

## Incidence of Neonatal Hyperbilirubinemia based on Their Characteristics at Dr. Hasan Sadikin General Hospital Bandung Indonesia

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### Abstract

**Background:** Hyperbilirubinemia is the most frequent clinical condition that occurs in neonates identified by yellow discoloration of the skin and other tissues. It is caused by elevations of bilirubin level as the effect of increased breakdown of red blood cells, impaired conjugation of indirect bilirubin, and incomplete bilirubin excretion. This study was conducted to describe the characteristics of neonates with hyperbilirubinemia.

**Methods:** This study used descriptive quantitative method which took retrospective data from medical record of neonates with hyperbilirubinemia in 2014. The population of this study was neonates which were born in the perinatology division at Dr. Hasan Sadikin General Hospital, Bandung. The variables collected were gender, gestational age, weight birth, general condition and treatment options. The collected data were tabulated and presented by percentage and in the form of a table.

**Results:** One hundred and seventy four of 230 medical records of neonates with hyperbilirubinemia were collected based on the inclusion criteria. The results showed that 8.04% of 2,531 neonates born at Dr. Hasan Sadikin General Hospital in 2014 suffered from hyperbilirubinemia. Males (56.9%) were higher than females to have hyperbilirubinemia. Neonates born at term gestational age (55.2%) were more likely to have hyperbilirubinemia with low birth weight category (51.7%), healthy general condition (60.4%). The most treatment option was phototherapy (54.6%).

**Conclusions:** Most neonates with hyperbilirubinemia are males, who were born at term gestational age, with low birth weight. Most of the neonates are in healthy general condition and the most common treatment given to neonates is phototherapy.

**Keywords:** Hyperbilirubinemia, neonates, phototherapy

### Introduction

Hyperbilirubinemia is a term of increased bilirubin serum levels based on the laboratory examination.<sup>1</sup> Every year, 65% of the 4 million neonates in the United States suffer from hyperbilirubinemia in the first week of their lives.<sup>2</sup> In Malaysia<sup>3</sup>, 75% of the neonates suffer from hyperbilirubinemia in 1998. In Indonesia<sup>4</sup>, in 2007, incidence of neonatal hyperbilirubinemia varies among several teaching hospitals at Dr. Cipto Mangunkusumo General Hospital, Jakarta reported that there are 58% of hyperbilirubinemia cases from all neonates. Dr. Sardjito General Hospital, Yogyakarta, Central Java revealed

that 38% of newborn neonates suffer from hyperbilirubinemia. Dr. Kariadi General Hospital in Semarang with 22.8% of neonates suffer from hyperbilirubinemia, and Dr. Sutomo General Hospital in Surabaya with 33% of neonates suffer from hyperbilirubinemia.<sup>4</sup>

Most neonates experience increased levels of bilirubin at the first days of life due to a physiological process.<sup>5</sup> This process is influenced by high erythrocytes number, short life of erythrocytes (80–90 days), and immature development of liver during neonatal period.<sup>6,7</sup> Increased levels of indirect bilirubin in neonates cause damage to brain cells and lead to death.<sup>8</sup> Some studies showed that the risk factors of hyperbilirubinemia are maternal gestational

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age, sex, and comorbid diseases including sepsis and asphyxia.<sup>9</sup> Hyperbilirubinemia harms the neonatal condition and causes complications if untreated. Phototherapy, exchange transfusion, and pharmacological therapy are the treatments for neonates with hyperbilirubinemia.<sup>10</sup> The treatments are determined based on the age of the mother's gestation but there are some guidelines for hyperbilirubinemia treatment considering treatment from birth weight.<sup>11</sup>

The aim of the study was to describe the proportions and characteristics of neonates with hyperbilirubinemia at Dr. Hasan Sadikin General Bandung as the West Java Top Referral and Teaching Hospital.

## Methods

This study used descriptive quantitative method and was conducted in October 2015. The data of the neonates with hyperbilirubinemia were obtained through

the medical record retrospectively. Population in this study was all neonates with hyperbilirubinemia and hospitalized in Perinatology Division at Department of Child Health, Dr. Hasan Sadikin General Hospital in the period of January to Desember 2014. This study used total sampling methods. Inclusion criteria for this study were all neonates with hyperbilirubinemia with bilirubin levels >5 mg/dl, born in >32 weeks, and had complete medical record data. Exclusion criterion of this study was patients with incomplete medical record data. The variable in this study were neonates which had bilirubin levels >5 mg/dl, sex, gestational age, birth weight, general condition, and treatment options.

This study was approved by the Health Research Ethics Committee of Dr. Hasan Sadikin General Hospital Bandung number LB.04.01/A05/EC/283/VII/2015. The collected data were presented in percentage and in the form of a table.

**Table Characteristic of Neonates with Hyperbilirubinemia**

Characteristics	Neonates with Hyperbilirubinemia	
	(n)	(%)
Gender		
Male	99	56.9
Female	75	43.1
Gestational Age		
Near-term (34–36 weeks)	38	21.8
Preterm (<37 weeks)	40	23
Aterm(37–41 weeks)	96	55.2
Birth Weight		
High birth weight (>4000 gr)	2	1.1
Normal birth weight (2500–4000 gr)	83	47.7
Low birth weight (<2500 gr)	90	51.7
Very low birth weight (≤1000 gr)	1	0.6
General Condition		
Healthy	105	60.4
Unhealthy	69	39.6
Management		
Phototherapy	95	54.6
Exchange Transfusion	0	0
Pharmacology	0	0
Observation	79	45.4

## Results

The population in this study was 230 neonates, where 174 neonates met the inclusion criteria for this study. The proportion of neonates with hyperbilirubinemia at Department of Child Health, Dr. Hasan Sadikin General Hospital in 2014 was 8.04% in the period of January 2014 to December 2014. The characteristics of neonates with hyperbilirubinemia were described in Table 1.

This study discovered that most of the patients were males. Based on the gestational age, 55,2% neonates were in their normal gestational age, but with low birth weight. Most of the patients were in their healthy condition. Regarding the treatment, most of the patients underwent phototherapy.

## Discussion

The highest number of congenital anomaly. The proportion of neonates with hyperbilirubinemia at Dr. Hasan Sadikin General Hospital in 2014 is 8.04%. This proportion is lower than in 2010.<sup>12</sup> Decreasing number of neonatal hyperbilirubinemia was suspected because of the good implementation of hyperbilirubinemia prevention, such as the breast feeding method for all the neonates and screening of neonates with risk of hyperbilirubinemia in accordance with the guideline published by the American Academy of Pediatrics (AAP).<sup>13</sup>

This study showed that male neonates were more dominant than female neonates. Gender is one of the risk factor in neonatal hyperbilirubinemia.<sup>2</sup> This result was relevant with the study conducted by Onwuanaku CA et al.<sup>14</sup> in Nigeria. A study in The United Kingdom by Tioseco et al.<sup>15</sup>, stated the Y chromosome increases the risk of bilirubin metabolism disorder and damage to enzymes that roles the formation of bilirubin.

Gestational age is one of the risk factors that influence the numbers of hyperbilirubinemia in neonates, hence, this study showed that the incidences of neonates with hyperbilirubinemia were most discovered in born with term gestational age. A study by Bhutani et al.<sup>16</sup> in 2014 mentioned that the newborns with preterm gestational age suffer from hyperbilirubinemia compared to neonates that have term gestational age.<sup>16</sup> This contradictory situation might be explained that the onset of hyperbilirubinemia on premature newborns are more slowly than term neonates. The preterm neonates had

already taken home by their parents and did not undergo the examination at the time of routine control in the hospital where the neonates were born.<sup>17</sup>

Birth weight is one of the characteristics that affect hyperbilirubinemia. In this study, low birth weight neonates placed the highest proportion compared to other groups. This finding was in accordance with a study conducted by Ben et al.<sup>2</sup> The study mentioned that neonates born with weight less than 2,500 grams might have higher bilirubin levels because the liver organs are not mature enough and metabolic enzymes have not worked properly so the bilirubin level will increase.<sup>2</sup>

General condition of neonates with hyperbilirubinemia in this study was healthy. The results of this study was relevant with the study conducted by Han et al.<sup>18</sup> in China in 2015. It discovered that 80% of neonates with hyperbilirubinemia are without any comorbid disease.<sup>18</sup>

Treatment given to neonates with hyperbilirubinemia at Dr. Hasan Sadikin General Hospital is phototherapy. Observation for general condition of neonates was performed in most neonates with hyperbilirubinemia. The exchange transfusion or pharmacological therapy was not implemented in the neonates. The study conducted by Vanborgg et al.<sup>19</sup> stated that phototherapy becomes the general treatment for neonates with hyperbilirubinemia because phototherapy is safer and more effective than the exchange transfusion. Observation of vital sign and bilirubin serum level is performed on neonates who do not have risk factors from hyperbilirubinemia, such as low birth weight or premature gestational age.<sup>20</sup>

Limitations of this study are the presence of incomplete medical records. Some medical records were not available due to inappropriate storage of the medical records.

This study concluded that the proportion of neonates with hyperbilirubinemia at Dr. Hasan Sadikin General Hospital is 8.04%. Most neonates with hyperbilirubinemia are males, a term, low birth weight, in a healthy condition, and given phototherapy management.

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