African American Health Disparities in Lung Cancer

Pauline M. Green, PhD, RN, CNE, Suzy Guerrier-Adams, MSN, Priscilla O. Okunji, PhD, RN-BC, Deborah Schiavone, PhD, RN, PMHCNS-BC, CNE, and Joann E. Smith, PhD, RN, APHN-BC, CNE

Lung cancer is a leading cause of cancer-related deaths in the United States and globally. African Americans experience significant differences in lung cancer incidence and mortality. Smoking is the single greatest risk for lung cancer, making smoking cessation programs a potentially fruitful approach for reducing the risk of lung cancer. Despite clinical practice guidelines that prompt nurses to advise patients to quit smoking, only a small percentage of nurses do so. Minority patients are less likely than Whites to receive smoking cessation advice. This article discusses recent findings on the pathophysiology and risks for lung cancer. The literature on smoking cessation research is examined to determine the features of successful cessation interventions. Recommendations are offered for enhancing tobacco cessation efforts in nursing practice, education, and research.

Global statistics on lung cancer report 1.6 million new cases each year (Jemal et al., 2011). Lung cancer is the most common cancer and the leading cause of cancer-related death in men worldwide (Jemal et al., 2011). In the United States, lung cancer is the second most common type of cancer among men and women, with more than 228,160 new cases estimated in 2013, and the leading cause of cancer-related death (Siegel, Naishadham, & Jemal, 2013). The incidence of lung cancer varies with age, peaking from age 70–79 years (Centers for Disease Control and Prevention [CDC], 2010a). African Americans experience a higher incidence and mortality from lung cancer than other racial or ethnic groups. Smoking is a major contributor to the high incidence of lung cancer among African Americans, and tobacco smoking is the leading preventable cause of death (U.S. Department of Health and Human Services [USDHHS], 2006). Evidence exists to support the effectiveness of treatment of tobacco dependence (Fiore et al., 2008), and greater efforts are needed to prevent smoking and treat tobacco dependence. Smoking cessation is important even for those with a diagnosis of early-stage lung cancer as preliminary evidence indicates it may improve prognostic outcomes (Parsons, Daley, Begh, & Aveyard, 2010).

Lung cancer represents a public health burden and a research challenge, yet lung cancer research receives the lowest level of funding of all prevalent cancers (American College of Chest Physicians, 2010). Recommendations from the latest clinical practice guidelines on treating tobacco dependence call for more research on treatment options among racial and ethnic minorities. However, the number of nurse researchers involved in the study of lung cancer remains limited (Sarna, 2012). In their roles as advocates, nurses support all efforts to promote health and reduce differences in cancer incidence, mortality, and health outcomes linked to race, ethnicity, and socioeconomic status. Less than optimal research funding will reduce the number of studies focused on minorities and lung cancer, which, in turn, will widen existing inequalities. In that respect, lung cancer in African Americans is an area particularly ripe for nurses to examine the impact of health disparities and develop interventions aimed at prevention, treatment, and smoking cessation.

Background

African Americans have a higher incidence of lung cancer (76.1 per 100,000) compared to Whites (69.7 per 100,000) (CDC, 2010a). African Americans are more susceptible to smoking-induced lung cancer (Mechanic et al., 2007; Zhang et al., 2006) and have less access to healthcare services than do Whites (CDC, 2011c). Research using national data demonstrated racial and
regional disparities in lung cancer incidence. Incidence was highest among men (86.2 per 100,000), Blacks (73), people aged 70–79 years (431.1), and those living in the South (74.7) (Underwood et al., 2011). Disparity in lung cancer incidence and mortality rates is evident by race and gender (Howlader et al., 2012) (see Table 1). Black men have much higher incidence and death rates than White men. White men experienced a steady decline in smoking prevalence since 1965, whereas smoking prevalence in Black men demonstrated a slower rate of decline (Burns et al., 1997; Garrett, Dube, Tsrilcar, Carabello, & Pechacek, 2011). Black men may not have known about the risks of smoking as early as White men, and smoking cessation efforts started later among Black men, resulting in greater smoking exposure (National Cancer Institute [NCI], 2008). Black women smoke less than their White counterparts (Burns et al., 1997) but have similar statistics for lung cancer incidence and death rate. Additional research is needed to identify the role other factors may play in lung cancer disparity for Black women, such as metabolism of tobacco smoke, susceptibility to tobacco-induced lung cancer, and socioeconomic status (CDC, 2010a). Greater efforts to improve early detection and treatment are essential to eliminate racial disparities in cancer mortality (DeLancey, Thun, Jemal, & Ward, 2008).

Pathophysiology

Lung cancer is classified as small cell lung cancer or non-small cell lung cancer (NSCLC). Eighty-five percent of all lung cancers are NSCLC (Herbst, Heymach, & Lippman, 2008). Smoking is the leading cause of lung cancer, with 80% of lung cancer deaths attributed to tobacco smoke, a carcinogen that causes changes in epithelial cells (American Cancer Society, 2013). Radon is the second leading cause of lung cancer and the leading cause of lung cancer in nonsmokers (NCI, 2012b, 2012c).

Epidemiologic studies have identified a number of factors that increase the risk for lung cancer. Modifiable, nonmodifiable, social, and cultural factors that increase risk are addressed in this article.

Modifiable Risk Factors

Smoking is the single greatest risk factor for lung cancer and is the largest preventable cause of death and disease (CDC, 2011c). The risk increases with the number of cigarettes smoked each day and the number of years of smoking (USDHHS, 2004). Quitting smoking can significantly lower one’s risk of developing lung cancer (NCI, 2012c). Public health efforts to decrease smoking since the 1990s have resulted in an overall decline in smoking prevalence (CDC, 2011c). African Americans have a smoking rate of 20%, which is similar to Whites (CDC, 2011c). However, African American men have higher incidence and mortality rates from lung cancer. Menthol cigarettes are used by African Americans more than other racial groups (Giovino et al., 2004); menthol was thought to mask airway irritation, allowing deeper inhalation and, therefore, increasing users’ exposure to carcinogens found in cigarette smoke. A review of evidence from epidemiologic studies, however, did not support the preference for menthol cigarettes as a contributor to the high lung cancer rates in African American men (Lee, 2011). Genetic susceptibility, environmental exposure, and socioeconomics may play an important role in the higher lung cancer incidence and mortality rates among African Americans (American Lung Association, 2010; Haiman et al., 2006). Additional research is needed on the differential causes of lung cancers in African Americans.

Secondhand smoke is another major risk factor for lung cancer. Most exposures to secondhand smoke occur in the home and work place (USDHHS, 2006). An estimated 88 million nonsmokers were exposed to secondhand smoke from 2007–2008. Deaths related to smoking and secondhand smoke were estimated at 443,000 annually from 2000–2004 (CDC, 2008). Children, in particular, are at risk for exposure, with 54% of young children living with smokers in the home (CDC, 2010b). African American male workers in general, as well as construction workers, blue collar workers, and service workers, experience high levels of secondhand smoke exposure in the workplace (Arheart et al., 2008).

Residential and occupational exposures to chemical carcinogens increase the risk for developing lung cancer. Radon gas exposure in the home is the leading cause of lung cancer in nonsmokers (Darby, Hill, & Doll, 2001; Frumkin & Samet, 2001). Occupational exposure to asbestos, arsenic, chromium, nickel, and tar also can increase the risk of developing lung cancer, particularly in smokers (NCI, 2012b). Although the combination of asbestos exposure and cigarette smoking is a strong risk factor for lung cancer, the exact relationship between the two components remains uncertain (Frost, Darnton, & Harding, 2011).

Additional study is needed on the relationship between diet and lung cancer risk. Frequent consumption of foods high in cholesterol and drinking more than a moderate amount of alcohol increase the risk of lung cancer (NCI, 2012a). The relationship between drinking and tobacco smoking is uncertain because many people both smoke and drink alcohol (NCI, 2012a).

Nonmodifiable Risk Factors

Inherited genetic characteristics are the major nonmodifiable risk factors contributing to the development of lung cancer. The risk for lung cancer increases with age and family history of lung cancer. Risk is increased by smoking or living in a home where carcinogens such as radon are present (Etzel, Amos, & Spitz, 2001). Lung cancer is more prevalent in men and older adults than their female or younger counterparts. People with adenocarcinomas of the lung often have mutations in the epidermal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>All Races</td>
<td>Black Men</td>
<td>White Men</td>
<td>Black Women</td>
<td>White Women</td>
</tr>
<tr>
<td>Incidence</td>
<td>76.4</td>
<td>99.9</td>
<td>76.4</td>
<td>52.6</td>
<td>55.1</td>
</tr>
<tr>
<td>Death</td>
<td>65.7</td>
<td>82.6</td>
<td>65.3</td>
<td>38</td>
<td>40.8</td>
</tr>
<tr>
<td><strong>Note.</strong> All numbers are per 100,000 people.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note.</strong> Based on information from Howlader et al., 2012.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
growth factor gene, which may serve as the initial step in the development of lung carcinoma (Herbst et al., 2008; Sun, Schiller, & Gazdar, 2007). The TP53 pathway contributes to tumor suppression after damage to DNA, and lung cancer in African Americans is associated with a genetic variation in the TP53 pathway (Mechanic et al., 2007; Zhang et al., 2006). Greater susceptibility of African Americans to carcinogenesis attributable to smoking may contribute to lung cancer disparity. Additional research is needed to explain the possible genetic susceptibility of African Americans to smoking-related lung cancer.

Hormonal influences may affect the development of lung cancer. Overexpression of the estrogen receptor beta mediator

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrews et al., 2007</td>
<td>Quasieperimental, repeated measures</td>
<td>103 African American women in public housing</td>
<td>Culturally tailored, nurse-led counseling and nicotine replacement therapy with community health workers for one hour weekly for six weeks</td>
<td>Six-month continuous smoking abstinence rate of 28% in intervention group and 6% in comparison group Changes in social support and smoking self-efficacy over time predicted smoking abstinence. Demonstrated support for community health workers in smoking abstinence efforts</td>
</tr>
<tr>
<td>Bryant et al., 2011</td>
<td>Review of 32 trials</td>
<td>Disadvantaged groups (homeless, prisoners, indigenous populations, at-risk youth, low socioeconomic status, mental illness)</td>
<td>Behavioral smoking cessation programs</td>
<td>Majority of studies reviewed rated low on methodologic quality Increased cessation rate in programs targeted for low-income women at short-term follow-up and for individuals with mental illness at long-term follow-up</td>
</tr>
<tr>
<td>Chouinard &amp; Robichaud-Ekstrand, 2005</td>
<td>Experimental</td>
<td>123 male and 45 female cardiovascular inpatients</td>
<td>Tailored smoking cessation program with telephone follow-up; one hour of counseling and six follow-up calls for two months</td>
<td>42% cessation with follow-up tailored to individual stage of change compared to 30% with counseling alone; 20% cessation with usual care</td>
</tr>
<tr>
<td>Rice &amp; Stead, 2008</td>
<td>Review of 42 trials</td>
<td>Various</td>
<td>Smoking cessation programs with follow-up of at least six months</td>
<td>Interventions significantly increased likelihood of quitting in 31 studies.</td>
</tr>
<tr>
<td>Rigotti et al., 1997</td>
<td>Randomized clinical trial</td>
<td>650 male inpatients</td>
<td>Smoking cessation program; 5–10 minute bedside counseling; 1–3 follow-up phone calls</td>
<td>Increased smoking cessation rates at one month did not lead to long-term abstinence.</td>
</tr>
<tr>
<td>Rigotti et al., 2008</td>
<td>Review of 33 trials</td>
<td>Inpatient</td>
<td>Smoking cessation program, behavioral counseling, and/or pharmacotherapy</td>
<td>Increased cessation rate at 6 and 12 months with smoking counseling begun in hospital and contact for one month or more postdischarge Adding nicotine replacement therapies increased odds of quitting.</td>
</tr>
<tr>
<td>Robles et al., 2008</td>
<td>Review of nine trials</td>
<td>African American, Hispanic, Native American, Alaskan Native</td>
<td>Smoking cessation pharmacotherapy</td>
<td>Evidence supports use of nicotine patch and bupropion sustained release in non-White patients.</td>
</tr>
<tr>
<td>Smith et al., 2011</td>
<td>Randomized clinical trial</td>
<td>616 male inpatients</td>
<td>Nurse-managed smoking cessation: intensive versus brief; five minute bedside counseling with telephone follow-up over two months</td>
<td>Confirmed abstinence one year postintervention; 28% of those in the intensive group, 24% of those in the brief advice group</td>
</tr>
<tr>
<td>Tzelepis et al., 2011</td>
<td>Review of 24 trials</td>
<td>Various</td>
<td>Proactive telephone counseling versus self-help materials or usual care</td>
<td>Proactive telephone counseling increased prolonged or continuous abstinence for actively and passively recruited smokers.</td>
</tr>
<tr>
<td>Wakefield et al., 2004</td>
<td>Experimental</td>
<td>137 male outpatients with cancer who are current smokers</td>
<td>Advice program telephone and in-person counseling; motivational interviewing for three months</td>
<td>No difference in quit rates between groups. Intervention group more likely to report attempts to quit</td>
</tr>
</tbody>
</table>
can promote the development of NSCLC (Motohashi, Okamoto, Yoshino, & Nakayama, 2011). The human papillomavirus may play an important role in the development of small cell lung cancer (Buonomo, Carraresi, Rossini, & Martinelli, 2011). Infection with HIV is linked with a high risk for lung cancer, as well (NCI, 2012a).

Social and Cultural Risk Factors

Socioeconomic status: “Poverty and cancer are, too often, a lethal combination” (Freeman, 2004, p. 74). Poor cancer outcomes and survival rates in patients with early-stage lung cancer are associated with low socioeconomic status (Ou, Zell, Ziogos, & Anton-Culver, 2008). African Americans experience poverty at a higher rate (26%) than Whites (10%) (U.S. Census Bureau, 2012). Poverty is associated with an array of factors that promote health disparities, such as poor living conditions; risky lifestyle; and lack of education, information, and resources. Smoking prevalence is higher for those who live at or below the poverty line (CDC, 2011a).

Access to care: Access to care, critical for obtaining necessary health services, is associated with socioeconomic status and health insurance. Coverage insurance is strongly related to better health outcomes. Low socioeconomic status decreases the likelihood of having medical insurance, a regular health provider, and preventive services (CDC, 2011a). African Americans have higher uninsured rates compared to other racial groups (CDC, 2011b). People in the lowest income group are five times more likely to delay medical care and nine times more likely not to receive needed medical care (Adams, Martinez, & Vickerie, 2010). Lack of paid sick leave can act as a possible barrier to cancer screening (Peipins, Soman, Berkowitz, & White, 2012). Worry over lost income may act as a barrier to seeking care in the presence of symptoms for low-income people with or without health insurance.

Racial inequality in access to curative surgery may help explain a portion of lung cancer disparity in survival and mortality rates. African Americans were found to have a lower rate of surgery for early-stage lung cancer when it was potentially curable (Bach, Cramer, Warren, & Begg, 1999). Other research found African Americans had lung cancer surgery less often than Whites, even if they had health insurance. African Americans were more likely to receive a negative recommendation for NSCLC surgery and more likely to refuse surgery than their White counterparts (Latham, Neville, & Earle, 2006).

Beliefs: Trust in the medical system is necessary for deciding to seek health care and complying with treatment. Mistrust of health professionals can negatively affect African Americans’ care seeking for symptoms of lung cancer, as well as prevent participation in clinical trials from which they may benefit. African Americans’ mistrust of healthcare providers, which has its origin in past discrimination, mistreatment, and exploitation, has resulted in a fear of medicine and medical institutions (Gamble, 1997). That sentiment was intensified with respect to medical research following the unethical treatment of Black men in the Tuskegee study (Gamble, 1997). Researchers found African Americans were more likely than Whites not to trust physicians and suggested that the perception of advocacy may be particularly important to African Americans (Corbie-Smith, Thomas, & St. George, 2002).

Implications for Practice

- Nurses in oncology and other fields should assess patients for smoking behaviors and recommend smoking cessation resources such as quit-lines, brochures, and Web sites.
- Nurses should educate African Americans about the risks of smoking behaviors and their greater susceptibility to smoking-induced lung cancer compared to other groups.
- Culturally tailored smoking cessation programs for African Americans should include plans for follow-up support for efforts to quit, with attention to individuals’ social support needs.

Low levels of healthcare use by African Americans also have been associated with fatalism related to a cancer diagnosis. Fatalism and fear may continue to play a role in African Americans’ willingness to participate in preventive services and acceptance of surgery for treatment, leading to a later stage of lung cancer at time of diagnosis and further contributing to lung cancer disparity (Phillips, Cohen, & Moses, 1999; Powe, 1996).

Research Studies on Smoking Cessation

Several studies have reported results indicating smoking cessation programs as a possible approach for interventions and research by nurses (see Table 2). Few of the publications cited in the table focus on African Americans and smoking cessation, indicating a need for future study by nurse researchers. Bryant, Bonevski, Paul, McEllduff, and Attia (2011) reviewed 32 trials on smoking cessation for disadvantaged groups (e.g., low-income women, those with mental illness) and rated the studies low on the quality of research methods used. Numerous meta-analyses demonstrated support for offering smoking cessation programs to hospitalized patients. High-intensity programs that began while patients were hospitalized and provided supportive contact for more than one month after discharge increased cessation rates (Rigotti, Munafó, & Stead, 2008). Prior to that study, Rigotti et al. (1997) found increased smoking cessation rates at one month were not maintained over time. Similarly, a meta-analysis by Rice and Stead (2008) found interventions that offered hospitalized patients advice and support for smoking cessation increased the likelihood of quitting smoking. Follow-up counseling by telephone or in person increased smoking cessation rates (Rigotti et al., 2008; Tzelepis, Paul, Walsh, McEllduff, & Knight, 2011). The efficacy of pharmacotherapy for smoking cessation in non-White populations also was supported (Robles, Singh-Franco, & Ghin, 2008).

Nurse researchers have made important contributions to knowledge of smoking cessation. A nursing intervention study
conducted by nurse case managers that compared intensive versus brief tobacco cessation interventions confirmed abstinence rates of 28% for those in the intensive program and 24% in the brief program (Smith, Corso, Brown, & Cameron, 2011). Another nursing intervention study used a stages-of-change model to tailor interventions according to the patient’s readiness to quit smoking. The authors found a higher rate of smoking abstinence with inpatient counseling plus telephone follow-up (42%) compared to inpatient counseling alone (30%) or usual care (20%). Participants’ stages of readiness to quit, established at baseline, predicted smoking status at six months follow-up (Chouinard & Robichaud-Ekstrand, 2005). A novel approach by nurse counselors using community health workers and a culturally tailored cessation program for African American women demonstrated a significant difference in abstinence rates in the intervention group (Andrews, Felton, Wewers, Waller, & Tingen, 2007). Wakefield, Oliver, Whitford, and Rosenfeld (2004) found no difference in smoking cessation rates between groups using motivational interviewing (i.e., support, empathy, reflective listening, and feedback) for patients with cancer compared to a control group receiving advice to quit smoking, a quit-smoking brochure, and quit-line service information. Participants who succeeded in quitting smoking at six months, however, were more likely to have had a smoking-related cancer diagnosis, made more attempts to quit before the trial began, and were less likely to have had radiation therapy.

Despite evidence supporting smoking cessation interventions by healthcare personnel, a recent national survey found only 10% of nurses recommended quit lines to patients who smoke (Sarna, et al., 2009). A National Health Interview Survey showed that Black smokers had lower odds of being asked about tobacco use, being advised to quit smoking, and receiving smoking cessation aids (Cokkinides, Halpern, Barbeau, Ward, & Thun, 2005).

Implications for Nursing Practice

Oncology nurses and those in other fields can readily leverage their access to patients in hospital settings by implementing the current practice guidelines for smoking cessation. Nurses should recognize the potential benefits of incorporating routine inquiry about smoking behavior during admission assessments and provide patient education resources for quitting smoking (see Figure 1). Smoking cessation advice provided in inpatient or outpatient settings that provides frequent follow-up support for efforts to quit will require new policy initiatives along with administrative support. Nurses need to be mindful of the principles of smoking cessation when planning patient education. Every effort by patients to quit smoking should be reinforced positively. Nurses should understand that several attempts may be needed before successfully quitting.

Conclusions

Greater efforts are needed to screen for and promote smoking cessation among African Americans who experience significant differences in lung cancer incidence and mortality. To ensure an ongoing cadre of prepared nurses, nursing curricula should include principles of smoking cessation, resources for smoking cessation, and incorporation of both in clinical practice. The nurse’s role in preventing initiation of smoking in youth and young adults should be presented in health promotion courses and include resources for community outreach activities. Indeed, preventing young people from beginning to smoke is a powerful strategy for reducing tobacco use and achieving the ultimate goal of decreasing lung cancer incidence.

Scant literature focuses on smoking cessation interventions with African Americans. More studies are needed to describe the process of attempting to quit smoking, barriers encountered, and achieving success in smoking cessation. Additional research is needed to evaluate which culturally adapted programs are most helpful for African Americans who desire to stop smoking. For that reason, researchers should ensure recruitment and inclusion of African Americans in their studies. African Americans should be encouraged to participate in clinical trials on smoking prevention and cessation. The goal of


Reducing the burden of lung cancer in African Americans can best be achieved by developing evidence-based interventions aimed at preventing smoking initiation and successful smoking cessation.

References


Receive Continuing Nursing Education Credits

Receive free continuing nursing education credit* for reading this article and taking a brief quiz online. To access the test for this and other articles, visit http://evaluationcenter.ons.org/Login.aspx. After entering your Oncology Nursing Society profile username and password, select CNE Tests and Evals from the left-hand menu. Scroll down to Clinical Journal of Oncology Nursing and choose the test(s) you would like to take.

* The Oncology Nursing Society is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center’s COA.