

Disparities in Perceptions of Lung Cancer among African American, Hispanic, and Caucasian Adults: Evidence from the Health Informational National Trend Survey

Edward V. Wallace Ph.D., MPH. ^{#1}Derrick Jenkins, Ph.D. ^{#2}

^{#1}Associate Professor, Department of Africana Studies
College of Arts and Sciences, University of Cincinnati

Abstract

Background: African Americans are more likely to die from lung cancer than any other ethnic group. Furthermore, many African Americans and Latinos have a lower perception of risk when it comes to being diagnosed for lung cancer. Given the disparities in lung cancer across income levels, race, age, and education, we examined the risk of lung cancer using the Health Informational National Trend Survey (HINTS) and compared them across demographic markers to determine the differences in perception that may contribute to disparities in lung cancer.

Methods: A cross-sectional study design was conducted using the 2015 HINTS National Cancer Institute survey. A total of 1,246 adults participated in the study. Hispanics ($n = 161$), Blacks ($n = 119$), and Whites ($n = 966$). We used multivariate logistic regression to calculate the odds ratio and to explore the associations between lung cancer and demographic variables including race, age, and education.

Results: When compared with whites, Blacks perceived themselves to be less likely to develop lung cancer in the future ($p < .001$), as well as worrying about lung cancer ($p < .001$). Lower level of education was correlated with lower perceived risk of developing lung cancer ($P = .0063$), and never or rarely worrying about lung cancer ($p = .0101$). In terms of age, adults (34 – 49 years) agreed that there is no risk of getting lung cancer if someone only smokes a few years ($p = .0037$).

Conclusion: Our analysis showed that the inaccurate perceptions of lung cancer were common among older, ethnic minorities with less education. These perceptions maybe a reflection of one's cultural values, fake news, and socioeconomic status. These views may help explain the increase in lung cancer morbidity and mortality in minorities. This provides evidence that providing accurate health education that is culturally appropriate remains to be a critical

step in reducing health disparities among minority populations.

Keywords — Health Disparities, Perceptions, Lung Cancer, Adults, African Americans, Hispanics, Caucasians

INTRODUCTION

Studies have shown that preventative behavior to prevent lung cancer is often determined how severe a person's perceives their risk [1],[2],[3]. African Americans are more likely to die from lung cancer than any other ethnic group [4]. Furthermore, many African Americans have a lower perception of risk when it comes to being diagnosed with lung cancer [2]. Latinos and Asian minorities also perceive themselves at lower risk for lung cancer [5]. In African American men and women, lung cancer is the second leading cause of cancer related deaths next to prostate and breast cancer, respectively [24].

Although new rates of lung cancer have decreased across both racial demographics, lung and bronchus cancers occur in higher numbers in African American men, than White men, while lower cases are reported in African American Women than White Women [24]. Education about tobacco use also predicts lung cancer risk perception. According to data from the American Cancer Society (2017) 87% of college graduates was aware that smoking was directly associated with lung cancer and the second most common cancer in African Americans [6]. People with a low socioeconomic status often view themselves as less susceptible to lung disease and are less likely to seek preventive care [6]. Poor patient perceptions increase negative health consequences [7]. In a study with regard to breast cancer, Kerr-Cresswell and associates (2005) reported that nearly 35% of women with symptomatic breast cancer delayed seeking medical attention for at least 3 months due to poor perception [8]. This study is particularly relevant because it supports the hypothesis that patient perception of if they are at high or low risk of developing cancer contributes to health disparities. In older adults' lung cancer among African Americans surpass that of their

Caucasian counterparts: 26.7% versus 24% respectively [9].

Given the disparities in lung cancer across income levels, race, age, and education, we examined the risk of lung cancer using the Health Informational National Trend Survey (HINTS) and compared them across demographic markers to determine the differences in perception that may contribute to disparities in lung cancer.

METHODOLOGY

A cross-sectional study design was conducted using the 2015 HINTS National Cancer Institute survey. The Health Information National Trends Survey (HINTS) is a nationally representative survey, which assesses cancer-related knowledge, attitudes and behaviors among adults aged 18 or older in the United States [10]. One adult within each household was sampled using the computer-assisted telephone interview system. A survey was considered to be complete if at least 80% of the survey was answered. A total of 1,246 adults participated in the study. Hispanics (n = 161), Blacks (n = 119), and Whites (n = 966). Lung cancer related perceptions were examined in Hispanics, Blacks, and Whites. Other racial/ethnic groups were not analysed due to small sample size. Respondents answered questions about lung cancer and perceived risk.

Statistical analysis

We used multivariate logistic regression to calculate the odds ratio and to explore the associations between lung cancer and demographic variables including race, age, and education. All data was analysed using the Statistical Package for the Social Sciences (SPSS) version 23. To examine whether responses were associated with race we adjusted for gender, age, education, income and logistic regression was applied. That process was repeated for analysis of all socio-economic status variables.

Demographics

Of the 1,246 adult participants 79.9% were White, 12.9 Hispanic and 9.5% Black. Blacks and Whites both tended to have some college education and Whites reported a higher income than Blacks and Hispanics (Table 1).

Table 1. Characteristics according to Race and Ethnicity

Characteristics	Hispanic (12.9%) n = 161		Black (9.5%) n = 119		White (79.9%) n = 966	
Age	N	%	N	%	N	%
18 to 34	70	43.5	35	29.4	160	16.6
35 to 49	63	39.1	40	33.6	279	28.9
50 to 64	19	11.8	24	20.2	262	27.1
65 to 74	5	3.1	17	13.4	137	14.2
75+	4	2.5	3	2.5	128	13.3
Gender						
Male	60	37.3	37	31.1	346	35.8
Female	101	62.7	82	68.9	620	64.2
Relationship						
Married	60	37.3	24	20.2	83	8.6
Widowed	33	20.5	27	22.7	275	28.5
Divorced	41	25.5	41	34.5	291	30.1
Never Married	27	16.8	27	22.7	317	32.8
Education						
Less than HS	60	37.3	24	20.2	83	8.6
HS Graduate	33	20.5	27	22.7	275	28.5
Some College	41	25.5	41	34.5	291	30.1
College Graduate	27	16.8	27	22.7	317	32.8
Income						
Under \$25,000	71	44.1	35	29.4	245	25.4
\$25,000 - \$34,999	17	10.6	25	21.0	128	13.3
\$35,000 - \$49,999	23	14.3	21	17.6	140	14.5
\$50,000 - \$74,999	20	12.4	20	16.8	210	21.7
\$75,000+	30	18.6	18	15.1	243	25.2

RESULTS

Racial Status

When compared with Whites, Blacks perceived their likelihood of developing lung cancer in the near future as low ($p < .001$), as well as worrying about lung cancer ($p < .001$) (Table 2). When asked the question “There is not much you can do to reduce your chances of getting lung cancer?” both Blacks ($p = .0441$) and Hispanics ($p = < .001$) were more likely to agree. Hispanics were more likely than Whites to believe lung cancer developed over a period of several years ($p < .001$). Compared with Whites, Blacks agreed that getting lung cancer depends on a person’s genes ($p = .0007$). Both Blacks ($p = .0138$) and Hispanics ($p = .001$) agreed that people with lung cancer would have pain or other symptoms prior to being diagnosed. When asked the statement “There is no risk of getting cancer if someone only smokes a few years” both Blacks and Hispanics were more likely to agree than Whites ($p = .0493$ and $p = .0355$ respectively) (Table 2).

Table 2.
Results by Race (compared with whites)

Questions	Blacks		Hispanics	
	OR	P value	OR	P value
1. Likelihood of you developing lung cancer in the future (low...very high)	5.43	<.001*	1.31	.1277
2. Worry about lung cancer (rarely...or never...all the time)	0.21	<.001*	0.93	.4550
3. Not much you can do to reduce getting cancer (agree/disagree)	2.31	.0441*	3.78	.001*
4. Lung Cancer develops over a period of several years (agree/disagree)	2.87	.0147	3.37	.001*
5. Lung Cancer is caused by a person's behavior (agree/disagree)	0.37	.0110*	0.58	.4442
6. Seems almost everything causes lung cancer (agree/disagree)	0.53	.0425*	1.51	.0923
7. You are reluctant to get checked for lung cancer because you fear you may have it (agree/disagree)	2.06	.2197	1.38	.0700
8. Getting lung cancer depends more on a person's genes (agree or disagree)	0.40	.0007*	0.36	.0507
9. People with lung cancer would have pain or other symptoms prior to being diagnosed (agree/disagree)	2.19	.0138*	3.35	.001*
10. No risk of getting cancer if someone only smokes a few years (agree/disagree)	2.82	.0493*	2.00	.0355*
OR = Odds Ratio *Statistically significant (p < .05).				

Education

Lower levels of education, was also correlated with lower perceived risk of developing lung cancer in the future (P = .063), and never or rarely worrying about lung cancer (p = .001) (Table 3). Those who completed high school agreed that it seems as though everything causes cancer (p = .002) and that they were reluctant to get checked for lung cancer because they feared they may have it (p = .01). Lower education was also associated with people with lung cancer having pain or other symptoms prior to being diagnosed (p < .001). Those with less education also agreed that there was not risk of getting lung cancer if a person only smoked a few years (P < .027) (Table 3).

Table 3.
Results by Education (compared with college graduates)

Questions	< HS		HS Grad		College	
	OR	PV	OR	PV	OR	PV
1. Likelihood of you developing lung cancer in the future (low to very high)	2.076	.063	1.03	.8804	1.03	.8952
2. Worry about lung cancer (rarely, never or all the time)	2.27	.001*	1.83	.040	1.04	.8835
3. Not much you can do to reduce getting cancer (agree/disagree)	8.31	.001*	5.00	.01*	3.41	.081
4. Lung Cancer develops over a period of several years (agree or disagree)	8.33	.001*	5.08	.001*	3.44	.001*
5. Lung Cancer is caused by a person's behavior (agree/disagree)	1.19	.6441	0.68	.293	1.50	.2311
6. Seems almost everything causes lung cancer (agree/disagree)	5.12	.001*	3.44	.002	1.83	.0654
7. You are reluctant to get checked for lung cancer because you fear you may have it (agree or disagree)	8.44	.001*	7.35	.01*	2.80	.0517
8. Getting lung cancer depends more on a person's genes agree or disagree	1.03	.9011	1.12	.610	1.06	.7806
9. People with lung cancer would have pain or other symptoms prior to being diagnosed (agree/disagree)	7.43	<.001*	3.06	.022	2.02	.0319
10. No risk of getting cancer if someone only smokes a few years (agree or disagree)	2.48	.027*	1.95	.029	0.93	.6932
OR = Odds Ratio; PV = P Value *Statistically significant (p < .05).						

Age

Compared with young adults (18 – 34 years old), older adults stated that the likelihood of developing lung cancer in the future was very high ($p < .001$) and that they worried about lung cancer all the time ($p = .001$) (Table 4). Those over the age of 75 agreed that there was not much you can do to reduce getting lung cancer ($p = .001$). Similar to education all age groups (34 – 39 years) ($p < .01$), (50 – 64 years) ($p < .01$), (65 – 74 years) ($p < .0001$), and (75 years and older), ($p < .01$) agreed that lung cancer developed over a period of years. Middle-aged adults (50 – 64 years) believed that lung cancer is caused by a person's behavior ($p = .001$). This age group ($p < .001$) as well as those adults age (34 – 49 years) agreed that there is no risk of getting lung cancer if someone only smokes a few years ($p = .01$) (Table 4).

Table 4 Results by Age (compared with 18 – 34 years old)

Questions	34 – 49		50 – 64		65 – 74		>75 years	
	OR	PV	OR	PV	OR	PV	OR	PV
1. Likely to develop lung cancer in the future (low to very high)	0.74	.84	0.61	.493	1.66	.46	3.76	.001*
2. Worry about lung cancer (rarely, never or all the time)	0.79	.996	0.89	.763	1.82	.806	3.76	.001*
3. Not much you can do to reduce getting cancer (agree or disagree)	2.11	.81	0.94	.805	1.34	.586	3.58	.001*
4. Lung Cancer develops over several years (agree or disagree)	3.49	.01*	2.10	.01*	3.04	.01*	2.09	.001*
5. Lung Cancer is caused by a person's behavior (agree or disagree)	2.11	.81	0.94	.001	1.34	.86	3.58	.001*

6. Seems almost everything causes lung cancer (agree or disagree)	3.49	.001	2.10	.067	3.04	.001*	2.09	.001*
7. You are reluctant to get checked for lung cancer because you fear you may have it (agree or disagree)	1.16	.74	1.02	.996	0.74	.641	1.50	.363
8. Getting lung cancer depends more on a person's genes (agree or disagree)	0.93	.72	1.46	.199	1.0	.912	1.47	.413
9. People with lung cancer would have pain or other symptoms prior to being diagnosed (agree or disagree)	1.12	.73	0.84	.621	1.07	.8398	1.24	.6926
10. No risk of getting cancer if someone only smokes a few years (agree or disagree)	0.58	.01	0.43	.001*	0.61	.057	1.53	.530
OR, Odds Ratio, PV = P Value *Statistically significant ($p < .05$).								

DISCUSSION

It has been well documented that when it relates to cancer that health disparities exist in society [11],[12],[13]. African Americans and other minorities tend to have higher mortality and morbidity than their White counterpart. Lung cancer among Whites continues to increase drastically, it also continues to increase among African Americans and Hispanics and people who live below the poverty level [14]. Lack of access to health insurance and race negatively impact lung cancer outcomes [15],[16].

Although poverty, lack of education, and racism are considered to be a major contributors to negative health outcomes, these factors by themselves do not fully account for all the health disparities associated within African American and

Latino communities. In addition to poverty, lack of education, and racism there are other social determinants of health that we must pay attention too, such as lack of trust in the healthcare system, and the lack of Black and Latino oncologist in the medical field. Often times when patients do not see health professionals that look like them, they tend to walk away from the doctors office with the perception that they are not a risk for developing lung cancer. In fact this is furthest from the truth. Many times Black and Latinos health outcomes are worst because there is no patient –to-doctor relationship. We need to be mindful and pay particular attention to how doctors communicate with their patients because this can impact individual's perception of if they are at high or low risk of lung cancer.

Data from the HINTS survey reveal that lung cancer risk perceptions tend to differ across demographic characteristics. These differences are important to note because they may play a significant role on how lung cancer patients go about seeking treatment and prevention. Older adults, who are minority, and less educated tend to be at greater risk of having false perceptions of lung cancer. People who are over 65 years of age who potentially have a weaker immune system tend to be at greater risk of lung cancer [17]. Being an older adult with lung cancer is strongly associated with re-hospitalization and mortality [18]. Elderly patients whom are not strong enough to endure having a surgical lobectomy may also be a factor [19]. Mortality from lung cancer tends to increase with age [20].

Older adults in this study worried all the time about the likelihood of getting lung cancer. Reasons for this worrying is unclear in this study because older adults did not believe that there was a risk of getting lung cancer if someone smoked. Future research should focus on why older adults have these perceptions regarding lung cancer.

Our HINTS study showed that people who had higher levels of education also had correct perceptions of lung cancer. A U.S. study found that cancer patients with some college education tended to be active information seekers and generally tended to seek out information about their health compared to less educated cancer patients who were viewed as passive information seekers [21]. Having low levels of education is a risk factor for lung cancer. A recent study showed that less educated individuals were more likely to be chronically ill and have lower health literacy than highly educated individuals [22]. This alludes to the fact that more of an effort needs to be made when students are taking health classes in school.

Our most significant and interesting finding of our study had to do with the perceptions of African Americans. Black respondents were aware of developing lung cancer in the future, and worried more about getting lung cancer compared to Hispanics and Whites. Blacks in our study were

more likely to agree that lung cancer is caused by someone's behavior compared to whites. The leading health behavior for developing lung cancer in African Americans is the inhalation of carcinogens, which tends to be cigarette smoke. One theory is that the type of cigarettes Blacks tend to inhale may influence carcinogenic exposure resulting in lung cancer. King (2016) observed that 70% of African Americans prefer to smoke menthol cigarettes. [23]. Menthol cigarettes causes a cooling effect permitting African Americans to take deeper inhalation and larger puffs, which leads to greater exposure to carcinogens in their lungs.

Black were more likely to believe that lung cancer depended on a person's genes and people with lung cancer would have pain or other symptoms prior to being diagnosed. These indicate that Blacks have a great understanding of their potential health risks of developing lung cancer. The use of biomarkers is essential for predicting human exposure to nicotine. King (2016) observed that cotinine, which is the major metabolite of nicotine, can be measured in blood, saliva, or urine making it one of the best reliable and valid biomarkers [23]. King (2016) found that saliva cotinine levels are significantly higher in African Americans than in Caucasians when they both smoked an equal number of cigarettes [23]. This suggests that the elimination of cotinine from the body or the body's ability to metabolize nicotine maybe slower in African Americans allowing carcinogens to remain in the body longer to develop lung cancer.

LIMITATIONS

There were several limitations in this study that need to be discussed. First, the HINTS survey is a cross-sectional design, which only gives a snapshot of a specific point in time. Second, the HINTS questionnaire used the general phase "lung cancer" rather than specific stages of lung cancer. This limits how the data can be analyzed with regard to lung cancer. Third there were relatively a small number of Black and Hispanic participants. Finally, the survey response rate was low. This is a limitation because researchers rely on the HINTS database to conduct research.

Despite these limitations we believe that our research still is of importance and that in future studies these limitations could be addressed. First, we can look at longitudinal studies, which can give us a better understanding of risk perceptions of lung cancer. Second, we can ask specific questions in relation to the stages of lung cancer. Third, in the future we could use larger samples of Blacks and Hispanic participants who would help define their risk perceptions of lung cancer. Finally, we can take in consideration that many people use cell phones in lieu of landline phones.

By using this methodology we could increase the response rate to complete telephone surveys.

CONCLUSION

Our analysis showed that the inaccurate perceptions of lung cancer were common among older, ethnic minorities with less education. Elderly participants felt that there was no risk of getting lung cancer if someone only smoked a few years. Both Blacks and Hispanics perceived that there is not much you can do to reduce your chances of getting lung cancer and that there is no risk of getting cancer if someone only smokes a few years. These inaccurate perceptions maybe a reflection of cultural values, fake health information from the internet, low socioeconomic status, and other factors. These views may help explain the increase in lung cancer morbidity and mortality in minorities. Despite these concerns, reliable and valid information from reputable sources can have a positive impact on raising one's awareness about lung cancer. This provides evidence that providing accurate health education that is culturally appropriate remains to be a critical step in reducing health disparities among minority populations.

REFERENCES

- [1] Vernon Simpson. 1999. "Risk perception and risk communication for cancer screening behaviors: a review". Journal of National Cancer Institute Monographs 25: 101-119.
- [2] Katapodi, Lee, Nicole Facione, and Michael Dodd. 2004. "Predictors of perceived lung cancer risk and the relation between perceived risk and lung cancer screening: a meta-analytic review". Prevention Medicine 38: 388-402.
- [3] McQueen, Swank, Louis Bastian, and Vernon Simpson. 2008. Predictors of perceived of susceptibility of breast cancer and changes over time: a mixed modelling approach. Health Psychology 27: 68-77.
- [4] American Cancer Society. (2007). "Cancer facts and figures". Atlanta, GA Author
- [5] Orom, Kiviniemi, Underwood, Lisa Ross, and Vincent Shavers. 2010. Perceived cancer risk: why is it lower among nonwhites than whites? Cancer Epidemiology Biomarkers Prevention 19: 746-754.
- [6] American Cancer Society. Cancer Facts & Figures 2017. Atlanta: American Cancer Society; 2017.
- [7] Centers for Disease Control and Prevention (2002). Annual smoking-attributable mortality years of potential life lost, and economic cost Morbidity and Mortality Weekly Report, 51(14), 300-303.
- [8] Kerr-Cresswell, D.M., Fitzgerald, B., Fergus, K., Gould, J., Lenis, M., & Clemons, M. (2005). Why so late? Presentation delay in locally advanced breast cancer. Journal of Clinical Oncology, 23(16S), 712
- [9] Centers for Disease Control and Prevention (2006a). Tobacco use among adults. Morbidity and Mortality Weekly Report, 55(42), 1145-1148.
- [10] Health Information National Trends Survey [Internet]. Bethesda (MD): U.S. National Institute of Health. Available at: <http://hints.cancer.gov>. Accessed January 15, 2015.
- [11] Wingo, Bolden, Tong, Parker, Leslie Martin and Carl Health. 1996. Cancer statistics for African Americans. Cancer Journal Clinical 46: 113-125.
- [12] Byrd, Wilson, Samuel Hoyler, and Gary Peck. 2004. Advanced presentation of melanoma in African Americans. Journal of American Academy Dermatology 50: 21-24.
- [13] Halder, and Karen Bang. 1988. Skin cancer in Blacks in the United States. Dermatology Clinical. 6: 397-405.
- [14] Linos, Sweeter, Cockburn, Gary Colditz, and Cindy Clarke. 2009. Increasing burden of Cancer in the United States. Journal Investigative Dermatology 129: 1666-1674.
- [15] Gellar, Miller, Lew, Clapp, Melissa Wenneker, and Hong Koh. 1996. Cutaneous melanoma mortality among the socioeconomically disadvantaged in Massachusetts. American Journal of Public Health 86: 538-543.
- [16] Reyes-Ortiz, John Goodwin, and Julia Freeman. 2006. Socioeconomic status and survival in older patients with cancer. Preventive Medicine 54: 1758-1764.
- [17] Hung, W. W., Ross, J. S., Boockvar, K. S., & Siu, A. L. (2011). Recent trends chronic disease, impairment and disability among older adults in the United States. BMC Geriatrics, 11(1), 47. 11- 47.
- [18] Lum, H., Studenski, S., Degenholtz, H., Hardy, S., Lum, H. D., Studenski, S. A., & Hardy, S. E. (2012). Early hospital readmission is a predictor of one-year mortality in community-dwelling older Medicare beneficiaries. JGIM: Journal Of General Internal Medicine, 27(11), 1467-1474.
- [19] Stitzenberg, K., Shah, P., Snyder, J., & Scott, W. (2012). Disparities in access to video-assisted thoracic surgical lobectomy for treatment of early-stage lung cancer. Journal of Laparoendoscopic & Advanced Surgical Techniques, 22(8), 753-757.
- [20] Morris and Alexis Sober. 1989. Malignant cancer in the older patient. Clinical Geriatric Medicine 5: 171-181.
- [21] Ehemann, C., Berkowitz, Z., Lee, J., Mohile, S., Purnell, J., Marie Rodriguez, E., & ... Morrow, G. (2009). Information-seeking styles among cancer patients before and after treatment by demographics and use of information sources. Journal Of Health Communication, 14(5), 487-502. doi:10.1080/10810730903032945
- [22] Milne, R., Puts, M., Papadakis, J., Le, L., Milne, V., Hope, A., & ... Giuliani, M. E. (2015). Predictors of High eHealth Literacy in Primary Lung Cancer Survivors. Journal of Cancer Education, 30(4), 685-692. doi:10.1007/s13187-014-0744-5
- [23] King, Gary. 2016. Tobacco use. Ed. Jessica Ramos, 316-344. New York: Guilford Publications.
- [24] National Center for Health Statistics. National Health Interview Survey, 2000, 2013, and 2014. Public-use data file and documentation .<http://www.cdc.gov/nchs/nhis.htm>