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Characteristics of American Indian light smokers

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Abstract

Introduction—American Indians (AI) have the highest smoking rates of any racial/ethnic group in the U.S. and have more difficulty quitting smoking. Little is known about the smoking characteristics of AI smokers. The present study compared the demographic and smoking characteristics of light (10 cigarettes per day; N = 206) and moderate/heavy (11+ cigarettes per day; N = 86) AI smokers participating in a cross-sectional survey about smoking and health.

Methods—Multiple methods were used to recruit participants in attendance at powwows, health and career fairs, and conferences. A total of 998 AI (76% cooperation rate) completed a survey assessing general health, sociodemographics, traditional and commercial tobacco use, knowledge and attitudes related to cancer, source of health information and care and other health-related behaviors.

Results—AI light smokers were younger and less likely to be married or living with a partner compared to moderate/heavy smokers. AI light smokers were less dependent on smoking and more likely to have home smoking restrictions. There were no differences with respect to number of quit attempts in the past year or the average length of their most recent quit attempt by light vs. moderate/heavy smoking. In addition, a similar proportion of light and heavy smokers reported using tobacco for traditional purposes such as ceremonial, spiritual and prayer.

Conclusions—These findings highlight important differences between AI light and heavier smokers. Differences related to smoking characteristics such as level of dependence and home smoking restrictions have important implications for the treatment of AI smokers.

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Contributors

Authors NN, KAG, WSC, and CMD designed the study and wrote the protocol. Author BB conducted the literature review and drafted part of the manuscript. Author NN wrote parts of the first draft and conducted the statistical analysis. Author CMP, CM and BF assisted with editing the manuscript. All authors have contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

Keywords

Smoking; American Indians

1. Introduction

American Indians (AI) have the highest smoking rates of any racial/ethnic group in the U.S. and have more difficulty quitting smoking (Choi et al., 2006; Cox, Okuyemi, Choi, & Ahluwalia, 2011; Gohdes et al., 2002). Approximately 33% of AI adults were current smokers, compared with 22.5% White adults and 20.6% African American adults (Barnes, Adams, & Powell-Griner, 2010). While smoking prevalence across most racial/ethnic groups has declined, this has not been the case in some AI populations, where rates vary across regions and tribal communities. Smoking among AI females increased in 2002, from 34.1% in 1980 to 40.9% (NHIS 2002). High rates of smoking contribute to higher mortality rates from cardiovascular disease, hypertension, lung cancer and other chronic conditions (Barnes et al., 2010; Burgess et al., 2007).

In 2000, 70% of AI smokers indicated a desire to quit; 41% of these attempted to quit and 5% succeeded. Among AI who had ever smoked, 41% reported successfully quitting, compared with 51% of Whites (Barnes et al., 2010; Choi et al., 2006). Barriers to cessation include lack of access to health care, nicotine replacement therapy and pharmacotherapy, and a lack of culturally appropriate programs (Burgess et al., 2007; Choi et al., 2006; Denny, Holtzman, Goins, & Croft, 2005). Psychological disorders and a higher risk for traumatic events within this population hinder cessation and contribute to smoking and relapse (Burgess et al., 2007; Hodge et al., 1995; Manson, Beals, Klein, & Croy, 2005). Finally, tobacco is used traditionally among some AI (Choi et al., 2006; Daley et al., 2011; Nez Henderson, Jacobsen, & Beals, 2005) and traditional use may have a protective effect (Daley et al., 2011).

Research and public health interventions generally aim to reduce smoking in moderate/heavy smokers, those who smoke more than 10 cigarettes daily. Theoretical models are based on what is known about the addiction process and cessation in these smokers. Far less is known about smoking patterns and cessation in light smokers (Fagan & Rigotti, 2009; Schane, Ling, & Glantz, 2010; Shiffman, 2009; Trinidad et al., 2009). There is little consensus as to what constitutes a “light” smoker, including lack of clarity on frequency, physiological addiction, and behavioral patterns. Light smokers may use fewer than 20, 15 or 10 cigarettes per day, and may do so intermittently (Schane et al., 2010; Shiffman, 2009; Shiffman & Paty, 2006). We define light smokers as those who smoke 10 cigarettes per day, as this is the most commonly accepted definition.

Incidence of light smoking is increasing, while regular use has declined due to public health interventions to aid cessation and increase awareness, as well as policy measures, such as smoking bans, indoor air quality laws, and taxation. (Fagan & Rigotti, 2009; Schane et al., 2010). Concurrent increase in light smoking is cause for concern. One-fifth to one-half of U.S. smokers are light or intermittent smokers (LITS) (Fagan & Rigotti, 2009; Shiffman, 2009). Studies indicate that minority racial/ethnic groups, including AI, are more likely to be light smokers, (Fagan & Rigotti, 2009; Shiffman, 2009; Trinidad et al., 2009) who consistently experience the most disparate rates of smoking related diseases. Because the Surgeon General has determined that there is no safe level of tobacco smoke exposure (USDHHS, 2006), there is a significant need to understand light smokers’ patterns to aid cessation efforts. We seek to characterize the differences between AI light versus moderate/heavy smokers to understand better ways to target cessation efforts.

2. Methods

2.1. Study participants

Because there is no comprehensive list of AI residents in Kansas or the Midwest region, we used multiple recruitment methods. Participants were recruited by AI research assistants via pow-wows (N = 207), focus groups (N = 211), health fairs (N = 124), career fairs and conferences (N = 275), and other AI events or through referrals (N = 181). This convenience sample potentially created a non-representative sample with respect to socio-demographic characteristics. We recruited 998 AI from May 2008 to December 2009. The cooperation rate, calculated as the percent who agreed to the survey of all those who were approached, was approximately 76% (998 out of 1313 approached) across all recruitment methods. After providing written and verbal consent, participants completed a 20-minute self-administered survey related to health behaviors and knowledge. Participants received a \$10 gift card for their time and participation.

Eligible participants included men and women who self-identified as AI (only or in part) and were at least 18 years of age. The survey included questions about general health, demographics, traditional and commercial tobacco use, knowledge and attitudes related to cancer, use of the Internet, sources of health information and health care and other health-related behaviors. This study was approved by the Institutional Review Board of the University of Kansas Medical Center.

2.2. Measures

2.2.1. Smoking status—Current smokers (those who reported smoking “every day” or “some days”) were asked: “On average, how many cigarettes do you now smoke in one day?” Those who answered 10 cigarettes or less per day were classified as light smokers and those smoking more than 10 as moderate/heavy smokers.

2.2.2. Traditional use of tobacco—We asked the following questions to ascertain information related to traditional use of tobacco for all participants: 1) “Do you use tobacco for traditional purposes, such as ceremonial, spiritual, or prayer, etc.?” (Response options were Yes/No), 2) “When using tobacco for traditional purposes, how do you use it?” (Response options were: ‘check all that apply’ Smoke cigarettes, Smoke a pipe, Smudge, Offering or prayer, Gift, Other).

2.2.3. Quitting history—To estimate the smoking relapse curve for current smokers, participants were asked the following questions related to quitting history: 1) “Are you seriously thinking about quitting in the next 30 days?”, 2) “In the last 12 months, how many times have you tried to quit smoking for at least one day?” and 3) “On your last quit attempt, how many days did you quit for?”

2.3. Data analysis

Discrete variables are described using frequency and percentage. Means and standard deviations (SD) are used to describe continuous variables. Parametric tests were used for comparisons among groups: Chi-square test in the case of categorical variables and the *t*-test in the case of continuous variables. The relapse curve was generated using the Kaplan–Meier method and the log-rank test was employed to compare the curves for groups of interest. Statistically significant associations and differences were identified by *p*-values of less than 0.05. All analyses were conducted using SAS version 9.2 (copyright 2002–2008 by SAS Institute Inc., Cary, NC, USA).

3. Results

Table 1 shows the demographic distribution and smoking characteristics of current smokers. Of the 998 participants, 292 (29.3%) were current smokers. The mean age of smokers was 33.5 years and approximately 57% were females. Current smokers reported smoking an average of 10 cigarettes per day. Seventy one percent of the current smokers smoked 10 cigarettes or less per day and were classified as light smokers. Fewer than 36% of the smokers smoked their first cigarette within 30 min of waking and 55% had home smoking restrictions. The mean number of days for most recent quit attempt was 46 days with an average of 3 quit attempts during the past 12 months. Most smokers (74%) reported using traditional tobacco, and of those who used traditional tobacco, 74% used traditional tobacco in a form that involved smoking it.

Table 2 compares light and moderate/heavy smokers and shows differences between the two. A higher proportion of moderate/heavy smokers smoke their first cigarette within 30 min of waking compared to light smokers. Though 73% of moderate/heavy smokers had children at home, only 38% had home smoking restrictions. Almost 44% of moderate/heavy smokers were married or living with a partner compared to only 27% of light smokers.

Fig. 1 shows the duration of most recent quit attempt for all current smokers by level of tobacco use. Though not statistically significant ($p = 0.26$), on average light smokers had similar abstinence rates (mean of 46 $\pm$ 162 days) compared to moderate/heavy smokers (mean of 45 $\pm$ 276 days).

A stepwise logistic model showed that smoking within the first 30 min of waking is the strongest predictor of being a moderate to heavy smoker with an odds ratio of 13.7 (95% CI 7.1–26.6).

4. Discussion

In this descriptive cross-sectional study of AI smokers, light smokers were younger, less likely to be married or have a partner, more likely to have a complete smoking ban at home, and less likely to smoke within 30 min of waking. Factors that were not significantly different between light and moderate/heavy smokers were number of quit attempts in the past year, use of traditional tobacco, and length of most recent quit attempt. Approximately 70% of current smokers reported being “light smokers,” smoking 10 or less cigarettes per day.

There are too few smoking cessation interventions for this under-served population which has the highest smoking prevalence of any racial/ethnic group and most interventions have focused on daily and heavier smokers. However, an increasing percentage of current smokers in the U.S. are lighter and non-daily smokers (CDC, 2007) (Shiffman, 2009). Our findings support previous findings that the majority of AI are light smokers, but have as difficult a time quitting as heavier smokers. Therefore, it is critical that cessation programs for AI incorporate information for light smokers. Further research is needed to understand the driving factors causing AI light smokers to have more difficulty quitting than other light smokers, including social and behavioral issues and potential genetic and pharmacokinetic factors.

Though statistically not significant, the percentage of current smokers using tobacco for traditional purposes is higher for light smokers compared to moderate/heavy smokers and a higher percentage of light smokers used traditional tobacco by smoking it. The impact of the way traditional tobacco is being used (i.e. smoked compared to other methods) on cessation should be examined further because our results suggest a potential benefit. As previously

reported, the use of traditional tobacco in ways other than smoking may be protective for helping AI remain quit, while smoking traditional tobacco diminishes, though does not negate, the effect (Daley et al., 2011).

On average, light smokers are 10 years younger compared to moderate/heavy smokers. If we assume this as a trend of smoking more cigarettes as AI get older, then the need for more research and appropriate interventions at a younger age becomes more acute.

We found that the overwhelming majority of AI smokers were light smokers. This will inform interventions emphasizing considerable risks of morbidity and mortality associated with any level of smoking. More studies are needed to examine the relationship of traditional use of tobacco and smoking quantity among AI. Data from African Americans show that although they smoke fewer cigarettes per day compared to Whites, their level of nicotine dependence may be similar to heavier smokers (Trinidad, Gilpin, Lee, & Pierce, 2004; White, Nagin, Replogle, & Stouthamer-Loeber, 2004). A possible explanation is that slower nicotine metabolism has been associated with lower rates of smoking (Perez-Stable, Herrera, Jacob, & Benowitz, 1998; Tyndale & Sellers, 2001). Pharmacokinetic studies are needed to characterize nicotine metabolism and nicotine dependence in AI light smokers.

A major strength of this study was the ascertainment of information related to traditional tobacco use in addition to patterns of recreational use. The majority of the previous limited studies of AI smokers have not examined the relationship between traditional and recreational tobacco use. Because we know that traditional use of tobacco affects cessation, capturing use of traditional tobacco is critical to designing successful cessation programs. This is a unique aspect of AI about which very little is known. Limitations of this study include the cross-sectional nature of the study and self-reported smoking status. Results cannot be generalized to all AI given the variability of both traditional and recreational tobacco use across tribes and regions in the U.S.

Significantly more research is needed to develop more effective smoking cessation interventions among AI smokers. These interventions should be tailored with respect to both culture and level of smoking and targeted to younger AI smokers to reduce the future burden of smoking related diseases.

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References

- Barnes, P.; Adams, P.; Powell-Griner, E. Health characteristics of the American Indian or Alaska native adult population: United States, 2004–2008. Hyattsville, MD: 2010. Retrieved from. <http://www.cdc.gov/nchs/products/nhsr.htm>
- Burgess D, Fu SS, Joseph AM, Hatsukami DK, Solomon J, van Ryn M. Beliefs and experiences regarding smoking cessation among American Indians. *Nicotine & Tobacco Research*. 2007; 9(Suppl 1):S19–S28. <http://dx.doi.org/10.1080/14622200601083426> (769874707 [pii]). [PubMed: 17365723]
- CDC. *Morb Mortal Wkly Rep*. Vol. 56. Center for Disease Prevention and Control; 2007. Cigarette smoking among adults — United States, 2006; p. 1157-1161.

- Choi WS, Daley CM, James A, Thomas J, Schupbach R, Segraves M, et al. Beliefs and attitudes regarding smoking cessation among American Indians: a pilot study. *Ethnicity and Disease*. 2006; 16(1):35–40. [PubMed: 16599346]
- Cox LS, Okuyemi K, Choi WS, Ahluwalia JS. A review of tobacco use treatments in U.S. ethnic minority populations. *American Journal of Health Promotion*. 2011; 25(5 Suppl):S11–S30. <http://dx.doi.org/10.4278/ajhp.100610-LIT-177>. [PubMed: 21510783]
- Daley CM, Faseru B, Nazir N, Solomon C, Greiner KA, Ahluwalia JS, et al. Influence of traditional tobacco use on smoking cessation among American Indians. *Addiction*. 2011; 106(5):1003–1009. <http://dx.doi.org/10.1111/j.1360-0443.2011.03391.x>. [PubMed: 21306597]
- Denny CH, Holtzman D, Goins RT, Croft JB. Disparities in chronic disease risk factors and health status between American Indian/Alaska native and White elders: findings from a telephone survey, 2001 and 2002. *American Journal of Public Health*. 2005; 95(5):825–827. <http://dx.doi.org/10.2105/ajph.2004.043489>. [PubMed: 15855458]
- Fagan P, Rigotti NA. Light and intermittent smoking: the road less traveled. *Nicotine & Tobacco Research*. 2009; 11(2):107–110. <http://dx.doi.org/10.1093/ntr/ntn015>. [PubMed: 19264864]
- Gohdes D, Harwell TS, Cummings S, Moore KR, Smilie JG, Helgersen SD. Smoking cessation and prevention: an urgent public health priority for American Indians in the Northern Plains. *Public Health Reports*. 2002; 117(3):281–290. [PubMed: 12432139]
- Hodge FS, Cummings S, Fredericks L, Kipnis P, Williams M, Teehee K. Prevalence of smoking among adult American Indian clinic users in northern California. *Preventive Medicine*. 1995; 24(5):441–446. [PubMed: 8524717]
- Manson SM, Beals J, Klein SA, Croy CD. Social epidemiology of trauma among 2 American Indian reservation populations. *American Journal of Public Health*. 2005; 95(5):851–859. <http://dx.doi.org/10.2105/ajph.2004.054171>. [PubMed: 15855465]
- Nez Henderson P, Jacobsen C, Beals J. Correlates of cigarette smoking among selected Southwest and Northern plains tribal groups: the AI-SUPERPFP study. *American Journal of Public Health*. 2005; 95(5):867–872. <http://dx.doi.org/10.2105/AJPH.2004.050096> (95/5/867 [pii]). [PubMed: 15855467]
- Perez-Stable EJ, Herrera B, Jacob P III, Benowitz NL. Nicotine metabolism and intake in Black and White smokers. *JAMA*. 1998; 280(2):152–156. [PubMed: 9669788]
- Schane RE, Ling PM, Glantz SA. Health effects of light and intermittent smoking: a review. *Circulation*. 2010; 121(13):1518–1522. <http://dx.doi.org/10.1161/circulationaha.109.904235>. [PubMed: 20368531]
- Shiffman S. Light and intermittent smokers: background and perspective. *Nicotine & Tobacco Research*. 2009; 11(2):122–125. <http://dx.doi.org/10.1093/ntr/ntn020>. [PubMed: 19246630]
- Shiffman S, Paty J. Smoking patterns and dependence: contrasting chippers and heavy smokers. *Journal of Abnormal Psychology*. 2006; 115(3):509–523. <http://dx.doi.org/10.1037/0021-843x.115.3.509>. [PubMed: 16866591]
- Trinidad DR, Gilpin EA, Lee L, Pierce JP. Do the majority of Asian-American and African-American smokers start as adults? *American Journal of Preventive Medicine*. 2004; 26(2):156–158. [PubMed: 14751329]
- Trinidad DR, Perez-Stable EJ, Emery SL, White MM, Grana RA, Messer KS. Intermittent and light daily smoking across racial/ethnic groups in the United States. *Nicotine & Tobacco Research*. 2009; 11(2):203–210. <http://dx.doi.org/10.1093/ntr/ntn018> (ntn018 [pii]). [PubMed: 19246433]
- Tyndale RF, Sellers EM. Variable CYP2A6-mediated nicotine metabolism alters smoking behavior and risk. *Drug Metabolism and Disposition*. 2001; 29(4 Pt 2):548–552. [PubMed: 11259349]
- USDHHS. The health consequences of involuntary exposure to tobacco smoke: a report of the surgeon general. 2006.
- White HR, Nagin D, Replogle E, Stouthamer-Loeber M. Racial differences in trajectories of cigarette use. *Drug and Alcohol Dependence*. 2004; 76(3):219–227. <http://dx.doi.org/10.1016/j.drugalcdep.2004.05.004>. [PubMed: 15561473]

Fig. 1.
Smoking relapse curve for American Indian current smokers most recent quit attempt.

Table 1

Demographics and smoking characteristics of current smokers (N = 292).

Demographics	n	%
Age (mean +/-SD)	33.5 (13.9)	
Gender		
Male	126	43.45
Female	164	56.55
Education		
High school	103	35.52
Any college	152	52.41
College graduate	35	12.07
Health care		
IHS (Indian Health Services)	136	56.43
Tribal clinic/KU/other	99	41.08
Traditional healer	6	2.49
Most recent provider visit		
<1 month ago	96	33.22
1–6 months ago	117	40.48
6–12 months ago	34	11.76
>12 months ago	42	14.53
Current living situation		
Married/partner	92	31.72
Others	198	68.28
Children		
No	131	46.13
Yes	153	53.87
Smoking characteristics		
Cigarettes smoked per day (mean +/-SD)	10.13 (13.2)	
Light smokers 10	206	70.55
Mod/heavy smokers >10	86	29.45
Smokes cigarettes within 30 min of waking		
No	172	64.42
Yes	95	35.58
Smoking allowed in the home		
No	159	55.21
Yes/some places	129	44.79
Quit attempts in the last 12 months (mean +/-SD)	3.2 (13.2)	
Days quit (mean +/-SD)	46.02 (201.8)	
Tobacco use for traditional purposes		
No	90	30.8
Yes	202	69.2
Use traditional tobacco as “smoke it” ^a		

Demographics	n	%
No	53	26.24
Yes	149	73.76

Note: Numbers do not always add up to the total N of the study (N = 998, 292 smokers) due to missing data.

^aOnly asked of those who answered “Yes” to traditional tobacco use.

Table 2

Comparison of light and mod/heavy smokers.

Variable	% light smokers (N = 206)	% mod/heavy smokers (N = 86)	<i>p</i> -Value ^a
Age of participant (mean +/-SD)	31 (+/-13)	40 (+/-14)	<.0001 ^c
Female	56.6	56.5	0.9857
Married/partner	26.8	43.5	0.005
Education			0.2387
High school	33.2	41.2	
Any college	55.6	44.7	
College graduate	11.2	14.1	
Health care			0.0047 ^b
IHS (Indian Health Services)	62.9	40.9	
Tribal clinic/KU/other	34.7	56.3	
Traditional healer	2.4	2.8	
Most recent provider visit			0.1107
<1 month ago	31.9	36.5	
1–6 months ago	41.2	38.8	
6–12 months ago	9.8	16.5	
>12 months ago	17.2	8.2	
Children at home	46.0	72.6	<.0001
Smoking characteristics			
Average cigarettes smoked per day (mean +/-SD)	4.4 (+/-3.7)	23.8 (+/-17.2)	<.0001 ^c
1st cigarette within 30 min	18.4	74.4	<.0001
Smoking not allowed in the home	62.6	37.7	<.0001
Quit attempts in the last 12 months (mean +/-SD)	3.2 (+/-11.7)	3.3 (+/-16.2)	0.9423 ^c
Days quit (mean +/-SD)	46.3 (+/-161.8)	45.4 (+/-276.1)	0.9787 ^c
Tobacco used for traditional purposes	70.4	66.3	0.4882
Use traditional tobacco as “smoke it”	74.5	71.9	0.7105

^a Chi-square unless otherwise specified.^b Fishers exact test.^c Two sample *t*-test.