



## AT RISK NEWBORN: THE NEED FOR LIFE-SAVING CARE

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### ABSTRACT

Some newborns are delivered before the attainment of healthy weight and full development in various vital organs. This places such newborn in dire need of critical life-saving care that can be accessed in the neonatal intensive care unit. Care in the neonatal intensive care unit is characterized by frequent handling in an environment of bright lights and noise, frequent painful diagnostic and treatment procedures, and the inadequate bonding with parents. However, with planned care the newborn will survive without complications.

**KEYWORDS:** At risk, Newborn, Life-saving care.

### INTRODUCTION

Gestation in singleton pregnancies lasts an average of 40 weeks (280 days) from the first day of the last menstrual period to the estimated date of delivery. Previously, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered "term" because, neonatal outcomes from deliveries in this interval were uniform and good.<sup>[1]</sup> However, research increasingly identified that adverse neonatal outcomes is lowest only among uncomplicated pregnancies delivered between 39 0/7 weeks of gestation and 40 6/7 weeks of gestation.<sup>[2]</sup> Therefore, to address the lack of uniformity in neonatal outcomes within this interval, a work group which comprised representatives from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, the American College of Obstetricians and Gynecologists, the Society for Maternal-Fetal Medicine, and other professional societies was convened in late 2012 to determine whether term pregnancy should be redefined.<sup>[3]</sup> The work group recommended that the label "term" be replaced with the designations early term (37 0/7 through 38 6/7 weeks of gestation), full term (39 0/7 through 40 6/7 weeks of gestation), late term (41 0/7 through 41 6/7 weeks of gestation), and post term (42 0/7 weeks of gestation and beyond) to more accurately describe deliveries occurring at or beyond 37 weeks of gestation and report neonatal outcomes.<sup>[2,3]</sup>

In the words of,<sup>[5]</sup> babies born before 37 weeks of gestation are approximately seven times more likely to die during the first four weeks of their lives than babies born at term. In addition, preterm survivors often suffer from lifelong disabilities, such as visual and hearing

impairments, chronic lung disease, long term cardiovascular ill-health, learning and behavioural impairments.<sup>[6]</sup> Corroborating this,<sup>[7]</sup> stated that preterm newborn suffer from breathing problems, feeding difficulties, cerebral palsy, developmental delay, vision problems and hearing problems. According to,<sup>[8]</sup> some problems may be apparent at birth, while others may not develop until later in life. Basically, the final weeks in utero are crucial for healthy weight gain and for the full development of various vital organs, including the brain and lungs.<sup>[9]</sup> In fact, the earlier a baby is born, the higher the risk of complications.<sup>[10]</sup> Therefore, it is correct to say that any newborn of less than 37 weeks of gestation is an 'at risk newborn' because, they are yet to gain healthy weight and yet to attain full development in various vital organs. This places such newborn at a greater risk of adverse conditions cum higher morbidity and mortality compared to their term counterparts.<sup>[11]</sup>

Often, the specific cause of births before 37 weeks is not clear, but a wide range of interacting genetic and environmental factors may place a newborn at risk.<sup>[8]</sup> Although, special medical care in a neonatal intensive care unit (NICU) until organ-systems can function without support has been proven to improve the survival chances of such newborn,<sup>[7]</sup> prematurity is still a leading cause of death among children under five around the world.<sup>[12]</sup> In fact, one in three newborn deaths are due to preterm birth complications in Nigeria.<sup>[5]</sup> Considering that about 270,000 children in Nigeria die yearly within the first month of life as a direct consequence of preterm birth, low birth weight and perinatal asphyxia,<sup>[11]</sup> it is imperative for nurses to understand the factors that place a newborn at risk, identify women at risk of preterm

labor and support them to give birth as near as possible to term, in a health facility that can offer extra care when needed, as well as ensure that such newborns get the critical life-saving care and nurturing they need to survive.

#### At Risk Newborn

An at risk newborn is a newborn who was born after 20 weeks but before 37 weeks of gestation,<sup>[11]</sup> before the full development of various vital organs, including the brain and lungs and before the attainment of a healthy weight.<sup>[9]</sup> Thereby, placing the newborn at risk of dire complications that incurs long-term medical and financial burdens for the affected newborn, the family, and the health care system.<sup>[4]</sup> Similarly,<sup>[8]</sup> described an at risk newborn as one whose birth took place more than three weeks before the birth is due. In other words, the birth occurred before the start of the 37th week of pregnancy, instead of the normal 40 weeks. Such birth gives the fetus less time to develop in utero. Especially, those born earliest often have more complicated medical problems.

#### Characteristics of an At Risk Newborn

In the words of,<sup>[13]</sup> the appearance of an “at risk” newborn will depend upon the gestational age. However, newborn who is born in the last trimester can be described thus. The at risk newborn:

1. Is not large enough in utero to develop muscular flexion
2. Does not fully adopt the fetal position. as a result of which, their posture appears flattened with hips abducted, knees and ankles flexed
3. Is generally hypotonic with a weak and feeble cry
4. Has a head that is in proportion with the body
5. Has skull bones that are soft with large fontanelles and wide sutures
6. Has a small and narrow chest that appears underdeveloped owing to minimal lung expansion during fetal life
7. Has a prominent abdomen because, the liver and spleen are large and abdominal muscle tone is poor.
8. Has an umbilicus that appears low in the abdomen because linear growth is cephalo-caudal.
9. Will have subcutaneous fat laid down from 28 weeks' gestation.
10. Has vernix caseosa in abundance by the last trimester, at sites of dense lanugo growth (the face, ears, shoulders and sacral region).
11. Has a flat pinna that is a bit curved.
12. Has prominent orbital ridges and bulged eyes.
13. Has a poorly developed nipple areolar which are barely visible
14. Has a whitish cord that is fleshy and glistening.
15. Do not have plantar creases before 36 weeks
16. Has labia majora that fails to cover the labia minora in girls and an undescended testes in boys. The testes will descend into the scrotal sac at about the 37th gestational week.

#### The Life-Saving Care

For at risk newborns, their care should include breathing, thermoregulation, diet, fluid and electrolyte management, medical care, skin care and bonding.<sup>[14]</sup> Hence, within the first few weeks of life, they will need special care in a neonatal intensive care unit (NICU). The NICU combines advanced technology and trained health professionals to provide specialized care for the tiniest patients (sick and premature babies). The NICU team is led by a neonatologist, who is a pediatrician with additional training in the care of sick and premature babies. Furthermore, the care of an at risk newborn will depend on the gestational age, overall health, medical history, extent of any disease and tolerance for specific medications, procedures or therapies.<sup>[15]</sup> The specific care of an at risk newborn include

#### Breathing

Extra oxygen will need to be administered by a mask or with a breathing machine (mechanical ventilators) to do the work of breathing for the newborn.<sup>[15]</sup> According to,<sup>[16]</sup> automated oxygen control should be used because, it has the benefit of improving oxygen saturation by targeting different saturation ranges in premature infants on noninvasive and invasive respiratory support. This will reduce hypoxemia, hyperoxemia and hypoxia. Otherwise, the hypoxia will cause pulmonary vasoconstriction and further hypoxia. Increased oxygen consumption results in hypoxia, anaerobic metabolism, and lactic acid production.

#### Thermoregulation

The newborn care will often involve them staying in an incubator which replicates the conditions of the uterus.<sup>[14]</sup> More so, maintenance of the neutral thermal environment is critical for minimizing stress and optimizing growth of all at risk newborns. The neutral thermal environment is defined as the environmental temperature in which the neonate maintains a normal temperature and is consuming minimal oxygen for metabolism. Furthermore, radiant warmers with skin probes will help to regulate the desired temperature (in general, a normal body temperature of 36.5°-37.5°C). A heated and humidified isolette or food-grade plastic wrap/sheets is ideal for controlling humidity and prevent heat loss in extremely low birth weight (ELBW) neonates.<sup>[16]</sup> However, the environmental temperature should be maintained to at least 25°C to prevent heat loss by evaporation, conduction, convection and radiation.

At risk newborns are relatively unable to compensate for cold stress because they have only a small amount of subcutaneous tissue (insulation), decreased brown fat to produce heat and do not shiver.<sup>[15]</sup> Consequences of cold stress are increased metabolism with loss of weight or failure to gain weight because of increased use of glucose with depletion of glycogen stores to tackle hypoglycemia.<sup>[16]</sup> added that incubators are more efficient than radiant warmers because the heated

environment decreases heat loss due to conduction, convection, and radiation.

### Diet

Nutrition in the first several days after birth is provided intravenously because, even the relatively healthy preterm infant may not reach full enteral nutrition until a week or longer after birth. In addition, newborns receiving parenteral therapy have improved glucose tolerance and calorie absorption when given chromium supplements (0.2 mcg/kg/day) in the first week of life. Thereafter, if available, colostrum is the preferred initial nourishment. Colostrum contains digestible proteins, antibody (secretory immunoglobulin A [IgA]), growth factors, and other components that in the aggregate promote intestinal villous growth and influence the intestinal colonization.<sup>[16]</sup> Otherwise, infant formula designed specifically for preterm infants based on infant weight rather than gestational age should be used.

### Fluid and electrolyte management

At risk newborns require intense monitoring of their fluid and electrolyte levels because of their increased transdermal water loss, immature renal function, and other environmental issues (like radiant warming, phototherapy, mechanical ventilation). The degree of prematurity dictates the initial fluid management. However, initial fluids should be 10% dextrose water to prevent hyperglycemia.<sup>[16]</sup>

### Medical Care

Stabilization in the delivery room with prompt respiratory and thermal management is crucial to the immediate and long-term outcome of the at risk newborn.<sup>[16]</sup> According to,<sup>[15]</sup> medications and other treatments for complications such as antibiotics should be administered.

### Skin care

The "at risk" newborn has immature skin, a decreased cohesiveness between skin layers, increased water fixation, and tissue edema. The immature skin integrity leads to easy injury, transdermal absorption of drugs and other materials in contact with the skin, as well as increased risk for infection. Hence, bathing should be done using only water for newborns who weigh less than 1000 g, disinfectants should be completely cleaned off after procedures to decrease transdermal absorption, and elastoplast rather than adhesives should be used.

### Bonding

A multistakeholder group of newborn health advocates proposed accelerating global kangaroo mother care (KMC) as the standard of care for at risk newborns. KMC consists of various preterm infant care practices that include skin-to-skin contact, breastfeeding, and close post discharge follow-up. In the words of,<sup>[15]</sup> a method of caring for premature babies using skin-to-skin contact with the parent to provide contact and aid

parent-infant attachment reduces the length of hospital stay for the preterm.

### Laboratory studies

Initial laboratory studies are performed to identify issues that, if corrected, improve the newborn's outcome.<sup>[17]</sup> Such tests include frequent blood glucose test, full blood count, Coombs test, serum electrolyte levels, lumbar puncture and imaging studies like chest radiography.

### Preparation for discharge

Premature babies often need time to "catch up" in both development and growth. In the hospital, this catch-up time may involve learning to eat and sleep, as well as steadily gaining weight. Depending on their condition, premature babies often stay in the hospital until they reach the pregnancy due date. However, if a baby was transferred to another hospital for specialized NICU care, he or she may be transferred back to the "home" hospital once the condition is stable. Moreover,<sup>[14,15]</sup> stated that discharge can only be done if there is no recent apnea, caloric intake is adequate for growth and taken by breast or cup and spoon, newborn has been weaned from supplemental heat and the baby is able to stay warm in an open crib, parents can now provide care including medications and feedings alone.

### The Responsibilities of the Nurse In The Care Of An At Risk Newborn.<sup>[18]</sup> outlined the responsibilities of the Nurse in the care of an at risk newborn to include:

1. Assess the newborn's respiratory status, to identify signs of respiratory distress (like, tachypnea, nasal flaring, grunting, retractions, rhonchi, or crackles). Tachypnea indicates respiratory distress especially when respiratory rate is greater than 75cpm after the first 5 hours of life.
2. Assess vital signs especially temperature to identify hypothermia which predisposes the newborn to cold stress. Hyperthermia causes further respiratory depression instead of increased respiratory rate, leading to reduced oxygen uptake.
3. Assess the skin color for identify the development of cyanosis and the need for oxygen because, lack of oxygen will result in cyanosis.
4. Assess presence of reflexes associated with feeding (like swallowing, sucking & coughing), to determines the appropriate feeding method for the newborn.
5. Initiate intermittent or tube feedings as indicted. Lavage feedings may be necessary to provide adequate nutrition for the newborn who has a poorly coordinated suck-and-swallow reflex or who becomes fatigued during oral feedings.
6. Promote rest, minimize stimulation & energy expenditure to decrease the metabolic rate & Oxygen consumption.
7. Monitor laboratory/diagnostic studies as appropriate. This will reveal & prevent any further complications.

8. Place newborn with appropriate clothing in a warmer, isolette, incubator, open bed with radiant warmer or open crib. This will help to maintain thermoneutral environment, thereby preventing cold stress.
9. Use heat lamps during certain procedures & warm objects coming in contact with the newborn's body such as clothing. This will decrease heat loss to the cooler environment of the room.
10. Provide or administer medications as prescribed. This helps to prevent seizures associated with hyperthermia.
11. Instill breast milk or formula slowly over 20min at a rate of 20ml/min. Too rapid entry of feeding into stomach may cause rapid rebound response with regurgitation, increased risk of aspiration and abdominal distension, all of which compromise respiratory status.
12. Position the newborn on right side or prone with head elevated at 30 degrees. This facilitates gastric emptying & prevents reflux.
13. Feed as frequently as indicated based on the newborn's weight and estimated stomach capacity. This will ensure adequate nutrition and promote weight gain.
14. Ensure that the newborn learn to sleep on the back before being discharged home from the hospital, to reduce the risk for sudden infant death syndrome (SIDS).

### SUMMARY

An at risk newborn is a newborn who was born after 20 weeks but before 37 weeks of gestation when vital organs reach their full development in utero. They therefore need to receive critical life-saving care in the neonatal intensive care unit (NICU) which impacts their developing nervous system. Furthermore, the frequent handling in an environment of bright lights and noise, frequent painful diagnostic and treatment procedures, and the inadequate bonding with parents places the newborn at risk of dire complications that incurs long-term medical burdens for the affected newborn and the health care system. However, the Nurse has a responsibility to care for an at risk newborn via assessment, frequent feeding and nursing in a radiant warmer to help maintain a thermoneutral environment.

### CONCLUSION

In conclusion, gestation in singleton pregnancies lasts an average of 40 weeks (280 days) from the first day of the last menstrual period to the estimated date of delivery. However, at risk newborns are born more than 3 weeks earlier, will be admitted into the NICU where they will be handled frequently in an environment of bright light, noise and will undergo several painful procedures even when their nervous system is still developing. Hence, they are termed at risk newborn.

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