

**FEEDING RESPONSE NEONATES BASED ON GESTATIONAL AGE,  
HYPOGLYCEMIA, HYPERBILIRUBINEMIA AND INFECTION IN SURABAYA**

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**Abstract**

Nutrition was important rule to maintain health status and growth and development support. The variety of neonatal condition has contribution to neonatal feeding and feeding process in neonates. Hypoglikemia, hyperbilirubinemia, prematurity and infection have influence to respon if feeding in neonates. The aim of this study was to describe evidence of poor feeding in neonates. This research was use case control design. The population ware all of the neonates in NICU. The samples are 21 respondents taken by total sampling technique. Instrument was observation sheet. The results showed poor feeding in naonates happen in all neonates with hypoglikemia, hyperbilirubinemia, prematurity and infection in variety degree. The most number of baby with poor feeding showed by premature and infection baby. Poor feeding in premature baby caused by prematurity of gastrointestinal organ. Gestasional age contribute in rooting and sucking reflect. Infection has strong influence to poor feeding in neontes. Recommendation of this research was feeding process in neonate with prematurity and infection should given in careful way.

Keyword : Feeding response, neonates, NICU.

**Introduction**

NICU-administered nutrition in neonates is a challenge in nursing care. Nutrition plays an important role in supporting the improvement of the condition as a source of energy and growth and development. High-risk neonates who get enough nutrition have been shown to show accelerated stability of the condition. Understanding of nutrition is needed to maintain immunomodulators and provide energy sufficiency. This will be evident from changes in clinical and laboratory values of the patient (Roger's, 2008). Constraints in nutrition in neonates in NICU spaces are common. Various conditions affect in neonate nutrition. Nutrition problems in neonates that are often encountered are weak ability to swallow. This can be influenced by various things. Based on field studies, neonates who experience slowness in the ability to swallow nutrients are neonates with premature, hypoglycemia,

hyperbilirubin and infection. However, to date more in-depth assessment of the slowness of swallowing still needs to be done to develop appropriate interventions.

Nutrition problems affect the high infant and under-five mortality rate. According to Hadi (2005), more than 50% of maternal, infant and under-five mortality is caused by nutritional problems. Based on the report of MDG's 2010 achievement from the Ministry of National Development / National Planning Agency (Bappenas), infant mortality rate, infant and neonatal has decreased. The 1991 infant mortality rate of 1991 per 1,000 live births has decreased to 44 per 1000 live births in 2007, the MDG's target will decrease to 32 in 2015. The infant mortality rate in 1991 of 68 per 1000 live births has decreased in the year 2007 to 34 per 1000 live births and is targeted to decrease to 23 per 1000 live births by 2015. While the 1991

neonatal mortality rate of 32 per 1000 live births has declined in 2007 by 19 per 1000 live births and is targeted to continue to decline In 2015 (Bappenas, 2010).

Difficulty swallowing is a clinical picture depicting various situations. Premature patients show a delayed swallowing appearing under normal conditions as well as with complications. The ability to suck on a baby has been around since the baby is in the womb. However, the coordination between sucking and swallowing was formed at weeks 32-34, and this coordination was complete at weeks 36-37 gestational age. The ability to suck on the baby is not followed by the ability of muscle coordination of swallowing and esophageal contraction, therefore the baby is at risk of aspiration (Wilson & Hockenberry, 2007). The ability to suck, swallow and breathe is a behavioral state that requires high organizing abilities in young neonates. Oral nutrition is not given to neonates with gestational age of less than 32 weeks, whereas oral nutrition may be administered at weeks 34-36 weeks as a result of organ maturation (Bortoncelli et al., 2012). In the neonate room there are still many neonates with gestational age more than 32 weeks and still have difficulty swallowing drinking.

The NICU environment and poor maternal and infant interactions will affect the feeding transition phase. Feeding management by considering infant clinics is an appropriate solution. Understanding the condition of the baby is related to the natural phase of the emergence of reflexion into consideration of the method of oral, enteral or parenteral administration. Increased sucking and swallowing ability by synthesizing reflux reflexes and reflexes can help the baby to achieve optimal health status immediately.

### **Literature review**

Preterm delivery is a labor of conception that can live but not yet term

(enough months). Fetal weight between 1000-2500 grams or an old pregnancy between 28 weeks to 36 weeks (Wiknjastro, 2007).

According to WHO, premature infants are live births before the 37th week of pregnancy (calculated from the first day of the last menstrual period). The American Academy of Pediatrics, took a 38-week restriction to call premature. Most babies are born prematurely with weight less than 2500 grams (Surasmi, 2005). Meanwhile, according to Brooker (2008) premature infants are babies born after 24 weeks and before 37 weeks of pregnancy, weighing 2.5 kg or less at birth, regardless of the exact gestational age or under 37 weeks.

Premature babies are more likely to suffer from PDA (Patent Ductus Arteriosus), 15% of which can be closed within the first 3 months. The incidence of PDA (Patent Ductus Arteriosus) in preterm infants is higher and this can lead to heart failure in neonates (Oxorn, 2010). Other possible conditions are hypotension caused by hypovolemia, impaired cardiac function and occurrence of sepsis-induced vasodilation occurring in premature infants. In addition to the state of the immature cardiovascular system will aggravate other diseases suffered by the premature neonate. Cardiovascular changes in infants have a slower and less complete circular adaptation compared with term infants. Problems that occur in premature infants according to Bobak (2004), in preterm infants in borderline have problems that often arise include the instability of the body, difficulty suckling, jaundice, respiratory distress syndrome (RDS) may appear. And in premature infants are experiencing problems of body instability, regulation of glucose, RDS, jaundice, anemia, infection, difficulty breastfeeding. And almost all babies are very premature having severe complication problems.

According Priyono (2010), premature babies do not have adequate protection in the face of a cooler temperature than the temperature in the mother's womb. In addition, premature baby body temperature control has not been able to work perfectly so that even in a room that normal temperature, the baby often experience cold. Clarified according to Oxorn (2010), problems in premature infants one of them is hypothermia. Rectal temperature of infants below 35 ° C is defined as a hypothermic state, but in practice any temperature lower than 36 ° C already requires special attention and the implementation of procedures to maintain body heat. Babies most at risk for hypothermia are preterm babies. A baby with hypothermia appears weak and letargic, unwilling to suck milk and feel cold to the touch. If not addressed, hypothermia may cause neonatal cold injury in which solid edema (sclerema), marble baby, is a serious, often fatal condition (Surasmi, 2005).

According to Prawirohardjo (2007) there are several problems that occur in premature babies are:

#### A. Nutrition problem

The immaturity of the digestive system has not been able to adapt so well that functional ileus may be obtained within the first few days of life. Premature infant's weakness in sucking requires the provision of drinking via a nasogastric / orogastric tube for several weeks after birth.

#### B. Breathing Difficulty

Difficulty in developing lung and increased breathing work due to idiopathic respiratory distress syndrome can occur due to immaturity of respiratory organ function. Respiratory movement is also irregular. This is evident in a changeable periodic breathing pattern. Characterized by a period of apneu in infants.

#### C. Thermal Stability

Rapid fluid loss through the skin is caused because premature babies have a large body surface area ratio compared to body weight and have less fat and subcutaneous. So it can cause premature babies difficult to maintain thermal stability. Giving warmth to the baby can help the baby to maintain the baby's survival. To keep the baby's body temperature steady in need of incubator and heat transmitter.

#### D. Liver immaturity

May be characterized by increased bilirubin in laboratory tests. Physiologic jaundice can occur in premature infants rather than mature infants. Early drinking can be a factor that can reduce the risk of complications in infants. Increased bilirubin can cause the risk of damage to the brain.

#### E. Infection

Premature babies have thin skin and limited immune power, are more susceptible to infections, suggesting a decrease in immunity. Therefore, in infants who are suspected of having infection need to be screened sepsis include blood cultures, urine, and cerebrospinal fluid and start anthytic therapy sprektum wide.

#### F. Necrotizing Enterocolistics

Can occur in premature infants especially in the first 3 weeks of birth. The cause is unknown but hypoxic injury to the intestinal wall may be related to umbilical vein thickness, apnea attack, septochemia, and colonization of the intestines by certain organisms may be a precipitation factor.

#### Nutrition Management

The new paradigm in nutrition is to maintain body mass by using nutrients as

an intervention to modulate the immune response, minimize oxidative stress, normalize bowel integrity and maintain glucose control. Understanding of nutrition is needed to maintain immunomodulators and provide energy sufficiency. This will be evident from changes in clinical and laboratory values of the patient (Roger's, 2008).

#### Calorie needs

The determination of nutritional needs is very important for both sick and healthy children. Children admitted to hospital, both with acute and chronic diseases, are at risk of malnutrition. While children treated for malnutrition will experience disproportionately good nutrition conditions due to complications of infectious diseases and noninfection (Hendricks, Duggan & Walker, 2000).

#### A. Parenteral Nutrition

Parenteral nutrition is used if the patient is unable to take or absorb nutrients through the peroral or enteral to meet the energy sufficiency for metabolism or maintain and repair tissue synthesis.

##### 1. Peripheral Parenteral Nutrition

Peripheral parenteral nutrition is used to increase nutrient intake in patients with mild stress who are expected to return to enteral or oral nutrition within 1 to 2 weeks. PPN is administered through peripheral venous access, glucose content given <20% with additional lipids and amino acids. PPN is used to avoid the danger of central venous access and metabolite complications from TPN, but PPN is inadequate for patients with large nutritional impairment or to gain weight.

##### 2. Total Parenteral Nutrition (TPN)

TPN administration is done through large venous access. TPN administration can

prevent hunger and help tissue synthesis, wound healing and normal metabolic function. TPN administration is based on patients' caloric needs. The fluids administered through TPN contain high concentrations with dextrose concentrations of 20-70%, amino acids, multivitamins, electrolytes and essential elements the body needs. Insulin is sometimes added to control blood glucans.

Before determining the fluid to be used, first must be set GIR (Glucose Infusion Rate) on the liquid to be used. GIR represents the amount of glucose administered every minute in the patient.

#### B. Enteral Nutrition

Enteral nutrition is one of the recommended options for feeding in critical conditions if without contraindications. Enteral nutrition helps maintain intestinal tissue integrity. About 50-60% of calories from the body will be used to maintain immune response modulation. Maintaining the integrity and function of the stomach is very important to reduce the mortality in patients in the ICU room. Enteral nutrition will help maintain the structure and function of the mucosal barrier, trigger bowel motility and prevent infection complications and be more cost effective than parenteral nutrition. It will also help prevent mucosal atrophy through increased blood flow in the gastrointestinal mucosa and secrete immunoglobulin and hormones (Jarden, 2009).

#### Method

This research was used cross sectional design. The sample was all neonates in NICU. This research was use secondary data which are taken from nursing report from nursing student which are care the baby in NICU of hospital in Surabaya. Total sample of this research was 21 neonates. The data of response feeding collected in 3 days and report with

supervision by clinical instructor and researcher. The baby have variety in gestational age to check degree of prematurity, laboratory data which are consent on infection, hyperbilirubinemia, hypoglykemia and clinical observation.

## Result

Table 1 : Frequency of Feeding responses in premature baby

NO	Feeding response	Premature / LBW	Aterm / normal	TOTAL
1	Normal	2	5	7
2	Poor	14		14
	TOTAL	16	5	21

Table 2 : frequency of feeding response in hypoglykemia baby.

NO	Feeding response	Hypoglykemia	Non Hipoglykemia	TOTAL
1	Normal	2	5	7
2	Poor	2	12	14
	TOTAL	4	17	21

Table 3 : Frequency of feeding response in hyperbilirubinemia baby.

NO.	RESPON MINUM	Hyperbilirubinemia	Non Hyperbilirubinemia	TOTAL
1	Normal	2	5	7
2	Poor	5	9	14
	TOTAL	7	14	21

Table 4 : frequency of feeding response in infection baby.

NO.	Feeding response	Infection	Non Infection	TOTAL
1	Normal	1	6	7
2	Poor	7	7	14
	TOTAL	8	13	21

## Discussion

### 1. Feeding response in premature baby

The results showed that most infants with prematurity showed weak drinking responses. This can occur in patients with prematurity because in premature infants reflex suction and swallowing has not appeared perfectly. The reflexes of sucking and swallowing babies have appeared since the 28-week-old gestational age. But this reflex is not perfect and there is coordination between sucking and swallowing.

In general, co-ordination between sucking and swallowing of new neonates appears at 32 weeks gestational age. This results in neonates born on week 31 or 32 weeks most having difficulty sucking and swallowing the given milk. Therefore, in this neonate proper nutrition management is the provision of nutrition through enteral with OGT (oro gastric tube) and TPN (total parenteral nutrition) if necessary. The suction and swallowing of the neonate will be complete and the coordination ability to suck and swallow when the neonate is 35-37 weeks gestational age. This is indicated by neonates whose gestation period is approaching 35-36 weeks week has been able to receive oral nutrition. This condition applies equally to neonates who receive nutrition through sonde, when premature babies with gestational age younger than 35 weeks have received nutrition through OGT, when the age of correction has reached 35 weeks it's time to start trying orally. The appearance of this flower-growing suction reflex indicates better nutrition management in the neonate. Weaning of OGT and displacement to people through spoon begins with consideration of age of infant and

clinical correction. However this may not be applicable when there are other complications in neonatal drinking, such as the appearance of NEC, obstructive ileus or other conditions that cause neonatal bloating and an increase in gastric residue with abnormal color.

2. Feeding response in neonates based on incidence of hypoglykemia

Based on the results obtained weak and strong suction response occurs in a balanced manner in neonates with hypoglycemia. While neonates without hypoglycemia still show a weak drinking response. This means that the incidence of hypoglycemia can lead to a weak drinking response, but not strong enough compared to other enzymes.

Neonates who are promptly treated with hypoglycemia can promptly demonstrate improved drink response. In general, signs of hypoglycemia in the form of tremor, baby yawning and letargis can disappear immediately after the neonate gets intravenous glucose infusion. Careful anticipation of glucose targets can be calculated with glucose infusion rate so that glucose therapy can run optimally and quickly overcome hypoglycemia.

Based on STABLE guideline in treating neonates, confectionary hypoglycemia can be performed before the neonate is transferred to a more stable space. GDA glucose and screening can be done several hours after birth, especially high-risk neonates. So that when the neonate is transferred from the delivery room e NICU space does not experience advanced hypoglycemia.

Neonates with TPN need GDA series monitoring. This is due to the TPN

with the measured levels of GIR and calories can cause a variety of responses, especially in unstable neonates or high risk neonates. That is why neonatal monitoring with TPN needs to take into account the occurrence of hypoglycemia. In addition, neonates with severe disease or complications are at risk of hypoglycemia. This indicates that neonates are not always with macrosomia requiring monitoring of hypoglycemia, but severe complications of neonates may fluctuate and cause hypoglycemia.

3. Feeding response in neonates based on incidence of hyperbilirubinemia.

Slow drinking responses also occur in patients with hyperbilirubinemia. This is not clearly known for its mechanism, but it is thought to be derived from a liver metabolic disorder that is anatomically very closely related to digestion. Neonates with excessively elevated bilirubin levels may cause a slowing drinking response in relation to the risk of kernicterus.

4. Feeding response in neonates based on incidence of neonatal infection.

Neonates with infection mostly show a weak drinking response. This suggests that the drinking response is closely related to the incidence of infection. Bacterial and viral toxins are known to cause systemic effects that cause the baby to slow down. It is also associated with a decrease in platelets in the incidence of neonatal infections. Some neonates with an infection show gastrointestinal bleeding that may appear as a change in gastric residue to redness and stolsel. So neonates who have an infection need to get treatment of sucralfat if considered the channel is highly disgraced cernanya. Another

intervention that can be done is to empower the patient to a clear gastric residue, normal platelets and improved infant clinics.

### **Conclusion**

Neonates show different respon to feeding process. It can influenced by many condition. Severe of illness have strong influence in naonates. Although they have aterm gestasional age, but severity of illness can couse poor feeding. Recommendation of this research, nurse have to developing many way in nutrition administration, good observation in gastrointestinal response will be base to developing nursing intervention, especially in poor of rooting and sucking reflect and grastric residual volume.

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