Questionnaire on Knowledge, Perception and Dietary Practice of Iron-Absorption Modulation among Pregnant Women Attending Antenatal Care in Ogun State, Nigeria

Structured, interviewer-administered questionnaire (English version)

About this instrument

This questionnaire was adapted, and not reproduced, from previously published sources. Its structure follows the Food and Agriculture Organization (FAO) guidelines for assessing nutrition-related knowledge, attitudes and practices; the knowledge items were adapted from published instruments on iron-deficiency anaemia and iron-rich food intake; the dietary-practice items were adapted from published dietary-assessment guidance; and the perception items were framed on Health Belief Model constructs. Item wording and content were refined using findings from the qualitative phase of the study, reviewed by subject experts, translated into Yoruba with back-translation, and pre-tested (see main manuscript, Methods). The questionnaire was administered by trained interviewers in English or Yoruba, according to the respondent's preference.

Interview details

Respondent ID	
Health facility	☐ Oke-Ilewo PHC ☐ Obada PHC ☐ Kugba PHC
Date of interview	
Interviewer ID	
Language of interview	☐ English ☐ Yoruba

Informed consent statement (read to the respondent before the interview): You are invited to take part in a study on what pregnant women know and do about foods that help or reduce the body's absorption of iron, and on anaemia in pregnancy. Taking part is voluntary, your name will not be written on this form, your answers will be kept confidential, and you may stop at any time without any effect on the care you receive. A small finger-prick blood sample will be taken to measure your haemoglobin. Written informed consent (or thumbprint) is recorded separately.

Section A: Sociodemographic and economic characteristics

A1. What is your age group (years)?

- ☐ Below 20
- ☐ 20–24
- ☐ 25–29
- ☐ 30–34
- ☐ 35 and above

A2. What is your marital status?

- ☐ Married
- ☐ Single
- ☐ Other

A3. What is the highest level of education you have attained?

- ☐ No formal education
- ☐ Primary
- ☐ Secondary
- ☐ Tertiary

A4. What is your religion?

- ☐ Christianity
- ☐ Islam
- ☐ Other

A5. What is your ethnic group?

- ☐ Yoruba
- ☐ Igbo
- ☐ Other

A6. What is your occupation?

- ☐ Artisan
- ☐ Business
- ☐ Professional
- ☐ Petty trading
- ☐ Housewife
- ☐ Unemployed
- ☐ Other

A7. What is your average monthly household income?

- ☐ Less than ₦20,000
- ☐ ₦20,000–50,000
- ☐ ₦51,000–99,000
- ☐ ₦100,000–200,000
- ☐ More than ₦200,000

A8. Health facility attended (record from interview details above).

- ☐ Oke-Ilewo PHC
- ☐ Obada PHC
- ☐ Kugba PHC

Section B: Obstetric and medication history

B1. In which trimester of pregnancy are you?

- ☐ First (up to 3 months)
- ☐ Second (4–6 months)
- ☐ Third (7–9 months)

B2. How many children have you previously delivered?

- ☐ None (first pregnancy)
- ☐ 1–2 children
- ☐ 3 or more children

B3. How many babies are you carrying in this pregnancy?

- ☐ One (singleton)
- ☐ Twins
- ☐ Three or more
- ☐ Don’t know

B4. Do you have any longstanding medical condition?

- ☐ No
- ☐ Yes

B5. How often do you take your iron/folate tablets (haematinics)?

- ☐ Never
- ☐ 1–3 times a week
- ☐ 4–6 times a week
- ☐ Every day

B6. How many doses of anti-malaria preventive medication have you taken in this pregnancy?

- ☐ None
- ☐ Once
- ☐ Twice
- ☐ Three times
- ☐ More than three times

B7. How many times have you taken deworming medication in this pregnancy?

- ☐ None
- ☐ Once
- ☐ Twice

Section C: Knowledge of anaemia and dietary modulation of iron absorption

Read each statement to the respondent and tick True, False or Don't know. Items C1 to C3 are single questions; items C4 to C11 each contain five statements.

C1. Do you know how to prevent anaemia?

- ☐ Yes
- ☐ No

C2 and C3. Tick True, False or Don't know for each statement.

Statement	True	False	Don't know
C2. Anaemia is a condition of low red blood cells due to poor nutrition.	☐	☐	☐
C3. Anaemia during pregnancy cannot be prevented.	☐	☐	☐

C4. Causes of anaemia. Which of the following can cause anaemia?

Statement	True	False	Don't know
Infections	☐	☐	☐
Excessive sunlight exposure	☐	☐	☐
Eating too little	☐	☐	☐
Not drinking enough tea	☐	☐	☐
Heavy menstrual bleeding	☐	☐	☐

C5. Signs and symptoms. Which of the following are signs or symptoms of anaemia?

Statement	True	False	Don't know
Tiredness	☐	☐	☐
Fever	☐	☐	☐
Dizziness	☐	☐	☐
Vomiting	☐	☐	☐
Paleness (pallor)	☐	☐	☐

C6. Groups at risk. Which of the following are at higher risk of anaemia?

Statement	True	False	Don't know
Girls below 18 years	☐	☐	☐
People with low family income	☐	☐	☐
People with a family history of anaemia	☐	☐	☐
People not using iron supplements	☐	☐	☐
People with a low level of education	☐	☐	☐

C7. Complications. Which of the following can result from anaemia?

Statement	True	False	Don't know
Increased susceptibility to disease	☐	☐	☐
Having a very big baby	☐	☐	☐
Risk of maternal death	☐	☐	☐
Premature delivery	☐	☐	☐
Delayed mental development of the infant	☐	☐	☐

C8. Prevention. Which of the following can help to prevent anaemia?

Statement	True	False	Don't know
Sleeping well	☐	☐	☐
Taking iron/folic acid tablets regularly	☐	☐	☐
Drinking tea with meals	☐	☐	☐
Eating vitamin C-rich foods with meals	☐	☐	☐
Eating iron-rich foods	☐	☐	☐

C9. Sources of easily absorbed (heme) iron. Which of the following are sources of easily absorbed iron?

Statement	True	False	Don't know
Organ meat	☐	☐	☐
Green leafy vegetables	☐	☐	☐
Insects	☐	☐	☐
Flesh meat	☐	☐	☐
Beans	☐	☐	☐

C10. Inhibitors of iron absorption. Which of the following reduce the absorption of iron from food?

Statement	True	False	Don't know
Tea	☐	☐	☐
Coffee	☐	☐	☐
Milk	☐	☐	☐
Alcohol	☐	☐	☐
Tomatoes	☐	☐	☐

C11. Enhancers of iron absorption. Which of the following improve the absorption of iron from food?

Statement	True	False	Don't know
Tea	☐	☐	☐
Orange	☐	☐	☐
Milk	☐	☐	☐
Tomatoes	☐	☐	☐
Pineapple	☐	☐	☐

Section D: Perception towards dietary modulation of iron absorption

Perception items are based on Health Belief Model constructs (perceived susceptibility, perceived severity, and attitudes towards preparing and eating iron-rich foods). Tick one response for each item.

D1. How likely do you think you are to be anaemic in this pregnancy?

- ☐ Unlikely
- ☐ Not sure
- ☐ Likely

D2. How serious do you think anaemia (low blood) is in pregnancy?

- ☐ Not serious
- ☐ Somewhat serious
- ☐ Very serious

D3. Preparing iron-rich food is good for a pregnant woman.

- ☐ Disagree
- ☐ Not sure
- ☐ Agree

D4. It is easy for me to prepare iron-rich meals.

- ☐ Disagree
- ☐ Not sure
- ☐ Agree

D5. I am confident that I can prepare iron-rich meals.

- ☐ Disagree
- ☐ Not sure
- ☐ Agree

D6. I like the taste of iron-rich foods.

- ☐ Disagree
- ☐ Not sure
- ☐ Agree

Section E: Dietary practice related to modulation of iron absorption

E1. Behavioural practices

E1.1. Do you take alcoholic drinks?

- ☐ Yes
- ☐ No

E1.2. When do you usually eat citrus fruit (for example, orange) in relation to your main meals?

- ☐ During a meal or soon after a meal
- ☐ Before a meal
- ☐ Between meals, well apart from meals
- ☐ I do not eat citrus fruit

E1.3. Do you habitually take tea or coffee?

- ☐ Yes
- ☐ No

E1.4. If yes to E1.3: How long before or after a meal do you usually take tea or coffee?

- ☐ With the meal
- ☐ Less than 1 hour before or after the meal
- ☐ 1 hour to less than 2 hours before or after the meal
- ☐ At least 2 hours before or after the meal
- ☐ Not applicable (does not take tea or coffee)

E2. Food frequency checklist

How often do you eat or drink each of the following foods?

Food	Never	Less than once a week	Once a week	2–5 times a week	Every day
Iron-absorption-enhancing fruits					
Orange	☐	☐	☐	☐	☐
Tangerine	☐	☐	☐	☐	☐
Watermelon	☐	☐	☐	☐	☐
Pawpaw	☐	☐	☐	☐	☐
Pineapple	☐	☐	☐	☐	☐
Iron-rich animal-source foods					
Meat	☐	☐	☐	☐	☐
Offal	☐	☐	☐	☐	☐
Fresh fish	☐	☐	☐	☐	☐
Chicken	☐	☐	☐	☐	☐
Egg	☐	☐	☐	☐	☐
Iron-absorption-inhibiting dairy products					
Evaporated milk	☐	☐	☐	☐	☐
Powdered milk	☐	☐	☐	☐	☐
Cheese (wara)	☐	☐	☐	☐	☐

Section F: Haemoglobin measurement

To be completed by the laboratory/health worker after a finger-prick capillary blood sample measured with a point-of-care digital haemoglobinometer. Not asked of the respondent.

Haemoglobin concentration (g/dl)	
Haematocrit (%)	
Anaemia status (WHO 2011, pregnancy)	☐ Not anaemic (≥ 11.0 g/dl) ☐ Mild (10.0–10.9 g/dl)
	☐ Moderate (7.0–9.9 g/dl) ☐ Severe (< 7.0 g/dl)

Scoring guide and answer key

Knowledge (Section C)

Correct answers are shown below. “Don’t know” and wrong answers are scored as incorrect. C1 to C3 are single items scored 1 mark each for a correct response. C4 to C11 each earn 1 mark when three or more of the five statements are answered correctly. Maximum score = 11, converted to a percentage and categorised as poor (< 50%), moderate (50–74%) or good (≥ 75%).

Item	Correct response
C1	Yes
C2	True
C3	False
C4	Infections: True; Sunlight: False; Eating too little: True; Not drinking enough tea: False; Heavy menstrual bleeding: True
C5	Tiredness: True; Fever: False; Dizziness: True; Vomiting: False; Paleness: True
C6	All five statements: True
C7	Disease susceptibility: True; Very big baby: False; Maternal death: True; Premature delivery: True; Delayed infant mental development: True
C8	Sleeping well: False; Iron/folic acid: True; Tea with meals: False; Vitamin C-rich foods with meals: True; Iron-rich foods: True
C9	Organ meat: True; Green leafy vegetables: False; Insects: True; Flesh meat: True; Beans: False
C10	Tea: True; Coffee: True; Milk: True; Alcohol: False; Tomatoes: False
C11	Tea: False; Orange: True; Milk: False; Tomatoes: True; Pineapple: True

Perception (Section D)

Each of the six items is scored on a 3-point scale (1 to 3; aggregate range 6–18), with higher scores denoting a more favourable perception (D1: Unlikely = 1, Not sure = 2, Likely = 3; D2: Not serious = 1, Somewhat serious = 2, Very serious = 3; D3–D6: Disagree = 1, Not sure = 2, Agree = 3). The aggregate is re-expressed as a percentage of the achievable range. Scores below 50% are classified as negative perception and 50% or above as positive perception; scores were also categorised as poor (< 50%), moderate (50–74%) or good (≥ 75%).

Dietary practice (Section E)

Favourable-practice scores are summed, expressed as a percentage of the maximum obtainable score, and categorised as poor (< 50%), moderate (50–74%) or good (≥ 75%). Favourable responses: E1.1, no alcohol; E1.2, citrus fruit during or soon after a meal; E1.3, does not habitually take tea or coffee; E1.4, tea or coffee taken at least 2 hours before or after a meal. Food frequency: more frequent consumption of enhancer fruits and iron-rich animal-source foods, and less frequent consumption of inhibiting dairy products, is favourable.

Anaemia classification (Section F)

World Health Organization (2011) thresholds for pregnancy: not anaemic ≥ 11.0 g/dl; mild 10.0–10.9 g/dl; moderate 7.0–9.9 g/dl; severe < 7.0 g/dl.