

CLINICAL SCENARIO

Phototherapy & Lightmeter 1

NAME: _____ DATE: _____

PURPOSE: Teaching / Practice
 Test Result: Pass / Fail / Retest

Scenario Overview

A 7-day old baby weighing 1.3 kg is jaundiced. The participant should assess the baby and the severity of jaundice using a Kramer chart, commence phototherapy, monitor the baby during therapy, and stop treatment when appropriate.

Reminder to Facilitator

Facilitator team to decide what is essential for participants' understanding; we suggest facilitator team underline or mark these essential items in the **INFORMATION/RESULT** column before beginning the session to ensure these are highlighted in that section.

ALWAYS REMEMBER THE CANDIDATE SHOULD START WITH THE 4 Ss

Safety of the staff and patient

Setting for the environment and patient

Stimulate the patient for response

Shout for help

Begin Scenario

SETTING THE SCENE: A 2-day old baby weighing 1.4 kg appears to be jaundiced. **WHAT DO YOU DO?**

#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
1	Observe safety	Gloves/sharps	
2	(Setting) place the baby on a bed/resuscitation couch and stimulate	The baby is alert and able to suck but is obviously jaundiced	
3	Call for help	No need for help at present	
4	Open the airway (neutral position) and Look, Listen and Feel for breathing	<ul style="list-style-type: none">The airway is clearThe breathing is regular and normal rate	
5	Check for other signs of respiratory distress: Head nodding Crackles Grunting Nasal flaring Cyanosis Respiratory rate Pulse oximetry Indrawing / acidotic breathing	Normal, the baby is not pale	
6	Disability	The baby is active and sucking	
7	Please assess the level of jaundice There is no transcutaneous bilirubinometer or bilispec, what do you do?	<ul style="list-style-type: none">Compare with levels on the Kramer's scale wall chart: use the right graph for the age in days and the gestational age (i.e., premature)The baby's face and trunk are yellow	
8	Please explain to the mother what you plan to do and why	Tell mother: <ul style="list-style-type: none">Baby is jaundiced and blue light on the skin will help clear the jaundiceIt is not painful	

continue to the following page 

#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
9	Now please set up the phototherapy device How high above the cot should the phototherapy lights be placed?	This distance should not be greater than 50 cm (20 in) and can be less (down to 10 cm) provided the infant's temperature is monitored	
10	Please turn the phototherapy lights on You have a radiance reader, what should it read?	Reading should be in the range of 460-490 nm	
11	Please prepare the baby to be put under the phototherapy lights	<ul style="list-style-type: none"> • Ensure baby will remain warm • Place eye protective bandage on baby • Undress baby leaving only a nappy on • Place baby under the lights 	
12	What advice will you give the mother?	Tell mother to continue feeding and can remove baby from under the lights to do so	
13	What will you ask the mother and what will you look for during an examination?	<ul style="list-style-type: none"> • Is the baby feeding well? • Is the baby floppy or active? • Is the cord clean, any discharge, any smell or redness? • Any pallor, respiratory difficulties? 	
14	The baby appears active and pink and mother says is on NG feeds. Now, how often will you check on the baby?	4 hourly	
15	At the 4-hour check the baby does not look more yellow. When will you recheck bilirubin?	After 12 hours	
16	What side effects will you look out for?	<ul style="list-style-type: none"> • Dehydration • Bronzed skin appearance • Abnormal movements • Hypocalcaemia (rare and reversible) 	
17	When will you stop the phototherapy?	When the bilirubin level is within the normal range for age and gestation	
18	After stopping phototherapy, will you recheck the bilirubin?	Yes, after 12 hours	

THANK YOU

i REMIND PARTICIPANTS:

- One must first assess the baby's ABCD. (any problem identified must be dealt with before continuing)
- Any jaundice on day one needs urgent investigation and treatment
- ABO or Rhesus incompatibility may cause haemolysis and rapid
- Take the temperature, if above or below normal consider sepsis and look for focus of infection, do FBC, Hb, LP, and blood culture if possible, consider antibiotics

DISCUSS RISK FACTORS FOR THE DEVELOPMENT OF SEVERE HYPERBILIRUBINEMIA AND KERNICTERUS, SUCH AS:

- Isoimmune haemolytic disease
- Glucose-6-phosphate deficiency
- Asphyxia
- Significant lethargy
- Temperature instability
- Sepsis
- Acidosis
- Hypoalbuminemia (< 3 g/dL)

! INFECTION PREVENTION AND CONTROL

Be sure to wash your hands thoroughly and to put on gloves before handling the baby or any equipment. After every use, remember to disinfect all consumables and equipment before using them again.

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i REFERENCE LEVELS FOR WHEN TO START PHOTOTHERAPY:

Kramer's Scale

1	4 - 6 mg/dL
2	8 - 10 mg/dL
3	12 - 14 mg/dL
4	15 - 18 mg/dL
5	15 - 20 mg/dL



Day of life	Healthy term baby		Preterm < 35 weeks, LBW	
	mg/dl	mmol/L	mg/dl	mmol/L
Day 1	Treat any visible jaundice with phototherapy			
Day 2	15	260	10	170
Day 3	18	310	15	260
Day 4	20	340	17	290

! For the VLBW start phototherapy when the total serum bilirubin level is greater than 5 times the birth weight. Thus, in a 1-kg infant, phototherapy is started at a bilirubin level of 5 mg/dL; in a 2-kg infant, phototherapy is started at a bilirubin level of 10 mg/dL and so on.

i REFERENCES:

- Maisel MJ, McDonagh AD. Phototherapy for Neonatal Jaundice. *N Engl J Med.* 2008;358:920-928. Phototherapy for Jaundice: Background, Indications, Contraindications, <https://emedicine.medscape.com/article/1894477-overview>, May 2018
- Maisels MJ, Bhutani VK, Bogen D, Newman TB, Stark AR, Watchko JF. Hyperbilirubinemia in the Newborn Infant \geq 35 Weeks' Gestation: An Update With Clarifications *Pediatrics* Oct 2009, 124 (4) 1193-1198. How is phototherapy administered for the treatment of neonatal, <https://www.medscape.com/.../how-is-phototherapy-administered-for-the-treatment-of...>, 27 Dec 201

Scenario end

CLINICAL SCENARIO

Phototherapy & Lightmeter 2

NAME: _____ DATE: _____

PURPOSE: Teaching / Practice
 Test Result: Pass / Fail / Retest

Scenario Overview

A 1-day old baby weighing 3 kg is jaundiced. The participant should assess the baby, identify anaemia and hypoglycaemia, investigate the cause, and treat (includes IV glucose, compatible blood transfusion, and phototherapy). Complications of treatment should be understood. Kernicterus is discussed.

Reminder to Facilitator

Facilitator team to decide what is essential for participants' understanding; we suggest facilitator team underline or mark these essential items in the **INFORMATION/RESULT** column before beginning the session to ensure these are highlighted in that section.

ALWAYS REMEMBER THE CANDIDATE SHOULD START WITH THE 4 Ss

Safety of the staff and patient

Setting for the environment and patient

Stimulate the patient for response

Shout for help

Begin Scenario

SETTING THE SCENE: A 1-day old baby weighing 3 kg appears to be jaundiced. **WHAT DO YOU DO?**

#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
1	Observe safety	Gloves/sharps	
2	(Setting) place the baby on a bed/resuscitation couch and stimulate	The baby is drowsy and unable to suck but is obviously jaundiced	
3	Call for help	Help is on the way	
4	Open the airway (neutral position) and Look, Listen and Feel for breathing	<ul style="list-style-type: none">The airway is clearThe breathing is regular, RR is 80 b/minHR is 200 bpm	
5	Check for other signs of respiratory distress: Head nodding Crackles Grunting Nasal flaring Cyanosis Respiratory rate Pulse oximetry Indrawing / acidotic breathing	<ul style="list-style-type: none">No indrawing, no head nodding, no cyanosis, no cracklesThe baby is extremely paleGive O₂ 1 L/min	
6	Please check circulation and cord	<ul style="list-style-type: none">The pulse is rapid and weak, the hands are cold, capillary refill cannot be measured as baby is too paleThe cord tie has not slippedGroup and Xmatch Gp 0 Rhesus neg bloodGive 5 mL/kg packed cells and reviewCheck mother's blood groupConsider FBC, B culture, VDRL	
7	Please explain to the mother what you plan to do and why	Tell mother: <ul style="list-style-type: none">The baby is pale and needs a blood transfusionBaby is jaundiced and blue light on the skin will help clear the jaundice. It is not painful	

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#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
8	Disability	<ul style="list-style-type: none"> • AVPU = P • Do blood glucose = 2 mmol/L • Give IV 10% glucose 2 mL/kg 	
9	<p>Please do a full exam to look for any reasons for jaundice</p> <p>Consider Rhesus or ABO incompatibility, what do you do?</p>	<ul style="list-style-type: none"> • Check the cord for infection • Check temperature • Do appropriate tests 	
10	<p>Please assess the level of jaundice</p> <p>The baby is jaundiced on the face, what do you treat?</p>	<ul style="list-style-type: none"> • Severity of jaundice is assessed by Kramer's scale, S Bilirubin or transcutaneous bilirubinometer • Day-one jaundice needs urgent treatment • Considerable risk of kernicterus and permanent brain damage 	
11	Please explain to the mother what you plan to do and why	<p>Tell mother:</p> <ul style="list-style-type: none"> • Baby is jaundiced and blue light on the skin will help clear the jaundice • It is not painful 	
12	<p>Now please set up the phototherapy device</p> <p>How high above the cot should the phototherapy lights be placed?</p>	This distance should not be greater than 50 cm (20 in) and can be less (down to 10 cm) provided the infant's temperature is monitored	
13	<p>Please turn the phototherapy lights on</p> <p>You have a radiance reader, what should it read?</p>	Reading should be in the range of 460-490 nm	
14	Please prepare the baby to be put under the phototherapy lights	<ul style="list-style-type: none"> • Ensure baby will remain warm • Place eye protective bandage on baby • Undress baby leaving only a nappy on • Place baby under the lights 	
15	Why must the eyes be covered?	The light can damage the eyes	
16	What advice will you give the mother?	Tell mother to continue feeding and can remove baby from under the lights to do so	
17	How often will you check on the baby?	4 hourly	
18	How often will you recheck the bilirubin level and the Hb?	If bilirubin appears to be rising rapidly check after 4 hours, otherwise check every 12 hours until stable	
19	What else do you check?	Blood glucose	
20	The baby is not sucking. What do you do?	Place an NGT for expressed milk or an IV for 10% glucose (2 mL/kg 10%)	
21	At the 4-hour check the baby does not look more yellow. When will you recheck bilirubin?	After 12 hours	
22	What side effects will you look out for?	<ul style="list-style-type: none"> • Dehydration • Bronzed skin appearance • Abnormal movements • Hypocalcaemia (rare and reversible) 	
23	When will you stop the phototherapy?	When the bilirubin level is within the normal range for age and gestation	
24	After stopping phototherapy, will you recheck the bilirubin?	Yes, after 12 hours	

THANK YOU

continue to the following page 

i REMIND PARTICIPANTS:

- One must first assess the baby's ABCD. (any problem identified must be dealt with before continuing)
- Any jaundice on day one needs urgent investigation and treatment
- ABO or Rhesus incompatibility may cause haemolysis and rapid
- Take the temperature, if above or below normal consider sepsis and look for focus of infection, do FBC, Hb, LP, and blood culture if possible, consider antibiotics

DISCUSS RISK FACTORS FOR THE DEVELOPMENT OF SEVERE HYPERBILIRUBINEMIA AND KERNICTERUS, SUCH AS:

- Isoimmune haemolytic disease
- Glucose-6-phosphate deficiency
- Asphyxia
- Significant lethargy
- Temperature instability
- Sepsis
- Acidosis
- Hypoalbuminemia (< 3 g/dL)

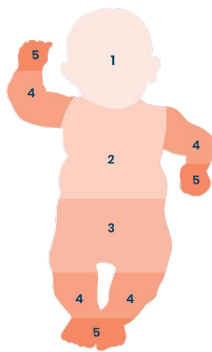
! INFECTION PREVENTION AND CONTROL

Be sure to wash your hands thoroughly and to put on gloves before handling the baby or any equipment. After every use, remember to disinfect all consumables and equipment before using them again.

i REFERENCE LEVELS FOR WHEN TO START PHOTOTHERAPY:

Kramer's Scale

1	4 - 6 mg/dL
2	8 - 10 mg/dL
3	12 - 14 mg/dL
4	15 - 18 mg/dL
5	15 - 20 mg/dL



Day of life	Healthy term baby		Preterm < 35 weeks, LBW	
	mg/dl	mmol/L	mg/dl	mmol/L
Day 1	Treat any visible jaundice with phototherapy			
Day 2	15	260	10	170
Day 3	18	310	15	260
Day 4	20	340	17	290

! For the VLBW start phototherapy when the total serum bilirubin level is greater than 5 times the birth weight. Thus, in a 1-kg infant, phototherapy is started at a bilirubin level of 5 mg/dL; in a 2-kg infant, phototherapy is started at a bilirubin level of 10 mg/dL and so on.

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Scenario end

CLINICAL SCENARIO

Phototherapy & Lightmeter 3

NAME: _____ DATE: _____

PURPOSE: Teaching / Practice
 Test Result: Pass / Fail / Retest

Scenario Overview

A 3-day old baby weighing 1.3 kg is drowsy and jaundiced. The participant should assess the baby and the severity of jaundice, check the blood glucose, provide phototherapy, and monitor during treatment. Underlying causes of jaundice should be investigated.

Reminder to Facilitator

Facilitator team to decide what is essential for participants' understanding; we suggest facilitator team underline or mark these essential items in the **INFORMATION/RESULT** column before beginning the session to ensure these are highlighted in that section.

ALWAYS REMEMBER THE CANDIDATE SHOULD START WITH THE 4 Ss

Safety of the staff and patient

Setting for the environment and patient

Stimulate the patient for response

Shout for help

Begin Scenario

SETTING THE SCENE: A 3-day old baby weighing 1.4 kg appears to be jaundiced. **WHAT DO YOU DO?**

#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
1	Observe safety	Gloves/sharps	
2	(Setting) place the baby on a bed/resuscitation couch and stimulate	The baby is drowsy, able to suck but is obviously jaundiced	
3	Call for help	Help is on the way	
4	Open the airway (neutral position) and Look, Listen and Feel for breathing	<ul style="list-style-type: none"> The airway is clear The breathing is regular, RR is 76 b/min HR is 170 bpm 	
5	Check for other signs of respiratory distress: Head nodding Crackles Grunting Nasal flaring Cyanosis Respiratory rate Pulse oximetry Indrawing / acidotic breathing	<ul style="list-style-type: none"> Some indrawing, no head nodding, no cyanosis, no crackles SpO₂ is 93% The baby is extremely pale Give O₂ 1 L/min 	
6	Please check circulation and mother's blood group	<ul style="list-style-type: none"> The pulse is regular not weak, the hands are cool Capillary refill is 2 seconds No pallor 	
7	Disability	<ul style="list-style-type: none"> AVPU = V Check blood glucose = 7 mmol/L 	
8	Please assess the level of jaundice	<ul style="list-style-type: none"> Use bilirubin levels or compare with levels on the Kramer's scale wall chart: use the right graph for the age in days and the gestational age (i.e., premature) The baby's face and trunk are yellow 	

continue to the following page 

#	ACTION REQUIRED	INFORMATION / RESULT	COMMENTS:
9	Please explain to the mother what you plan to do and why	Tell mother: <ul style="list-style-type: none"> Baby is jaundiced and blue light on the skin will help clear the jaundice It is not painful 	
10	Now please set up the phototherapy device How high above the cot should the phototherapy lights be placed?	This distance should not be greater than 50 cm (20 in) and can be less (down to 10 cm) provided the infant's temperature is monitored	
11	The baby has cool peripheries and the pulse is weak. What do you do next?	<ul style="list-style-type: none"> Look for the cause of the jaundice Take the temperature and vital signs Check the cord for infection: is it clean, any discharge, any smell or redness? Any pallor, respiratory difficulties? 	
12	There is no pallor, the cord is clean, temp is 35.6°C. RR is 80 b/min and there is indrawing What investigations should you do?	<ul style="list-style-type: none"> Blood culture FBC Us & Es Blood glucose 	
13	What treatment should be commenced?	<ul style="list-style-type: none"> IV antibiotics (Pen & Gent) Consider NGT or IV if not sucking well) May have septicaemia 	
14	Please turn the phototherapy lights on You have a radiance reader, what should it read?	Reading should be in the range of 460-490 nm	
15	Please prepare the baby to be put under the phototherapy lights	<ul style="list-style-type: none"> Ensure baby will remain warm Place eye protective bandage on baby Undress baby leaving only a nappy on Place baby under the lights 	
16	What advice will you give the mother?	Tell mother to continue feeding and can remove baby from under the lights to do so	
17	What will you ask the mother and what will you look for during an examination?	<ul style="list-style-type: none"> Is the baby feeding well? Is the baby floppy or active? Is the cord clean, any discharge, any smell or redness? Any pallor, respiratory difficulties? 	
18	The baby appears active and not pale; mother says he is feeding well How often will you check on the baby?	4 hourly	
19	At the 4-hour check the baby does not look more yellow. When will you recheck bilirubin?	After 12 hours	
20	What side effects will you look out for?	<ul style="list-style-type: none"> Dehydration Bronzed skin appearance Abnormal movements Hypocalcaemia (rare and reversible) 	
21	When will you stop the phototherapy?	When the bilirubin level is within the normal range for age and gestation	
22	After stopping phototherapy, will you recheck the bilirubin?	Yes, after 12 hours	

THANK YOU

continue to the following page 

i REMIND PARTICIPANTS:

- One must first assess the baby's ABCD. (any problem identified must be dealt with before continuing)
- Any jaundice on day one needs urgent investigation and treatment
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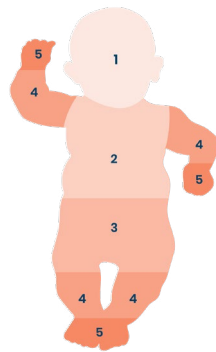
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i REFERENCE LEVELS FOR WHEN TO START PHOTOTHERAPY:

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Day of life	Healthy term baby		Preterm < 35 weeks, LBW	
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Day 4	20	340	17	290

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Scenario end

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Newborn Essential Solutions and Technologies–Education Clinical Scenarios:
Phototherapy & Lightmeter

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