

# Management of neonatal jaundice in primary care

Wan ASL, Mat Daud S, Teh SH, Choo YM, Kutty FM on behalf of Development Group  
Clinical Practice Guidelines Management of Neonatal Jaundice (Second Edition).

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## Authors:

### Angeline Wan Seng Lian

Consultant Neonatologist  
Hospital Pakar Sultanah Fatimah,  
Jalan Salleh Muar, 84000 Muar,  
Johor  
E-mail: angelinewsl@yahoo.com /  
angelinewsl@gmail.com

### Suzaini Mat Daud

Family Medicine Specialist  
Klinik Kesihatan Changloon  
Jitra, Kubang Pasu, 06010  
Changloon, Kedah  
E-mail: drsuz67@yahoo.com.my

### Teh Siao Hean

Consultant Paediatrician  
Hospital Miri, Jalan Cahaya Miri,  
98000 Miri, Sarawak  
E-mail: tehshuan@gmail.com

### Choo Yao Mun

Senior Lecturer & Consultant  
Neonatologist  
Pusat Perubatan Universiti Malaya,  
Lembah Pantai, 59100 Kuala Lumpur,  
Wilayah Persekutuan Kuala Lumpur  
E-mail: yaomun@um.edu.my

### Fazila Mohamed Kutty

Consultant Neonatologist  
Hospital Serdang, Jalan Puchong  
Kajang, 43000 Kajang, Selangor  
E-mail: dfuzzy@gmail.com

## Abstract

The Clinical Practice Guidelines on Management of Neonatal Jaundice 2003 was updated by a multidisciplinary development group and approved by the Ministry of Health Malaysia in 2014. A systematic review of 13 clinical questions was conducted using evidence retrieved mainly from Medline and Cochrane databases. Critical appraisal was done using the Critical Appraisal Skills Programme checklist. Recommendations were formulated based on the accepted 103 evidences and tailored to local setting as stated below.

Neonatal jaundice (NNJ) is a common condition seen in primary care. Multiple risk factors contribute to severe NNJ, which if untreated can lead to adverse neurological outcomes. Visual assessment, transcutaneous bilirubinometer (TcB) and total serum bilirubin (TSB) are the methods used for the detection of NNJ. Phototherapy remains the mainstay of the treatment. Babies with severe NNJ should be followed-up to detect and manage sequelae. Strategies to prevent severe NNJ include health education, identification of risk factors, proper assessment and early referral.

## Introduction

Jaundice is one of the most common conditions, which needs medical attention in newborn babies. It is caused by high levels of bilirubin in the blood. Globally, about 60% of the term babies and 80% of the preterm babies develop jaundice in the first week of life. In most of the babies, early jaundice is physiological and harmless. However, some babies may develop severe jaundice, which can be harmful if left untreated. High levels of bilirubin can lead to brain damage, which may result in neurodevelopmental impairment such as cerebral palsy, and visual and hearing loss. Hence early detection of neonatal jaundice (NNJ) is very important, followed by timely referral and appropriate treatment.

An evidence-based Clinical Practice Guidelines on *Management of Neonatal Jaundice* (Second Edition) was published in 2015, which addresses the management of NNJ in the term and preterm babies excluding prolonged jaundice and conjugated hyperbilirubinaemia.

## Risk factors

Risk factors of severe NNJ are as follows:

- prematurity
- low birth weight
- jaundice in the first 24 hours of life
- mother with blood group O or rhesus negative
- glucose-6-phosphate dehydrogenase (G6PD) deficiency

- rapid rise of total serum bilirubin (TSB)
- sepsis
- lactation failure in exclusive breastfeeding
- high predischARGE bilirubin level
- cephalohaematoma or bruises
- babies of diabetic mothers
- family history of severe NNJ in siblings

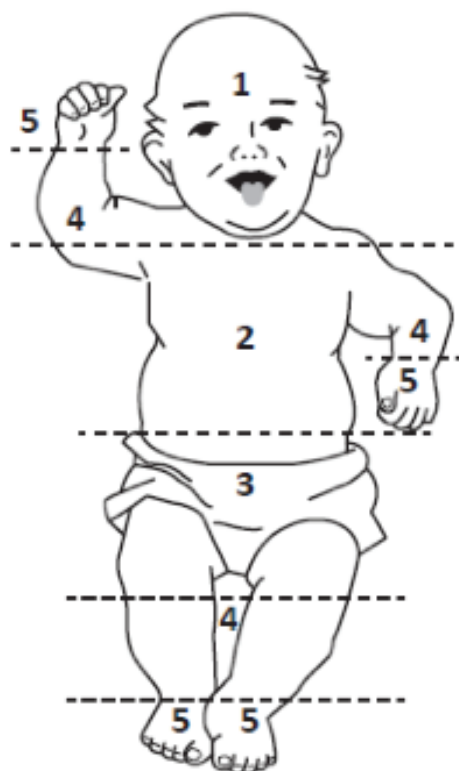
Breastfeeding, because of its benefits, should be continued in babies with jaundice. Adequate lactation/breastfeeding support should be provided to all mothers, particularly those with preterm babies. In jaundice-associated breastfed babies with inadequate intake, excessive weight loss (>10% of birth weight) or dehydration, supplementation with expressed breast milk or formula may be considered. Babies with weight loss >7% of birth weight should be evaluated and closely monitored for jaundice.

## Methods of detection

All babies should be visually assessed for jaundice at every opportunity. Kramer's rule describes the relationship between serum bilirubin levels and the progression of skin discolouration (see **Table 1 and Figure 1**). Trained primary health workers may use this as a screening tool.

**Table 1.** Visual assessment of NNJ (Kramer's rule)

Area of the body	Level	Range of serum bilirubin	
		$\mu\text{mol/L}$	$\text{mg/dL}$
Head and neck	1	68–133	4–8
Upper trunk (above umbilicus)	2	85–204	5–12
Lower trunk and thighs (below umbilicus)	3	136–272	8–16
Arms and lower legs	4	187–306	11–18
Palms and soles	5	$\geq 306$	$\geq 18$

**Figure 1.** Visual assessment of NNJ (Kramer's rule)

The transcutaneous bilirubinometer (TcB) is a hand-held device that measures the amount of bilirubin in the skin. If available, it may be used in the assessment of NNJ. Mean differences between TcB measurements and TSB levels are large when the bilirubin levels exceed 205  $\mu\text{mol/L}$  (12  $\text{mg/dL}$ ).

Visual assessment and TcB should not be used to monitor bilirubin levels in the babies on phototherapy.

TSB measurement is the gold standard for detecting and determining the levels of hyperbilirubinaemia. It is used to confirm the levels of bilirubin detected from visual assessment and TcB as well as to monitor the babies on phototherapy.

### Treatment

Phototherapy is the mainstay of treatment in NNJ. Phototherapy should be commenced when TSB reaches the phototherapy threshold for NNJ (see **Table 2**). Phototherapy thresholds are lower in the preterm and low birth weight babies.

**Table 2.** TSB levels for phototherapy and exchange transfusion (ET) in babies  $\geq 35$  weeks gestation

Age	Low risk ( $\geq 38$ weeks and well)		Medium risk ( $\geq 38$ weeks with risk factors or 35–37 weeks + 6 days and well)		High risk (35–37 weeks + 6 days with risk factors)	
	Conventional phototherapy	ET	Conventional phototherapy	ET	Conventional phototherapy	ET
Hours of life	TSB in $\text{mg/dL}$ ( $\mu\text{mol/L}$ )					
<24*	-	-	-	-	-	-
24	9 (154)	19 (325)	7 (120)	17 (291)	5 (86)	15 (257)
48	12 (205)	22 (376)	10 (171)	19 (325)	8 (137)	17 (291)
72	15 (257)	24 (410)	12 (205)	21 (359)	10 (171)	18.5 (316)
96	17 (291)	25 (428)	14 (239)	22.5 (385)	11 (188)	19 (325)
>96	18 (308)	25 (428)	15 (257)	22.5 (385)	12 (205)	19 (325)

a Start intensive phototherapy at TSB 3  $\text{mg/dL}$  (51  $\mu\text{mol/L}$ ) above the level for conventional phototherapy or when TSB increasing at  $>0.5$   $\text{mg/dL}$  (8.5  $\mu\text{mol/L}$ ) per hour.

b Risk factors are isoimmune haemolytic disease, G6PD deficiency, asphyxia and sepsis.

\* Jaundice appearing within 24 hours of life is abnormal and needs further evaluation.

ET should be considered when TSB reaches the threshold levels in NNJ (see **Table 2**).

There is limited good evidence on the use of pharmacotherapy (clofibrate, intravenous immunoglobulin, human albumin and phenobarbitone) and complementary medicine in NNJ.

### Referral

Babies should be referred for phototherapy if their TSB reaches the phototherapy threshold (see **Table 2**). They should also be referred to the secondary/tertiary care when they are presented with any of the following:

- onset of jaundice within 24 hours of life
- rapidly rising TSB of >6 mg/dL/day (103 µmol/L/day)
- clinical jaundice below umbilicus, corresponding to TSB of 12–15 mg/dL (205–257 µmol/L)
- clinical jaundice till the soles of the feet (urgent referral for possibility of ET)
- G6PD deficiency, if not previously hospitalised
- clinical symptoms/signs suggestive of sepsis

The overall summary on management is shown in the Algorithm on Management of NNJ.

### Long-term follow-up

Severe NNJ may cause acute bilirubin encephalopathy (ABE). Babies with ABE should have long-term follow-up to monitor the neurodevelopmental sequelae (athetoid cerebral palsy, intellectual disability and high-frequency hearing loss).

Babies with severe jaundice [TSB >20 mg/dL (342 µmol/L)] or those who require ETs should have auditory brainstem response (ABR) testing done within the first 3 months of life. If the ABR is abnormal, neurodevelopmental follow-up should be continued.

Healthy babies born at 35 weeks gestation and above with non-haemolytic hyperbilirubinaemia and TSB <25 mg/dL (428 µmol/L) may be followed-up at the primary care level.

### Strategies to prevent severe NNJ

- Antenatal and postnatal strategies include:
  - health education on NNJ
  - identification of risk factors
  - early detection of NNJ
  - proper assessment of babies with NNJ
  - early referral as indicated

- Late preterm, G6PD deficiency and isoimmune haemolytic disease (ABO and rhesus incompatibility) are the important risk factors for developing severe NNJ. Phototherapy thresholds are lower for babies with these risk factors.
- All babies should be screened for G6PD deficiency at birth. If G6PD is deficient, babies should be admitted and monitored for NNJ during the first 5 days of life. If they were discharged earlier, they should be followed-up closely.
- Breastfeeding should be encouraged and adequate lactation support should be provided to all mothers.
- Predischarge screening in hospital using TcB may be considered.

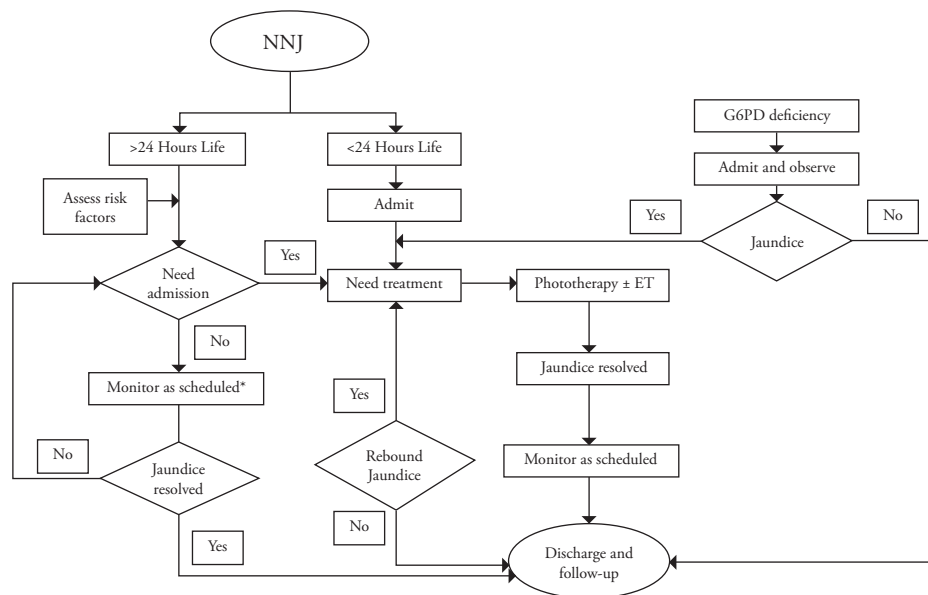
### Information for parents and carers

The following advices are helpful for parents/carers on NNJ:

1. Look for jaundice daily during the first week of life.
2. Check the naked baby for jaundice in bright and preferably natural light, by blanching the skin with gentle finger pressure over the chest.
3. Presence of jaundice needs to be confirmed by healthcare providers; blood tests may be required.
4. Jaundice in the first 48 hours of life needs urgent review by healthcare providers.
5. Continue breastfeeding even if the baby is jaundiced. Contact the healthcare provider for assistance with breastfeeding if needed.
6. Untreated jaundice may lead to deafness and brain damage.
7. Phototherapy is a safe and effective form of treatment for NNJ.
8. Traditional and alternative methods of treating jaundice are unproven and likely to be ineffective.
9. Exposing the baby to sunlight as a form of treatment may be harmful due to dehydration and sunburn.

Details of the evidence supporting the above statements can be found in Clinical Practice Guidelines on the Management of Neonatal Jaundice (Second Edition) 2014, available on the following website: Ministry of Health Malaysia: <http://www.moh.gov.my>; and Academy of Medicine: <http://www.acadmed.org.my>. Corresponding organisation: CPG Secretariat, Health Technology Assessment Section, Medical Development Division, Ministry of Health Malaysia and contactable at [htamalaysia@moh.gov.my](mailto:htamalaysia@moh.gov.my).

Algorithm on Management of Neonatal Jaundice



\* If jaundice persists beyond 14 days in the term babies and 21 days in the preterm babies, further evaluation for prolonged jaundice is needed.