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Understanding Gestational Age Assessment Practices Among Health Workers in Burkina Faso's Urban Settings

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Abstract

In Burkina Faso, the DenBalo study aimed to explore differences in vulnerability between preterm and full-term newborns but found fewer preterm cases than anticipated based on routine health centre records. This follow-up study investigates how urban healthcare workers determine gestational age and the factors influencing their assessments. Researchers conducted ten individual interviews and four focus groups with healthcare staff across four facilities in Bobo-Dioulasso. Thematic analysis focused on practices for defining and measuring preterm birth, recording methods, care challenges, and suggested improvements. Definitions of preterm birth varied: some staff relied on gestational age under 37 weeks, while others used birth weight below 2.5 kg. Estimations often depended on the last menstrual period, though its reliability was questioned. Early ultrasound was preferred for precision, but limited access meant fundal height measurements were commonly used. Reporting practices were inconsistent, and healthcare workers faced obstacles including insufficient resources, difficulties in accurate data collection, and parental reluctance to seek specialized care. Staff highlighted the importance of community education, enhanced health infrastructure, and continuous professional training to improve outcomes. Accurate and consistent gestational age assessment, paired with better documentation, is essential for tracking preterm births and supporting neonatal care in resource-limited urban settings.

Keywords: Gestational age, Preterm birth, Neonatal care, Healthcare practices, Burkina Faso

Introduction

Determining a baby's gestational age is a cornerstone of prenatal care, as it guides monitoring of fetal development, timing of antenatal tests, and estimation of delivery dates [1]. Accurate dating is also essential in managing complications such as early or delayed labor, assessing risks in high-risk pregnancies, and deciding on interventions [2, 3]. It allows clinicians to distinguish between infants who are preterm and those who are small for gestational age, which is critical for tailoring neonatal care [4]. In particular, precise assessment of gestational age supports individualized management for extremely premature newborns, helps monitor their development over time, and informs both research and public health planning [5].

Preterm birth continues to be a major contributor to child mortality under five years old, responsible for about a third of deaths in the neonatal period [6, 7]. The majority of these births occur in regions such as South Asia and sub-Saharan Africa, and nearly 80% of deaths linked to prematurity happen in low- and middle-income countries [8, 9]. These statistics highlight an urgent need to both prevent preterm births and strengthen neonatal care services to improve infant survival.

In response to these challenges, the DenBalo study—"Describing and Comparing Biological Vulnerability in

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Small Vulnerable Neonates versus Healthy Community Controls in Urban Burkina Faso: Gut Microbiota, Immune System, and Breastmilk Assembly and Development in the First Days and Weeks of Life"—was launched in early 2023 [10]. The study aimed to enroll 50 preterm and 50 full-term infants. Based on local health records, researchers expected to identify 8–12 preterm births per month, reaching the target within six months. Surprisingly, only four preterm births were recorded between April 7 and October 6, 2023—far below the anticipated 48 cases in Bobo-Dioulasso [11].

This unexpected shortfall prompted a closer look at potential reasons behind the discrepancy. One hypothesis involved the AMANHI late-pregnancy method for estimating gestational age, which relies on measuring the Transcerebellar Diameter (TCD) and Femur Length (FL) between 24 and 29 weeks 6 days of gestation. Concerns about identification accuracy and reporting practices led to a qualitative investigation.

The qualitative study explored how urban healthcare providers define and estimate gestational age, identify preterm births, and manage related care. This complemented a separate quantitative study published elsewhere [12]. Misclassification of preterm births can have serious consequences: it may prevent timely clinical care for mother and newborn and distort official statistics, which inform resource allocation such as neonatal units, incubators, and essential medications. The study also examined operational challenges, resource gaps, and staff capacity in urban health facilities, aiming to clarify why the preterm birth rate recorded by DenBalo differed from district-level statistics.

Materials and Methods

Study design and setting

Burkina Faso's healthcare system is organized as a three-tiered structure. The first level includes the *Centre de Santé et de Promotion Sociale* (CSPS), which provides primary healthcare, and the *Centre Médical avec Antenne Chirurgicale* (CMA), offering more advanced services including minor surgical procedures. These first-tier facilities operate under the administrative structure of a Health District. The second level typically consists of *Centre Hospitalier Régional* (CHR) referral hospitals, while the third level includes *Centre Hospitalier Universitaire* (CHU), such as Souro Sanou in Bobo-Dioulasso, providing specialized tertiary care. In Bobo-Dioulasso, the second-tier CHR is not present, so patients are referred directly from CSPS to the CHU.

This study applied a qualitative, descriptive approach and was conducted across four health facilities within the Dô Health District: three CSPS and one CMA. Using semi-structured interviews with key personnel and open-ended discussion prompts, the study investigated healthcare providers' practices and perceptions regarding gestational age estimation and preterm birth identification. Data collection occurred between 9 and 24 August 2024.

Participants and recruitment

A total of ten individual in-depth interviews and four focus group discussions were carried out. Individual interviews involved facility heads, maternity ward supervisors, and consultant gynecologists from the CMA, including two gynecologists, two general practitioners, two nurses, and four midwives.

Focus groups involved other maternity staff, such as midwives, nurses, and auxiliary birth attendants, who were actively involved in maternal and child health as part of the DenBalo study. Participants were purposively selected to capture diverse professional experiences, roles, and levels of specialization. All participants were provided with detailed information about the study, and written informed consent was obtained. Anonymity and confidentiality were strictly observed throughout the study.

Data collection

Data were collected using a structured interview guide through both individual interviews and focus group discussions. These sessions explored providers' practices, knowledge, and challenges in defining, measuring, and managing preterm births. A sociologist, independent of the research team and unaffiliated with the participating facilities, facilitated all sessions. Prior to participation, respondents were briefed on study objectives and reassured about confidentiality.

The discussions focused on themes such as classification and documentation of preterm births, resource availability, difficulties in care delivery, and perceived strategies for improving maternal and neonatal outcomes. Interviews were conducted in French, audio-recorded, and held in private spaces to minimize disruptions and maintain confidentiality.

Data analysis

The data were analyzed using thematic analysis [13, 14] to identify key patterns regarding gestational age estimation and preterm birth management. Transcriptions from interviews and focus groups were anonymized and organized according to the interview guide.

A hybrid approach was applied: manual coding was complemented by AI-assisted qualitative analysis to improve consistency, reveal latent patterns, and validate emerging themes. Transcripts were processed in NVivo 14 (Rich Text Format converted to .docx), and ChatGPT 4.0 was used for spelling, grammar, and readability improvements in French, followed by English translation via Google Translate. The translations were refined for clarity using ChatGPT 4.0.

The final dataset included structured files pairing each question with its original French response, improved French version, and the English translation. These responses were compiled in Excel and imported into Python for further algorithmic analysis, allowing iterative validation of recurring themes across interviews and focus groups.

We applied a combined approach of natural language processing (NLP) and network analysis to explore and visualize the connections among textual responses. This approach, which builds on methods validated in previous studies [15, 16], involved the following steps:

1. **Text processing with spaCy**: The spaCy library, using the "en_core_web_lg" model, was employed to parse each textual response. This process extracted key linguistic features including tokens, lemmas, and parts of speech, which were then incorporated into the dataset for further analysis.
2. **Stopword elimination**: Commonly used words with little semantic weight, or stopwords, were removed using spaCy's built-in English stopword list to enhance the focus on meaningful content.
3. **Constructing a similarity network**: NetworkX was used to create a graph in which each node represented a parsed response. Edges between nodes were weighted according to semantic similarity, calculated via spaCy's similarity function. This initial graph captured the overall structure of relationships among responses.
4. **Filtering and refining the network**: To emphasize stronger connections, edges below a predefined similarity threshold were removed. The resulting filtered network (strong_G) highlighted the most meaningful relationships between responses.
5. **Graph visualization**: The refined network was visualized with NetworkX and Matplotlib. Node positions were determined using the Fruchterman-Reingold force-directed layout algorithm (nx.fruchterman_reingold_layout) to optimize clarity and readability.
6. **Enhanced visual representation**: Additional visualization refinements, such as adjustments to node size, edge color, and label placement, were implemented to improve interpretability and highlight key patterns within the data.

This integrative methodology enabled a detailed and nuanced understanding of the dataset, revealing relationships and patterns across responses on specific topics **(Figures 1 and 2)**. Each subtopic within "assessment of preterm birth" was visualized through its own network **(Figure 2)**. To ensure robustness, themes identified through NLP-assisted analysis were cross-validated using traditional thematic coding. Illustrative quotes were then extracted from the original responses to exemplify each validated theme, providing depth and contextual insight. The full workflow of this analytical process is summarized in **Figure 3**.

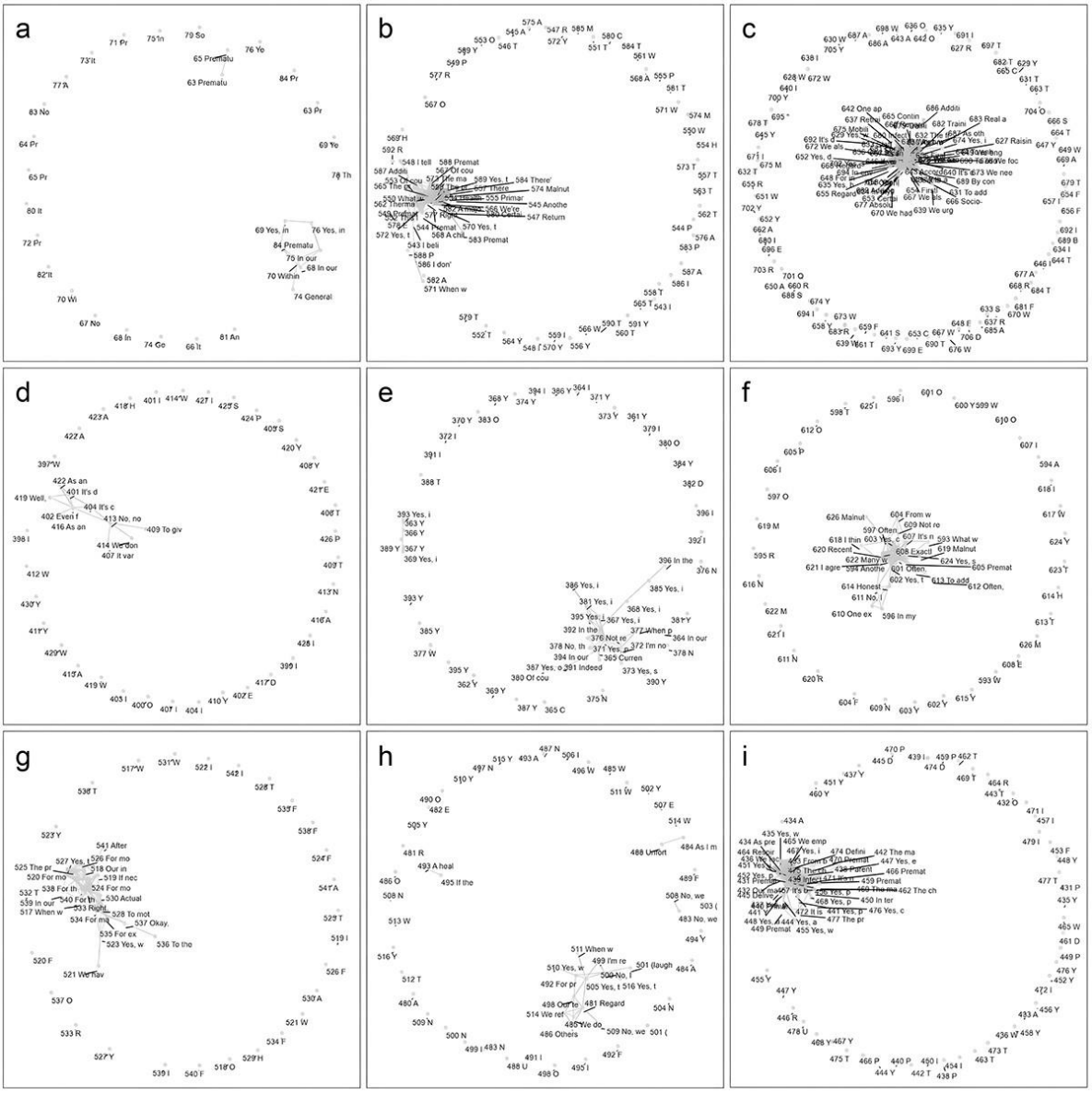

Figure 1. Force directed graphs for 9 of 10 topics based on interview guide. (a): Definition of preterm birth; (b): health risks in premature infants; (c) improvement in care of preterm birth; (d): number of preterm birth per month; (e): registration of preterm births; (f): specificities of mothers of preterm children; (g): services and care provided to preterm babies and their mothers; (h): staff skills and existence of equipment for better care; (i): types of challenges faced during preterm births.

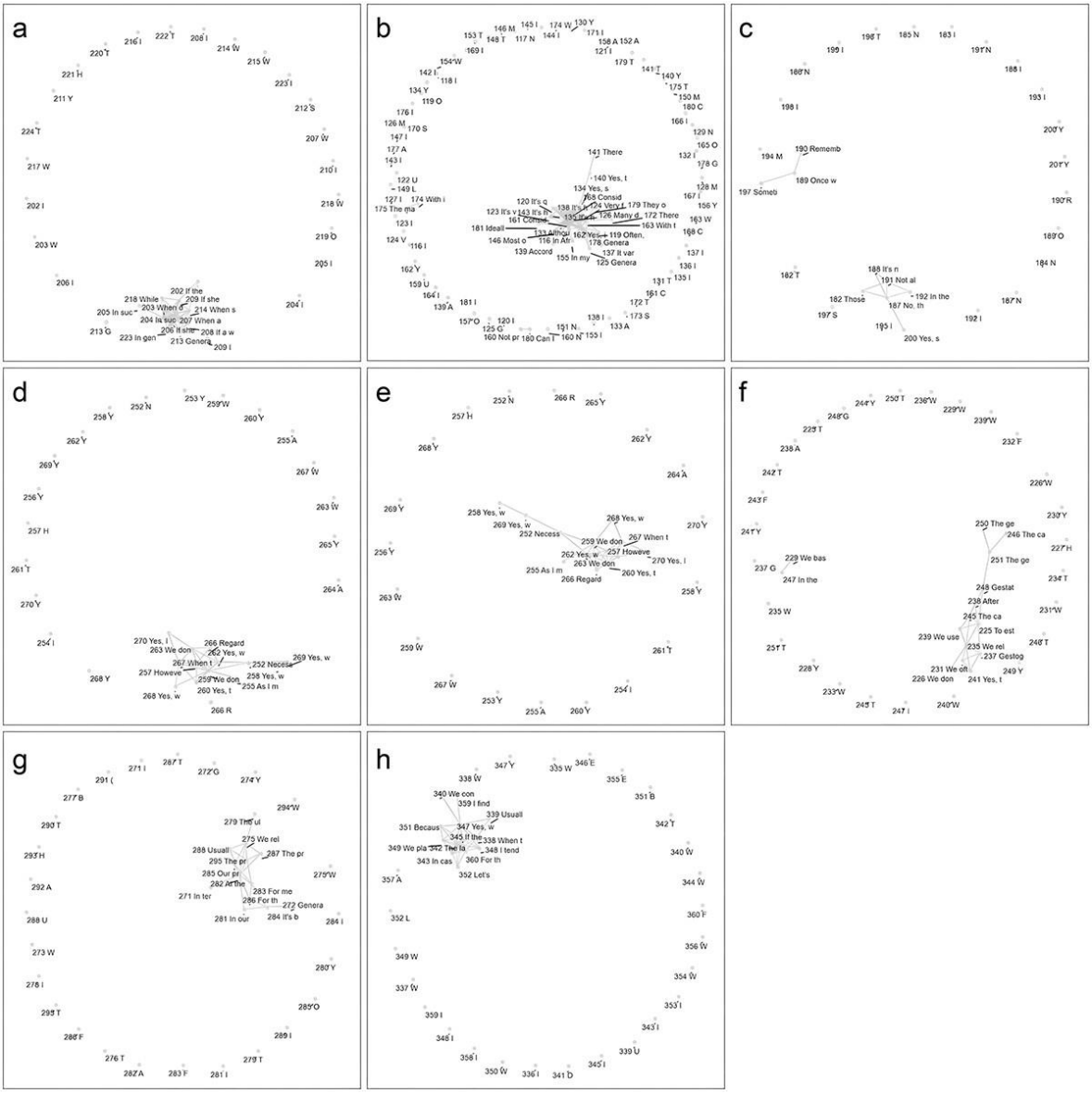

Figure 2. Force directed graphs for subtopics from assessment of preterm birth topic. (a): Method of calculating gestational age from fundal height; (b): appointment for prenatal consultations with ultrasound measurement carried out; (c): control of the date of the last period by women who present late to their ANC; (d): control of the last menstrual period; (e): materials needed for calculating gestational age; (f): priority between different methods of measuring gestational age; (g): priority method if the date of the last period, fundal height and ultrasound are discordant; (h): ways health workers help women remember the date of their last period.

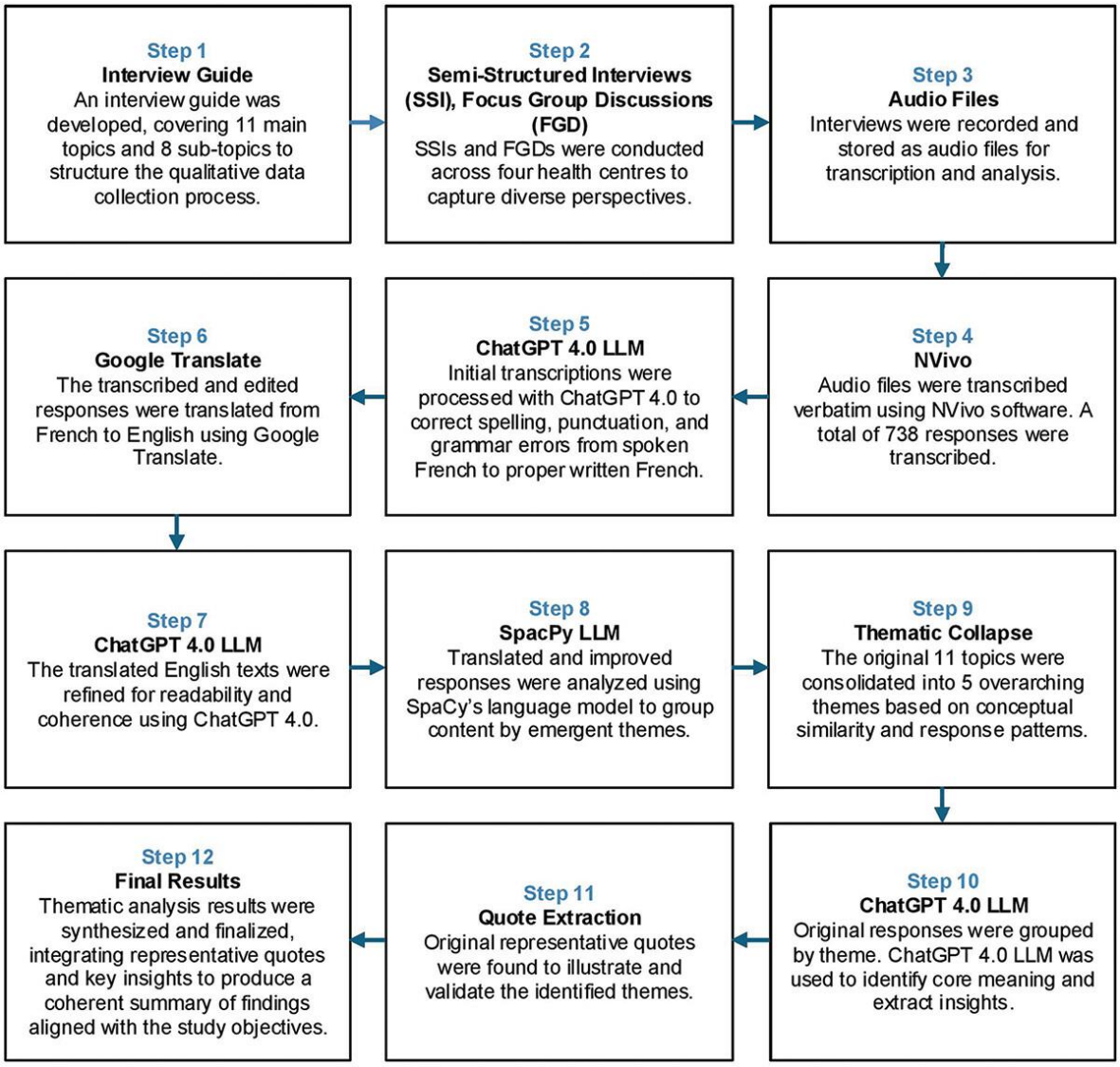

Figure 3. Workflow for qualitative data analysis: from data collection to thematic synthesis

Based on the interview guide, the ten themes were initially identified, which were further consolidated into five key themes based on the similarity in responses and objectives of study. These themes include the definition of preterm birth (1), the assessment of preterm birth (2), the registration and incidence of preterm births (3), the challenges encountered in preterm birth management (4) and improvement in preterm birth care (5) **(Figure 4)**. The full thematic analysis of all ten themes can be found in the supplementary material.

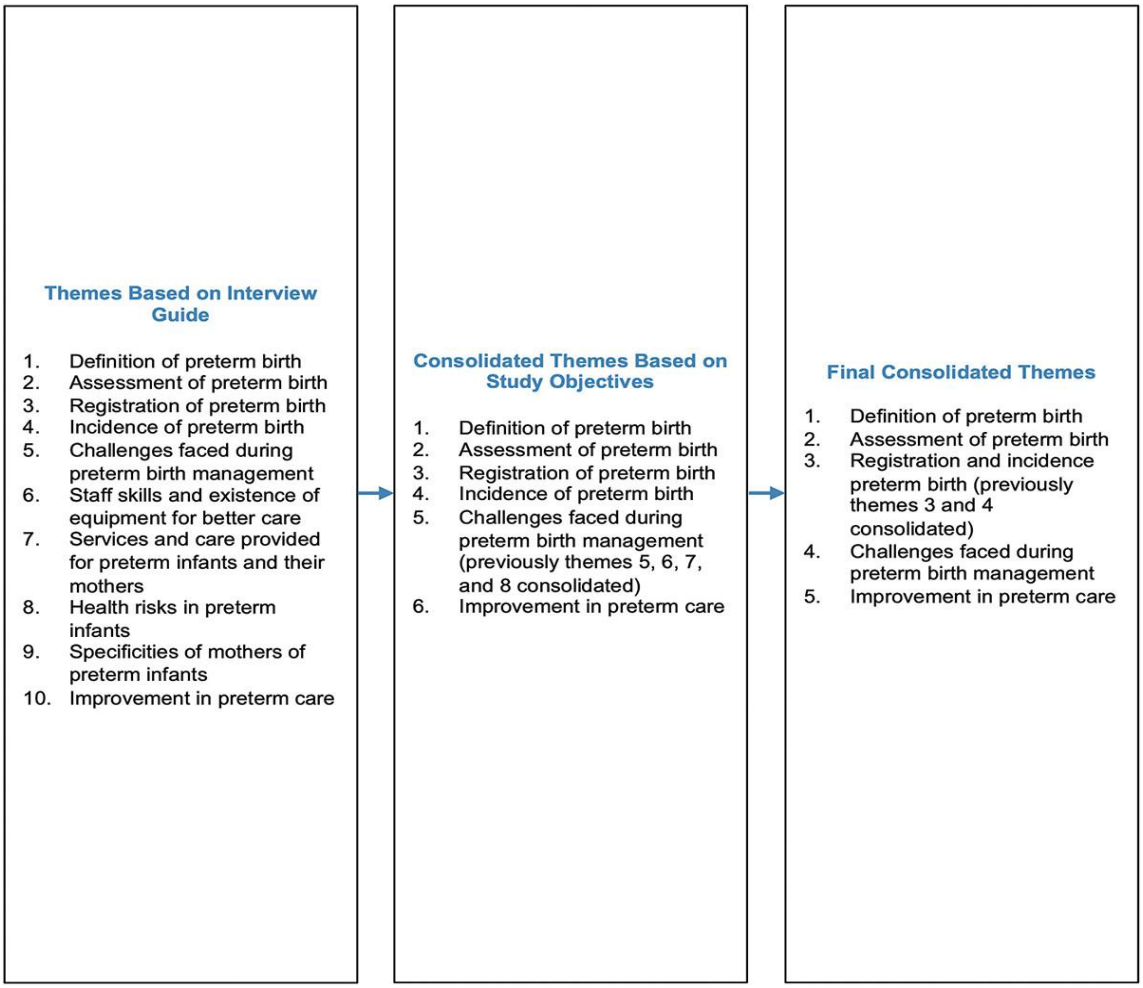

Figure 4. Selection of themes

Ethical considerations

Approval for this study was obtained from the Comité d'Éthique Institutionnel de Recherche en Sciences de la Santé (CEIRES) at the Institut de Recherche en Sciences de la Santé (IRSS), Direction Régionale de l'Ouest (protocol R021–2024/CEIRES, dated 06/10/2024). Researchers ensured that participants' identities and responses remained confidential and anonymous throughout the study.

Informed consent

Before participation, all healthcare workers were briefed on the study's goals and procedures. Verbal consent was collected from each participant, which was deemed appropriate given the conversational nature of the interviews and focus groups. This method helped create a relaxed environment for open discussion while ensuring participants clearly understood their role in the study. Audio recordings were made of all verbal consents for documentation and ethical accountability.

Results and Discussion

Analysis of the data initially generated ten themes, which were later consolidated into five major themes that captured the most prominent ideas from participant responses and aligned with the study's objectives.

Understanding of preterm birth

Participants identified two main ways to define a preterm birth: gestational age and newborn weight. Most agreed that delivery occurring between 28 and 37 weeks of gestation is considered preterm. One experienced gynaecologist explained, "Pregnancies under 36 weeks are treated as preterm." Another added, "Here, preterm births are usually defined between 28 and 37 weeks of amenorrhea."

In cases where gestational age was unknown, birth weight was used as an alternative indicator, although thresholds varied between facilities. One gynaecologist said, "We also look at fetal weight; if it is below 2 kilograms, we often consider the birth preterm, but age remains our main reference." A CSPS nurse noted, "Typically, preterm babies weigh under 2.5 kilograms, so we include weight as a supporting measure." Thus, birth weight serves as a secondary check, especially in settings where precise dating of pregnancy is difficult.

Approaches to estimating preterm birth

Gestational age methods

Last menstrual period (LMP)

Estimating gestational age using LMP was reported to be challenging because many women cannot recall the exact date of their last cycle. Limited literacy often complicates this further, making accurate tracking difficult. One midwife shared, "Most women remember only approximate months or link their periods to cultural or seasonal events, like Ramadan or the harvest, rather than exact dates."

Healthcare workers observed that LMP-based estimates often rely on rough approximations rather than precise information. A CSPS nurse explained, "Women generally provide a month, plus or minus a few weeks, so the exact day is rarely known." While tools like the Gestogram can help calculate gestational age from LMP, their usefulness depends entirely on the accuracy of the woman's recall. As one midwife noted, "Gestogram results are only as reliable as the information women provide about their last period."

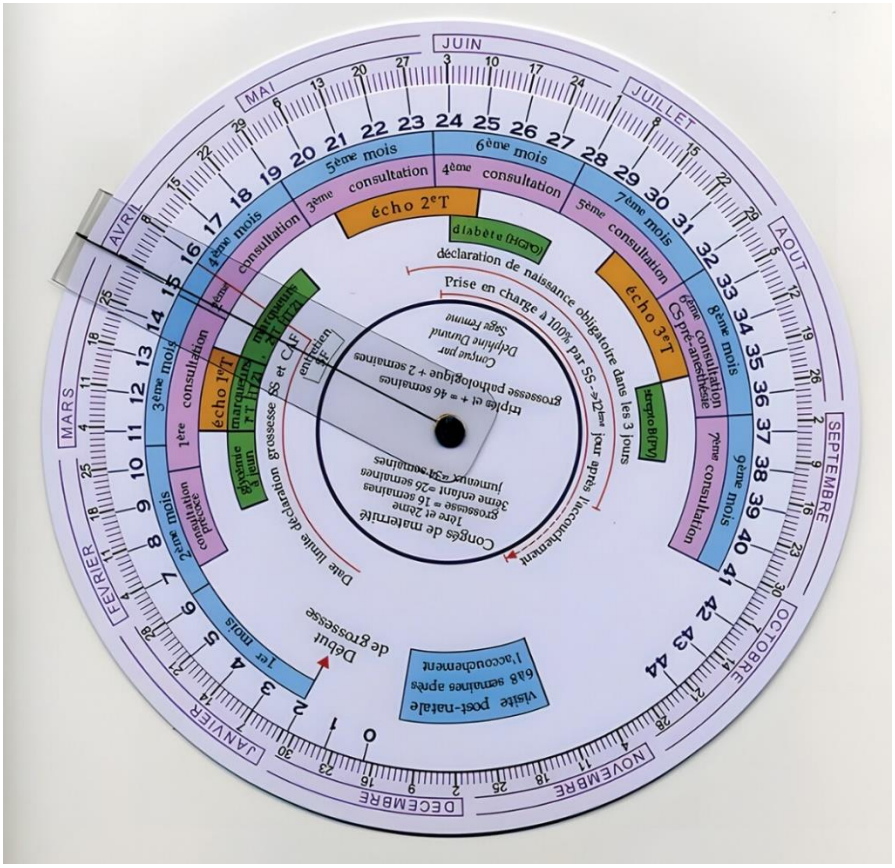

Figure 5. Gestogram

Participants reported that many women begin antenatal care relatively late, often during the second trimester, which complicates accurate gestational age calculation based on the last menstrual period (LMP). This practice diverges from World Health Organization guidelines that recommend early pregnancy visits. One midwife explained, "In this area, most women start prenatal visits around three months, following traditional customs,

although WHO suggests they attend as soon as they suspect pregnancy." Similarly, a gynaecologist noted, "Typically, women only come around five months into pregnancy. First-trimester checkups are rare unless there is a complication."

Ultrasound

Ultrasound, especially during the first trimester, was acknowledged by participants as the most accurate method for determining gestational age. However, most women only undergo ultrasound if early complications arise. A maternity manager said, "Few women arrive with an ultrasound already performed; it usually happens only if there were issues early in pregnancy."

Cost was consistently raised as a barrier to widespread ultrasound use. Healthcare providers described that many patients cannot afford routine scans, leading them to rely on alternative approaches. A maternity unit manager stated, "Financial constraints mean ultrasound cannot always be our first option." This illustrates the tension between clinical precision and patients' economic limitations, which often necessitates the use of other methods such as fundal height measurement.

Fundal height measurement

When LMP data is missing, fundal height measurement is frequently used as an alternative method. An obstetrics health officer described their procedure: "We add 4 cm to the measured fundal height until the seventh month, 3 cm in the seventh month, and 2 cm in the eighth month. For instance, if the fundal height is 20 cm, adding 4 cm gives approximately 24 weeks of gestation."

Some staff also referenced pre-prepared correlation tables to standardize estimations when LMP is unknown. As one gynaecologist explained, "We consult tables that link fundal height to gestational age."

Participants emphasized that fundal height should be combined with clinical evaluation because maternal body type or fetal position can affect measurements. A midwife explained, "Before using fundal height to estimate gestational age, we confirm the pregnancy is in the second trimester by checking if the mother has started feeling fetal movements, which usually begin then." These additional clinical checks were seen as important for improving the accuracy of gestational age assessments.

Preferences for gestational age assessment methods

Healthcare providers expressed differing opinions on which approaches should take priority when estimating gestational age.

Early ultrasound preference

A recurring view among respondents was that early ultrasounds, particularly those performed before 12 weeks of gestation, provide the most reliable dating of pregnancies. One physician with two years' experience managing a CSPS explained, "When an ultrasound is available from the first twelve weeks, we prioritize it above all else." The preference for early ultrasound reflects its recognized precision, which decreases as pregnancy progresses. Nonetheless, participants acknowledged that both cost and limited access often restrict the routine use of ultrasound.

Using the last menstrual period

Several participants emphasized the value of using the LMP when available. One medical doctor overseeing a CMA for three years stated, "We begin by asking the woman about her last menstrual period. The gestogram helps calculate gestational age, adding two weeks for maturation." A midwife added that knowing the LMP represents "the ideal scenario" for estimating gestational age. However, participants noted the challenge of obtaining accurate recall from women and indicated that when LMP information is uncertain, practitioners frequently rely on alternative methods.

Fundal height measurement

Fundal height remains widely used, particularly where ultrasound is inaccessible. Respondents highlighted its limitations, including the influence of maternal body composition and amniotic fluid volume. A gynaecologist with 13 years of experience remarked, "Fundal height can be affected by many factors, such as the amount of amniotic fluid." Another obstetric officer added, "A woman's body size also affects fundal height measurements. In obese women, locating the uterus can even be difficult." Despite these limitations, fundal height continues to be a practical solution in low-resource settings. A medical doctor with three years at a CMA explained, "In rural areas, fundal height is our main tool because ultrasound is unavailable."

These findings underscore the diversity of gestational age assessment methods, each with advantages and constraints. While early ultrasound is the most accurate,

its limited accessibility compels reliance on LMP and fundal height measurements in many contexts.

Documentation and preterm birth incidence

Participants described how preterm births are typically recorded in facility birth registers. At primary health centres (CSPS), many respondents—including maternity managers and nurses—confirmed that registers contain sections for gestational age, birth weight, and preterm status. One obstetric officer explained, "We record whether a birth is preterm, the gestational age, and the number of low birth weight infants, specifying if they are preterm."

By contrast, some higher-level facilities, such as CMAs, lacked registers specifically dedicated to preterm births. A CMA maternity manager with nine years of experience noted, "There isn't a specific register for preterm births. Ideally, these details should appear in the birth register."

The inclusion of preterm birth data in monthly reports also varied. One CSPS doctor with two years of experience said, "Our monthly reports don't always include preterm births; we usually only count total deliveries." In contrast, a midwife with 11 years of experience reported consistent documentation: "Yes, prematurity details are included in our monthly activity reports."

Estimates of preterm birth frequency were also inconsistent. A primary health centre officer estimated, "About 5 to 10% of monthly deliveries are preterm." Another midwife added, "The number varies—some months we have two preterm cases, other months none." These discrepancies reveal challenges in accurately recording and reporting preterm births, resulting in uncertainty and potentially unreliable data for planning and resource allocation.

Challenges in preterm birth care

Difficulties in data collection

Healthcare providers reported multiple obstacles affecting the accurate recording and classification of preterm births. A maternity officer with nine years of experience at a CMA described the issue: "When preparing monthly reports, tracing prematurity is difficult because it isn't explicitly recorded in the register. We can identify low birth weight babies under 2,500 grams, but we don't have enough information to distinguish preterm from growth-restricted infants." This points to a major gap in routine data collection, where critical indicators such as gestational age at birth are often missing.

In addition, limitations in current reporting systems make it challenging to quantify preterm births reliably. One CSPS doctor noted, "Our monthly reports show total births, but not how many were preterm. Determining that requires reviewing each birth individually, checking gestational age, weight, and other clinical details." These accounts highlight structural shortcomings in the district's statistical systems, suggesting that current preterm birth figures may be incomplete or inaccurate for decision-making and planning.

Shortages of resources and equipment

Preterm infants often need specialized care to address complications such as hypothermia, respiratory distress, and infections. A gynaecologist with 13 years at a CMA emphasized, "Preterm babies are extremely fragile, with breathing difficulties, temperature regulation issues, and high infection risk. They require close monitoring and careful treatment."

However, participants consistently reported serious shortages of essential resources, including incubators, kangaroo mother care units, and critical medications. A CSPS maternity officer explained, "We face major challenges due to a lack of proper care resources. Without kangaroo care units or incubators, managing hypothermia and other complications is very difficult."

Insufficient facility capacity often forces transfers to higher-level hospitals. One midwife stated, "We cannot provide adequate care for preterm infants on-site, so we send them to CHU hospitals for specialized support, like incubators and infection prevention." Transfers, however, introduce additional problems. A CSPS obstetric officer described, "Even when we evacuate, hospitals like Souro Sanou, despite having incubators, are often overcrowded, and infants sometimes return with only prescriptions." These limitations directly jeopardize preterm infants' survival prospects.

Sociocultural and socioeconomic barriers

Parental attitudes frequently affect preterm care. Respondents reported that families often resist or refuse referrals for higher-level care. A CSPS maternity officer observed, "Parents sometimes refuse because they doubt the survival of preterm babies. They worry about time, travel, and disruption to their daily lives."

Socioeconomic factors, such as maternal malnutrition and limited prenatal care, were also linked to preterm births. An experienced midwife noted, "Poor maternal

nutrition, often tied to low socioeconomic status, can contribute to premature delivery."

Stigma surrounding preterm births adds further complications. A CSPS doctor explained, "Being premature still carries stigma, which can be emotionally painful for mothers. It may lead to feelings of rejection or social isolation." These findings suggest that improving preterm care requires culturally sensitive interventions that address medical needs, reshape social perceptions, reduce stigma, and build trust among families and communities.

Advancing the care of preterm births

Within this theme, three interconnected subthemes emerged.

Increasing community awareness and preventive practices

Participants consistently highlighted community awareness as a cornerstone for lowering rates of preterm births. They emphasized that maternal and neonatal health outcomes are shaped not only by medical interventions but also by socio-behavioral factors. Early initiation of antenatal care, nutritional support, and regular pregnancy monitoring were frequently mentioned as essential practices. As one midwife explained, *"Raising awareness is fundamental. Women need to begin antenatal visits early, take iron supplements, follow a healthy diet, and attend follow-up appointments. With better awareness, we can reduce premature births."*

Beyond general health promotion, respondents underlined the importance of detecting and treating maternal conditions such as urinary tract infections and malaria, both known local drivers of preterm labor. This illustrates a move toward risk-based antenatal care, adapted to local health challenges. A midwife with two years of practice noted, *"We need to address women's problems as early as possible. Timely detection and treatment of infections like malaria and urinary tract infections can prevent premature deliveries or late miscarriages."*

Health education also emerged as a central strategy for empowering women, especially in recognizing warning signs during pregnancy. A physician with three years' experience in managing the CMA stated, *"We don't just provide routine care—we also teach mothers about red flags such as severe abdominal pain, bleeding, or intense headaches, which could indicate premature labor."*

Respondents further expanded the discussion to include psychosocial stressors, citing domestic violence, paternity denial, and financial hardship as hidden contributors to stress-induced prematurity. This reflects the need to integrate social and cultural considerations into maternal health. As one midwife put it, *"Issues like domestic disputes or denial of paternity can cause stress that triggers premature births ... Counseling, especially encouraging husbands to be supportive, is very important."*

Another barrier identified was the stigma surrounding prematurity, which can prevent timely and appropriate care. To address this, participants recommended community-wide education. A midwife shared, *"There's increasing understanding of the needs of premature babies ... When we advise, especially older family members like mothers-in-law, they often follow the guidance carefully."*

Strengthening technical capacity and resources

A second major area of concern centered on the inadequacy of health facility infrastructure and medical resources. Respondents repeatedly called for the establishment of dedicated neonatology units at district and referral hospitals, pointing to the gap between the complexity of preterm care and the limited resources available. As one experienced gynecologist stressed, *"To improve care for premature babies, we need neonatology units staffed with pediatricians, along with stronger infrastructure, more personnel, and better-trained teams at the CMA."*

Participants described chronic shortages of essential equipment—radiant warmers, oxygen supplies, suction devices, and nasogastric tubes—particularly in primary facilities. These deficiencies were reported to have direct and often severe impacts on newborn survival and long-term outcomes. A midwife with more than a decade of experience emphasized, *"We need better resuscitation equipment—heating lamps, oxygen, suction machines. Nasogastric tubes are especially important, but they're scarce and costly."*

Ongoing training and knowledge sharing

Participants highlighted continuous professional development as essential for improving preterm care. Many noted that the skills required for managing preterm newborns are often not reinforced after initial training, particularly for midwives in rural or underserved areas.

As one midwife explained, “Ongoing training is crucial because the skills we need aren’t used daily.”

Knowledge dissemination was seen as both necessary and challenging. Frequent staff turnover in many facilities threatens the retention of institutional knowledge. In this context, peer-to-peer learning and structured knowledge-sharing were considered vital. One midwife with two years of experience commented, “When we train health staff, it’s important that they pass on what they’ve learned to colleagues who didn’t attend. This ensures that knowledge remains accessible and care remains consistent.”

Respondents also emphasized the importance of nationally coordinated training programs. Fragmented or ad-hoc initiatives were viewed as insufficient for sustainable improvement. A midwife with five years of experience stated, “Addressing training for prematurity is more effective when organized at the national level. Regular refresher courses should be planned for existing staff.”

Some participants suggested linking training to retention strategies. For example, staff could commit to serving a set number of years after receiving training, or priority could be given to local staff more likely to remain in the area. One midwife noted, “We could implement a policy where trained staff agree to stay for a few years, or focus on training local personnel who are more likely to remain at the center.”

Collectively, these strategies—community engagement, infrastructure improvement, and ongoing capacity-building—highlight practical ways to strengthen neonatal care in resource-limited settings, promoting more resilient and context-sensitive health systems.

This study provides an in-depth look at the diagnosis and management of preterm births in urban health centres in Burkina Faso, drawing on four main themes: the definition of preterm birth, assessment methods, registration and incidence, and challenges encountered in care. These findings offer a detailed picture of the practices and obstacles faced by healthcare providers in this context.

Gestational age emerged as the primary criterion for defining preterm birth, typically ranging between 28 and 37 weeks of gestation. This aligns with Burkina Faso’s midwifery training programs [17] and prior research [18], and partially follows WHO guidelines defining prematurity as birth before 37 completed weeks [19]. Birth weight was also used as a secondary criterion, contributing to variability in defining preterm birth. These discrepancies underscore the importance of standardizing definitions and providing consistent training to ensure uniform identification, documentation, and management of preterm births.

Respondents preferred early ultrasounds, particularly those conducted before 12 weeks, as the most accurate dating method. This preference is supported by evidence that ultrasound precision declines as pregnancy advances [20-22]. Nevertheless, geographic, financial, and technological barriers limit early ultrasound access, with many women in resource-limited settings receiving late or no scans [23]. For example, only 23% of women in Cameroon underwent a first-trimester ultrasound [24]. These gaps highlight the need for targeted interventions to improve access to precise gestational dating, which could significantly enhance preterm care and neonatal outcomes.

Although early ultrasound is preferred, the last menstrual period (LMP) remains valuable when available [25]. It simplifies gestational age estimation and allows tools like gestograms to be used [25, 26]. However, LMP-based estimates are prone to inaccuracies due to recall errors, delayed antenatal visits, irregular cycles, or atypical implantation bleeding. In such cases, fundal height measurement is frequently used, despite limitations influenced by maternal body type, multiple pregnancies, and amniotic fluid volume. Accuracy improves with repeated measurements [27, 28]. The reliance on fundal height in low-resource settings highlights the importance of adaptable, context-sensitive methods. Integrating clinical assessments and patient reports is crucial, especially when early ultrasounds are unavailable, emphasizing the need for comprehensive approaches to prenatal care in resource-constrained environments.

Recording preterm births varies widely between health centres, which makes it difficult to gather accurate data. While most facilities include preterm births in their registers, the level of detail differs, and monthly reports often do not specify whether births were premature. This inconsistency makes it hard to assess preterm birth rates on a larger scale. It is also challenging to separate preterm infants from babies who are small for other reasons, such as growth restriction. Many centres do not have dedicated systems for monitoring prematurity, so staff often have to manually check records to extract the relevant information. Estimates of preterm birth rates range from 5% to 10% per month, but these numbers fluctuate and are often unreliable. Creating separate registers for preterm births has been suggested as a way to improve

data collection and make tracking more accurate. Similar difficulties with inconsistent reporting have been reported in both high-income and low-income countries, especially in settings where health information systems are underdeveloped [8, 29, 30]. Standardized reporting and record-keeping could help improve accuracy and strengthen maternal and newborn care.

Preterm births are a serious public health issue due to their frequency and the risks involved [7, 8]. A key barrier is the lack of essential equipment and medicines. Incubators, kangaroo care units, and life-saving medications are often unavailable, forcing healthcare providers to transfer babies to higher-level facilities. Such transfers can delay care and are complicated by overcrowding in referral hospitals. Medication shortages make managing infections and other complications even harder, reflecting systemic supply chain problems [31]. Addressing these gaps requires investment in neonatal care infrastructure, staff training, and reliable supply chains to improve outcomes for preterm infants.

Parents' concerns also create challenges. Some families are reluctant to transfer premature babies to advanced facilities, fearing that the child may not survive or worried about the time and cost involved. Infections are frequently cited as contributing to prematurity, adding to the difficulty of care when medicines are limited [32]. Preterm babies need specialized care for conditions like hypothermia and breathing difficulties, but many centres can only manage healthier infants. Training staff in neonatal care and providing appropriate equipment, such as for Kangaroo Mother Care, is essential to reduce risks [33].

Socioeconomic factors, such as poor maternal nutrition and financial hardship, were consistently mentioned as causes of preterm birth, reflecting patterns seen elsewhere in sub-Saharan Africa [34]. Stigma around prematurity also affects families, leading to social isolation or reluctance to seek care. Similar issues have been reported in Ethiopia and Malawi, where misunderstandings about preterm birth negatively affect maternal and newborn support [35]. Addressing these challenges requires not only better clinical care but also community education to reduce stigma, promote healthy practices, and encourage families to follow medical advice. Tackling both healthcare and social barriers is essential for improving the survival and well-being of preterm infants.

Community engagement emerged as an important factor for both preventing and identifying conditions that can lead to preterm birth. Respondents highlighted the need for early initiation of antenatal care (ANC), improved maternal nutrition, and education on warning signs during pregnancy. These priorities echo earlier studies that link timely ANC and women's empowerment with lower risks of prematurity and better newborn outcomes [36, 37].

In light of the shortage of neonatal equipment, participants suggested locally feasible strategies to improve care despite limited infrastructure. One recurring proposal was the creation of specialized neonatal units within district and referral hospitals. These units would be staffed with trained paediatricians and equipped with basic but essential tools, including radiant warmers, oxygen concentrators, and nasogastric tubes. Such recommendations reflect international guidelines advocating for decentralizing neonatal services to bring specialized care closer to communities [38, 39].

Another central theme was the importance of continuous professional training. Since neonatal care is not part of everyday practice in many facilities, refresher courses were seen as essential for maintaining provider skills. This view aligns with evidence showing that well-designed in-service training—especially those combining theory and practical exercises—can improve both clinical performance and infant survival [40, 41].

Taken together, the findings suggest that improving care for preterm infants in Burkina Faso requires a layered approach. At the community level, awareness campaigns should address prevention, early detection, and stigma. At the facility level, better infrastructure, standardized provision of essential equipment, and strengthened infection control are necessary. At the workforce level, sustainable training, supervision, and retention policies are crucial for long-term improvements.

A striking observation was the mismatch between the higher prematurity rates reported by health centres and the lower prevalence estimated using the AMANHI algorithm. This gap likely reflects an overestimation linked to reliance on non-ultrasound methods of gestational dating. In many facilities, only a minority of women access ultrasound, leaving health workers dependent on less precise tools like last menstrual period (LMP) recall or fundal height measurements. Estimates derived from late-pregnancy ultrasounds, such as those used in the AMANHI algorithm, are therefore more reliable. These findings point to the need for wider integration of ultrasound-based dating into routine prenatal care to reduce misclassification, improve

surveillance data, and strengthen public health planning in urban Burkina Faso.

Limitations of the study

This study has some limitations. As with all in-depth interviews, there is a risk of desirability bias, where respondents shape their answers according to what they believe the interviewer expects. To minimize this, an independent interviewer with no ties to the local health system was engaged.

The qualitative analysis also used a relatively new NLP-based approach, which is not yet widely applied in health research. To safeguard validity, the process combined computational coding with established qualitative methods such as triangulation, saturation, and manual theme extraction.

Another limitation is the variability in responses, reflecting the diversity of professional roles and experiences of the participants. This made it difficult to directly compare perspectives across interviews. Furthermore, the interpretation of themes may have been influenced by selective emphasis, potentially amplifying certain viewpoints while underrepresenting others. As a result, some aspects of the findings may not capture the full spectrum of perspectives.

Conclusion

This study sheds light on the multifaceted nature of gestational age estimation and the difficulties surrounding preterm birth management in urban health centres in Burkina Faso. While gestational age remains the principal marker for identifying prematurity, the limited access to early ultrasound—the most reliable tool for pregnancy dating—poses a major challenge. In practice, health workers often depend on alternatives such as last menstrual period recall or fundal height measurement, both of which are prone to error. These inaccuracies not only risk misclassifying preterm births but also undermine the reliability of public health statistics and the quality of neonatal care.

The study also highlights wide variations in how preterm births are documented across facilities, with inconsistent recording systems hindering data consolidation and weakening both clinical decision-making and public health planning. Addressing these shortcomings will require standardized approaches to gestational age assessment, expanded access to affordable ultrasound services—potentially through subsidies or external support—and the establishment of clear documentation protocols dedicated to prematurity. Such measures would enable more accurate identification of preterm infants, better targeted clinical interventions, and improved overall care.

At the same time, the conclusions drawn from this work should be interpreted cautiously. As with all qualitative research, the findings reflect subjective experiences and are shaped by the diversity of professional perspectives, leaving room for selection and interpretation biases that may limit generalizability. Future studies could strengthen this evidence base by evaluating complementary postnatal dating tools, such as the Ballard score, to support antenatal assessments.

Despite these limitations, the recommendations arising from this research remain highly relevant. Enhancing the accuracy of gestational age data will help policymakers allocate resources more effectively, leading to better-equipped neonatal services, stronger medication supply systems, and more targeted preventive strategies. Taken together, such improvements hold the potential to substantially reduce preterm-related mortality and morbidity in Burkina Faso and other low-resource settings.

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