

Color Does Matter

Nursing Assessment of Varying Skin Tones/Pigmentation

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ABSTRACT

Background: The observation of color is an integral part of the nursing assessment. However, the current understanding of individual skin qualities and pigmentation has not yet been integrated thoroughly into foundational assessment courses, clinical education, simulation, and textbooks.

Evidence Acquisition: Literature is scarce regarding racial groups, skin color, and physical assessment for patients across the lifespan, but even more so for the neonatal population. Historically, many nursing textbooks did not provide visual pictures or observational assessment strategies for the assessment of the Black, Indigenous, and people of color (BIPOC) population. This is improving in some nursing textbooks; however, the descriptors of and visual differences and anticipated assessment findings for the BIPOC population are not comprehensive.

Results: Evidence-based assessment findings, which may occur in newborns with varying skin tones/pigmentations, are presented.

Implications for Practice and Research: The most essential step to having an accurate assessment is acknowledging the importance of color awareness. Color blindness, while thought to support inclusivity, only contributes to exclusion of one of the most important components of a person's being—their color.

Key Words: color awareness, infant, newborn, nursing assessment, racial groups, skin pigmentation

A major function within the role of the neonatal nurse is provision of a thorough nursing assessment of the newborn to collect vital information, which will inform the nursing care plan, improve nurses' ability to respond to, or evaluate changes in condition and determine whether there is progression toward the overall desired outcomes. The thoroughness of the nursing assessment is a key component of the nursing process (Assessment, Diagnosis, Planning, Intervention, and Evaluation [ADPIE]), which is an evidence-based method of problem identification and problem-solving. The inclusion of

differences in assessment findings for Black, Indigenous, and people of color (BIPOC) in the nurse physical assessment has long been ignored and misconceptions about how BIPOC people may present in a physical assessment are passed down from one nursing generation to another instead of being evidence-based. In the field of dermatology, skin color has long been recognized as a key component of the assessment, which is necessary to correctly diagnose dermatologic findings.¹ However, nursing, although progressing, still lacks in providing culturally aware and sensitive care in the appropriate assessment of patients with ranging variations of skin tone.

BACKGROUND

Historically, many nursing textbooks did not provide visual pictures or observational assessment strategies for the assessment of the BIPOC population. This is improving in some areas of nursing textbooks; however, the descriptors of differences and anticipated assessment findings for the BIPOC population are not comprehensive. Furthermore, a recent study analyzing the use of race and ethnicity in a pediatric textbook found numerous examples inappropriately depicting race as a biologic, rather than a social, construct.²

Visual observation is one, if not the key assessment strategy within the nursing assessment. Observation that includes changes in color is often key to identifying deterioration of a newborn's perfusion or other disease process. Understanding how a newborn may present

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differently because of variations in skin tone is a critical component within the nursing assessment.

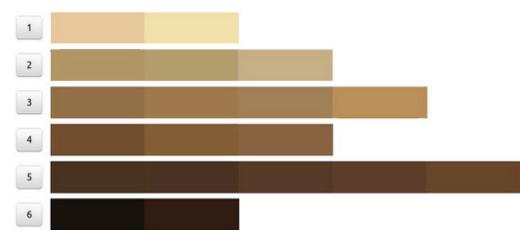
Skin Color Defined

While the purpose of this article is to help identify assessment differences, which are specific to the BIPOC population, there are many varying skin tones across the US population, including within the White and multiracial population. Four pigments contribute to skin color: melanin, carotene, oxygenated hemoglobin, and reduced hemoglobin. Melanin is a substance that is responsible for many biologic functions including the production of hair, eye, and skin pigmentation. In most cases, people have the same number of melanocytes; however, the variation comes with the amount of melanin each melanocyte produces.³ Melanin contributes most significantly to overall color; the closer melanin is clustered to the surface, the darker skin will appear. Carotene gives the skin a yellow hue, while oxygenated and reduced hemoglobin are red and purplish blue, respectively. In addition to melanin, all light-absorbing molecules and particles in the skin, or chromophores, play a part in perceived skin color.⁴ For the purpose of this article, in describing these color variations, we have used *variations in skin pigmentation or skin tone and/or color*.

Color Awareness

To perform a holistic newborn assessment, nurses must understand the implications of skin color and the importance of color awareness. First, we must acknowledge the newborn's individuality in terms of racial and ethnic identity, including newborns of multirace or ethnicity. Second, within each race, nurses must acknowledge there are variations of skin pigmentation. When we are "color-blind" or say "I don't see color," this contributes to health disparities because we are not acknowledging a key component of an individual's being. Understanding how those differences may present within the nursing assessment is important to differentiate normal from abnormal assessment findings (Figure 1).⁵ Failure to integrate findings that are specific to the skin color may contribute to incorrect assessment findings that are then presented to the provider who is developing the plan of care and differential diagnosis. Changes in skin color continue to be a key indicator in overall health status within the nursing assessment and can help determine oxygenation, injury, and nutritional status.⁴ Teaching assessment of differences found between races due to skin pigmentation is often challenging due to the sensitivity of the topic of race and attempts to be politically correct. However, it is critical that we recognize the variability in skin pigmentation among and within races and ethnicities.⁶ Literature is scarce regarding racial groups, color, and physical assessment. The purpose of this article

FIGURE 1



Expanded human skin tones. Reprinted from Clinics in Dermatology, 37(5), Gupta V, Sharma VK. Skin typing: Fitzpatrick grading and others, 430-436, 2019, with permission from Elsevier. All permission requests for this image should be made to the copyright holder.

is to provide descriptions of differences within the physical assessment for newborns with varying shades of skin pigmentation. Specific neonatal considerations are given when applicable but are not often found in the literature. As such, lifespan considerations are offered as a baseline starting point to bring awareness to the issue.

ASSESSMENT BY BODY SYSTEM

The following sections provide descriptions of differences within the physical assessment for newborns with varying shades of skin pigmentation. Specific neonatal considerations are given when applicable. Not surprisingly, most information found on this topic relates to the integumentary system. A summary of assessment on the remainder of body systems is offered based on the limited literature available.

Integumentary

Skin color awareness has been well documented in dermatologic conditions.⁷ This level of awareness can reduce health disparities associated with newborns who have various skin tones by addressing the knowledge gap in how these skin tones may present differently, thereby increasing the accuracy of treatment of skin conditions.

At birth, infants of color can have a range of skin tones due to delayed maturation of pigmentation; however, the color and texture of newborns' skin will change as they age.⁸ Newborns with higher level of melanin may appear a few shades lighter at birth, but with maturity, the skin will darken. The newborn's skin can also have a redness; however, this will fade in the first few days of life. Newborns with darker skin tones will also have deeper pigmentation in their nipples. Melanocytes, the pigment-producing cells, are generally more concentrated in the facial area than the trunk, so you may see more pigment in the face.⁸ The ear pinnae, axilla, areola, genitalia, and skin around the umbilical cord, fingernails, or

toes may also contain more pigment (Figure 2).⁸ There are several skin lesions that are more common in neonates with darker skin, including, but not limited to, hyperpigmented macules, transient hypermelanosis, transient neonatal pustular melanosis, café-au-lait spots, and nevus of ito and ota.

Hyperpigmented macules/slate gray nevi/slate gray patch/dermal melanosis were formerly referred to as Mongolian spots (Figure 3). Mongolian spots were thought to be a marker of racial inferiority; therefore, this nomenclature should no longer be used as it is considered disparaging and marginalizing.^{9,10} Hyperpigmented macules are seen in up to 90% of African American, Latinx, and Asian infants and only in 10% in Caucasian infants. Hyperpigmented macules generally fade over the first 3 years of life, becoming less apparent as the infant's skin darkens. Transient hypermelanosis is normal and is characterized by increased pigmentation to areas of the skin and is associated with African American and Asian ethnicity.

Transient neonatal pustular melanosis presents at birth as scattered superficial, vesiculopustular lesions, which rupture within 48 hours of life. After rupture, small, pigmented macules are left, often surrounded by a ring of fine white scales. This rash occurs in up to 5% of African American infants and only in 0.2% in Caucasian infants. Although benign, this rash can initially be very upsetting to parents.^{8,11}

Café-au-lait spots, evenly pigmented brown macules, are also seen in association with African American ethnicity (Figure 4).⁸ The presence of 6 or more café-au-lait spots should prompt further evaluation for neurofibromatosis.¹²

Areas of abnormal blue-gray pigmentation innervated by the lateral supraclavicular and lateral

FIGURE 3



Dermal melanosis. Used with permission from DFTB/Skin Deep.

cutaneous brachial nerves and the facial nerve are more common in neonates with Asian ethnicity and dark skin pigment. These areas are known as nevus of ito and nevus of ota.⁸ Both lesions are considered benign.⁸

Bruising on skin that contains more melanin occurs in the same manner as bruising on white or light to medium brown skin. However, the color of the bruise may present differently or be less apparent because of the contrast to the more highly pigmented skin. Pressure ulcers in dark skin are less detectable by visual observation due to the lack of visible reddening. Use of

FIGURE 2



Increased melanin at umbilicus base. Used with permission from DFTB/Skin Deep.

FIGURE 4



Café-au-lait spots. Used with permission from DFTB/Skin Deep.

natural light or pen light may improve the ability to visualize early stages of pressure ulcers.¹³

There are also fallacies that darker skin or more highly pigmented skin does not burn when exposed to the sun. While darker skin is not as likely to experience sunburn, it is highly recommended for all newborns to avoid prolonged sun exposure and utilize sunscreen if protected clothing or shade is unavailable.¹⁴ Sunburn also appears differently in skin that is lighter than in skin that is darker. For lighter skin tones, the skin may appear red; however, for darker skin tones, there may not be visual redness, but rather sensitivity, itchiness, and peeling in skin that is sunburned. In addition, patients diagnosed with vitiligo, which causes the skin to lose color or pigmentation in patches, may be more at risk to sunburn in the white patchy areas and should wear sunscreen. The Fitzpatrick Scale (Figure 5) has been noted as the gold standard for categorizing the skin's propensity to burn during exposure to ultraviolet rays/sunburn risk. However, when using the Fitzpatrick Scale, awareness of the intent of the tool should be understood as not to conflate race and ethnicity with the Fitzpatrick skin type.¹²

Pulmonary and Chest

Nursing assessment of color as a sign of deterioration includes descriptors such as pale, pallor, or flushed. For lighter skin tones, the descriptor of pale and flushed may still be appropriate; however, for darker skin the newborn may appear gray or ashen. Pallor, a condition in which the skin and mucous membranes appear as pale or with a loss of color, can be assessed in the lower conjunctiva of the eye. The rim should normally be bright red in color but will look pale when there is decreased perfusion.

Color changes of the skin relating to oxygenation and perfusion can include mottling, pallor, and cyanosis (bluish discoloration). In Caucasian newborns, this can be seen primarily on the skin. In newborns with dark skin, cyanosis may look gray or whitish. In newborns with yellow skin, cyanosis may cause a grayish–greenish skin tone. Additional assessment of the soles of the hands/feet, tongue, lips, and gums may be required to assess oxygenation status of the newborn with darker skin. Perfusion and oxygenation can also be assessed by looking at mucous membranes and conjunctiva. It is important to understand, for newborns with darker skin tones or highly pigmented, the gums may be dark and not appropriate to assess for oxygenation. Providers can also assess peripheral pulses and temperature in relation to adequate perfusion.

Physical assessment in conjunction with pulse oximetry is the most common method used by nurses to assess oxygenation status. Oxygen saturation, commonly known as SpO₂, is measured via a pulse oximeter device. Pulse oximetry is a reliable (in light and white skin tones/less pigmented skin) noninvasive method used to measure oxygen saturation of the blood. However, current studies in adults show that pulse oximetry measures in Black patients or patients with highly pigmented skin have been shown to be less reliable in measuring the rate of occult hypoxemia when compared with White or other races with skin that has lower level of pigmentation.¹¹ This makes it important to correlate patient presentation of all ages and baseline skin assessment to decide appropriate interventions, including obtaining an arterial blood gas.

Highly pigmented skin may provide a false-negative result when using transillumination in the

FIGURE 5

Fitzpatrick Skin Phototype	Skin Reaction	Skin Color Description	Skin Color
I	Always burn, never tan	Light, pale white	
II	Usually burn, tan less than average (with difficulty)	White, fair	
III	Sometimes mild burn, tan about average	Medium, white to olive	
IV	Rarely burn, tan more than average (with ease)	Olive, moderate brown	
V	Very rarely burns, tans very easily	Brown, dark brown	
VI	Very rarely burns, tans very easily, deeply pigmented	Black, very dark brown to black	

Fitzpatrick Scale. Reprinted from Clinics in Dermatology, 37(5), Gupta V, Sharma VK. Skin typing: Fitzpatrick grading and others, 430-436, 2019, with permission from Elsevier. All permission requests for this image should be made to the copyright holder.

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evaluation of pneumothorax.¹⁵ As such, a lower threshold for chest x-ray confirmation may be required with suspicion for pneumothorax in newborns with darker skin.¹¹

The presence of supernumerary, or accessory nipples, most commonly located 5 to 6 cm below the regular nipple, is more common in African American, Israeli Jewish, Arab, and Japanese infants.^{8,15} There may be an increased risk or link for congenital renal anomalies and genitourinary malignancies when supernumerary nipples are present.¹¹

Cardiovascular

In addition to auscultation of heart sounds and assessment of pulses, cardiovascular assessment includes evaluation for edema, capillary refill, and skin color. In Caucasian newborns, pallor can be seen on the palm of the hand. Pallor can also be seen on the tongue as paleness as perfusion decreases. Capillary refill should return to the same pink color in less than 2 seconds. Pallor in skin with less pigmentation, depending on undertones, can appear pale yellow and in darker skin can also look yellow or gray in the nailbeds and palms of hands. Gums are often assessed; however, in individuals with highly pigmented skin, gums can be dark brown and not a reliable sign of perfusion. In the newborn, the oral mucosa and tongue are the best sites to evaluate for cyanosis due to the general lack of pigmentation and the rich blood supply to these areas.¹¹ Quality of presence of peripheral pulses and temperature should be assessed as part of the cardiac assessment.

Gastrointestinal

Abdominal distention can appear as distention and redness but can also appear ashen gray or cyanotic. The darker the skin of the newborn, the nurse is less likely able to visualize reddening of the skin. Reliance on other signs such as tautness, abdominal circumference changes, and pain on palpation is critical part of assessment to arrive at a correct diagnosis.

The veins sometimes visible on the abdomen of newborns with lighter skin may not be visible on newborns with darker skin.¹¹ The presence of a linea nigra (hyperpigmented, vertical line up the midline of the abdomen) is more common in newborns of African American descent.⁸

Umbilical hernias, a protrusion of abdominal contents into the umbilicus, are present in 30% of term African American newborns.^{8,11} The color of the umbilical hernia should be the same color as the newborn's skin but could become red, purple, or much darker than the newborn's normal skin tone if blood flow is restricted. Most often, umbilical hernias close spontaneously by 2 years of age, but parents should be educated on how to monitor for strangulation or incarceration of the bowel, including changes in skin color that are specific to the color of the skin.¹¹

Genitourinary

The skin of the labia, scrotum, and anus is most often darker than other areas of the body. Racial differences exist in the size of the male genitalia. As such, when concerns arise, comparisons should be made with infants of the same gestational age and race.¹¹

Head, Ears, Eyes, Nose, and Throat

In individuals with higher levels of melanin, the color of the sclera may range from yellow to muddy brown. This is normal and a benign condition commonly seen in highly pigmented skin and is often mistaken for jaundice. This is caused by a build-up of melanin on the sclera and conjunctiva. However, it is critical to check laboratory values to be certain that yellowing of the sclera is not related to a disease process. Scleral icterus, a yellow tint to the sclera, is more common in newborns of East Asian descent.⁸

Normal ranges for anterior and posterior fontanelles have been reported to be larger in African American infants in comparison to Caucasian infants.^{8,11} Racial variations have also been reported in head circumference when comparing Black and Brown infants to White infants, with White infants having larger head circumferences.¹¹ These differences should be interpreted with caution, as the data are older but may reflect the need for race-specific growth charts.¹¹ The Centers for Disease Control and Prevention has one set of growth charts, which is used for all racial/ethnic groups, and they consider the charts are representative of the US population at the time surveys (National Health and Nutrition Examination Survey [NHANES] and National Health Expenditure Accounts [NHEA]) for validation of the tool were conducted.

Congenital skull depression, a concave area in the convex bony contour of the skull, is rare but has been associated with African ethnicity.⁸ Hair color, or pigmentation, should align with ethnicity of the parents; abnormal pigmentation should be followed up for potential genetic disorder such as albinism.⁸

Ectropion, eyelid eversion with swelling, is rare, but more common in African American newborns at birth.⁸ This condition is usually upsetting to parents but often resolves without surgery.¹¹ The incidence of dacryocystocele, dilation of the lacrimal sac, is lower in infants of color in comparison to Caucasian infants.⁸

Another physical assessment finding that differs in darker skinned newborns is evaluation of the red reflex. In White newborns the reflex is red, but the color of the reflex changes to orange, pale yellow, or even gray in darker skinned newborns.¹¹

Epicanthal folds are common in Asian newborns but can also occur in 20% of non-Asian newborns.^{8,11} The combination of epicanthal folds and upslanting palpebral fissures, while common in Asian newborns, may necessitate further evaluation for trisomy 21 in non-Asian newborns.¹¹

TABLE 1. Questions for Parents/Primary Caregiver(s)

What is your newborn's normal skin tone?
How does your newborn's skin look different today? What changes have you noticed?
What is the normal color of your newborn's eye, conjunctiva, gums, nailbeds, palm of hands, and soles of feet?
What is the normal color of your newborn's scalp?
When your newborn's skin is pinched, what is the color that you normally see as blood flow returns?
When your newborn's skin is bruised, what does the skin color look like in the area of the bruise?
When your newborn is cold, does the skin color change and if so, what color have you observed?
Have any medications that you have been prescribed for your newborn that have changed the color or texture of the skin?

An unusually small or underdeveloped ear, microtia, is associated with newborns of Japanese, Latinx, and Native American ancestry.⁸ Infants with microtia have higher incidence of hearing and renal anomalies.⁸ An excessively hairy ear, or hypertrichosis pinna, is associated with Asian ethnicity.⁸ No associated risks are connected to this finding.

Racial differences exist in lip thickness.¹¹ In addition, natal teeth are more commonly seen in Native American newborns.¹¹ Natal teeth tend to be mobile due to poor root formation and therefore require pediatric dentistry consultation for potential removal.¹¹

There is an association with cleft lip and newborns of Asian or Native American ancestry while a median alveolar notch (small indentation on the maxillary alveolar ridge at midline) is increased in newborns of African American ethnicity.⁸

Musculoskeletal

While there are no visual observational differences that we can provide for the musculoskeletal system, there are ethnic differences in incidences of some musculoskeletal abnormalities. Abnormal development of the hip, developmental dysplasia of the hip (DDH), occurs less frequently in newborns of African or Asian descent in comparison to newborns of Native American or Eastern European descent.¹¹ It is not known whether this difference exists due to the practice of swaddling or genetics.¹¹ It is important to note, that while the incidence of DDH is lower in African American newborns, it remains an important component of the physical assessment for all newborns.

Caucasian and Asian newborns have the lowest incidence of talipes equinovarus (club foot), while newborns of Polynesian (Hawaiian or Maori) descent have the highest rate.^{8,11} Syndactyly, congenital webbing of the fingers or toes, is less common in newborns of African descent than in Caucasian.¹¹ On the contrast, postaxial polydactyly (extra small finger or toe on the ulnar or fibular side) is more common in African American newborns than in Caucasian newborns,¹¹ while preaxial polydactyly (extra small finger or toe on the radial or tubular side) is associated with European or Asian ancestry.⁸ When present in African American newborns, polydactyly is most often an isolated

malformation but is associated with chromosomal anomalies or other skeletal malformations when present in Caucasian newborns without a family history.¹¹ Regardless, importance of the family history and assessment for other skeletal malformations is stressed for newborns of all races and ethnicities.

There is an increased risk of meningocele (herniation of meninges, cerebrospinal fluid, and spinal cord tissue) associated with newborns of Latinx ethnicity.⁸

Questions to Ask Parents/Primary Caregiver(s)

It is routine practice for the nurse to collect the maternal, pregnancy, perinatal, postnatal, and neonatal history when performing an assessment. These questions are key in understanding risk for conditions. Within the nursing assessment, it is also important to ask the parents/primary caregiver(s), or in some instances where the newborn is admitted directly after birth, the admitting nurse, questions related to how the newborn may normally present. To identify normal variations, Table 1 provides questions that may be helpful when trying to determine the baseline color of the newborn. Additionally, the race and/or ethnicity of the birth parents can provide clues regarding expected versus unexpected findings in the newborn and should be considered when conducting the comprehensive history.

CONCLUSION

The recognition of differences in the assessment of newborns with varying skin pigmentation, skin tone, or color must be included in nursing textbooks with appropriate use of race and ethnic terms. Color “blindness” contributes to inaccurate health assessment findings and does not acknowledge the newborn's racial and ethnic identity. When we disregard or do not understand how the inclusion of skin color should be considered a key assessment strategy with the newborn's health assessment, we are not providing high-level quality care and are creating and/or contributing to health disparities. Nursing assessment of color can help determine oxygenation, perfusion, injury, and nutritional status. Lack of understanding of how skin tone may contribute to findings within the nursing assessment may lead to incorrect assessment findings.

Summary of Recommendations for Practice and Research

What we know:	<ul style="list-style-type: none"> The nursing assessment is a critical part of newborn care and contributes to outcomes. To perform a true holistic admission, color awareness helps delineate normal from abnormal assessment findings. Courses, clinicals, and textbooks currently are not sufficiently highlighting the importance of this key assessment strategy.
What needs to be studied:	<ul style="list-style-type: none"> Intentional identification of key differences, for all body systems, that occur with varying skin tones/pigmentation. An in-depth review of nursing textbooks for inclusion of color assessment within each body system.
What we can do today:	<ul style="list-style-type: none"> Understand the newborn's normal baseline. Ask questions to the parent/caregiver that may not be comfortable to ask regarding the newborn's normal color/presentation. The nurse should document what is normal in terms of color. Documentation systems may not offer the right color, so adding notes that are specific to the newborn's baseline color is important for understanding change in condition.

It is important to recognize that we may not know a newborn's baseline, but the primary caregiver(s) and family members can offer valuable insight into their baseline skin condition, appearance, and color. It is important to note that a comprehensive history and physical assessment is imperative for all newborns, regardless of racial or ethnic background or reported incidence of specific findings.

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