



## PERCEPTIONS AND PRACTICES SURROUNDING TODDY CONSUMPTION DURING PREGNANCY IN SANGAREDDY DISTRICT, TELANGANA: A QUALITATIVE DESCRIPTIVE STUDY

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### ABSTRACT

**Background:** Toddy (kallu) is a naturally fermented palm-sap beverage consumed in parts of southern India. During pregnancy, its local classification as natural, traditional, or nutritious may conflict with biomedical advice to avoid alcohol. Evidence describing how pregnant women in Telangana understand and negotiate toddy use is limited.

**Objective:** To explore perceptions, culturally transmitted beliefs, social influences, and healthcare interactions related to toddy consumption during pregnancy among women in Sangareddy district, Telangana.

**Methods:** A qualitative descriptive study was conducted among 16 pregnant women attending routine antenatal care at the Maternal and Child Hospital, Government General Hospital, Sangareddy. Five additional eligible women declined participation; no enrolled participant discontinued the interview. Semi-structured one-to-one interviews were conducted in Telugu or Hindi in a private room, lasted 30-45 minutes, and were audio-recorded after written and recorded verbal consent. Interviews were transcribed and translated into English by the first author, with back-translation and linguistic verification by the second and corresponding authors. Manual hybrid inductive-deductive thematic analysis was undertaken. Saturation was observed after 14 interviews and confirmed through two additional interviews.

**Results:** Participants had a mean age of  $24.3 \pm 2.6$  years and mean gestational age of  $26.4 \pm 4.4$  weeks. Eleven women reported daily or nightly use, 14 consumed approximately 250 mL per occasion, and two consumed approximately 500 mL. Four interrelated themes were identified: toddy as a natural and nutritious substance distinct from alcohol; perceived maternal, fetal, and obstetric benefits; intergenerational, social, and ritual reinforcement; and limited risk awareness with weak or inconsistent healthcare influence. Participants described beliefs that toddy facilitated delivery, promoted fetal growth, improved sleep, and "cleaned" the fetus to prevent a white coating at birth.

**Conclusion:** Toddy consumption during pregnancy in this setting was embedded within local explanatory models of health and reproduction rather than understood simply as alcohol use. Antenatal services should ask explicitly about toddy and kallu, provide clear nonjudgmental counseling, and include influential family and community members in culturally responsive prevention strategies.

**Keywords:** Alcohol, Pregnancy, Palm Wine, Toddy, Kallu, Qualitative Research, Cultural Beliefs, Telangana, Antenatal Care.

### INTRODUCTION

Toddy, locally known as kallu, is produced from palm sap that undergoes spontaneous fermentation by naturally occurring yeasts and bacteria.

Fresh sap may initially contain little or no alcohol, but fermentation can rapidly produce an alcoholic beverage whose composition and ethanol concentration vary with palm species, temperature, storage time, handling, and local production practices [1]. This variability can make the strength of a serving difficult for consumers to estimate.

Prenatal alcohol exposure is preventable but can produce a broad spectrum of adverse outcomes, including impaired growth, miscarriage, stillbirth, congenital abnormalities, and lifelong neurodevelopmental impairment [2-4]. A safe threshold, safe timing, or safe type of alcoholic beverage in pregnancy has not been established



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[2,3]. Global estimates indicate that alcohol consumption during pregnancy occurs across regions and social groups, although prevalence and drinking patterns vary substantially [4]. International guidance therefore recommends routine identification of alcohol and other substance use during pregnancy, brief intervention, and referral when required [5].

Public-health messages based on ethanol content may not align with community classifications of beverages. Traditional fermented drinks may be understood as foods, tonics, cooling agents, medicines, or culturally appropriate sources of strength rather than as alcohol. Systematic reviews of qualitative research have shown that drinking during pregnancy is influenced by social norms, family practices, inconsistent information, perceptions of low risk, belief in beneficial properties, and advice from trusted community or healthcare figures [6-8]. The meaning attached to a beverage can therefore be as important as its pharmacological content when women make decisions during pregnancy.

Indian evidence is limited but demonstrates the importance of local context. In Odisha, Pati and colleagues described alcohol consumption during pregnancy as interwoven with tribal social life, easy availability, intergenerational traditions, and beliefs about health benefits [9]. Such findings cannot automatically be transferred to Telangana, where palm tapping, toddy vending, language, religion, rituals, and antenatal-care pathways have distinct local forms.

The possibility of adulteration adds a separate safety concern. Analytical and forensic literature from India has documented chloral hydrate and other sedative adulterants in some traditional alcoholic beverages [10]. The present study did not test beverage samples and cannot determine whether participants consumed adulterated toddy; nevertheless, the issue reinforces the need to ask specifically what was consumed and where it was obtained rather than treating all local beverages as compositionally uniform.

Little empirical work has documented how women in rural or semi-rural Telangana interpret toddy use during pregnancy, whose advice shapes their decisions, and whether antenatal care modifies these beliefs. This study therefore explored perceptions and practices surrounding toddy consumption during pregnancy among women attending a maternal and child hospital in Sangareddy district. The objectives were to identify perceived benefits and harms, describe cultural and interpersonal influences, and examine how healthcare advice entered women's decision-making.

## **Aims**

- To explore the perceptions and practices around Toddy consumption during Pregnancy.

## **Objectives**

- To explore the cultural influences
- Any impact on decision making regarding toddy intake

## **METHODS**

### **Study design and methodological orientation**

A qualitative descriptive design was used to obtain a practice-near account of women's beliefs, language, and decision-making concerning toddy use during pregnancy. The approach was selected because the research question concerned meanings and social processes rather than prevalence estimation, causal inference, or clinical diagnosis. Manuscript reporting was informed by the Standards for Reporting Qualitative Research (SRQR) and Consolidated Criteria for Reporting Qualitative Research (COREQ) [11,12].

### **Setting**

The study was conducted at the Maternal and Child Hospital, Government General Hospital, Sangareddy, Telangana, India. Sangareddy district includes urban, peri-urban, and rural populations and lies within a region where toddy is culturally familiar and commercially available. The recruitment period was June 2025 to December 2025

### **Participants, sampling, and eligibility**

Pregnant women attending the obstetrics and gynaecology outpatient department for routine antenatal care were recruited through criterion-based purposive sampling. Potentially eligible women were identified by obstetrics and gynaecology interns and postgraduate trainees and referred to the first author for study information and consent. Five eligible women declined participation, while 16 women provided consent and completed interviews; no participant discontinued an interview after it commenced. Eligibility criteria were age older than 18 years, current pregnancy, local residence, ability to converse in Telugu, Hindi, or English, reported toddy consumption during the current pregnancy following advice or encouragement from elders or older community members, and willingness to participate and be audio-recorded. Women who were intoxicated at the time of approach, unable to participate meaningfully in an interview, unwilling to consent to audio recording, or temporary visitors were excluded.

### **Data-collection instrument and interview procedure**

Data were collected through one-to-one in-depth interviews guided by open-ended questions developed from previous literature and the study objectives. The guide explored current toddy use; local names and classifications of toddy; beliefs about maternal, fetal, and delivery-related effects;

advice from elders, partners, neighbours, and community members; ritual or seasonal contexts; perceived risks; decision-making; and discussions with antenatal healthcare providers. No standardized psychometric or diagnostic scale was administered because the purpose was to explore perceptions, meanings, and social influences rather than to make a clinical diagnosis and establish any kind of correlation.

Interviews were conducted by the first author, a male senior resident in psychiatry who had completed three years of postgraduate training and had received training in interviewing. He had no prior relationship with the participants, who were informed that he was a doctor conducting research on toddy use during pregnancy. Interviews took place in a secure private room within the Maternal and Child Hospital, were conducted mainly in Telugu or Hindi, lasted approximately 30-45 minutes, and were audio-recorded after written and audio-recorded verbal consent. All participants were asked the core questions in the interview guide. No repeat interviews were required.

#### **Transcription, translation, and data management**

The first author transcribed the audio recordings verbatim and translated them into English. The second and corresponding authors performed back-translation and linguistic verification against the source-language material. The study team repeatedly read the transcripts to develop familiarity with the data, preserve the intended meaning of culturally specific expressions, and identify recurring and divergent accounts. Recordings and transcript files were stored securely. Coding was performed manually on paper, and the organized transcripts and theme summaries were subsequently prepared in Microsoft Word.

#### **Thematic analysis**

A hybrid inductive-deductive thematic analysis was undertaken using the flexible thematic-analysis framework described by Braun and Clarke [13]. Initial coding was developed independently and was subsequently cross-verified by two authors. Inductive codes were generated from participants' language, including expressions such as "baby comes out clean" and "toddy helps in delivery." Deductive codes reflected domains in the interview guide, including cultural influence, perceived benefit, social reinforcement, risk awareness, and healthcare communication. Through repeated reading and discussion, related codes were grouped into candidate themes, checked against participant responses, refined for coherence and distinctiveness, and finalized by the study authors.

#### **Information power and saturation**

After 14 interviews, the researchers observed repetition of established codes and no substantively new themes. Two additional interviews generated further examples within the existing categories without altering the thematic framework. The authors therefore considered thematic saturation to have been attained and concluded recruitment after 16 completed interviews.

#### **Trustworthiness and reflexivity**

Credibility was supported by private audio-recorded interviews, verbatim transcription, source-language review, back-translation by two co-authors, repeated transcript reading, initial independent coding, cross-verification of codes, discussion of theme boundaries, attention to divergent accounts, and the use of representative quotations. The interviewer had no prior relationship with participants and documented his professional role before consent. The analysis was manual and no dedicated qualitative-analysis software was used. Member checking and transcript return were not undertaken.

Table 1. Study design, participants, and analytic procedures

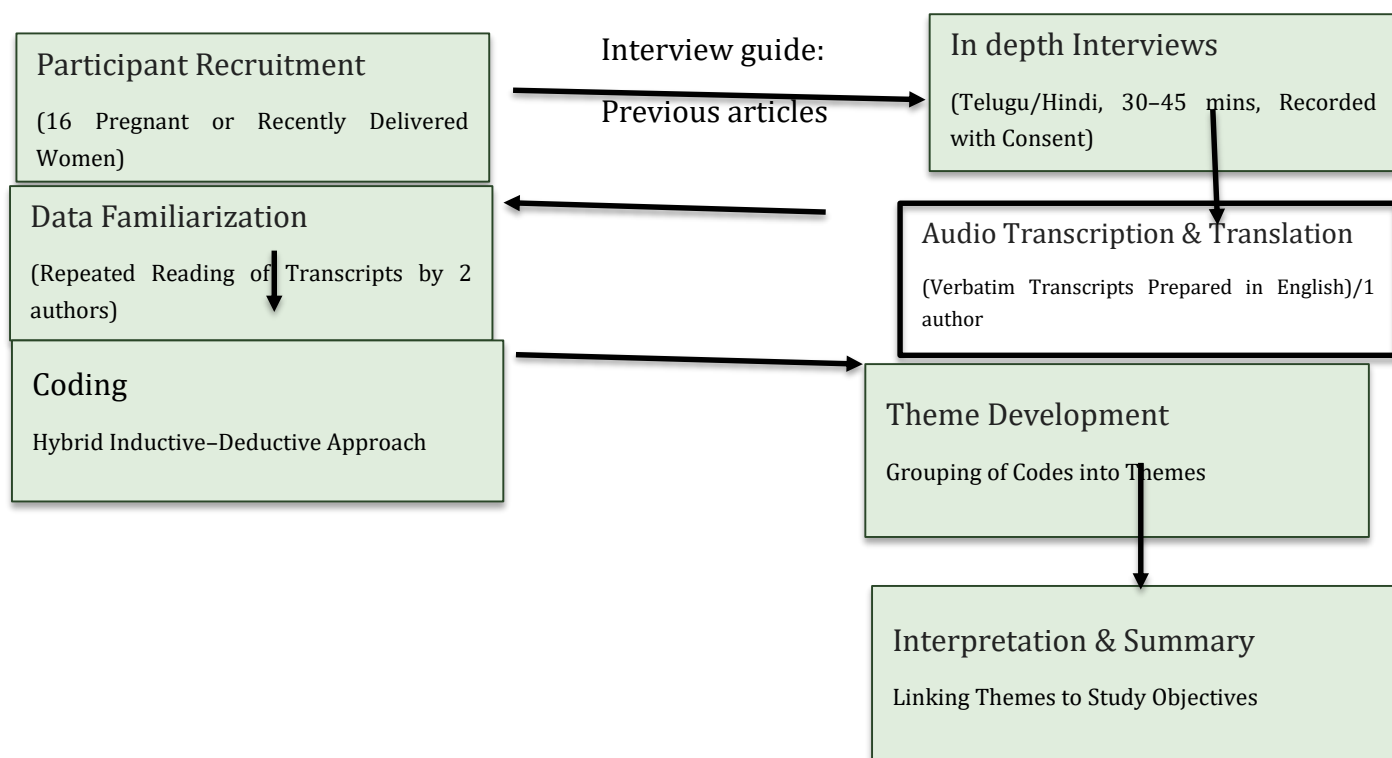
| Domain       | Study procedure                                                                                                | Reporting interpretation                                                                          |
|--------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Design       | Qualitative descriptive study using individual in-depth interviews                                             | Selected to explore meanings, beliefs, and social decision-making rather than estimate prevalence |
| Setting      | Maternal and Child Hospital, Government General Hospital, Sangareddy, Telangana                                | Hospital-based antenatal outpatient sample                                                        |
| Recruitment  | Eligible women identified by obstetrics and gynaecology interns/postgraduates and referred to the first author | Five eligible women declined; 16 completed interviews; no discontinuations                        |
| Participants | 16 currently pregnant women aged >18 years who reported toddy consumption during the current pregnancy         | Criterion-based purposive sample                                                                  |

| Domain                | Study procedure                                                                                                                 | Reporting interpretation                                                              |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Interviewer           | First author; male senior resident in psychiatry; three years of postgraduate training; no prior relationship with participants | Interviewing role and study purpose disclosed before consent                          |
| Languages and setting | Telugu or Hindi; secure private room in the Maternal and Child Hospital                                                         | One-to-one interviews lasting approximately 30-45 minutes                             |
| Consent and recording | Written consent and audio-recorded verbal consent obtained before interview                                                     | Interviews audio-recorded and anonymized                                              |
| Data-collection tool  | Semi-structured interview guide developed from literature and study objectives                                                  | No standardized psychometric or diagnostic scale was used                             |
| Translation           | First-author transcription and English translation; back-translation and verification by second and corresponding authors       | Culturally specific meanings reviewed against source-language material                |
| Analysis              | Manual hybrid inductive-deductive thematic analysis; initial independent coding followed by cross-verification by two authors   | Microsoft Word used for transcript organization and theme summaries                   |
| Stopping criterion    | Saturation observed after 14 interviews and confirmed by two additional interviews                                              | Final sample n=16                                                                     |
| Descriptive summaries | Participant characteristics summarized as mean $\pm$ SD, median (IQR), range, and n (%)                                         | Calculated using Python 3.13.5, pandas 2.2.3, and NumPy 2.3.5; no inferential testing |

Qualitative findings were interpreted thematically. Descriptive numerical summaries characterize the

sample only and are not estimates of population prevalence.

#### Flowchart : Study design and analysis



## RESULTS

### Sample and interview characteristics

Sixteen pregnant women completed interviews. Their mean age was  $24.3 \pm 2.6$  years (median 25.0, interquartile range 22.8-25.3; range 19-29), and their mean gestational age was  $26.4 \pm 4.4$  weeks (median 28.0, interquartile range 22.0-28.5; range 18-32). Nine participants were primigravidae. Twelve interviews were conducted in Telugu and four in Hindi. Eleven participants reported daily or nightly consumption, while the remaining five reported alternate-day, festival-related, or weekly use.

Fourteen women reported approximately 250 mL per occasion and two reported approximately 500 mL. For 14 participants, the record indicated that consumption began in the first trimester or from the start of pregnancy; two entries referred to consumption around delivery. Toddy was obtained from local toddy shops and was consumed on the advice of mothers-in-law, grandmothers, parents, other elders, or older neighbours. Participants did not know the alcohol concentration of the beverage and reported no use of other alcoholic beverages.

Table 2. Participant and interview characteristics

| Characteristic                     | Descriptive finding                                                                                                      | Interpretive note                                                                          |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Participants completing interviews | 16                                                                                                                       | Five additional eligible women declined; no enrolled participant discontinued an interview |
| Age, years                         | $24.3 \pm 2.6$ ; median 25.0 (IQR 22.8-25.3); range 19-29                                                                | Continuous descriptive summary                                                             |
| Gestational age, weeks             | $26.4 \pm 4.4$ ; median 28.0 (IQR 22.0-28.5); range 18-32                                                                | All participants were currently pregnant                                                   |
| Gravidity                          | Primigravida 9 (56.3%); multigravida 7 (43.8%)                                                                           | Derived from recorded obstetric history                                                    |
| Education                          | Primary 6 (37.5%); secondary 6 (37.5%); no formal education 2 (12.5%); degree 1 (6.3%); not recorded 1 (6.3%)            | No imputation for the unrecorded value                                                     |
| Occupation                         | Homemaker 9 (56.3%); daily-wage worker 3 (18.8%); manual labourer 2 (12.5%); not recorded 2 (12.5%)                      | Categories harmonized from participant records                                             |
| Interview language                 | Telugu 12 (75.0%); Hindi 4 (25.0%)                                                                                       | Interviews conducted in participants' preferred local language                             |
| Consumption frequency              | Daily/every night 11 (68.8%); alternate day/festival-related 2 (12.5%); once weekly 2 (12.5%); 2-3 times weekly 1 (6.3%) | Frequency was self-reported                                                                |
| Amount per occasion                | Approximately 250 mL: 14 (87.5%); approximately 500 mL: 2 (12.5%)                                                        | One glass was standardized as 250 mL and half bottle as 500 mL                             |
| Recorded initiation/timing         | First trimester/start of pregnancy 14 (87.5%); around delivery 2 (12.5%)                                                 | Based on the wording in the participant record                                             |
| Source and other alcohol           | Toddy shop; no other alcoholic beverage reported                                                                         | Alcohol concentration of toddy was unknown                                                 |
| Source of advice                   | Mothers-in-law, grandmothers, parents, elders, and older neighbours                                                      | Advice was predominantly intergenerational and community based                             |



Values are mean  $\pm$  standard deviation, median (interquartile range), range, or n (%). Percentages may not total 100 because of rounding. No p values or confidence intervals were calculated because the numerical data describe the qualitative sample rather than test hypotheses.

### Thematic findings

Four interrelated themes explained how toddy use became acceptable or desirable during pregnancy. The themes were not mutually exclusive; the perception that toddy was natural supported beliefs in benefit, while family endorsement reinforced both the practice and skepticism toward biomedical warnings.

Table 3. Themes, subthemes, interpretation, and representative quotations

| Theme                                                      | Subthemes                                                                                                                                                  | Analytic interpretation                                                                                                                                             | Representative quotation                                                                                              |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1. Toddy as natural, nutritious, and distinct from alcohol | Tree-derived origin; freshness and naturalness; food/tonic classification; limited recognition of fermentation and alcohol content                         | The beverage was often evaluated according to its source rather than its ethanol content. Natural origin functioned as a marker of safety.                          | "I didn't know it has alcohol. They say it's just from a tree." (P01/P02/P05/P06/P13)                                 |
| 2. Perceived maternal, fetal, and obstetric benefits       | Easier delivery; fetal growth; cleansing the fetus; preventing a white coating at birth; sleep and relaxation; general bodily strength                     | Toddy was positioned as a functional pregnancy remedy. Benefits were framed in concrete embodied outcomes rather than abstract health claims.                       | "If I drink toddy, the baby will be cleansed inside and will be grown without white paste." (P06/P01 in source notes) |
| 3. Intergenerational, social, and ritual reinforcement     | Mothers and elders as trusted authorities; neighbor encouragement; community normalization; seasonal heat; festival and ritual use                         | Advice was socially distributed and reinforced through observation, repetition, and cultural continuity. Approval from elders could outweigh clinical advice.       | "My mother said everyone drank toddy during pregnancy - it's good for the baby." (P04)                                |
| 4. Limited risk awareness and weak healthcare influence    | Uncertainty that toddy is alcohol; poor knowledge of fetal risk; little explicit antenatal counseling; advice perceived as unclear or overridden by elders | The absence of specific discussion about kallu allowed traditional explanations to remain unchallenged. Generic questions about alcohol may not identify toddy use. | "My neighbors and elders suggested it's good for the human body." (P09)                                               |

Quotations were translated from Telugu or Hindi into English. Participant identifiers are reproduced as available in the presentation notes. The original transcripts should be checked before final submission to confirm wording and identifiers.

### Theme 1: Toddy as natural, nutritious, and distinct from alcohol

Participants frequently evaluated toddy through a naturalness framework. Because it originated from a tree and was locally produced, it was described as closer to food, sap, or a nourishing traditional drink than to commercial alcohol. Several accounts suggested that spontaneous fermentation was not understood or was considered irrelevant. The phrase

"just from a tree" condensed a broader belief that natural origin implied low toxicity and that toddy belonged outside the category of alcohol that should be avoided during pregnancy.

This classification mattered because health warnings about "alcohol" could be accepted in principle without being applied to kallu. The finding suggests that beverage-specific language is essential: asking only whether a woman drinks alcohol may fail to elicit toddy use if she does not regard it as alcohol.

### Theme 2: Perceived maternal, fetal, and obstetric benefits

Toddy was associated with a cluster of perceived benefits. Participants described it as helping the

body, promoting sleep and relaxation, strengthening the mother, supporting fetal growth, and making delivery easier. One particularly salient explanatory model was that toddy "cleaned" the fetus within the womb and prevented a white coating or "paste" at birth. This belief translated a culturally observed neonatal feature into a preventable outcome and gave toddy a specific therapeutic purpose.

The perceived benefits were immediate, visible, and socially verifiable. By contrast, fetal neurodevelopmental risk was abstract, delayed, and not directly observable during pregnancy. This asymmetry helped sustain the practice even when participants had heard general warnings.

### **Theme 3: Intergenerational, social, and ritual reinforcement**

Mothers, older female relatives, neighbors, and community elders were central sources of advice. Their credibility arose from experience: previous generations had consumed toddy, delivered children, and interpreted apparently healthy outcomes as evidence of safety. The statement that "everyone drank toddy during pregnancy" framed the practice as normal and time-tested rather than deviant.

Toddy also appeared within wider social and ritual life. Participants referred to seasonal use during hot weather and to religious or festival contexts, including offering toddy during Dusshera. These practices gave the beverage moral and cultural legitimacy. Decisions were therefore not made by an isolated individual but within networks of expectations, approval, and inherited knowledge.

### **Theme 4: Limited risk awareness and weak healthcare influence**

Awareness ranged from not knowing that toddy contained alcohol to recognizing that clinicians might disapprove but continuing because family advice was more persuasive. Only a minority of participants recalled explicit healthcare counseling, and the advice described in the source material was either nonspecific, unclear, or insufficient to displace established beliefs. The accounts therefore indicated that community norms and trusted family advice remained highly influential.

The accounts suggest a communication gap rather than simple refusal of medical advice. If clinicians use generic terms, do not ask about local beverages, or provide warnings without engaging with perceived benefits, counseling may not address the actual reasons for consumption.

## **DISCUSSION**

This qualitative study identified four connected processes that supported toddy consumption during pregnancy in Sangareddy: classification of toddy as natural and non-alcoholic, belief in pregnancy-specific benefits, reinforcement by trusted social networks, and limited influence of antenatal

counseling. The findings show that the behavior cannot be understood solely as individual risk-taking. It was embedded in a local explanatory system in which toddy was a source of nutrition, bodily strength, sleep, fetal cleanliness, and easier delivery.

The strongest conceptual finding was the separation of toddy from the category of alcohol. Similar reasoning has been described across traditional and low-strength beverages, where naturalness, home production, fermentation, and cultural familiarity reduce perceived risk [6-9]. Popova and colleagues' review found that women may drink during pregnancy because they believe only strong alcohol or large quantities are harmful, because alcohol has beneficial properties, or because use is a cultural custom [6]. Lyall and colleagues likewise identified social norms, mixed information, and the influence of trusted relationships as central to drinking, reduction, or abstinence [7]. The current study extends those findings by showing how a palm-derived beverage can remain outside the semantic category targeted by routine counseling.

The findings closely parallel the qualitative study of handia consumption among tribal women in Odisha [9]. Both studies describe intergenerational transmission, easy cultural acceptance, limited alcohol literacy, and health-related meanings attached to a traditional drink. The Telangana accounts, however, included locally specific beliefs about fetal cleansing, prevention of a white coating at birth, seasonal heat, and ritual offering. This illustrates why prevention messages translated from generic alcohol guidance may be insufficient without understanding local reproductive beliefs.

Perceived benefit is particularly important. Participants did not merely minimize harm; they described toddy as actively protective. Such positive expectancies can be more resistant to change than simple lack of knowledge because abstention may be interpreted as giving up a maternal or fetal benefit. Counseling should therefore acknowledge the intended goal before correcting the mechanism. For example, a clinician might recognize the desire for sleep, strength, or an easier delivery, explain that fermented toddy contains ethanol of variable strength, and offer safer alternatives for the underlying concern.

The authority of elders and family members also has practical implications. Systematic reviews of women's experiences conclude that alcohol use in pregnancy is shaped by social and cultural context and that interventions focused only on individual responsibility are incomplete [7,8]. The current study suggests that mothers-in-law, mothers, partners, community health workers, and other respected figures should be included in educational strategies. Messages delivered only to the pregnant

woman may be undermined when the household continues to recommend toddy.

The limited recall of explicit healthcare advice indicates a missed prevention opportunity. International guidance recommends routine, respectful identification of substance use in pregnancy and brief intervention when use is detected [5]. In this setting, screening should use local names and examples: "Do you drink toddy or kallu?" may be more effective than "Do you use alcohol?" A nonjudgmental approach is essential because shame or fear of criticism can reduce disclosure [14]. Counseling should be consistent across obstetricians, nurses, midwives, Accredited Social Health Activists, and Anganwadi workers and should explain that fermentation converts sap into an alcoholic beverage even when it is natural or homemade.

The issue of adulteration should be addressed carefully. Indian analytical literature confirms that sedatives such as chloral hydrate can be detected in adulterated alcoholic beverages [10]. However, this study neither collected beverage samples nor asked systematically about adulterants. Programs should distinguish two messages: ethanol itself is not considered safe during pregnancy, and unregulated adulteration may create additional unpredictable risk. Conflating these issues could unintentionally imply that pure toddy is safe.

A culturally responsive intervention could combine brief antenatal screening, visual education in Telugu, explanation of fermentation, discussion of common benefit beliefs, and involvement of family elders. Community materials should avoid insulting traditions or blaming women. Instead, they should separate respect for cultural identity from endorsement of prenatal alcohol exposure and provide practical substitutes for sleep, hydration, nutrition, and delivery preparation. Community health workers can help identify local terminology and deliver repeated messages outside the hospital.

#### **Strengths**

- The study addresses a locally important but underdocumented maternal-health practice in Telangana.
- In-depth interviews in local languages enabled participants to describe culturally specific explanatory models in their own terms.
- The analysis combined inductive codes grounded in participants' words with deductive domains linked to the research objectives.
- Two authors reviewed transcripts and saturation was assessed pragmatically, with two additional interviews after the initial saturation point.
- Representative quotations make the relationship between raw accounts and themes visible.

#### **Limitations**

- The hospital-based sample of 16 women cannot be assumed to represent all pregnant women, toddy-consuming communities, or districts in Telangana.
- Frequency, volume, and timing were self-reported and were not independently verified. The ethanol concentration of individual toddy samples was unknown, and pregnancy or neonatal outcomes were not assessed; no dose-response inference is possible.
- Translation from Telugu or Hindi into English may have reduced cultural nuance despite back-translation and linguistic verification; some culturally specific idioms may not have exact English equivalents.
- Interviews in a hospital setting may have encouraged socially desirable responses or underreporting, particularly where women anticipated judgment.
- The interviews were conducted by a male psychiatry doctor within a hospital setting; despite privacy and the absence of a prior relationship, professional and gender differences may have influenced disclosure.

#### **Implications for practice and research**

- Add beverage-specific screening questions using the terms toddy and kallu to routine antenatal history-taking.
- Provide brief, nonpunitive counseling that explicitly explains fermentation, variable alcohol strength, and the absence of an established safe level in pregnancy.
- Address locally reported benefits directly and offer safer alternatives for sleep, nutrition, hydration, and delivery preparation.
- Include mothers, mothers-in-law, partners, elders, Accredited Social Health Activists, Anganwadi workers, and social workers in culturally adapted education.
- Develop Telugu-language information materials using locally recognizable examples rather than generic images of commercial alcohol.
- Conduct larger mixed-methods studies that document dose, frequency, gestational timing, beverage source, pregnancy outcomes, and healthcare counseling.
- Undertake community-based qualitative work with families, clinicians, and toddy producers and, where relevant, laboratory analysis of beverage composition.

#### **CONCLUSION**

Among women interviewed in Sangareddy, toddy consumption during pregnancy was supported by a coherent cultural logic: it was considered natural,



beneficial, socially approved, and distinct from alcohol. Elders and community traditions often exerted greater influence than nonspecific healthcare advice. Effective prevention therefore requires more than a generic abstinence message. Antenatal services should ask explicitly about kallu, engage respectfully with perceived benefits, provide consistent nonjudgmental information, and involve influential family and community members. These findings offer context-specific guidance for maternal-health communication but require confirmation in broader and more diverse samples.

**Availability of data and materials:** Interview recordings and transcripts may contain identifiable and culturally sensitive information. Access should be governed by the ethics approval, participant consent, and institutional policy. A de-identified coding framework may be shared on reasonable request if permitted.

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**Competing interests:** The authors declare no competing interests.

**Author contributions:** S.K. conducted participant interviews, transcription, translation, initial coding, and manuscript drafting. S.Po. and V.B. performed back-translation and linguistic verification and contributed to analytic cross-checking. S.Pi. contributed to interpretation and critical revision. All authors reviewed and approved the final manuscript. Initials: S.K., Sidharth Kadganchikar; S.Po., Sindhuri Potluri; S.Pi., Srilaxmi Pingali; V.B., Vijaykumar Bandaru.

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