



Color Vision Deficiency

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Occupational and environmental health nurses can promote awareness of color vision deficiency in the workplace. [*Workplace Health Saf* 2013;61(6):280.]

Color vision deficiency, or color blindness, is the “inability to distinguish certain shades of color or in more severe cases, see colors at all” (American Optometric Association, 2006, p. 1). Individuals who are color blind can see colors but are unable to determine the difference between some complementary colors. Red/green color vision deficiency is the most common; individuals have a difficult time distinguishing between the two colors. Blue/yellow color vision deficiency is less common but more severe, as these individuals frequently have red/green color vision deficiency too. A complete absence of color vision, called achromatopsia, is the most severe color vision deficiency and rare. Individuals with achromatopsia see objects as black and white or in shades of gray.

Normal color vision requires the use of specialized receptor cells

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called cones located in the retina of the eye. Three types of cones—red, green, and blue—enable individuals to see a wide spectrum of colors. A deficiency of any of these types of cones results in abnormal color vision.

Approximately 8% to 12% of males of European origin and 0.5% of females are affected by color vision deficiency (American Optometric Association, 2006). Symptoms vary and may include difficulty seeing colors and brightness of colors and distinguishing between shades of the same color or similar colors (PubMed Health, 2011). With age, color vision often deteriorates at a faster rate than visual acuity (Richmond Products, 2010).

Color vision deficiency can be diagnosed through a comprehensive eye examination including “use of a series of specially designed pictures composed of color dots, called pseudoisochromatic plates, which include hidden numbers or embedded figures that can be correctly seen by persons with normal color vision” (American Optometric Association, 2006, p. 2). Additional testing may be needed to determine the exact type of color vision deficiency.

Various health conditions, diseases, and medications can cause color blindness (Richmond Products, 2010). Exposure to fertilizers

and styrene has been known to cause loss of color vision (American Optometric Association, 2006). However, in most cases, color blindness is an inherited trait that is present throughout life.

Color vision is essential in many occupations. Occupational and environmental health nurses should conduct vision screening for workers whose jobs require accurate color perception. Most individuals adapt to color cues and other adjustments. Individuals can remember the order of colors to identify them (e.g., the colors of a traffic light). Color filters, such as an X-Chrom lens, may be used by some individuals to distinguish colors by increasing the contrast. At the work site, colors should have a high degree of contrast (e.g., black letters on a white background). Ways of communicating hazards and warnings other than using red should be explored.

Occupational and environmental health nurses can promote awareness of color vision deficiency in the workplace and support affected workers and their families.

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