understandable	
	Simple response options	Response options too vague
	Questions about participant's own perspective on substance use	

[a]NIDA-modified alcohol, smoking and substance involvement screening test

[b]Substance use risk profile-pregnancy scale

encourage comfort and honesty during prenatal substance use screening.

4P's Plus

The plurality of participants (43.4%) preferred the 4P's Plus. Although a greater percentage preferred this screener at both practices, a higher proportion of participants preferred this tool at Practice A compared to Practice B (52.9% vs. 38.3%; $p < 0.01$) (Tables 5 and 6). When explaining their preference, most participants said that they felt the 4P's Plus was comprehensive yet concise; a *happy medium* between the other tools. Participants discussed several factors that they felt made the tool more comprehensive and *detailed*. First, many participants from both practices liked that the tool asked about their parents' and partners' substance use. One

Table 5 Screening tool preferences of overall sample and participants testing positive for substance use

Preferred screening tool	All participants % (n = 486)[a]	Participants testing positive for substances % (n = 188)[b]	P-value for Chi-square test[c]
4P's Plus	43.4% (211)	37.2% (70)	0.14
NIDA Quick Screen/ASSIST	32.5% (158)	34.6% (65)	0.61
SURP-P	24.1% (117)	27.1% (51)	0.41

Percentages may not total 100% due to rounding

[a]Two participants could not decide on a single screening tool they preferred, five participants were not asked their preference due to interviewer error, and seven participants were not asked their preference because the interview was interrupted, therefore n = 486

[b]Participants with urine or hair tests found to be positive for any of the substances analyzed including: cocaine, marijuana, opiates, amphetamines, methamphetamines, phencyclidine, benzodiazepines, barbiturates, methadone, tricyclic antidepressants, oxycodone, propoxyphene, and buprenorphine

[c]Chi-square test comparing response proportions between all participants and participants testing positive for substances

Table 6 Screening tool preferences by practice

Screening tool	Practice A % (n = 170)[a]	Practice B % (n = 316)[b]	P-value for Chi-square test[c]
4P's Plus	52.9% (90)	38.3% (121)	< 0.01**
NIDA Quick Screen/ ASSIST	31.2% (53)	33.2% (105)	0.65
SURP-P	15.9% (27)	28.5% (90)	< 0.01**

Percentages may not total 100% due to rounding

[a]One participant from Practice A could not decide on a single screening tool they preferred, three participants were not asked their preference due to interviewer error, and one interview was not completed due to interruption, therefore n = 170 for this practice

[b]One participant from Practice B could not decide on a single screening tool they preferred, two participants were not asked their preference due to interviewer error, and six interviews were not completed due to interruption, therefore n = 316 for this practice

[c]Chi-square test comparing response proportions between Practice A and B: **p < 0.01

Practice A participant explained, *It can be more than just a self-issue […] It's good to ask if they're in a relationship with someone who maybe has those habits, or did they come from a family where they grew up seeing those habits.* Participants thought these questions could help identify if others are influencing her substance use or affecting her pregnancy through second-hand exposure, but also might make women feel more comfortable admitting their own use through providing the opportunity to describe their history or risk factors. Additionally, participants felt that the response options that included a scale of frequency of use made the screening tool more comprehensive.

Participants felt that the tool was comprehensive, but also concise and clear. They described the 4P's Plus as *fast*, and *straight to the point*. Participants liked that the questions were *direct*, *easy to understand*, and *simple*. Thus, the 4P's Plus was overall the most preferred screening tool because it gathers enough relevant information on substance use quickly, while also minimizing confusion and making participants feel comfortable.

When participants were asked what they disliked about the tool, several themes emerged but varied by practice. Practice A participants were often confused when questions switched between time periods. Some also found it difficult to remember details of their substance use in the month before they knew they were pregnant. Other dislikes that were more prevalent among Practice A participants included the none/any response options, which participants claimed were awkward and vague, and questions that asked about "problems" with substance use, which were deemed too *subjective*. Some Practice B participants disliked the questions about parents' and partners' substance use, saying that the questions were uncomfortable and irrelevant, and some may not know about others' use. One participant said, *I don't really see why it's your business what my partner does.* Another explained, *I feel like*

the choices that people make in their life don't necessarily have to do with their partners or their parents.

NIDA Quick Screen/ASSIST

The NIDA Quick Screen/ASSIST was the second most preferred screening tool by participants (32.5%) (Table 5). Most participants who preferred this tool explained that it was more *in-depth,* and *detailed*. In particular, participants who tested positive for substances liked that this tool allowed them to provide more detail and explanation of their substance use. Participants from both practices felt that this tool collected more information through including more questions about various substances, a scale of response options, and providing a holistic understanding of the patient. Participants felt that the examples of different names used for each substance aided understanding and the skip pattern often made screening quick.

Although a majority of participants reported liking the comprehensiveness of the NIDA Quick Screen/ASSIST and its response options, some participants disliked these aspects of the tool. Participants were concerned that the screening tool may be too *long* or *repetitive*, particularly if the patient was using substances. A few participants thought that its length could lead to inaccurate results due to fatigue. Other participants reported liking the range of response options, but felt like their substance use did not fit within the categories provided. They explained that often their frequency of substance use changed over time and with the knowledge that they were pregnant. A Practice B participant said, *I was kind of between – it wasn't daily, it wasn't weekly, and it wasn't monthly […] it could have been a gap where I didn't drink at all until the next month.*

SURP-P

The fewest participants preferred the SURP-P screening tool (24.1%), but participants at Practice B liked this tool more than participants at Practice A (28.5% vs. 15.9%; $p < 0.01$) (Tables 5 and 6). Most of these participants preferred the SURP-P because it was *short* and *straightforward*. Participants also described the tool as *easy* and *basic*. Some participants discussed how they liked the simple yes/no response options because they felt less *intrusive* and were easier to answer. Others, particularly from Practice B, noted they liked the question regarding whether they ever felt the need to cut down on their substance use because it prompted self-reflection and provided the opportunity to share their own perspective.

Although participants often discussed brevity as a strength, it also made participants feel like the SURP-P was not comprehensive enough. Participants noted that the SURP-P did not ask about many substances and its broad questions and response options resulted in a less holistic, accurate picture of a woman's substance use. Some participants at Practice A also reported disliking the last question about alcohol use. Participants were unsure of how to respond because it asked about three kinds of alcohol at once and they disliked the vague response options. A Practice A participant explained, *'None' and 'any' […] could be taken as 'any' is like binge drinking all the time, whereas it could also be a drink or two.*

Factors Influencing Honesty and Comfort

The majority of participants did not provide any recommendations on how to encourage honesty during screening or thought disclosure was dependent on the individual. Of those participants who did provide recommendations, most suggested reiterating that responses are confidential and including questions about patient background to build rapport and provide context for answers. Participants also encouraged staff to have a friendly, non-judgmental demeanor, screen in a private place, and explain the clinical importance of screening. Participants disagreed over whether simple or detailed response options would result in greater honesty, with some participants explaining that women may be more honest if they are able to provide vague answers and others claiming that more options would lead to fewer reports of no use at all. A Practice A participant explained, *I think people are more apt to answer [yes/no questions] honestly as opposed to exactly having to quantify something*. Conversely, another participant said, "*It's asking have you done it every day? Three to six weeks? […] so it kind of doesn't make you look like you're a whole alcoholic if you're not one of the people that drink every day*."

Discussion/Conclusion

This study aimed to identify a substance use screening tool that is acceptable among pregnant women of three that are currently validated for use with a pregnant population. Of the screening tools studied, the plurality of pregnant women from both practices preferred the 4P's Plus, explaining it was comprehensive yet brief, easy to understand, and comfortable to answer. Additionally, results identified important factors influencing pregnant women's substance use screening preferences, including screening length/comprehensiveness, clarity/comprehensibility, subjectivity, and comfort with and specificity of questions and response options.

The NIDA Quick Screen/ASSIST was the second-most preferred tool and the SURP-P was the least preferred tool among the three assessed. Many participants felt that the NIDA Quick Screen/ASSIST and the SURP-P did not possess the appropriate comprehensiveness or length to

effectively assess substance use. However, a significantly higher proportion of participants at Practice B preferred the SURP-P compared to Practice A ($p < 0.01$). The reasons for differences in preferences at each practice were not able to be fully elucidated. Further research should explore demographic differences in substance use screening preferences to better understand potential variations. Practice A's patient population is older, privately insured, and has significantly more white patients, whereas Practice B's patient population is younger, Medicaid-eligible, and has significantly more Black patients. Exploring race/ethnicity and the role it specifically may play in substance use screener preferences would be an important next step. In addition, the SURP-P asks only about alcohol and marijuana, which some participants reported as less "intrusive". Given this, it is possible that reporting laws around prenatal substance use may also impact preferences. Maryland does not consider prenatal substance use to be child abuse or grounds for civil commitment, but it does comply with the Child Abuse Prevention and Treatment Act (CAPTA) which requires reporting of infants born and deemed to be "affected" by in utero substance exposure. Additionally, 24 states do consider substance use during pregnancy to be child abuse under civil child-welfare statutes and 3 consider it grounds for civil commitment. As this study was done exclusively in the state of Maryland, it was not designed to address how state laws and policies may influence preferences for a substance use assessment tools. This is an area that should be considered in future research. Since the 4P's Plus was the most preferred tool of the three assessed at both practices and among participants who tested positive for substance use, it may be more acceptable to a broader population of pregnant people.

Other research, including parent study results, supports the finding that the 4P's Plus is an accurate, acceptable screening tool for pregnant people (Chasnoff et al., 2007; Coleman-Cowger et al., 2019; Jones, 2005). The 4P's Plus was found to have high sensitivity and negative predictive values, indicating that it is a clinically useful screening tool for prenatal substance use (Coleman-Cowger et al., 2019). In focus groups, practice staff were asked to compare the screening tools' potential effectiveness and usability in prenatal care. Staff identified the 4P's Plus as the most acceptable tool for use with pregnant people, claiming it was easy to understand and administer, non-judgmental, and achieved a balance of length and comprehensiveness (Trocin et al., 2020). The screening tool's accuracy and non-judgmental tone have also been noted by the developers of the tool and other scholars (Chasnoff et al., 2007; Jones, 2005).

Clinical Implications

Findings suggest that the 4P's Plus is not only an accurate substance use screening tool, but is highly acceptable among pregnant people and should be considered for routine clinical use in prenatal care settings. This study also provides insights on how to increase acceptability of substance use screening among this population and encourage disclosure of use to ensure adequate care. Many pregnant people are uncomfortable disclosing substance use to their providers due to fear of being judged or reported to authorities, and may delay or completely disengage from prenatal care due to these concerns (Roberts & Nuru-Jeter, 2010; Change et al., 2017; Howell et al., 2019). Consistent with previous research on the topic, this study revealed that pregnant people feel more comfortable during substance use screening when providers explain the extent to which their responses are confidential, the clinical importance of screening, and maintain a nonjudgmental attitude (Chasnoff et al., 2005; Howell et al., 2019). Since some participants in this study expressed a desire to provide more explanation and context to their substance use, planned provider-patient follow-up conversations after formalized screening could enhance patient acceptability. As with any substance use screening tool, the most appropriate implementation method is universal screening to avoid discrimination, stigma and missed opportunities that occur with targeted screening (ACOG, 2017). Overall, the variations in reactions to the screening tools further emphasize the likely benefit of a multi-modal approach to prenatal substance use screening and the importance of nonjudgmental care.

Research Implications

Patient perspectives of the 4P's Plus complement previous findings on the screening tool's accuracy and acceptability among prenatal care providers. Results also elicit broader questions around the kinds of screening questions and response options pregnant people prefer and find most comfortable. To facilitate substance use disclosure, the data revealed conflicting perspectives about whether screening questions should ask about women's background and others' substance use and if response options should be simple versus detailed. Since the majority of participants, regardless of substance use, felt the parent/partner substance use questions were a strength of the 4P's Plus and this finding is supported by other research, evidence exists for the acceptability of questions about patient history and social context in prenatal substance use screening (Jones, 2005; Trocin et al., 2020). When administering the 4P's Plus or similar screeners in clinical practice, we suggest explaining the relevance of these questions to address some people's discomfort (Coleman-Cowger et al., 2018). Future research should further explore how to promote comfort and disclosure during prenatal substance use screening through provider interaction and setting, but also screening questions and response options. Given differences in preferences among practice

patient populations in this study, it will be important to further explore the impact of race/ethnicity, age, socioeconomic status, and other aspects of identity on screening preference.

Strengths and Limitations

This research is a qualitative companion to a larger study that contributes to understanding acceptability and accuracy of prenatal substance use screening tools. The study draws upon a robust qualitative dataset representing diverse patient populations from a large metropolitan area. Interviews were conducted by trained staff, recorded and transcribed verbatim, and then analyzed by experienced qualitative researchers. However, the generalizability of the study population is somewhat limited given the high prevalence of substance use in the sample, concentration in one geographic area, and racial/ethnic and socioeconomic characteristics of the participants (Coleman-Cowger et al., 2019). A small proportion of study participants did not complete a cognitive interview or their interview was lost due to recorder malfunction. Lost recordings were summarized based on interviewer recall, which could have introduced bias into the data. Additionally, given that the screeners were given in a controlled research setting, it is possible the preferences and comfort with the screeners may change based on the setting in which the screeners are administered. Despite these limitations, this study provides important insights into substance use screening preferences of pregnant people.

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Declarations

Conflict of interest The authors report no conflicts of interest.

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