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Antenatal Risk Assessment for Preterm Birth: Summary Guidance for Healthcare Providers

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1 Background Information

About 80% of preterm births (PTB) occur in low- and middle-income countries (LMIC), and the highest rates are seen in sub-Saharan Africa and South-East Asia. This guidance aims to help identify women likely to experience PTB in LMIC settings to help reduce the risk of PTB and improve birth outcomes.

This chapter includes a summary of the following five key areas of guidance relevant to pregnancy care for PTB:

- Demographics and Patient History (Sect. 2.1, 3.1).
- Pregnancy Dating (Sect. 2.2, 3.2).
- Infection (Sect. 2.3, 3.3).
- Nutrition (Sect. 2.4, 3.4).
- Alcohol, Tobacco and Other Substance Use (Sect. 2.5, 3.5).

For discussion of the in-depth evidence on each of these key areas, please see Chapters "Prenatal Risk Assessment for Preterm Birth in Low-Resource Settings: Demographics and Obstetric History" to "Evaluating Alcohol, Tobacco and Other Substance Use in Pregnant Women".

The pregnancy booking (registration) visit affords the healthcare professional an opportunity to assess a pregnant woman's risk of PTB, among other potential adverse pregnancy outcomes. Although many of the following areas may be

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routinely enquired about during antenatal booking and registration in most contexts, the information is seldom used to identify the risk of PTB.

2 Evidence Statements

2.1 Demographics/Patient History

There is evidence of increased risk of PTB when mothers are either very young or very old, of black ethnicity or have a low maternal body mass index (BMI) (see Sect. 2.4).

PTB is multifactorial, sometimes related to health and lifestyle factors (such as nutrition (see Sect. 2.4) and smoking (see Sect. 2.5). Social circumstances must be taken into account, not only as a PTB risk but also in terms of helping to ensure appropriate access to care.

Domestic abuse is an evidence-based risk factor of PTB. Women with a previous history of spontaneous PTB or mid-trimester miscarriage, particularly when this occurs before 32 weeks, are also at high risk of PTB.

Other PTB risk factors which identify women that should ideally receive further risk assessment and specialist care include women who have had a previous caesarean section at full cervical dilatation and women with congenital uterine abnormalities.

2.2 Pregnancy Dating

Accurate pregnancy dating enables a diagnosis of preterm labour and birth to be made. This can ensure timely provision of obstetric interventions in appropriate healthcare settings for the management of complications of pregnancy and birth such as foetal growth abnormalities.

Pregnancy dating can be challenging. Women may not remember their last menstrual period, and menstrual cycle lengths may vary because of lactation following a recent previous baby (Chapter “Pregnancy Dating Guidance”).

Clinical palpation may not be accurate because of excess maternal weight, foetal growth restriction, uterine fibroids or foetal malpresentation often associated with high parity. Late presentation to pregnancy booking makes estimation of pregnancy duration more difficult.

Accuracy of pregnancy dating varies depending on the duration of the pregnancy at the time of presentation.

2.3 Infection Screening (See Chapter "Prenatal Risk Assessment for Preterm Birth in Low-Resource Settings: Infection")

Some maternal infections are associated with an increased risk of PTB; infections are estimated to contribute to between 40% and 50% of all PTB. High rates of maternal bacterial and viral infections are reported in LMIC settings compared to high-income settings.

Early diagnosis and treatment of HIV has been shown to reduce mother-to-child vertical transmission and horizontal transmission to unaffected sexual partners.

2.4 Nutrition

Both high and low BMI, as well as nutrient deficiencies, can have implications for PTB risk, as well as for pregnancy outcomes in general. Access to a well-balanced diet can represent a challenge for pregnant women in LMICs.

Iron and folic acid (and calcium in specific contexts) are necessary supplements for pregnancy in general, as well as having potential benefits for reducing the risk of PTB (iron and calcium).

Low-certainty evidence links some other nutrient deficiencies, such as zinc, to PTB outcomes, but the value of routine supplementation over and above a healthy diet is questioned. However, specific LMIC contexts where dietary zinc is low may benefit from supplementation.

2.5 Alcohol, Tobacco and Other Substance Use

Substance use disorder during pregnancy is a critical public health concern. The most widely used substances globally in pregnancy include tobacco, alcohol, cannabis, opioids and cocaine, but other illicit substances may also be consumed.

Use of alcohol, smoking, and other psychoactive substances during pregnancy leads to an increased risk of health problems for mother and child such as spontaneous abortion, PTB (see Chapter "Evaluating Alcohol, Tobacco and Other Substance Use in Pregnant Women"), stillbirth, low birth weight and birth defects. Concurrent use of these substances (i.e. using more than one) along with other psychosocial factors further increases the risk of adverse outcomes in all settings.

Despite gaps in current knowledge, the potential benefits of the recommended actions (see Sect. 3.5) outweigh the harms (see Chapter "Evaluating Alcohol, Tobacco and Other Substance Use in Pregnant Women").

3 Risk Assessment and Recommended Interventions

To enable formal evaluation and assessment of a woman's risk of PTB and to signpost the woman to appropriate care, the healthcare worker assessing the pregnant woman at booking and subsequently should systematically assess the following:

3.1 Risk Assessment: Demographics/Patient History

Risk of PTB is higher for pregnant women older than 40 and for adolescents. Maternal BMI (< 19Kg/m^2 is a risk factor for PTB) should be derived from maternal weight and height (see Sect. 3.4 below).

Recommended intervention: Document maternal age, weight and height.

Previous history of PTB or mid-trimester miscarriage is important as the earlier the pregnancy stage (gestation) of the previous PTB, the higher the risk of recurrence: women whose prior pregnancy ended between 16 and 20 weeks have a risk of having another PTB even higher than those for whom previous PTB occurred after 20 weeks of pregnancy. Short pregnancy interval (less than 6 months), previous cervical surgery, and intrapartum caesarean section at full cervical dilatation, which can damage the fibres of the cervix in the region of the cervical internal os, can increase the risk of PTB.

Recommended intervention: Document past obstetric history. Those deemed to be at high risk of PTB should be provided general advice as well as referred, where possible, to a specialist able to undertake further evaluation and management of risk. Specialised care, where resources permit and evidence of effectiveness exists, may include serial cervical scanning, cervical cerclage or progesterone supplementation.

3.2 Pregnancy Dating

Accurate pregnancy dating should be established. In early pregnancy, a reliable last menstrual period (LMP) can be confirmed by the foetal crown-rump length (CRL) if ultrasound is readily accessible. In the case of a difference of more than 1 week between estimated dates by LMP and CRL, the expected date of delivery indicated by the ultrasound CRL is more reliable. After the first trimester, foetal biometry using a formula (an algorithm that assesses BPD/HC/FL) may be employed if ultrasound is readily available. If ultrasound is not available and LMP is unknown, clinical assessment of the uterine fundal height (the symphysiofundal height) can be employed pending confirmation by ultrasound. Foetal biometric estimation of gestational age after 20–24 weeks is further improved if the transcerebellar distance can be employed either singly or with femur length assessment to estimate the

duration of a clinically advanced pregnancy >20 weeks' gestation. When pregnancy duration has been estimated by the best and earliest possible modality, this should not be changed by foetal size estimates at later gestation.

Recommended intervention: Document pregnancy dating at clinic visits. See Chapter "Pregnancy Dating Guidance" for more information, including a flow diagram to guide the dating of the pregnancy process.

Enquiring about social circumstances can help ensure access to personalised care. In particular, information on domestic abuse should be sensitively and tactfully sought to offer psychosocial support and safeguarding as available per local protocols.

Recommended interventions: Document social history. Patients with vulnerable social circumstances and other markers (e.g. low BMI, domestic abuse) related to lack of maternal wellbeing may lead to both pregnancy risks and also signal challenges in access to care. Women should be referred to local support services available (psychosocial support, social services) as well as be highlighted for ongoing special support by an identified caregiver.

3.3 Risk Assessment: Infection

Healthcare workers should determine the context-specific risk of infections linked to PTB, to inform testing and management as follows:

Urinary Tract Infections (UTI): UTIs and progression to pyelonephritis are risk factors for PTB.

Recommended intervention: A midstream urine specimen (MSU) should be collected from all women at the antenatal booking clinic. Point of care dipstick testing should be undertaken, and if there is evidence of infection from history or from the dipstick test, treatment should be instituted per clinical protocols, preferably also informed with sensitivities from MSU where laboratory culture is available.

Bacterial Vaginosis (BV)

Recommended intervention: Routine screening is NOT recommended for asymptomatic BV. For symptomatic BV, pregnant women should be asked about any changes to odour or consistency of vaginal discharge and/or vaginal itching.

Syphilis, HIV and Hepatitis B

Recommended intervention: Routine blood testing should be offered to all women at the booking clinic for syphilis, HIV and hepatitis B and treatment offered as per local protocols.

Malaria

Recommended intervention: In contexts where malaria infection occurs, a blood sample for malarial parasite investigation should be sent at booking and intermittent presumptive therapy offered as per local protocols.

3.4 Risk Assessment and Recommended Intervention: Nutrition

Maternal BMI should be calculated at the booking and subsequent appointments.

Recommended intervention (context-specific): If BMI is <19 kg/m2 or nutrition deficiencies detected in undernourished populations:

- Balanced energy and protein dietary supplementation are recommended for pregnant women (shown to reduce the risk of stillbirths and SGA but may also improve PTB risk).
- Zinc supplementation for low dietary levels may reduce the risk of PTB; however, further research is required.

Knowledge of and access to a well-balanced diet should be assessed during pregnancy.

Recommended intervention: Nutrition education (access to a well-balanced diet is advised above and beyond specific micronutrient supplementation) and exercise advice is recommended for healthy pregnancy outcomes in general.

Screening for iron deficiency anaemia should be done early in pregnancy and at 28 weeks.

Recommended intervention if no deficiency: Standard care consisting of iron (daily oral iron with 30 mg to 60 mg of elemental iron) and folic acid (daily folic acid supplementation with 400 μg (0.4 mg)) to improve general pregnancy outcomes, not specifically for PTB.

If anaemia prevalence in pregnant women is <20%, an alternative regimen of intermittent oral iron and folic acid with 120 mg of elemental iron and 2800 g (2.8 mg) of folic acid once weekly can be offered.

Recommended intervention if deficiency detected: If a woman is diagnosed with anaemia during pregnancy, her daily elemental iron should be increased to 120 mg until her haemoglobin concentration rises to normal (110 g/L or higher).

In a context where calcium deficiency may exist, patients with low dietary levels of calcium should be identified (risk of pre-eclampsia).

Recommended intervention: Daily calcium supplementation (1.5–2.0 g oral elemental calcium) for populations with low dietary calcium intake (to reduce the risk of pre-eclampsia). NOTE: Iron and calcium supplements should preferably be administered several hours apart to minimise interactions that reduce their absorption.

In populations at risk of vitamin D deficiency: patients with potentially low levels should be detected, due to risk for pregnancy outcomes in general. In the UK, for example, this includes women with darker skin (such as those of African, African–Caribbean or South Asian family origin) or women who have limited exposure to sunlight, who may usually be covered or housebound.

Recommended intervention: Vitamin D supplementation may be recommended for populations at risk of deficiency to improve general pregnancy outcomes, but routine supplementation is not proven to reduce the risk of PTB.

3.5 Risk Assessment: Alcohol, Tobacco and Other Substance Use

Sensitive and non-judgemental approaches to enquiry about alcohol, smoking (and exposure to second-hand smoke) and other substance use (past and present) are recommended.

Recommended intervention: Document substance use disorder. The presence of family members during maternal health checks may act as a barrier to full disclosure. Effort should be made to address fears of confidentiality. Screening and referral to local services (psychosocial interventions, detoxification and pharmacological treatment) were available.

Smoking and Second-Hand Exposure to Smoke

Recommended intervention: Advice on protection from second-hand smoke in pregnancy (homes and public places). Brief intervention and more intensive psychosocial interventions per local protocols. Pharmacological interventions (Nicotine Replacement Therapy (NRT)) according to local protocols.

Suggested Readings (More References in Chapters 3–7).

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