Polytobacco use and multiple-product smoking among a random community sample of African-American Adults

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Polytobacco use and multiple-product smoking among a random community sample of African-American Adults [1]

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Author Contributions

Irma Corral made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Hope Landrine made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

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ARTICLE SUMMARY

Article Focus

- This study is the first to examine prevalence of smoking of cigars, bidis, kreteks, blunts, cigarillos (by brand name), and marijuana among a random, statewide sample of 2,118 California Black adult cigarette smokers and non-smokers.
- We hypothesized a high prevalence of smoking blunts and cigarillos, two products that appear to be popular among U.S. Blacks but are rarely assessed in population tobacco surveillance.

Key Messages

- Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days, and this was unrelated to socioeconomic status.
- Smokers had a high prevalence of smoking cigarillos (28.7%) and blunts (27.7%).
- These findings reveal a potentially high yet unexamined prevalence of multiple-product smoking among Blacks that involves frequent smoking of the products that are rarely assessed by researchers. This suggests a need for changes in tobacco-use assessment, and in tobacco prevention and cessation programs as well.

Strengths & Limitations

- Strengths include a large, random sample and a high survey response rate.
- Limitations are a California sample whose results may not generalize elsewhere, and use of self-reports that may underestimate tobacco use.

ABSTRACT

Background. Little is known about polytobacco use among African-American adults. This study is the first to examine this among a random, statewide, community sample of Black adults.

Method. Community-based sampling obtained a statewide, random-household sample of N = 2,118 California Black adults, surveyed door-to-door. Past 30-day smoking of cigarettes, blunts, bidis, kreteks, *Philly/Black & Mild*, marijuana, and cigars was examined.

Results. Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days. Smokers had substantial prevalence of smoking products such as *Phillies/Blacks* (28.7%) and blunts (27.7%). Logistic regressions revealed that the odds of smoking most non-cigarette products were higher for cigarette smokers and for men, inversely related to age, and unrelated to socioeconomic status. However, smoking of blunts, bidis, and kreteks was not predicted by cigarette smoking.

Conclusion. Smoking of cigarillos (e.g., *Phillies*, *Black & Mild*) and blunts may be somewhat prevalent among Black cigarette smokers and non-smokers alike, but such products are not examined in most population-level smoking research. Smoking of these products should be included in surveillance studies, in cancer prevention programs, and in healthcare providers= assessment of smoking, and addressed in smoking cessation programs as well.

INTRODUCTION

Polytobacco use refers to the use of cigarettes in combination with another tobacco or smoked product such as cigars, kreteks (clove cigarettes), bidis (hand-rolled, flavored tobacco wrapped in temburi or tendu leaves), and pipes [1-4] . Compared to cigarette smoking, polytobacco use is associated with higher nicotine addiction, greater difficulty quitting tobacco, and increased incidence of smoking-related cancers[1-5] . These three outcomes are more prevalent among Black than White smokers [5-7] even though Blacks smoke significantly fewer cigarettes per day and initiate smoking later in life[5-7]. Possible polytobacco use among Blacks might be relevant to these puzzling tobacco-related racial disparities, and hence assessment of polytobacco use among Black smokers is needed.

Population surveillance studies reveal that polytobacco use among adults (ages ∃ 18) is low, i.e., 2.5% overall, 2.6% for Whites, 2.9% for Blacks [1]. However, most population studies of adults [1,3], unlike those of teens[4,8], did not assess smoking of bidis and kreteks. These products have 3-5 times higher nicotine, tar, and carbon monoxide than conventional US cigarettes[9-10], and incidence of smoking-related cancers is up to 112% higher among bidi- than among cigarette-smokers[11-12]. The sole study of bidi smoking among a large, random sample of adults (i.e., 18-24 year olds in the Behavioral Risk Factor Surveillance System) found that 25.4% of Blacks had ever-smoked bidis, a rate three times higher than that of Whites [13]. Likewise, a study of polytobacco use among military recruits found significantly higher use of bidis (but not of kreteks) among Blacks than Whites[14].

In addition to limited population-data on Black adult smoking of highly-carcinogenic products such as bidis, population studies usually do not assess smoking of the products that are popular in the Black community among cigarette smokers and non-smokers alike. Foremost among these are the thin, flavored, little cigars/cigarillos[15-17] such as *Philly* and *Black & Mild*, that Blacks often do not categorize as cigars[18], and blunts, i.e., *Phillies* emptied of their tobacco and filled with marijuana[8,15-17]. Studies of small convenience samples have found prevalence rates of up to 30% for both products among young Black adults[15-16].

Thus, little is known about Black-adult smoking of a variety of non-cigarette products. This study reports the first data on the prevalence and correlates of smoking blunts, cigarillos (*Philly/Black & Mild* by brand name), bidis, kreteks, standard-size cigars, and marijuana among a random, statewide, community sample of Black adult smokers (polytobacco use) and non-smokers (multiple-product smoking). We hypothesized a high prevalence of polytobacco use among Black cigarette smokers, and prevalent smoking of the products that typically are not examined in smoking research.

METHOD

Procedures

Black participation in telephone and household-interview health surveys is low (e.g., 0.2%-20% [19-21]; hence, community-based sampling (CBS) and community-based participatory research (CBPR) approaches were used to increase participation rates[22-24]. CBS is a 3-stage, random-household probability sampling procedure often used in population studies of minorities to assure inclusion of segregated, linguistically-isolated, and phoneless/cell-phone only households; hence CBS yields more representative ethnic-minority samples [23-24]. In CBS Stage 1, census data were used to identify the counties in which the majority of CA Blacks reside. This revealed that most (90%) of the CA Black population resides in 7 counties, e.g., Los Angeles (42%), Sacramento (10%), San Diego (6%). Blacks were sampled from these counties proportional to representation, i.e., 42% of the sample came from Los Angeles county and 6% from San Diego county (etc.), such that this sample matched the distribution of the CA Black population. This was achieved by sampling more or fewer census tracts in each county as needed [24].

In CBS Stage 2, 513 census tracts (CTS) within the 7 counties were randomly selected. In Stage 3, a smaller set of equal numbers of low- (20-50% Blacks) and high-segregated (60-92% Blacks) CTS were randomly-selected from the 513, and block-groups within those randomly-selected. Every household in the block-groups was sampled door-to-door on weekends, with one adult participant permitted per household.

The door-to-door method assured inclusion of phoneless/cell phone only households. Further details on the method are provided elsewhere[24]. Because cigarette-smoking rates are significantly higher among phoneless/cell phone only households[19], their inclusion here via the door-to-door survey method is likely to yield higher smoking rates than found in random telephone surveys.

The CBPR aspect of the study was co-sponsorship by the California Black Health Network (CBHN), a well-known, trusted organization that has conducted statewide tobacco assessment and tobacco-control programs for CA Blacks since the 1970s. Black-adult surveyors from the CBHN collected the data. Surveyors approached all households in the block groups, introduced themselves as CBHN staff, and asked if a Black adult who resided in the household might wish to complete the brief, anonymous, *California Black Health Network* health survey for $10 cash. Using this approach, the response rate was 99%, i.e., of those who answered the door, 99% completed and only 1% refused the survey[24].

Because up to 68% of cotinine-determined Black smokers deny smoking (self-report non-smoking) in household interviews[25], a written survey was used instead. Anonymous written surveys decrease socially-desirable denial of smoking and substance use and yield higher smoking and substance-use prevalence rates[26]; hence higher smoking rates are expected here than found in random household surveys. Surveys were left with participants to complete in private, and retrieved 30 minutes later. The study had the approval of the Institutional Review Board of San Diego State University.

Materials/Measures.

The survey assessed Past 30-day Smoking (yes/no) of cigarettes, blunts, bidis, kreteks/clove cigarettes, two cigarillos (small cigars) by brand name (*Philly*, *Black & Mild*), standard-size cigars, and marijuana. Type of cigarettes smoked (menthol, non-menthol, both) and demographic variables also were assessed. The survey took 20 minutes to complete.

RESULTS

Participants were a random, statewide, household-probability sample of N = 2118, US-born, self-identified African-American/Black adult residents of California (CA), 1214 women (57.3%) and 904 men

(42.7%), whose ages ranged from 18 to 95 years (Mean = 43.8, s.d. = 16.2 years). Details of their demographics have been presented elsewhere[24], and revealed that this sample=s demographics are similar to those of the Black population in the CA Census. The prevalence of cigarette smoking among this sample was 32.6%, and significantly higher among men (37.2%) than women (29.7%; $\chi^2 = 10.651$, $p < .001$).

Table 1 displays Past 30-Day Smoking Prevalence Rates for 6 non-cigarette products among cigarette smokers and non-smokers. As shown, prevalence of smoking 1 or more non-cigarette product was 49.3% for cigarette smokers and 14.9% for non-smokers. Among Black men, prevalence of smoking 1 or more non-cigarette product was 57.3% for smokers, and 19.5% for non-smokers; among women, these rates were 40.6% (cigarette smokers) and 12.1% (non-smokers).

Table 1. Prevalence of Smoking Non-cigarette Products among a random sample of Black Adult Cigarette Smokers and Non-Smokers

Past 30 day Smoking of	**Overall %**	**Smokers [a] %**	**Non-Smokers [b] %**	χ^2_1 *
Philly; Black & Mild	13.0	28.7	5.3	176.389
Blunts	14.1	27.7	7.5	23.255
Standard Size Cigars	10.1	21.4	4.5	107.004
Marijuana	18.6	33.0	11.4	113.856
Bidis	2.0	5.0	0.5	35.97
Kreteks/Cloves	1.1	2.7	0.4	17.304
Any 1 or more of the above	26.1	49.3	14.9	257.73
Men Any 1 or more of the above	33.6	57.3	19.5	114.803
Women Any 1 or more of the above	20.6	40.6	12.1	107.047

[a] n = 690 (32.6%), [b] n = 1284 (67.3%), * p = .0005

Table 2 displays the hierarchical logistic regression predicting smoking of any non-cigarette product from demographic and cigarette-smoking variables. As shown, smoking non-cigarette products was

predicted by age, gender, and cigarette smoking, but not by socioeconomic status (SES; education, income, employment). Men (OR=2.5), cigarette smokers (OR = 3.2), and young adults (OR = 7.4) were more likely to smoke non-cigarette products, and the odds of smoking the products increased with decreasing age.

Table 2. Logistic Regression Predicting Black Adult Smoking of Non-Cigarette Products

Model and Variables Entered		β	Wald	P	OR	95% CI
STEP 1: DEMOGRAPHIC VARIABLES						
Age	45 and older (REF)					
	18-24	1.997	38.442	.0005	7.37	3.919,13.856
	25-34	1.05	17.546	.0005	2.85	1.46,4.656
	35-44	.705	7.882	.005	2.02	1.237,3.311
Gender	Women (REF)					
	Men	.931	22.023	.0005	2.54	1.720,3.742
Education	Didn't Finish High School (REF)					
	High School Graduate/GED	.051	0.022	.882		
	College and higher	-.227	1.078	.299		
Income	Less than $10,999 (REF)					
	$11,000 - $25,999	.330	1.156	.282		
	$26,000-$49,999	.524	3.445	.063		
	$50,000 and higher	-.189	0.437	.508		
Employment	Employed (REF)					
	Unemployed	.075	0.109	.741		
STEP 2: CIGARETTE SMOKING						
Smoking	Non-Smoker (REF)					
	Smoker	1.16	21.760	.0005	3.19	1.962,5.212
Cigarette Type	Non-Menthol(REF)					
	Menthol	.447	3.469	.063		
	Both	.851	7.166	.007	2.34	1.256, 4.366

REF = Reference group

Table 3 displays separate regressions predicting smoking of Blunts and of the cigarillos *Philly* and *Black & Mild*. Age, gender, and higher incomes were predictors of smoking Blunts. The odds of Blunt-smoking were 2.5 times higher for men, and increased as age decreased, with young (ages 18-24) adults 6.3 times more likely than older ones (ages ∃ 45) to smoke Blunts. *Philly/Black & Mild*- smoking was predicted by age, gender, and cigarette smoking. Men were 2.6 times more likely than women, young

adults 15.9 times more likely than older ones, and cigarette smokers 5.3 times more likely than non-smokers to smoke *Philly/Black &Mild*.

Table 3. Logistic Regressions Predicting Black Adult Smoking of Blunts and of Philly/Black & Mild Cigarillos

		Blunts				Philly/Black & Mild Cigarillos			
Variables Entered		Wald	p	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	29.69	.0005	6.25	3.23,12.08	51.69	.0005	15.90	7.48,33.81
	25-34	13.31	.0005	3.07	1.68,5.62	21.33	.0005	4.23	2.29,7.80
	35-44	7.208	.007	2.38	1.26,4.48	14.22	.0005	3.38	1.79,6.36
Gender	Women (REF)								
	Men	14.10	.0005	2.49	1.55,4.02	14.02	.0005	2.57	1.57,4.21
Education	Not HS Grad (REF)								
	HS Grad/GED	0.82	.365			.928	.335		
	College and higher	1.066	.302			.616	.433		
Income	Less than $10,999(REF)								
	$11,000 - $25,999	3.925	.048	2.17	1.01,4.66	.375	.540		
	$26,000-$49,999	4.792	.029	2.18	1.09,4.37	.289	.591		
	$50,000 and higher	0.051	.821			.089	.766		
Employment									
	Employed(REF)								
	Unemployed	0.259	.611			1.29	.257		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	3.767	.052	1.89	.994,3.59 [a]	19.75	.0005	5.34	2.55,11.18
Type	Non-Menthol(REF)								
	Menthol	0.521	.470			6.72	.013	2.36	1.19,4.66
	Both	0.169	.681			15.42	.005	5.08	2.26,11.43

REF = Reference group; [a] = Not Significant

The separate regressions predicting Cigar-Smoking and Marijuana-Smoking (Table 4) found age, gender, and cigarette smoking to be the predictors of both. Men, young adults, and smokers were 2.5 to 3 times more likely to smoke Standard-size Cigars than their reference groups. For Marijuana-Smoking, men were twice as likely, the youngest age group 6 times more likely, and smokers 2.5 times more likely than

their reference groups to smoke Marijuana. A similar regression predicting Bidi-smoking (Table 5) revealed that age was the sole predictor, with those ages 18-24 (OR = 4.7) and 35-44 (OR 4.4) more likely to smoke Bidis than the ∃ 45 age-group. The regression predicting smoking Kreteks/Cloves (Table 5) revealed that age and smoking menthol cigarettes were the predictors; those ages 35-44 were 11 times more likely, and menthol smokers (OR = 0.205) were less likely to smoke Kreteks/Cloves.

Table 4. Logistic Regressions Predicting Black Adult Smoking of Cigars and of Marijuana

		Standard-size Cigars				Marijuana			
Variables Entered		Wald	p	OR	95% CI	Wald	p	OR	95% CI
Age	45 and older (REF)								
	18-24	9.023	.003	2.99	1.46,6.09	30.68	.0005	6.05	3.20,11.45
	25-34	.819	.365			25.30	.0005	4.13	2.38,7.17
	35-44	4.132	.042	1.98	1.03,3.82	6.85	.009	2.18	1.22,3.90
Gender	Women (REF)								
	Men	16.823	.0005	3.08	1.80,5.28	11.51	.001	2.14	1.38,3.32
Education	Not HS Grad (REF)								
	HS Grad/GED	.264	.607			1.03	.310		
	College and higher	.004	.947			.129	.719		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	.518	.472			1.35	.245		
	$26,000-$49,999	2.065	.151			2.14	.143		
	$50,000 and higher	.473	.492			.048	.826		
Employment									
	Employed(REF)								
	Unemployed	.032	.858			1.08	.300		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	6.305	.012	2.54	1.23,5.26	9.42	.002	2.55	1.40,4.64
Type	Non-Menthol(REF)								
	Menthol	.162	.687			3.83	.050	1.76	.999,3.09 [a]
	Both	1.887	.170			2.74	.098		

REF = Reference group; [a] = Not Significant

Table 5. Logistic Regressions Predicting Black Adult Smoking of Bidis and of Kreteks/Cloves

		Bidis				Kreteks/Clove Cigarettes			
Variables Entered		Wald	p	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	4.634	.031	4.74	1.15,19.55	0.000	.997		
	25-34	3.256	.071			3.540	.06	5.79	.929,36.04[a]
	35-44	5.000	.025	4.43	1.20,16.32	7.265	.007	11.09	1.928,63.79
Gender	Women (REF)								
	Men	1.970	.160			0.179	.672		
Education	Not HS Grad (REF)								
	HS Grad/GED	.000	.990			0.033	.855		
	College and higher	.013	.910			1.447	.229		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	1.044	.307			0.758	.384		
	$26,000-$49,999	.119	.731			0.812	.367		
	$50,000 and higher	.089	.776			0.229	.632		
Employment									
	Employed(REF)								
	Unemployed	1.719	.190			0.116	.734		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	2.126	.145			0.000	.996		
Type	Non-Menthol(REF)								
	Menthol	.753	.386			4.365	.037	0.205	.046,.907
	Both	2.341	.126			0.488	.485		

REF = Reference group; [a] = Not Significant

DISCUSSION

As hypothesized, there was a high (49.3%) prevalence of polytobacco among Black adult cigarette smokers that held for men (57.3%) and women (40.6%). Substantial smoking of non-cigarette products also was found among non-cigarette smokers, with 19.5% of men and 12.1% of women non-smokers smoking at least one non-cigarette product in the past 30 days. The odds of smoking most non-cigarette products

generally were higher for men than women (ORs = 2.5 to 3.0), and for cigarette smokers than non-smokers (ORs = 3.2 to 5.3); however, gender did not contribute to smoking bidis or kreteks, and cigarette smoking did not contribute to smoking bidis, kreteks, or blunts. Smoking of any non-cigarette product andof each specific product generally was highest among adults ages 18-24 years (ORs = 3 to 15.9), and decreased as age increased. The exception was smoking kreteks/cloves; for these, older adults were more likely to be users. Moreover, unlike the well-known relationship between cigarette smoking and low SES[1,3-5], for these non-cigarette products, SES was related only to smoking blunts, with higher incomes a predictor. Type of cigarette smoked contributed to smoking non-cigarette products in general, and to smoking *Phillies/Blacks* specifically, with higher odds for those who smoked both menthol and non-menthol cigarettes, rather than one or the other.

These findings suggest a problematically high prevalence of polytobacco use among Black smokers that is strongly associated with gender and young-adulthood but not associated with low income, low education, or menthol-smoking. Polytobacco users were mostly young men of varied SES who smoked all types of cigarettes along with non-cigarette products B i.e., a possible pattern of smoking whatever is available. Given that low-SES was not a risk factor for this, polytobacco use might perhaps instead be related to the social risk-factors for cigarette smoking among Blacks that have been identified in prior studies, i.e., racial segregation[27-29] and racial discrimination[30-32]. High levels of residential segregation (with high exposure to targeted tobacco advertising and easy access to single cigarettes in Black neighborhoods), and high levels of (the stress of) racial discrimination might be associated with smoking any cigarette and non-cigarette product available. Studies of the possible role of these factors in polytobacco use among Blacks are needed.

The 14.9% prevalence of past 30-day smoking of non-cigarette products by non-cigarette smokers also is a concern. Smoking blunts and bidis was not associated with cigarette smoking but was strongly associated with youth. This suggests that smoking blunts and bidis might reflect youthful experimentation[13,15,17], and raises questions about whether young Blacks try these before they try

cigarettes[13]. Studies of age of initiating smoking of cigarettes versus blunts and cigarillos among Blacks are needed to clarify this.

This study also found a substantial prevalence of smoking products that are not assessed in most population smoking surveys (e.g., cigarillos, blunts). Hence, it would be beneficial for surveillance studies to assess smoking of blunts, bidis, and cigarillos such as *Phillies, Black & Mild,* and *Swisher Sweets*. Smoking of cigarillos may need to be assessed by brand name because young Blacks often do not categorize them as cigars[18] B and hence their reports of cigar use increase significantly when these brand names are included[18]. That these cigarillos are sold individually and come in a variety of flavors (e.g., chocolate, apple, cherry) may contribute to not categorizing them as cigars or cigarettes. Such data will provide a more comprehensive picture of smoking in the Black community and its health risks.

Indeed, more comprehensive, population-level assessment of multiple-substance smoking might yield data that in part explain Black difficulty quitting tobacco despite smoking only a few cigarettes per day[5-6], and likewise might yield findings that in part explain the puzzling high-incidence of smoking-related cancers at young ages among Black men [7,33]. Similarly, it would be beneficial for healthcare providers to include non-cigarette products such as bidis and blunts in 5A (ask, advise, assess, assist, arrange) assessment of smoking[34] among cigarette smokers and non-smokers alike, young adults in particular. Smoking cessation interventions also might be enhanced by assessing and addressing cessation of smoking such products. However, whether evidence-based smoking cessation interventions and nicotine replacement therapy are effective with polytobacco users remains unknown. Studies are needed to assess the possibility that hidden polytobacco use might contribute to the relative failure of standard smoking cessation programs with Black smokers[5-6], and research on the possible need for new cessation interventions for polytobacco users is needed as well.

Limitations of this study include use of self-reports that may be lower than biologically-validated data[25], lack of assessment of some forms of tobacco use (e.g., pipes), and a California sample whose data might not generalize to other states. Despite these limitations, this study is the first to highlight the

magnitude and complexity of smoking among a random, community sample of Black adults, and the first to underscore the need to improve its assessment in research and practice.

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CONTRIBUTORSHIP

All authors made substantial contributions to 1) study conception and design, acquisition of data, or analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

DATA SHARING

There are no additional, unpublished data related to this study.

COMPETING INTERESTS

None

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any pre-specified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe **all statistical methods**, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Polytobacco use and multiple-product smoking among a random community sample of African-American Adults

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Polytobacco use and multiple-product smoking among a random community sample of African-American Adults [1]

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Author Contributions

Irma Corral made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Hope Landrine made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Jukelia Bess made substantial contributions to 1) analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

ARTICLE SUMMARY

Article Focus

- This study is the first to examine prevalence of smoking of cigars, bidis, kreteks, blunts, cigarillos (by brand name), and marijuana among a random, statewide sample of 2,118 California Black adult cigarette smokers and non-smokers.
- We hypothesized a substantial prevalence of smoking cigarillos and blunts, two products that appear to be popular among U.S. Blacks but are rarely assessed in population tobacco surveillance.

Key Messages

- Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days, and this was unrelated to socioeconomic status.
- Smokers had a high prevalence of smoking cigarillos (28.7%) and blunts (27.7%).
- These findings reveal a potentially high yet unexamined prevalence of multiple-product smoking among Blacks that involves frequent smoking of the products that are rarely assessed by researchers. This suggests a need for changes in tobacco-use assessment, and in tobacco prevention and cessation programs as well.

Strengths & Limitations

- Strengths include a large, random sample and a high survey response rate.
- Limitations are a California sample whose results may not generalize elsewhere, and use of self-reports that may underestimate tobacco use.

ABSTRACT

Background. Little is known about polytobacco use among African-American adults. This study is the first to examine this among a random, statewide, community sample of Black adults.

Method. Community-based sampling obtained a statewide, random-household sample of N = 2,118 California Black adults, surveyed door-to-door. Past 30-day smoking of cigarettes, blunts, bidis, kreteks, *Philly/Black & Mild*, marijuana, and cigars was examined.

Results. Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days. Smokers had substantial prevalence of smoking products such as *Phillies/Blacks* (28.7%) and blunts (27.7%). Logistic regressions revealed that the odds of smoking most non-cigarette products were higher for cigarette smokers and for men, inversely related to age, and unrelated to socioeconomic status. However, smoking of blunts, bidis, and kreteks was not predicted by cigarette smoking.

Conclusion. Smoking of cigarillos (e.g., *Phillies*, *Black & Mild*) and blunts may be somewhat prevalent among Black cigarette smokers and non-smokers alike, but such products are not examined in most population-level smoking research. Smoking of these products should be included in surveillance studies, in cancer prevention programs, and in healthcare provider-assessment of smoking, and addressed in smoking cessation programs as well.

INTRODUCTION

Polytobacco use refers to the use of cigarettes in combination with another tobacco or smoked product such as cigars, kreteks (clove cigarettes), bidis (hand-rolled, flavored tobacco wrapped in temburi or tendu leaves), and pipes [1-4]. Compared to cigarette smoking, polytobacco use is associated with higher nicotine addiction, greater difficulty quitting tobacco, and increased incidence of smoking-related cancers[1-5] . These three outcomes are more prevalent among Black than White smokers [5-7] even though Blacks smoke significantly fewer cigarettes per day and initiate smoking later in life[5-7]. Possible polytobacco use among Blacks might be relevant to these puzzling tobacco-related racial disparities, and hence assessment of polytobacco use among Black smokers is needed.

Population surveillance studies reveal that polytobacco use among adults is low, i.e., 2.5% overall, 2.6% for Whites, 2.9% for Blacks [1]. However, most population studies of adults [1,3], unlike those of teens[4,8], did not assess smoking of bidis and kreteks. These products have 3-5 times higher nicotine, tar, and carbon monoxide than conventional US cigarettes[9-10], and incidence of smoking-related cancers is up to 112% higher among bidi- than among cigarette-smokers[11-12]. The sole study of bidi smoking among a large, random sample of adults (i.e., 18-24 year olds in the Behavioral Risk Factor Surveillance System) found that 25.4% of Blacks had ever-smoked bidis, a rate three times higher than that of Whites [13]. Likewise, a study of polytobacco use among military recruits found significantly higher use of bidis (but not of kreteks) among Blacks than Whites[14].

In addition to limited population-data on Black adult smoking of highly-carcinogenic products such as bidis, population studies usually do not assess smoking of the products that are popular in the Black community among cigarette smokers and non-smokers alike. Foremost among these are the thin, flavored, little cigars/cigarillos[15-17] such as *Philly* and *Black & Mild*, that Blacks often do not categorize as cigars[18], and blunts, i.e., *Phillies* emptied of their tobacco and filled with marijuana[8,15-17]. Studies of small convenience samples have found prevalence rates of up to 30% for both products among young Black adults[15-16].

Thus, little is known about Black-adult smoking of a variety of non-cigarette products. This study reports the first data on the prevalence and correlates of smoking blunts, cigarillos (*Philly/Black & Mild* by brand name), bidis, kreteks, standard-size cigars, and marijuana among a random, statewide, community sample of Black adult smokers (polytobacco use) and non-smokers (multiple-product smoking).

METHOD

Procedures

Black participation in telephone and household-interview health surveys is low (e.g., 0.2%-20% [19-21]; hence, community-based sampling (CBS) and community-based participatory research (CBPR) approaches were used to increase participation rates[22-24]. CBS is a 3-stage, random-household probability sampling procedure often used in population studies of minorities to assure inclusion of segregated, linguistically-isolated, and phoneless/cell-phone only households; hence CBS yields more representative ethnic-minority samples [23-24]. In CBS Stage 1, census data were used to identify the counties in which the majority of CA Blacks reside. This revealed that most (90%) of the CA Black population resides in 7 counties, e.g., Los Angeles (42%), Sacramento (10%), San Diego (6%). Blacks were sampled from these counties proportional to representation, i.e., 42% of the sample came from Los Angeles county and 6% from San Diego county (etc.), such that this sample matched the distribution of the CA Black population. This was achieved by sampling more or fewer census tracts in each county as needed [24].

In CBS Stage 2, 513 census tracts (CTS) within the 7 counties were randomly selected. In Stage 3, a smaller set of equal numbers of low- (20-50% Blacks) and high-segregated (60-92% Blacks) CTS were randomly-selected from the 513, and block-groups within those randomly-selected. Every household in the block-groups was sampled door-to-door on weekends 2006-2008, with one adult participant permitted per household. The door-to-door method assured inclusion of phoneless/cell phone only households. Further details on the method are provided elsewhere[24]. Because cigarette-smoking rates are significantly higher

among phoneless/cell phone only households[19], their inclusion here via the door-to-door survey method is likely to yield higher smoking rates than found in random telephone surveys.

The CBPR aspect of the study was co-sponsorship by the California Black Health Network (CBHN), a well-known, trusted organization that has conducted statewide tobacco assessment and tobacco-control programs for CA Blacks since the 1970s. CBHN needed a statewide health-assessment to improve its programs, and so co-sponsored the study. CBHN staff (Black adult surveyors) in each county collected the data in their counties. Surveyors wore CBHN ID badges, approached all households in the block groups, introduced themselves as CBHN staff, and stated that the purpose of the survey was to acquire data needed to improve CBHN programs in each Black community. Surveyors handed potential participants an Informed Consent Letter that described the survey, stated this study purpose, and included CBHN phone numbers (in each county) to call. Surveyors then asked if a Black adult resided in the household who might wish to complete the anonymous, *California Black Health Network* health survey for $10 cash. Using these CBPR approaches, the response rate was 99%, i.e., of those who answered the door, 99% completed and only 1% refused the survey [24].

Because up to 68% of cotinine-determined Black smokers deny smoking (self-report non-smoking) in household interviews[25], a written survey was used instead. Anonymous written surveys decrease socially-desirable denial of smoking and substance use and yield higher smoking and substance-use prevalence rates[26]; hence higher smoking rates are expected here than found in random household surveys. Surveys were left with participants to complete in private, and retrieved 30 minutes later. The study had the approval of the Institutional Review Board of San Diego State University.

Materials/Measures.

The survey assessed the health behaviors on which CBHN desired data (diet, physical activity, sun-safety, smoking of a variety of products); only the smoking data are presented here. We explored Past 30-day Smoking (yes/no) of a variety of products for the first time, because smoking these might have implications for Black smoking-related disparities. Products included cigarettes, blunts, bidis, kreteks/clove

cigarettes, two cigarillos (small cigars) by brand name (*Philly*, *Black & Mild*), standard-size cigars, and marijuana. Type of cigarettes smoked (menthol, non-menthol, both) and demographic variables also were assessed. The survey took 15-30 minutes to complete.

RESULTS

Participants were a random, statewide, household-probability sample of N = 2118, US-born, self-identified African-American/Black adult residents of California (CA), 1214 women (57.3%) and 904 men (42.7%), whose ages ranged from 18 to 95 years (Mean = 43.8, s.d. = 16.2 years). Details of their demographics have been presented elsewhere[24], and revealed that the demographics of this 2006-2008 sample are similar to those of the 2006-2008 Black population in the CA Census. The prevalence of cigarette smoking among this sample was 32.6%, and significantly higher among men (37.2%) than women (29.7%; $\chi^2 = 10.651$, $p < .001$).

Table 1. Prevalence of Smoking Non-cigarette Products among a random sample of Black Adult Cigarette Smokers and Non-Smokers

Past 30 day Smoking of	**Overall %**	**Smokers** [a] **%**	**Non-Smokers** [b] **%**	χ^2_1 *
Philly; Black & Mild	13.0	28.7	5.3	176.389
Blunts	14.1	27.7	7.5	23.255
Standard Size Cigars	10.1	21.4	4.5	107.004
Marijuana	18.6	33.0	11.4	113.856
Bidis	2.0	5.0	0.5	35.97
Kreteks/Cloves	1.1	2.7	0.4	17.304
Any 1 or more of the above	26.1	49.3	14.9	257.73
Men Any 1 or more of the above	33.6	57.3	19.5	114.803
Women Any 1 or more of the above	20.6	40.6	12.1	107.047

[a] n = 690 (32.6%), [b] n = 1284 (67.3%), * p = .0005

Table 1 displays Past 30-Day Smoking Prevalence Rates for 6 non-cigarette products among cigarette smokers and non-smokers. As shown, prevalence of smoking 1 or more non-cigarette product was

49.3% for cigarette smokers and 14.9% for non-smokers. Among Black men, prevalence of smoking 1 or more non-cigarette product was 57.3% for smokers, and 19.5% for non-smokers; among women, these rates were 40.6% (cigarette smokers) and 12.1% (non-smokers). Table 2 displays the hierarchical logistic regression predicting smoking of any non-cigarette product from demographic and cigarette-smoking variables. As shown, smoking non-cigarette products was predicted by age, gender, and cigarette smoking, but not by socioeconomic status (SES; education, income, employment). Men (OR=2.5), cigarette smokers (OR = 3.2), and young adults (OR = 7.4) were more likely to smoke non-cigarette products, and the odds of smoking the products increased with decreasing age.

Table 2. Logistic Regression Predicting Black Adult Smoking of Non-Cigarette Products

Model and Variables Entered		B	Wald	P	OR	95% CI
STEP 1: DEMOGRAPHIC VARIABLES						
Age	45 and older (REF)					
	18-24	1.997	38.442	.0005	7.37	3.919,13.856
	25-34	1.05	17.546	.0005	2.85	1.46,4.656
	35-44	.705	7.882	.005	2.02	1.237,3.311
Gender	Women (REF)					
	Men	.931	22.023	.0005	2.54	1.720,3.742
Education	Didn't Finish High School (REF)					
	High School Graduate/GED	.051	0.022	.882		
	College and higher	-.227	1.078	.299		
Income	Less than $10,999 (REF)					
	$11,000 - $25,999	.330	1.156	.282		
	$26,000-$49,999	.524	3.445	.063		
	$50,000 and higher	-.189	0.437	.508		
Employment	Employed (REF)					
	Unemployed	.075	0.109	.741		
STEP 2: CIGARETTE SMOKING						
Smoking	Non-Smoker (REF)					
	Smoker	1.16	21.760	.0005	3.19	1.962,5.212
Cigarette Type	Non-Menthol(REF)					
	Menthol	.447	3.469	.063		
	Both	.851	7.166	.007	2.34	1.256, 4.366

REF = Reference group

Table 3 displays separate regressions predicting smoking of Blunts and of the cigarillos *Philly* and *Black & Mild*. Age, gender, and higher incomes were predictors of smoking Blunts. The odds of Blunt-smoking were 2.5 times higher for men, and increased as age decreased, with young (ages 18-24) adults 6.3 times more likely than older ones (ages 45 and older) to smoke Blunts. *Philly/Black & Mild*- smoking was predicted by age, gender, and cigarette smoking. Men were 2.6 times more likely than women, young adults 15.9 times more likely than older ones, and cigarette smokers 5.3 times more likely than non-smokers to smoke *Philly/Black &Mild*.

Table 3. Logistic Regressions Predicting Black Adult Smoking of Blunts and of Philly/Black & Mild Cigarillos

		Blunts				**Philly/Black & Mild Cigarillos**			
Variables Entered		Wald	P	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	29.69	.0005	6.25	3.23,12.08	51.69	.0005	15.90	7.48,33.81
	25-34	13.31	.0005	3.07	1.68,5.62	21.33	.0005	4.23	2.29,7.80
	35-44	7.208	.007	2.38	1.26,4.48	14.22	.0005	3.38	1.79,6.36
Gender	Women (REF)								
	Men	14.10	.0005	2.49	1.55,4.02	14.02	.0005	2.57	1.57,4.21
Education	Not HS Grad (REF)								
	HS Grad/GED	0.82	.365			.928	.335		
	College and higher	1.066	.302			.616	.433		
Income	Less than $10,999(REF)								
	$11,000 - $25,999	3.925	.048	2.17	1.01,4.66	.375	.540		
	$26,000-$49,999	4.792	.029	2.18	1.09,4.37	.289	.591		
	$50,000 and higher	0.051	.821			.089	.766		
Employment									
	Employed(REF)								
	Unemployed	0.259	.611			1.29	.257		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	3.767	.052	1.89	.994,3.59 [a]	19.75	.0005	5.34	2.55,11.18
Type	Non-Menthol(REF)								
	Menthol	0.521	.470			6.72	.013	2.36	1.19,4.66
	Both	0.169	.681			15.42	.005	5.08	2.26,11.43

REF = Reference group; [a] = Not Significant

Table 4. Logistic Regressions Predicting Black Adult Smoking of Cigars and of Marijuana

Variables Entered		Standard-size Cigars				Marijuana			
		Wald	P	OR	95% CI	Wald	p	OR	95% CI
Age	45 and older (REF)								
	18-24	9.023	.003	2.99	1.46,6.09	30.68	.0005	6.05	3.20,11.45
	25-34	.819	.365			25.30	.0005	4.13	2.38,7.17
	35-44	4.132	.042	1.98	1.03,3.82	6.85	.009	2.18	1.22,3.90
Gender	Women (REF)								
	Men	16.823	.0005	3.08	1.80,5.28	11.51	.001	2.14	1.38,3.32
Education	Not HS Grad (REF)								
	HS Grad/GED	.264	.607			1.03	.310		
	College and higher	.004	.947			.129	.719		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	.518	.472			1.35	.245		
	$26,000-$49,999	2.065	.151			2.14	.143		
	$50,000 and higher	.473	.492			.048	.826		
Employment									
	Employed(REF)								
	Unemployed	.032	.858			1.08	.300		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	6.305	.012	2.54	1.23,5.26	9.42	.002	2.55	1.40,4.64
Type	Non-Menthol(REF)								
	Menthol	.162	.687			3.83	.050	1.76	.999,3.09 [a]
	Both	1.887	.170			2.74	.098		

REF = Reference group; [a] = Not Significant

The separate regressions predicting Cigar-Smoking and Marijuana-Smoking (Table 4) found age, gender, and cigarette smoking to be the predictors of both. Men, young adults, and smokers were 2.5 to 3 times more likely to smoke Standard-size Cigars than their reference groups. For Marijuana-Smoking, men were twice as likely, the youngest age group 6 times more likely, and smokers 2.5 times more likely than their reference groups to smoke Marijuana. A similar regression predicting Bidi-smoking (Table 5) revealed that age was the sole predictor, with those ages 18-24 (OR = 4.7) and 35-44 (OR 4.4) more likely to smoke Bidis than the older age-group. The regression predicting smoking Kreteks/Cloves (Table 5)

revealed that age and smoking menthol cigarettes were the predictors; those ages 35-44 were 11 times more likely, and menthol smokers (OR = 0.205) were less likely to smoke Kreteks/Cloves.

Table 5. Logistic Regressions Predicting Black Adult Smoking of Bidis and of Kreteks/Cloves

		Bidis				Kreteks/Clove Cigarettes			
Variables Entered		Wald	P	OR	95% CI	Wald	P	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	4.634	.031	4.74	1.15,19.55	0.000	.997		
	25-34	3.256	.071			3.540	.06	5.79	.929,36.04[a]
	35-44	5.000	.025	4.43	1.20,16.32	7.265	.007	11.09	1.928,63.79
Gender	Women (REF)								
	Men	1.970	.160			0.179	.672		
Education	Not HS Grad (REF)								
	HS Grad/GED	.000	.990			0.033	.855		
	College and higher	.013	.910			1.447	.229		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	1.044	.307			0.758	.384		
	$26,000-$49,999	.119	.731			0.812	.367		
	$50,000 and higher	.089	.776			0.229	.632		
Employment									
	Employed(REF)								
	Unemployed	1.719	.190			0.116	.734		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	2.126	.145			0.000	.996		
Type	Non-Menthol(REF)								
	Menthol	.753	.386			4.365	.037	0.205	.046,.907
	Both	2.341	.126			0.488	.485		

REF = Reference group; [a] = Not Significant

DISCUSSION

There was a high (49.3%) prevalence of polytobacco among Black adult cigarette smokers that held for men (57.3%) and women (40.6%). Substantial smoking of non-cigarette products also was found among non-cigarette smokers, with 19.5% of men and 12.1% of women non-smokers smoking at least one non-cigarette product in the past 30 days. The odds of smoking most non-cigarette products generally were

higher for men than women (ORs = 2.5 to 3.0), and for cigarette smokers than non-smokers (ORs = 3.2 to 5.3); however, gender did not contribute to smoking bidis or kreteks, and cigarette smoking did not contribute to smoking bidis, kreteks, or blunts. Smoking of any non-cigarette product and of each specific product generally was highest among adults ages 18-24 years (ORs = 3 to 15.9), and decreased as age increased. The exception was smoking kreteks/cloves; for these, older adults were more likely to be users. Moreover, unlike the well-known relationship between cigarette smoking and low SES[1,3-5], for these non-cigarette products, SES was related only to smoking blunts, with higher incomes a predictor. Type of cigarette smoked contributed to smoking non-cigarette products in general, and to smoking *Phillies/Blacks* specifically, with higher odds for those who smoked both menthol and non-menthol cigarettes, rather than one or the other; menthol smoking generally did not predict use of other products.

These findings suggest a problematically high prevalence of polytobacco use among Black smokers that is strongly associated with gender and young-adulthood but not associated with low income, low education, or menthol-smoking. Polytobacco users were mostly young men of varied SES who smoked all types of cigarettes along with non-cigarette products, i.e., a possible pattern of smoking whatever is available. Given that low-SES was not a risk factor for this, polytobacco use might perhaps instead be related to the social risk-factors for cigarette smoking among Blacks that have been identified in prior studies, i.e., racial segregation[27-29] and racial discrimination[30-32]. High levels of residential segregation (with high exposure to targeted tobacco advertising and easy access to single cigarettes in Black neighborhoods), and high levels of (the stress of) racial discrimination might be associated with smoking any cigarette and non-cigarette product available. Studies of the possible role of these factors in polytobacco use among Blacks are needed.

The 14.9% prevalence of past 30-day smoking of non-cigarette products by non-cigarette smokers also is a concern. Smoking blunts and bidis was not associated with cigarette smoking but was strongly associated with youth. This suggests that smoking blunts and bidis might reflect youthful experimentation [13,15,17], and raises questions about whether young Blacks try these before they try cigarettes[13].

Studies of age of initiating smoking of cigarettes versus blunts and cigarillos among Blacks are needed to clarify this.

This study also found a substantial prevalence of smoking products that are not assessed in most population smoking surveys of adults (e.g., marijuana, cigarillos, blunts). Hence, it would be beneficial for surveillance studies to assess smoking of blunts, bidis, and (in particular) cigarillos such as *Phillies, Black & Mild,* and *Swisher Sweets*. Smoking of cigarillos may need to be assessed by brand name because young Blacks often do not categorize them as cigars[18], and hence their reports of cigar use increase significantly when these brand names are included[18]. That these cigarillos are sold individually and come in a variety of flavors (e.g., chocolate, apple, cherry) may contribute to not categorizing them as cigars or as cigarettes. Such assessment will provide a more comprehensive picture of smoking among Black adults, and would match the complexity of recent (2011) assessments of youth smoking that included bidis, kreteks and cigarillos [35].

This study has several limitations, including use of self-reports that may be lower than biologically-validated data[25], lack of assessment of some forms of tobacco use (e.g., pipes), and a California sample whose data might not generalize to other states. In addition, we used categorical instead of continuous demographic variables, and these may have limited the sensitivity of analyses. Moreover, to decrease the number of consecutive significance tests, potentially-interesting interaction effects (e.g., gender X education, gender X age, gender X income) were not examined; such effects however generally are not examined in basic, epidemiologic studies of product-use [e.g., 35] and is a limitation of this study and of similar studies. Likewise, because more than 90% of these Black cigarette smokers consumed 10 or fewer cigarettes per day, potential relationships between number of cigarettes smoked and smoking of other products were not examined. In addition, prevalence of smoking the products may have changed since this study. This is particularly the case for kreteks (clove cigarettes) that were banned by the 2009 *Family Smoking Prevention and Tobacco Control Act* [36]. The CDC's 2011 study of youth [35] revealed that youth still smoke kreteks despite the ban, and this suggests that adults also might still smoke them. How

youth and adults acquire banned and illegal products is worthy of investigation.

Despite these limitations, this study is the first to highlight the magnitude and complexity of smoking among a random, community sample of Black adults, and the first to underscore the need to improve its assessment in research and practice. More comprehensive, population-level assessment of multiple-substance smoking might yield data that in part explain Black difficulty quitting tobacco despite smoking only a few cigarettes per day[5-6], and likewise might yield findings that in part explain the puzzling high-incidence of smoking-related cancers at young ages among Black men [7,33]. Similarly, it would be beneficial for healthcare providers to include non-cigarette products such as bidis and blunts in 5A (ask, advise, assess, assist, arrange) assessment of smoking [34] among cigarette smokers and non-smokers alike, young adults in particular. Smoking cessation interventions also might be enhanced by assessing and addressing cessation of smoking such products. However, whether evidence-based smoking cessation interventions and nicotine replacement therapy are effective with polytobacco users remains unknown. Studies are needed to assess the possibility that hidden polytobacco use might contribute to the relative failure of standard smoking cessation programs with Black smokers[5-6], and research on the possible need for new cessation interventions for polytobacco users is needed as well.

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any pre-specified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe **all statistical methods**, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Polytobacco use and multiple-product smoking among a random community sample of African-American Adults [1]

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Key Words: Smoking, African-Americans, blunts, Philly, polytobacco use

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Author Contributions

Irma Corral made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Hope Landrine made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Jukelia Bess made substantial contributions to 1) analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

ARTICLE SUMMARY

Article Focus

- This study is the first to examine prevalence of smoking of cigars, bidis, kreteks, blunts, cigarillos (by brand name), and marijuana among a random, statewide sample of 2,118 California Black adult cigarette smokers and non-smokers.
- We hypothesized a substantial prevalence of smoking cigarillos and blunts, two products that appear to be popular among U.S. Blacks but are rarely assessed in population tobacco surveillance.

Key Messages

- Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days, and this was unrelated to socioeconomic status.
- Smokers had a high prevalence of smoking cigarillos (28.7%) and blunts (27.7%).
- These findings reveal a potentially high yet unexamined prevalence of multiple-product smoking among Blacks that involves frequent smoking of the products that are rarely assessed by researchers. This suggests a need for changes in tobacco-use assessment, and in tobacco prevention and cessation programs as well.

Strengths & Limitations

- Strengths include a large, random sample and a high survey response rate.
- Limitations are a California sample whose results may not generalize elsewhere, and use of self-reports that may underestimate tobacco use.

ABSTRACT

Background. Little is known about polytobacco use among African-American adults. This study is the first to examine this among a random, statewide, community sample of Black adults.

Method. Community-based sampling obtained a statewide, random-household sample of N = 2,118 California Black adults, surveyed door-to-door. Past 30-day smoking of cigarettes, blunts, bidis, kreteks, *Philly/Black & Mild*, marijuana, and cigars was examined.

Results. Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days. Smokers had substantial prevalence of smoking products such as *Phillies/Blacks* (28.7%) and blunts (27.7%). Logistic regressions revealed that the odds of smoking most non-cigarette products were higher for cigarette smokers and for men, inversely related to age, and unrelated to socioeconomic status. However, smoking of blunts, bidis, and kreteks was not predicted by cigarette smoking.

Conclusion. Smoking of cigarillos (e.g., *Phillies*, *Black & Mild*) and blunts may be somewhat prevalent among Black cigarette smokers and non-smokers alike, but such products are not examined in most population-level smoking research. Smoking of these products should be included in surveillance studies, in cancer prevention programs, and in healthcare provider-assessment of smoking, and addressed in smoking cessation programs as well.

INTRODUCTION

Polytobacco use refers to the use of cigarettes in combination with another tobacco or smoked product such as cigars, kreteks (clove cigarettes), bidis (hand-rolled, flavored tobacco wrapped in temburi or tendu leaves), and pipes [1-4]. Compared to cigarette smoking, polytobacco use is associated with higher nicotine addiction, greater difficulty quitting tobacco, and increased incidence of smoking-related cancers[1-5] . These three outcomes are more prevalent among Black than White smokers [5-7] even though Blacks smoke significantly fewer cigarettes per day and initiate smoking later in life[5-7]. Possible polytobacco use among Blacks might be relevant to these puzzling tobacco-related racial disparities, and hence assessment of polytobacco use among Black smokers is needed.

Population surveillance studies reveal that polytobacco use among adults is low, i.e., 2.5% overall, 2.6% for Whites, 2.9% for Blacks [1]. However, most population studies of adults [1,3], unlike those of teens[4,8], did not assess smoking of bidis and kreteks. These products have 3-5 times higher nicotine, tar, and carbon monoxide than conventional US cigarettes[9-10], and incidence of smoking-related cancers is up to 112% higher among bidi- than among cigarette-smokers[11-12]. The sole study of bidi smoking among a large, random sample of adults (i.e., 18-24 year olds in the Behavioral Risk Factor Surveillance System) found that 25.4% of Blacks had ever-smoked bidis, a rate three times higher than that of Whites [13]. Likewise, a study of polytobacco use among military recruits found significantly higher use of bidis (but not of kreteks) among Blacks than Whites[14].

In addition to limited population-data on Black adult smoking of highly-carcinogenic products such as bidis, population studies usually do not assess smoking of the products that are popular in the Black community among cigarette smokers and non-smokers alike. Foremost among these are the thin, flavored, little cigars/cigarillos[15-17] such as *Philly* and *Black & Mild*, that Blacks often do not categorize as cigars[18], and blunts, i.e., *Phillies* emptied of their tobacco and filled with marijuana[8,15-17]. Studies of small convenience samples have found prevalence rates of up to 30% for both products among young Black adults[15-16].

Thus, little is known about Black-adult smoking of a variety of non-cigarette products. This study reports the first data on the prevalence and correlates of smoking blunts, cigarillos (*Philly/Black & Mild* by brand name), bidis, kreteks, standard-size cigars, and marijuana among a random, statewide, community sample of Black adult smokers (polytobacco use) and non-smokers (multiple-product smoking).

METHOD

Procedures

Black participation in telephone and household-interview health surveys is low (e.g., 0.2%-20% [19-21]; hence, community-based sampling (CBS) and community-based participatory research (CBPR) approaches were used to increase participation rates[22-24]. CBS is a 3-stage, random-household probability sampling procedure often used in population studies of minorities to assure inclusion of segregated, linguistically-isolated, and phoneless/cell-phone only households; hence CBS yields more representative ethnic-minority samples [23-24]. In CBS Stage 1, census data were used to identify the counties in which the majority of CA Blacks reside. This revealed that most (90%) of the CA Black population resides in 7 counties, e.g., Los Angeles (42%), Sacramento (10%), San Diego (6%). Blacks were sampled from these counties proportional to representation, i.e., 42% of the sample came from Los Angeles county and 6% from San Diego county (etc.), such that this sample matched the distribution of the CA Black population. This was achieved by sampling more or fewer census tracts in each county as needed [24].

In CBS Stage 2, 513 census tracts (CTS) within the 7 counties were randomly selected. In Stage 3, a smaller set of equal numbers of low- (20-50% Blacks) and high-segregated (60-92% Blacks) CTS were randomly-selected from the 513, and block-groups within those randomly-selected. Every household in the block-groups was sampled door-to-door on weekends 2006-2008, with one adult participant permitted per household. The door-to-door method assured inclusion of phoneless/cell phone only households. Further details on the method are provided elsewhere[24]. Because cigarette-smoking rates are significantly higher

among phoneless/cell phone only households[19], their inclusion here via the door-to-door survey method is likely to yield higher smoking rates than found in random telephone surveys.

The CBPR aspect of the study was co-sponsorship by the California Black Health Network (CBHN), a well-known, trusted organization that has conducted statewide tobacco assessment and tobacco-control programs for CA Blacks since the 1970s. CBHN needed a statewide health-assessment to improve its programs, and so co-sponsored the study. CBHN staff (Black adult surveyors) in each county collected the data in their counties. Surveyors wore CBHN ID badges, approached all households in the block groups, introduced themselves as CBHN staff, and stated that the purpose of the survey was to acquire data needed to improve CBHN programs in each Black community. Surveyors handed potential participants an Informed Consent Letter that described the survey, stated this study purpose, and included CBHN phone numbers (in each county) to call. Surveyors then asked if a Black adult resided in the household who might wish to complete the anonymous, *California Black Health Network* health survey for $10 cash. Using these CBPR approaches, the response rate was 99%, i.e., of those who answered the door, 99% completed and only 1% refused the survey [24].

Because up to 68% of cotinine-determined Black smokers deny smoking (self-report non-smoking) in household interviews[25], a written survey was used instead. Anonymous written surveys decrease socially-desirable denial of smoking and substance use and yield higher smoking and substance-use prevalence rates[26]; hence higher smoking rates are expected here than found in random household surveys. Surveys were left with participants to complete in private, and retrieved 30 minutes later. The study had the approval of the Institutional Review Board of San Diego State University.

Materials/Measures.

The survey assessed the health behaviors on which CBHN desired data (diet, physical activity, sun-safety, smoking of a variety of products); only the smoking data are presented here. We explored Past 30-day Smoking (yes/no) of a variety of products for the first time, because smoking these might have implications for Black smoking-related disparities. Products included cigarettes, blunts, bidis, kreteks/clove

cigarettes, two cigarillos (small cigars) by brand name (*Philly*, *Black & Mild*), standard-size cigars, and marijuana. Type of cigarettes smoked (menthol, non-menthol, both) and demographic variables also were assessed. The survey took 15-30 minutes to complete.

RESULTS

Participants were a random, statewide, household-probability sample of N = 2118, US-born, self-identified African-American/Black adult residents of California (CA), 1214 women (57.3%) and 904 men (42.7%), whose ages ranged from 18 to 95 years (Mean = 43.8, s.d. = 16.2 years). Details of their demographics have been presented elsewhere[24], and revealed that the demographics of this 2006-2008 sample are similar to those of the 2006-2008 Black population in the CA Census. The prevalence of cigarette smoking among this sample was 32.6%, and significantly higher among men (37.2%) than women (29.7%; $\chi^2 = 10.651$, $p < .001$).

Table 1. Prevalence of Smoking Non-cigarette Products among a random sample of Black Adult Cigarette Smokers and Non-Smokers

Past 30 day Smoking of	**Overall %**	**Smokers** [a] **%**	**Non-Smokers** [b] **%**	χ^2_1 *
Philly; Black & Mild	13.0	28.7	5.3	176.389
Blunts	14.1	27.7	7.5	23.255
Standard Size Cigars	10.1	21.4	4.5	107.004
Marijuana	18.6	33.0	11.4	113.856
Bidis	2.0	5.0	0.5	35.97
Kreteks/Cloves	1.1	2.7	0.4	17.304
Any 1 or more of the above	26.1	49.3	14.9	257.73
Men Any 1 or more of the above	33.6	57.3	19.5	114.803
Women Any 1 or more of the above	20.6	40.6	12.1	107.047

[a] n = 690 (32.6%), [b] n = 1284 (67.3%), * p = .0005

Table 1 displays Past 30-Day Smoking Prevalence Rates for 6 non-cigarette products among cigarette smokers and non-smokers. As shown, prevalence of smoking 1 or more non-cigarette product was

49.3% for cigarette smokers and 14.9% for non-smokers. Among Black men, prevalence of smoking 1 or more non-cigarette product was 57.3% for smokers, and 19.5% for non-smokers; among women, these rates were 40.6% (cigarette smokers) and 12.1% (non-smokers). Table 2 displays the hierarchical logistic regression predicting smoking of any non-cigarette product from demographic and cigarette-smoking variables. As shown, smoking non-cigarette products was predicted by age, gender, and cigarette smoking, but not by socioeconomic status (SES; education, income, employment). Men (OR=2.5), cigarette smokers (OR = 3.2), and young adults (OR = 7.4) were more likely to smoke non-cigarette products, and the odds of smoking the products increased with decreasing age.

Table 2. Logistic Regression Predicting Black Adult Smoking of Non-Cigarette Products

Model and Variables Entered		B	Wald	P	OR	95% CI
STEP 1: DEMOGRAPHIC VARIABLES						
Age	45 and older (REF)					
	18-24	1.997	38.442	.0005	7.37	3.919,13.856
	25-34	1.05	17.546	.0005	2.85	1.46,4.656
	35-44	.705	7.882	.005	2.02	1.237,3.311
Gender	Women (REF)					
	Men	.931	22.023	.0005	2.54	1.720,3.742
Education	Didn't Finish High School (REF)					
	High School Graduate/GED	.051	0.022	.882		
	College and higher	-.227	1.078	.299		
Income	Less than $10,999 (REF)					
	$11,000 - $25,999	.330	1.156	.282		
	$26,000-$49,999	.524	3.445	.063		
	$50,000 and higher	-.189	0.437	.508		
Employment	Employed (REF)					
	Unemployed	.075	0.109	.741		
STEP 2: CIGARETTE SMOKING						
Smoking	Non-Smoker (REF)					
	Smoker	1.16	21.760	.0005	3.19	1.962,5.212
Cigarette Type	Non-Menthol(REF)					
	Menthol	.447	3.469	.063		
	Both	.851	7.166	.007	2.34	1.256, 4.366

REF = Reference group

Table 3 displays separate regressions predicting smoking of Blunts and of the cigarillos *Philly* and *Black & Mild*. Age, gender, and higher incomes were predictors of smoking Blunts. The odds of Blunt-smoking were 2.5 times higher for men, and increased as age decreased, with young (ages 18-24) adults 6.3 times more likely than older ones (ages 45 and older) to smoke Blunts. *Philly/Black & Mild*- smoking was predicted by age, gender, and cigarette smoking. Men were 2.6 times more likely than women, young adults 15.9 times more likely than older ones, and cigarette smokers 5.3 times more likely than non-smokers to smoke *Philly/Black &Mild*.

Table 3. Logistic Regressions Predicting Black Adult Smoking of Blunts and of Philly/Black & Mild Cigarillos

		Blunts				**Philly/Black & Mild Cigarillos**			
Variables Entered		Wald	P	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	29.69	.0005	6.25	3.23,12.08	51.69	.0005	15.90	7.48,33.81
	25-34	13.31	.0005	3.07	1.68,5.62	21.33	.0005	4.23	2.29,7.80
	35-44	7.208	.007	2.38	1.26,4.48	14.22	.0005	3.38	1.79,6.36
Gender	Women (REF)								
	Men	14.10	.0005	2.49	1.55,4.02	14.02	.0005	2.57	1.57,4.21
Education	Not HS Grad (REF)								
	HS Grad/GED	0.82	.365			.928	.335		
	College and higher	1.066	.302			.616	.433		
Income	Less than $10,999(REF)								
	$11,000 - $25,999	3.925	.048	2.17	1.01,4.66	.375	.540		
	$26,000-$49,999	4.792	.029	2.18	1.09,4.37	.289	.591		
	$50,000 and higher	0.051	.821			.089	.766		
Employment									
	Employed(REF)								
	Unemployed	0.259	.611			1.29	.257		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	3.767	.052	1.89	.994,3.59 [a]	19.75	.0005	5.34	2.55,11.18
Type	Non-Menthol(REF)								
	Menthol	0.521	.470			6.72	.013	2.36	1.19,4.66
	Both	0.169	.681			15.42	.005	5.08	2.26,11.43

REF = Reference group; [a] = Not Significant

Table 4. Logistic Regressions Predicting Black Adult Smoking of Cigars and of Marijuana

Variables Entered		Standard-size Cigars				Marijuana			
		Wald	P	OR	95% CI	Wald	p	OR	95% CI
Age	45 and older (REF)								
	18-24	9.023	.003	2.99	1.46,6.09	30.68	.0005	6.05	3.20,11.45
	25-34	.819	.365			25.30	.0005	4.13	2.38,7.17
	35-44	4.132	.042	1.98	1.03,3.82	6.85	.009	2.18	1.22,3.90
Gender	Women (REF)								
	Men	16.823	.0005	3.08	1.80,5.28	11.51	.001	2.14	1.38,3.32
Education	Not HS Grad (REF)								
	HS Grad/GED	.264	.607			1.03	.310		
	College and higher	.004	.947			.129	.719		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	.518	.472			1.35	.245		
	$26,000-$49,999	2.065	.151			2.14	.143		
	$50,000 and higher	.473	.492			.048	.826		
Employment									
	Employed(REF)								
	Unemployed	.032	.858			1.08	.300		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	6.305	.012	2.54	1.23,5.26	9.42	.002	2.55	1.40,4.64
Type	Non-Menthol(REF)								
	Menthol	.162	.687			3.83	.050	1.76	.999,3.09 [a]
	Both	1.887	.170			2.74	.098		

REF = Reference group; [a] = Not Significant

The separate regressions predicting Cigar-Smoking and Marijuana-Smoking (Table 4) found age, gender, and cigarette smoking to be the predictors of both. Men, young adults, and smokers were 2.5 to 3 times more likely to smoke Standard-size Cigars than their reference groups. For Marijuana-Smoking, men were twice as likely, the youngest age group 6 times more likely, and smokers 2.5 times more likely than their reference groups to smoke Marijuana. A similar regression predicting Bidi-smoking (Table 5) revealed that age was the sole predictor, with those ages 18-24 (OR = 4.7) and 35-44 (OR 4.4) more likely

to smoke Bidis than the older age-group. The regression predicting smoking Kreteks/Cloves (Table 5) revealed that age and smoking menthol cigarettes were the predictors; those ages 35-44 were 11 times more likely, and menthol smokers (OR = 0.205) were less likely to smoke Kreteks/Cloves.

Table 5. Logistic Regressions Predicting Black Adult Smoking of Bidis and of Kreteks/Cloves

		Bidis				Kreteks/Clove Cigarettes			
Variables Entered		Wald	P	OR	95% CI	Wald	P	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	4.634	.031	4.74	1.15,19.55	0.000	.997		
	25-34	3.256	.071			3.540	.06	5.79	.929,36.04[a]
	35-44	5.000	.025	4.43	1.20,16.32	7.265	.007	11.09	1.928,63.79
Gender	Women (REF)								
	Men	1.970	.160			0.179	.672		
Education	Not HS Grad (REF)								
	HS Grad/GED	.000	.990			0.033	.855		
	College and higher	.013	.910			1.447	.229		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	1.044	.307			0.758	.384		
	$26,000-$49,999	.119	.731			0.812	.367		
	$50,000 and higher	.089	.776			0.229	.632		
Employment									
	Employed(REF)								
	Unemployed	1.719	.190			0.116	.734		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	2.126	.145			0.000	.996		
Type	Non-Menthol(REF)								
	Menthol	.753	.386			4.365	.037	0.205	.046,.907
	Both	2.341	.126			0.488	.485		

REF = Reference group; [a] = Not Significant

DISCUSSION

There was a high (49.3%) prevalence of polytobacco among Black adult cigarette smokers that held for men (57.3%) and women (40.6%). Substantial smoking of non-cigarette products also was found among

non-cigarette smokers, with 19.5% of men and 12.1% of women non-smokers smoking at least one non-cigarette product in the past 30 days. The odds of smoking most non-cigarette products generally were higher for men than women (ORs = 2.5 to 3.0), and for cigarette smokers than non-smokers (ORs = 3.2 to 5.3); however, gender did not contribute to smoking bidis or kreteks, and cigarette smoking did not contribute to smoking bidis, kreteks, or blunts. Smoking of any non-cigarette product and of each specific product generally was highest among adults ages 18-24 years (ORs = 3 to 15.9), and decreased as age increased. The exception was smoking kreteks/cloves; for these, older adults were more likely to be users. Moreover, unlike the well-known relationship between cigarette smoking and low SES[1,3-5], for these non-cigarette products, SES was related only to smoking blunts, with higher incomes a predictor. Type of cigarette smoked contributed to smoking non-cigarette products in general, and to smoking *Phillies/Blacks* specifically, with higher odds for those who smoked both menthol and non-menthol cigarettes, rather than one or the other; menthol smoking generally did not predict use of other products.

These findings suggest a problematically high prevalence of polytobacco use among Black smokers that is strongly associated with gender and young-adulthood but not associated with low income, low education, or menthol-smoking. Polytobacco users were mostly young men of varied SES who smoked all types of cigarettes along with non-cigarette products, i.e., a possible pattern of smoking whatever is available. Given that low-SES was not a risk factor for this, polytobacco use might perhaps instead be related to the social risk-factors for cigarette smoking among Blacks that have been identified in prior studies, i.e., racial segregation[27-29] and racial discrimination[30-32]. High levels of residential segregation (with high exposure to targeted tobacco advertising and easy access to single cigarettes in Black neighborhoods), and high levels of (the stress of) racial discrimination might be associated with smoking any cigarette and non-cigarette product available. Studies of the possible role of these factors in polytobacco use among Blacks are needed.

The 14.9% prevalence of past 30-day smoking of non-cigarette products by non-cigarette smokers also is a concern. Smoking blunts and bidis was not associated with cigarette smoking but was strongly

associated with youth. This suggests that smoking blunts and bidis might reflect youthful experimentation [13,15,17], and raises questions about whether young Blacks try these before they try cigarettes[13]. Studies of age of initiating smoking of cigarettes versus blunts and cigarillos among Blacks are needed to clarify this.

This study also found a substantial prevalence of smoking products that are not assessed in most population smoking surveys of adults (e.g., marijuana, cigarillos, blunts). Hence, it would be beneficial for surveillance studies to assess smoking of blunts, bidis, and (in particular) cigarillos such as *Phillies, Black & Mild,* and *Swisher Sweets*. Smoking of cigarillos may need to be assessed by brand name because young Blacks often do not categorize them as cigars[18], and hence their reports of cigar use increase significantly when these brand names are included[18]. That these cigarillos are sold individually and come in a variety of flavors (e.g., chocolate, apple, cherry) may contribute to not categorizing them as cigars or as cigarettes. Such assessment will provide a more comprehensive picture of smoking among Black adults, and would match the complexity of recent (2011) assessments of youth smoking that included bidis, kreteks and cigarillos [35].

This study has several limitations, including use of self-reports that may be lower than biologically-validated data[25], lack of assessment of some forms of tobacco use (e.g., pipes), and a California sample whose data might not generalize to other states. In addition, we used categorical instead of continuous demographic variables, and these may have limited the sensitivity of analyses. Moreover, to decrease the number of consecutive significance tests, potentially-interesting interaction effects (e.g., gender X education, gender X age, gender X income) were not examined; such effects however generally are not examined in basic, epidemiologic studies of product-use [e.g., 35] and is a limitation of this study and of similar studies. Likewise, because more than 90% of these Black cigarette smokers consumed 10 or fewer cigarettes per day, potential relationships between number of cigarettes smoked and smoking of other products were not examined. In addition, prevalence of smoking the products may have changed since this study. This is particularly the case for kreteks (clove cigarettes) that were banned by the 2009 *Family*

Smoking Prevention and Tobacco Control Act [36]. The CDC's 2011 study of youth [35] revealed that youth still smoke kreteks despite the ban, and this suggests that adults also might still smoke them. How youth and adults acquire banned and illegal products is worthy of investigation.

Despite these limitations, this study is the first to highlight the magnitude and complexity of smoking among a random, community sample of Black adults, and the first to underscore the need to improve its assessment in research and practice. More comprehensive, population-level assessment of multiple-substance smoking might yield data that in part explain Black difficulty quitting tobacco despite smoking only a few cigarettes per day[5-6], and likewise might yield findings that in part explain the puzzling high-incidence of smoking-related cancers at young ages among Black men [7,33]. Similarly, it would be beneficial for healthcare providers to include non-cigarette products such as bidis and blunts in 5A (ask, advise, assess, assist, arrange) assessment of smoking [34] among cigarette smokers and non-smokers alike, young adults in particular. Smoking cessation interventions also might be enhanced by assessing and addressing cessation of smoking such products. However, whether evidence-based smoking cessation interventions and nicotine replacement therapy are effective with polytobacco users remains unknown. Studies are needed to assess the possibility that hidden polytobacco use might contribute to the relative failure of standard smoking cessation programs with Black smokers[5-6], and research on the possible need for new cessation interventions for polytobacco users is needed as well.

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Polytobacco use and multiple-product smoking among a random community sample of African-American Adults

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Polytobacco use and multiple-product smoking among a random community sample of African-American Adults [1]

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ABSTRACT

Objectives. Little is known about polytobacco use among African-American adults. This study is the first to explore this among a random, statewide, community sample of Black adults.

Setting. Community-based sampling obtained a random, household-probability sample of California Black adults, surveyed door-to-door in randomly-selected census tracts, statewide

Participants. Participants were a statewide, random-household sample of N = 2,118 California Black adults who completed a survey on past 30-day smoking of cigarettes, blunts, bidis, kreteks, cigarillos, marijuana, and cigars.

Results. Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days. Smokers had substantial prevalence of smoking cigarillos (28.7%) and blunts (27.7%). Logistic regressions revealed that the odds of smoking most non-cigarette products were higher for cigarette smokers and for men, inversely related to age, and unrelated to socioeconomic status. However, smoking of blunts, bidis, and kreteks was not predicted by cigarette smoking.

Conclusion. Smoking of cigarillos (e.g., *Phillies*, *Black & Mild*) and blunts may be prevalent among Black cigarette smokers and non-smokers alike, but such products are not examined in most population-level smoking research. Smoking of these products should be included in surveillance studies, in cancer prevention programs, and in healthcare provider-assessment of smoking, and addressed in smoking cessation programs as well.

ARTICLE SUMMARY

Article Focus

- This study is the first to examine prevalence of smoking of cigars, bidis, kreteks, blunts, cigarillos (by brand name), and marijuana among a random, statewide sample of 2,118 California Black adult cigarette smokers and non-smokers.
- We hypothesized a substantial prevalence of smoking cigarillos and blunts, two products that appear to be popular among U.S. Blacks but are rarely assessed in population tobacco surveillance.

Key Messages

- Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days, and this was unrelated to socioeconomic status.
- Smokers had a high prevalence of smoking cigarillos (28.7%) and blunts (27.7%).
- These findings reveal a potentially high yet unexamined prevalence of multiple-product smoking among Blacks that involves frequent smoking of the products that are rarely assessed by researchers. This suggests a need for changes in tobacco-use assessment, and in tobacco prevention and cessation programs as well.

Strengths & Limitations

- Strengths include a large, random sample and a high survey response rate.
- Limitations are a California sample whose results may not generalize elsewhere, and use of self-reports that may underestimate tobacco use.

INTRODUCTION

Polytobacco use refers to the use of cigarettes in combination with another tobacco or smoked product such as cigars, kreteks (clove cigarettes), bidis (hand-rolled, flavored tobacco wrapped in temburi or tendu leaves), and pipes [1-4]. Compared to cigarette smoking, polytobacco use is associated with higher nicotine addiction, greater difficulty quitting tobacco, and increased incidence of smoking-related cancers[1-5]. These three outcomes are more prevalent among Black than White smokers [5-7] even though Blacks smoke significantly fewer cigarettes per day and initiate smoking later in life[5-7]. Possible polytobacco use among Blacks might be relevant to these puzzling tobacco-related racial disparities, and hence assessment of polytobacco use among Black smokers is needed.

Population surveillance studies reveal that polytobacco use among adults is low, i.e., 2.5% overall, 2.6% for Whites, 2.9% for Blacks [1]. However, most population studies of adults [1,3], unlike those of teens[4,8], did not assess smoking of bidis and kreteks. These products have 3-5 times higher nicotine, tar, and carbon monoxide than conventional US cigarettes[9-10], and incidence of smoking-related cancers is up to 112% higher among bidi- than among cigarette-smokers[11-12]. The sole study of bidi smoking among a large, random sample of adults (i.e., 18-24 year olds in the Behavioral Risk Factor Surveillance System) found that 25.4% of Blacks had ever-smoked bidis, a rate three times higher than that of Whites [13]. Likewise, a study of polytobacco use among military recruits found significantly higher use of bidis (but not of kreteks) among Blacks than Whites[14].

In addition to limited population-data on Black adult smoking of highly-carcinogenic products such as bidis, population studies usually do not assess smoking of the products that are popular in the Black community among cigarette smokers and non-smokers alike. Foremost among these are the thin, flavored, little cigars (i.e., cigarillos [15-17]) such as *Philly* and *Black & Mild* that Blacks often do not categorize as cigars[18], and blunts. The term blunts refers to two different products: Inexpensive, moderate-sized cigars (larger than cigarillos but smaller than standard-sized cigars) that are wrapped in a single tobacco-leaf and burn as fast as cigarettes, and moderate-sized cigars emptied of their tobacco, filled with marijuana, and wrapped in a single tobacco-leaf. Hence, irrespective of how the term is

defined, blunts are tobacco products and have been analyzed in tobacco studies [8,15-17]. Such studies found prevalence rates of up to 30% for both products among young Black adults [8,15-17].

Thus, little is known about Black-adult smoking of a variety of non-cigarette products. This study reports the first data on the prevalence and correlates of smoking blunts, cigarillos (*Philly/Black & Mild* by brand name), bidis, kreteks, standard-size cigars, and marijuana among a random, statewide, community sample of Black adult smokers (*polytobacco use*) and non-smokers (*multiple-product smoking*). Marijuana is not a tobacco-product, does not contain nicotine, and hence generally is excluded from studies of smoking. However, marijuana smoke contains many of the same carcinogens as cigarettes and is associated with increased cancer risk; hence, marijuana smoking may be relevant to understanding persistent, unexplained smoking-related cancer-disparities among Blacks [37].

METHOD

Procedures

Black participation in telephone and household-interview health surveys is low (e.g., 0.2%-20% [19-21]; hence, community-based sampling (CBS) and community-based participatory research (CBPR) approaches were used to increase participation rates[22-24]. CBS is a 3-stage, random-household probability sampling procedure often used in population studies of minorities to assure inclusion of segregated, linguistically-isolated, and phoneless/cell-phone only households; hence CBS yields more representative ethnic-minority samples [23-24]. In CBS Stage 1, census data were used to identify the counties in which the majority of CA Blacks reside. This revealed that most (90%) of the CA Black population resides in 7 counties, e.g., Los Angeles (42%), Sacramento (10%), San Diego (6%). Blacks were sampled from these counties proportional to representation, i.e., 42% of the sample came from Los Angeles county and 6% from San Diego county (etc.), such that this sample matched the distribution of the CA Black population. This was achieved by sampling more or fewer census tracts in each county as needed [24].

In CBS Stage 2, 513 census tracts (CTS) within the 7 counties were randomly selected. In Stage 3, a smaller set of equal numbers of low- (20-50% Blacks) and high-segregated (60-92% Blacks) CTS were randomly-selected from the 513, and block-groups within those randomly-selected. Every household in the block-groups was sampled door-to-door on weekends 2006-2008, with one adult participant permitted per household. The door-to-door method assured inclusion of phoneless/cell phone only households. Further details on the method are provided elsewhere[24]. Because cigarette-smoking rates are significantly higher among phoneless/cell phone only households[19], their inclusion here via the door-to-door survey method is likely to yield higher smoking rates than found in random telephone surveys.

The CBPR aspect of the study was co-sponsorship by the California Black Health Network (CBHN), a well-known, trusted organization that has conducted statewide tobacco assessment and tobacco-control programs for CA Blacks since the 1970s. CBHN needed a statewide health-assessment to improve its programs, and so co-sponsored the study. CBHN staff (Black adult surveyors) in each county collected the data in their counties. Surveyors wore CBHN ID badges, approached all households in the block groups, introduced themselves as CBHN staff, and stated that the purpose of the survey was to acquire data needed to improve CBHN programs in each Black community. Surveyors handed potential participants an Informed Consent Letter that described the survey, stated this study purpose, and included CBHN phone numbers (in each county) to call. Surveyors then asked if a Black adult resided in the household who might wish to complete the anonymous, *California Black Health Network* health survey for $10 cash. Using these CBPR approaches, the response rate was 99%, i.e., of those who answered the door, 99% completed and only 1% refused the survey [24].

Because up to 68% of cotinine-determined Black smokers deny smoking (self-report non-smoking) in household interviews[25], a written survey was used instead. Anonymous written surveys decrease socially-desirable denial of smoking and substance use and yield higher smoking and substance-use prevalence rates[26]; hence higher smoking rates are expected here than found in random household surveys. Surveys were left with participants to complete in private, and retrieved 30 minutes later. The study had the approval of the Institutional Review Board of San Diego State University.

Materials/Measures.

The survey assessed the health behaviors on which CBHN desired data (diet, physical activity, sun-safety, smoking of a variety of products); only the smoking data are presented here. We explored Past 30-day Smoking (yes/no) of cigarettes, blunts, bidis, kreteks/clove cigarettes, two cigarillos by brand name (*Philly*, *Black & Mild*), standard-size cigars, and marijuana. Type of cigarettes smoked (menthol, non-menthol, both) and demographic variables also were assessed. The survey took 15-30 minutes.

RESULTS

Participants were a random, statewide, sample of N = 2118, US-born, self-identified African-American/Black adult residents of California (CA), 1214 women (57.3%) and 904 men (42.7%), whose ages ranged from 18 to 95 years (Mean = 43.8, s.d. = 16.2 years). Details of their demographics have been presented elsewhere[24], and revealed that this 2006-2008 sample is similar to the 2006-2008 Black population in the CA Census. The prevalence of cigarette smoking among this sample was 32.6%, and significantly higher among men (37.2%) than women (29.7%; $\chi^2 = 10.651$, $p < .001$).

Table 1. Prevalence of Smoking Non-cigarette Products among a random sample of Black Adult Cigarette Smokers and Non-Smokers

Past 30 day Smoking of	**Overall %**	**Smokers** [a] **%**	**Non-Smokers** [b] **%**	χ^2_1 *
Philly; Black & Mild	13.0	28.7	5.3	176.389
Blunts	14.1	27.7	7.5	23.255
Standard Size Cigars	10.1	21.4	4.5	107.004
Marijuana	18.6	33.0	11.4	113.856
Bidis	2.0	5.0	0.5	35.97
Kreteks/Cloves	1.1	2.7	0.4	17.304
Any 1 or more of the above	26.1	49.3	14.9	257.73
Men Any 1 or more of the above	33.6	57.3	19.5	114.803
Women Any 1 or more of the above	20.6	40.6	12.1	107.047

[a] n = 690 (32.6%), [b] n = 1284 (67.3%), * p = .0005

Table 1 displays Past 30-Day Smoking Prevalence Rates for 6 non-cigarette products among cigarette smokers and non-smokers. As shown, prevalence of smoking 1 or more non-cigarette product was 49.3% for cigarette smokers and 14.9% for non-smokers. Among Black men, prevalence of smoking 1 or more non-cigarette product was 57.3% for smokers, and 19.5% for non-smokers; among women, these rates were 40.6% (cigarette smokers) and 12.1% (non-smokers).

Table 2 displays the hierarchical logistic regression predicting smoking of any non-cigarette product from demographic and cigarette-smoking variables. As shown, smoking non-cigarette products was predicted by age, gender, and cigarette smoking, but not by socioeconomic status (SES; education, income, employment). Men (OR=2.5), cigarette smokers (OR = 3.2), and young adults (OR = 7.4) were

Table 2. Logistic Regression Predicting Black Adult Smoking of Non-Cigarette Products

Model and Variables Entered		B	Wald	P	OR	95% CI
STEP 1: DEMOGRAPHIC VARIABLES						
Age	45 and older (REF)					
	18-24	1.997	38.442	.0005	7.37	3.919,13.856
	25-34	1.05	17.546	.0005	2.85	1.46,4.656
	35-44	.705	7.882	.005	2.02	1.237,3.311
Gender	Women (REF)					
	Men	.931	22.023	.0005	2.54	1.720,3.742
Education	Didn't Finish High School (REF)					
	High School Graduate/GED	.051	0.022	.882		
	College and higher	-.227	1.078	.299		
Income	Less than $10,999 (REF)					
	$11,000 - $25,999	.330	1.156	.282		
	$26,000-$49,999	.524	3.445	.063		
	$50,000 and higher	-.189	0.437	.508		
Employment	Employed (REF)					
	Unemployed	.075	0.109	.741		
STEP 2: CIGARETTE SMOKING						
Smoking	Non-Smoker (REF)					
	Smoker	1.16	21.760	.0005	3.19	1.962,5.212
Cigarette Type	Non-Menthol(REF)					
	Menthol	.447	3.469	.063		
	Both	.851	7.166	.007	2.34	1.256, 4.366

REF = Reference group

more likely to smoke non-cigarette products, and the odds of smoking the products increased with

decreasing age.

Table 3 displays separate regressions predicting smoking of Blunts and of the cigarillos *Philly* and *Black & Mild*. Age, gender, and higher incomes were predictors of smoking Blunts. The odds of Blunt-smoking were 2.5 times higher for men, and increased as age decreased, with young (ages 18-24) adults 6.3 times more likely than older ones (ages 45 and older) to smoke Blunts. *Philly/Black & Mild*- smoking was predicted by age, gender, and cigarette smoking. Men were 2.6 times more likely than women, young adults 15.9 times more likely than older ones, and cigarette smokers 5.3 times more likely than non-smokers to smoke *Philly/Black &Mild*.

Table 3. Logistic Regressions Predicting Black Adult Smoking of Blunts and of Philly/Black & Mild Cigarillos

		Blunts				**Philly/Black & Mild Cigarillos**			
Variables Entered		Wald	P	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	29.69	.0005	6.25	3.23,12.08	51.69	.0005	15.90	7.48,33.81
	25-34	13.31	.0005	3.07	1.68,5.62	21.33	.0005	4.23	2.29,7.80
	35-44	7.208	.007	2.38	1.26,4.48	14.22	.0005	3.38	1.79,6.36
Gender	Women (REF)								
	Men	14.10	.0005	2.49	1.55,4.02	14.02	.0005	2.57	1.57,4.21
Education	Not HS Grad (REF)								
	HS Grad/GED	0.82	.365			.928	.335		
	College and higher	1.066	.302			.616	.433		
Income	Less than $10,999(REF)								
	$11,000 - $25,999	3.925	.048	2.17	1.01,4.66	.375	.540		
	$26,000-$49,999	4.792	.029	2.18	1.09,4.37	.289	.591		
	$50,000 and higher	0.051	.821			.089	.766		
Employment									
	Employed(REF)								
	Unemployed	0.259	.611			1.29	.257		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	3.767	.052	1.89	.994,3.59 [a]	19.75	.0005	5.34	2.55,11.18
Type	Non-Menthol(REF)								
	Menthol	0.521	.470			6.72	.013	2.36	1.19,4.66
	Both	0.169	.681			15.42	.005	5.08	2.26,11.43

REF = Reference group; [a] = Not Significant

The separate regressions predicting Cigar-Smoking and Marijuana-Smoking (Table 4) found age,

gender, and cigarette smoking to be the predictors of both. Men, young adults, and smokers were 2.5 to 3 times more likely to smoke Standard-size Cigars than their reference groups. For Marijuana-Smoking, men were twice as likely, the youngest age group 6 times more likely, and smokers 2.5 times more likely than their reference groups to smoke Marijuana. A similar regression predicting Bidi-smoking (Table 5) revealed that age was the sole predictor, with those ages 18-24 (OR = 4.7) and 35-44 (OR 4.4) more likely to smoke Bidis than the older age-group. The regression predicting smoking Kreteks/Cloves (Table 5) revealed that age and smoking menthol cigarettes were the predictors; those ages 35-44 were 11 times more likely, and menthol smokers (OR = 0.205) were less likely to smoke Kreteks/Cloves.

Table 4. Logistic Regressions Predicting Black Adult Smoking of Cigars and of Marijuana

		Standard-size Cigars				Marijuana			
	Variables Entered	Wald	P	OR	95% CI	Wald	p	OR	95% CI
Age	45 and older (REF)								
	18-24	9.023	.003	2.99	1.46,6.09	30.68	.0005	6.05	3.20,11.45
	25-34	.819	.365			25.30	.0005	4.13	2.38,7.17
	35-44	4.132	.042	1.98	1.03,3.82	6.85	.009	2.18	1.22,3.90
Gender	Women (REF)								
	Men	16.823	.0005	3.08	1.80,5.28	11.51	.001	2.14	1.38,3.32
Education	Not HS Grad (REF)								
	HS Grad/GED	.264	.607			1.03	.310		
	College and higher	.004	.947			.129	.719		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	.518	.472			1.35	.245		
	$26,000-$49,999	2.065	.151			2.14	.143		
	$50,000 and higher	.473	.492			.048	.826		
Employment									
	Employed(REF)								
	Unemployed	.032	.858			1.08	.300		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	6.305	.012	2.54	1.23,5.26	9.42	.002	2.55	1.40,4.64
Type	Non-Menthol(REF)								
	Menthol	.162	.687			3.83	.050	1.76	.999,3.09 [a]
	Both	1.887	.170			2.74	.098		

REF = Reference group; [a] = Not Significant

Table 5. Logistic Regressions Predicting Black Adult Smoking of Bidis and of Kreteks/Cloves

		Bidis				Kreteks/Clove Cigarettes			
Variables Entered		Wald	P	OR	95% CI	Wald	P	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	4.634	.031	4.74	1.15,19.55	0.000	.997		
	25-34	3.256	.071			3.540	.06	5.79	.929,36.04[a]
	35-44	5.000	.025	4.43	1.20,16.32	7.265	.007	11.09	1.928,63.79
Gender	Women (REF)								
	Men	1.970	.160			0.179	.672		
Education	Not HS Grad (REF)								
	HS Grad/GED	.000	.990			0.033	.855		
	College and higher	.013	.910			1.447	.229		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	1.044	.307			0.758	.384		
	$26,000-$49,999	.119	.731			0.812	.367		
	$50,000 and higher	.089	.776			0.229	.632		
Employment									
	Employed(REF)								
	Unemployed	1.719	.190			0.116	.734		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	2.126	.145			0.000	.996		
Type	Non-Menthol(REF)								
	Menthol	.753	.386			4.365	.037	0.205	.046,.907
	Both	2.341	.126			0.488	.485		

REF = Reference group; [a] = Not Significant

DISCUSSION

There was a high (49.3%) prevalence of polytobacco among Black adult cigarette smokers that held for men (57.3%) and women (40.6%). Substantial smoking of non-cigarette products also was found among non-cigarette smokers, with 19.5% of men and 12.1% of women non-smokers smoking at least one non-cigarette product in the past 30 days. The odds of smoking most non-cigarette products generally

were higher for men than women (ORs = 2.5 to 3.0), and for cigarette smokers than non-smokers (ORs = 3.2 to 5.3); however, gender did not contribute to smoking bidis or kreteks, and cigarette smoking did not contribute to smoking bidis, kreteks, or blunts. Smoking of any non-cigarette product and of each specific product generally was highest among adults ages 18-24 years (ORs = 3 to 15.9) as in prior studies [13-16], and decreased as age increased. The exception was smoking kreteks/cloves; for these, older adults were more likely to be users. Moreover, unlike the well-known relationship between cigarette smoking and low SES[1,3-5], for these non-cigarette products, SES was related only to smoking blunts, with higher incomes a predictor. Type of cigarette smoked contributed to smoking non-cigarette products in general, and to smoking *Phillies/Blacks* specifically, with higher odds for those who smoked both menthol and non-menthol cigarettes, rather than one or the other; menthol smoking generally did not predict use of other products.

These findings suggest a problematically high prevalence of polytobacco use among Black smokers that is strongly associated with gender and young-adulthood but not associated with low income, low education, or menthol-smoking. Polytobacco users were mostly young men of varied SES who smoked all types of cigarettes along with non-cigarette products, i.e., a possible pattern of smoking whatever is available. Given that low-SES was not a risk factor for this, polytobacco use might perhaps instead be related to the social risk-factors for cigarette smoking among Blacks that have been identified in prior studies, i.e., racial segregation[27-29] and racial discrimination[30-32]. High levels of residential segregation (with high exposure to targeted tobacco advertising and easy access to single cigarettes in Black neighborhoods), and high levels of (the stress of) racial discrimination might be associated with smoking any cigarette and non-cigarette product available. Studies of the possible role of these factors in polytobacco use among Blacks are needed.

The 14.9% prevalence of past 30-day smoking of non-cigarette products by non-cigarette smokers also is a concern. Smoking blunts and bidis was not associated with cigarette smoking but was strongly associated with youth. This suggests that smoking blunts and bidis might reflect youthful experimentation [13,15,17], and raises questions about whether young Blacks try these before they try cigarettes[13].

Studies of age of initiating smoking of cigarettes versus blunts and cigarillos among Blacks are needed to clarify this.

This study also found a substantial prevalence of smoking products that are not assessed in most population smoking surveys of adults (e.g., marijuana, cigarillos, blunts). Hence, it would be beneficial for surveillance studies to assess smoking of blunts, bidis, and (in particular) cigarillos such as *Phillies, Black & Mild,* and *Swisher Sweets*. Smoking of cigarillos may need to be assessed by brand name because young Blacks often do not categorize them as cigars[18], and hence their reports of cigar use increase significantly when these brand names are included[18]. That these cigarillos are sold individually and come in a variety of flavors (e.g., chocolate, apple, cherry) may contribute to not categorizing them as cigars or as cigarettes. Such assessment will provide a more comprehensive picture of smoking among Black adults, and would match the complexity of recent (2011) assessments of youth smoking that included bidis, kreteks and cigarillos [35].

This study has several limitations, including use of self-reports that may be lower than biologically-validated data[25], lack of assessment of some forms of tobacco use (e.g., pipes), and a California sample whose data might not generalize to other states. In addition, we treated age as a categorical instead of a continuous variable, and this may have limited the sensitivity of analyses. We note however that the age categories used here are similar to those used in prior studies of polytobacco use in which the highest prevalence found was for 18-24 year olds [e.g., 13-16]. Moreover, to decrease the number of consecutive significance tests, potentially-interesting interaction effects (e.g., gender X age, gender X income) were not examined; such effects however generally are not examined in basic, epidemiologic studies of product-use [e.g., 35] and is a limitation of this study and of similar studies. Likewise, because more than 90% of these Black cigarette smokers consumed 10 or fewer cigarettes per day, potential relationships between number of cigarettes smoked and smoking of other products were not examined. In addition, prevalence of smoking the products may have changed since this study. This is particularly the case for kreteks (clove cigarettes) that were banned by the 2009 *Family Smoking Prevention and Tobacco Control Act* [36]. The CDC's 2011 study of youth [35] revealed that youth still

smoke kreteks despite the ban, and this suggests that adults also might still smoke them. How youth and adults acquire banned and illegal products is worthy of investigation.

Despite these limitations, this study is the first to highlight the magnitude and complexity of smoking among a random, community sample of Black adults, and the first to underscore the need to improve its assessment in research and practice. More comprehensive, population-level assessment of multiple-substance smoking might yield data that in part explain Black difficulty quitting tobacco despite smoking only a few cigarettes per day[5-6], and likewise might yield findings that in part explain the puzzling high-incidence of smoking-related cancers at young ages among Black men [7,33]. Similarly, it would be beneficial for healthcare providers to include non-cigarette products such as bidis and blunts in 5A (ask, advise, assess, assist, arrange) assessment of smoking [34] among cigarette smokers and non-smokers alike, young adults in particular. Smoking cessation interventions also might be enhanced by assessing and addressing cessation of smoking such products. However, whether evidence-based smoking cessation interventions and nicotine replacement therapy are effective with polytobacco users remains unknown. Studies are needed to assess the possibility that hidden polytobacco use might contribute to the relative failure of standard smoking cessation programs with Black smokers[5-6], and research on the possible need for new cessation interventions for polytobacco users is needed as well.

Conflicts of interests:

The authors have no financial or other conflicts of interests.

Author Contributions

Irma Corral made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Hope Landrine made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Jukelia Bess made substantial contributions to 1) analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Denise Adams Simms made substantial contributions to 1) study conception and design, and acquisition of data, 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

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Data sharing

There are no additional, unpublished data related to this study.

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Polytobacco use and multiple-product smoking among a random community sample of African-American Adults [1]

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ABSTRACT

Objectives. Little is known about polytobacco use among African-American adults. This study is the first to explore this among a random, statewide, community sample of Black adults.

Setting. Community-based sampling obtained a random, household-probability sample of California Black adults, surveyed door-to-door in randomly-selected census tracts, statewide

Participants. Participants were a statewide, random-household sample of N = 2,118 California Black adults who completed a survey on past 30-day smoking of cigarettes, blunts, bidis, kreteks, cigarillos, marijuana, and cigars.

Results. Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days. Smokers had substantial prevalence of smoking cigarillos (28.7%) and blunts (27.7%). Logistic regressions revealed that the odds of smoking most non-cigarette products were higher for cigarette smokers and for men, inversely related to age, and unrelated to socioeconomic status. However, smoking of blunts, bidis, and kreteks was not predicted by cigarette smoking.

Conclusion. Smoking of cigarillos (e.g., *Phillies*, *Black & Mild*) and blunts may be prevalent among Black cigarette smokers and non-smokers alike, but such products are not examined in most population-level smoking research. Smoking of these products should be included in surveillance studies, in cancer prevention programs, and in healthcare provider-assessment of smoking, and addressed in smoking cessation programs as well.

ARTICLE SUMMARY

Article Focus

- This study is the first to examine prevalence of smoking of cigars, bidis, kreteks, blunts, cigarillos (by brand name), and marijuana among a random, statewide sample of 2,118 California Black adult cigarette smokers and non-smokers.
- We hypothesized a substantial prevalence of smoking cigarillos and blunts, two products that appear to be popular among U.S. Blacks but are rarely assessed in population tobacco surveillance.

Key Messages

- Almost half (49.3%) of Black cigarette smokers, and 14.9 % of cigarette non-smokers had smoked at least one non-cigarette product in the past 30 days, and this was unrelated to socioeconomic status.
- Smokers had a high prevalence of smoking cigarillos (28.7%) and blunts (27.7%).
- These findings reveal a potentially high yet unexamined prevalence of multiple-product smoking among Blacks that involves frequent smoking of the products that are rarely assessed by researchers. This suggests a need for changes in tobacco-use assessment, and in tobacco prevention and cessation programs as well.

Strengths & Limitations

- Strengths include a large, random sample and a high survey response rate.
- Limitations are a California sample whose results may not generalize elsewhere, and use of self-reports that may underestimate tobacco use.

INTRODUCTION

Polytobacco use refers to the use of cigarettes in combination with another tobacco or smoked product such as cigars, kreteks (clove cigarettes), bidis (hand-rolled, flavored tobacco wrapped in temburi or tendu leaves), and pipes [1-4]. Compared to cigarette smoking, polytobacco use is associated with higher nicotine addiction, greater difficulty quitting tobacco, and increased incidence of smoking-related cancers[1-5]. These three outcomes are more prevalent among Black than White smokers [5-7] even though Blacks smoke significantly fewer cigarettes per day and initiate smoking later in life[5-7]. Possible polytobacco use among Blacks might be relevant to these puzzling tobacco-related racial disparities, and hence assessment of polytobacco use among Black smokers is needed.

Population surveillance studies reveal that polytobacco use among adults is low, i.e., 2.5% overall, 2.6% for Whites, 2.9% for Blacks [1]. However, most population studies of adults [1,3], unlike those of teens[4,8], did not assess smoking of bidis and kreteks. These products have 3-5 times higher nicotine, tar, and carbon monoxide than conventional US cigarettes[9-10], and incidence of smoking-related cancers is up to 112% higher among bidi- than among cigarette-smokers[11-12]. The sole study of bidi smoking among a large, random sample of adults (i.e., 18-24 year olds in the Behavioral Risk Factor Surveillance System) found that 25.4% of Blacks had ever-smoked bidis, a rate three times higher than that of Whites [13]. Likewise, a study of polytobacco use among military recruits found significantly higher use of bidis (but not of kreteks) among Blacks than Whites[14].

In addition to limited population-data on Black adult smoking of highly-carcinogenic products such as bidis, population studies usually do not assess smoking of the products that are popular in the Black community among cigarette smokers and non-smokers alike. Foremost among these are the thin, flavored, little cigars (i.e., cigarillos [15-17]) such as *Philly* and *Black & Mild* that Blacks often do not categorize as cigars[18], and blunts. The term blunts refers to two different products: Inexpensive, moderate-sized cigars (larger than cigarillos but smaller than standard-sized cigars) that are wrapped in a single tobacco-leaf and burn as fast as cigarettes, and moderate-sized cigars emptied of their tobacco, filled with marijuana, and wrapped in a single tobacco-leaf. Hence, irrespective of how the term is

defined, blunts are tobacco products and have been analyzed in tobacco studies [8,15-17]. Such studies found prevalence rates of up to 30% for both products among young Black adults [8,15-17].

Thus, little is known about Black-adult smoking of a variety of non-cigarette products. This study reports the first data on the prevalence and correlates of smoking blunts, cigarillos (*Philly/Black & Mild* by brand name), bidis, kreteks, standard-size cigars, and marijuana among a random, statewide, community sample of Black adult smokers (*polytobacco use*) and non-smokers (*multiple-product smoking*). Marijuana is not a tobacco-product, does not contain nicotine, and hence generally is excluded from studies of smoking. However, marijuana smoke contains many of the same carcinogens as cigarettes and is associated with increased cancer risk; hence, marijuana smoking may be relevant to understanding persistent, unexplained smoking-related cancer-disparities among Blacks [37].

METHOD

Procedures

Black participation in telephone and household-interview health surveys is low (e.g., 0.2%-20% [19-21]; hence, community-based sampling (CBS) and community-based participatory research (CBPR) approaches were used to increase participation rates[22-24]. CBS is a 3-stage, random-household probability sampling procedure often used in population studies of minorities to assure inclusion of segregated, linguistically-isolated, and phoneless/cell-phone only households; hence CBS yields more representative ethnic-minority samples [23-24]. In CBS Stage 1, census data were used to identify the counties in which the majority of CA Blacks reside. This revealed that most (90%) of the CA Black population resides in 7 counties, e.g., Los Angeles (42%), Sacramento (10%), San Diego (6%). Blacks were sampled from these counties proportional to representation, i.e., 42% of the sample came from Los Angeles county and 6% from San Diego county (etc.), such that this sample matched the distribution of the CA Black population. This was achieved by sampling more or fewer census tracts in each county as needed [24].

In CBS Stage 2, 513 census tracts (CTS) within the 7 counties were randomly selected. In Stage 3,

a smaller set of equal numbers of low- (20-50% Blacks) and high-segregated (60-92% Blacks) CTS were randomly-selected from the 513, and block-groups within those randomly-selected. Every household in the block-groups was sampled door-to-door on weekends 2006-2008, with one adult participant permitted per household. The door-to-door method assured inclusion of phoneless/cell phone only households. Further details on the method are provided elsewhere[24]. Because cigarette-smoking rates are significantly higher among phoneless/cell phone only households[19], their inclusion here via the door-to-door survey method is likely to yield higher smoking rates than found in random telephone surveys.

The CBPR aspect of the study was co-sponsorship by the California Black Health Network (CBHN), a well-known, trusted organization that has conducted statewide tobacco assessment and tobacco-control programs for CA Blacks since the 1970s. CBHN needed a statewide health-assessment to improve its programs, and so co-sponsored the study. CBHN staff (Black adult surveyors) in each county collected the data in their counties. Surveyors wore CBHN ID badges, approached all households in the block groups, introduced themselves as CBHN staff, and stated that the purpose of the survey was to acquire data needed to improve CBHN programs in each Black community. Surveyors handed potential participants an Informed Consent Letter that described the survey, stated this study purpose, and included CBHN phone numbers (in each county) to call. Surveyors then asked if a Black adult resided in the household who might wish to complete the anonymous, *California Black Health Network* health survey for $10 cash. Using these CBPR approaches, the response rate was 99%, i.e., of those who answered the door, 99% completed and only 1% refused the survey [24].

Because up to 68% of cotinine-determined Black smokers deny smoking (self-report non-smoking) in household interviews[25], a written survey was used instead. Anonymous written surveys decrease socially-desirable denial of smoking and substance use and yield higher smoking and substance-use prevalence rates[26]; hence higher smoking rates are expected here than found in random household surveys. Surveys were left with participants to complete in private, and retrieved 30 minutes later. The study had the approval of the Institutional Review Board of San Diego State University.

Materials/Measures.

The survey assessed the health behaviors on which CBHN desired data (diet, physical activity, sun-safety, smoking of a variety of products); only the smoking data are presented here. We explored Past 30-day Smoking (yes/no) of cigarettes, blunts, bidis, kreteks/clove cigarettes, two cigarillos by brand name (*Philly*, *Black & Mild*), standard-size cigars, and marijuana. Type of cigarettes smoked (menthol, non-menthol, both) and demographic variables also were assessed. The survey took 15-30 minutes.

RESULTS

Participants were a random, statewide, sample of N = 2118, US-born, self-identified African-American/Black adult residents of California (CA), 1214 women (57.3%) and 904 men (42.7%), whose ages ranged from 18 to 95 years (Mean = 43.8, s.d. = 16.2 years). Details of their demographics have been presented elsewhere[24], and revealed that this 2006-2008 sample is similar to the 2006-2008 Black population in the CA Census. The prevalence of cigarette smoking among this sample was 32.6%, and significantly higher among men (37.2%) than women (29.7%; $\chi^2 = 10.651$, $p < .001$).

Table 1. Prevalence of Smoking Non-cigarette Products among a random sample of Black Adult Cigarette Smokers and Non-Smokers

Past 30 day Smoking of	**Overall %**	**Smokers** [a] **%**	**Non-Smokers** [b] **%**	χ^2_1 *
Philly; Black & Mild	13.0	28.7	5.3	176.389
Blunts	14.1	27.7	7.5	23.255
Standard Size Cigars	10.1	21.4	4.5	107.004
Marijuana	18.6	33.0	11.4	113.856
Bidis	2.0	5.0	0.5	35.97
Kreteks/Cloves	1.1	2.7	0.4	17.304
Any 1 or more of the above	26.1	49.3	14.9	257.73
Men Any 1 or more of the above	33.6	57.3	19.5	114.803
Women Any 1 or more of the above	20.6	40.6	12.1	107.047

[a] n = 690 (32.6%), [b] n = 1284 (67.3%), * p = .0005

Table 1 displays Past 30-Day Smoking Prevalence Rates for 6 non-cigarette products among

cigarette smokers and non-smokers. As shown, prevalence of smoking 1 or more non-cigarette product was 49.3% for cigarette smokers and 14.9% for non-smokers. Among Black men, prevalence of smoking 1 or more non-cigarette product was 57.3% for smokers, and 19.5% for non-smokers; among women, these rates were 40.6% (cigarette smokers) and 12.1% (non-smokers).

Table 2 displays the hierarchical logistic regression predicting smoking of any non-cigarette product from demographic and cigarette-smoking variables. As shown, smoking non-cigarette products was predicted by age, gender, and cigarette smoking, but not by socioeconomic status (SES; education, income, employment). Men (OR=2.5), cigarette smokers (OR = 3.2), and young adults (OR = 7.4) were

Table 2. Logistic Regression Predicting Black Adult Smoking of Non-Cigarette Products

Model and Variables Entered		B	Wald	P	OR	95% CI
STEP 1: DEMOGRAPHIC VARIABLES						
Age	45 and older (REF)					
	18-24	1.997	38.442	.0005	7.37	3.919,13.856
	25-34	1.05	17.546	.0005	2.85	1.46,4.656
	35-44	.705	7.882	.005	2.02	1.237,3.311
Gender	Women (REF)					
	Men	.931	22.023	.0005	2.54	1.720,3.742
Education	Didn't Finish High School (REF)					
	High School Graduate/GED	.051	0.022	.882		
	College and higher	-.227	1.078	.299		
Income	Less than $10,999 (REF)					
	$11,000 - $25,999	.330	1.156	.282		
	$26,000-$49,999	.524	3.445	.063		
	$50,000 and higher	-.189	0.437	.508		
Employment	Employed (REF)					
	Unemployed	.075	0.109	.741		
STEP 2: CIGARETTE SMOKING						
Smoking	Non-Smoker (REF)					
	Smoker	1.16	21.760	.0005	3.19	1.962,5.212
Cigarette Type	Non-Menthol(REF)					
	Menthol	.447	3.469	.063		
	Both	.851	7.166	.007	2.34	1.256, 4.366

REF = Reference group

more likely to smoke non-cigarette products, and the odds of smoking the products increased with decreasing age.

Table 3 displays separate regressions predicting smoking of Blunts and of the cigarillos *Philly* and *Black & Mild*. Age, gender, and higher incomes were predictors of smoking Blunts. The odds of Blunt-smoking were 2.5 times higher for men, and increased as age decreased, with young (ages 18-24) adults 6.3 times more likely than older ones (ages 45 and older) to smoke Blunts. *Philly/Black & Mild*- smoking was predicted by age, gender, and cigarette smoking. Men were 2.6 times more likely than women, young adults 15.9 times more likely than older ones, and cigarette smokers 5.3 times more likely than non-smokers to smoke *Philly/Black &Mild*.

Table 3. Logistic Regressions Predicting Black Adult Smoking of Blunts and of Philly/Black & Mild Cigarillos

		Blunts				Philly/Black & Mild Cigarillos			
Variables Entered		Wald	P	OR	95% CI	Wald	p	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	29.69	.0005	6.25	3.23,12.08	51.69	.0005	15.90	7.48,33.81
	25-34	13.31	.0005	3.07	1.68,5.62	21.33	.0005	4.23	2.29,7.80
	35-44	7.208	.007	2.38	1.26,4.48	14.22	.0005	3.38	1.79,6.36
Gender	Women (REF)								
	Men	14.10	.0005	2.49	1.55,4.02	14.02	.0005	2.57	1.57,4.21
Education	Not HS Grad (REF)								
	HS Grad/GED	0.82	.365			.928	.335		
	College and higher	1.066	.302			.616	.433		
Income	Less than $10,999(REF)								
	$11,000 - $25,999	3.925	.048	2.17	1.01,4.66	.375	.540		
	$26,000-$49,999	4.792	.029	2.18	1.09,4.37	.289	.591		
	$50,000 and higher	0.051	.821			.089	.766		
Employment									
	Employed(REF)								
	Unemployed	0.259	.611			1.29	.257		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	3.767	.052	1.89	.994,3.59 [a]	19.75	.0005	5.34	2.55,11.18
Type	Non-Menthol(REF)								
	Menthol	0.521	.470			6.72	.013	2.36	1.19,4.66
	Both	0.169	.681			15.42	.005	5.08	2.26,11.43

REF = Reference group; [a] = Not Significant

The separate regressions predicting Cigar-Smoking and Marijuana-Smoking (Table 4) found age, gender, and cigarette smoking to be the predictors of both. Men, young adults, and smokers were 2.5 to 3

times more likely to smoke Standard-size Cigars than their reference groups. For Marijuana-Smoking, men were twice as likely, the youngest age group 6 times more likely, and smokers 2.5 times more likely than their reference groups to smoke Marijuana. A similar regression predicting Bidi-smoking (Table 5) revealed that age was the sole predictor, with those ages 18-24 (OR = 4.7) and 35-44 (OR 4.4) more likely to smoke Bidis than the older age-group. The regression predicting smoking Kreteks/Cloves (Table 5) revealed that age and smoking menthol cigarettes were the predictors; those ages 35-44 were 11 times more likely, and menthol smokers (OR = 0.205) were less likely to smoke Kreteks/Cloves.

Table 4. Logistic Regressions Predicting Black Adult Smoking of Cigars and of Marijuana

		Standard-size Cigars				Marijuana			
Variables Entered		Wald	P	OR	95% CI	Wald	p	OR	95% CI
Age	45 and older (REF)								
	18-24	9.023	.003	2.99	1.46,6.09	30.68	.0005	6.05	3.20,11.45
	25-34	.819	.365			25.30	.0005	4.13	2.38,7.17
	35-44	4.132	.042	1.98	1.03,3.82	6.85	.009	2.18	1.22,3.90
Gender	Women (REF)								
	Men	16.823	.0005	3.08	1.80,5.28	11.51	.001	2.14	1.38,3.32
Education	Not HS Grad (REF)								
	HS Grad/GED	.264	.607			1.03	.310		
	College and higher	.004	.947			.129	.719		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	.518	.472			1.35	.245		
	$26,000-$49,999	2.065	.151			2.14	.143		
	$50,000 and higher	.473	.492			.048	.826		
Employment									
	Employed(REF)								
	Unemployed	.032	.858			1.08	.300		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	6.305	.012	2.54	1.23,5.26	9.42	.002	2.55	1.40,4.64
Type	Non-Menthol(REF)								
	Menthol	.162	.687			3.83	.050	1.76	.999,3.09 [a]
	Both	1.887	.170			2.74	.098		

REF = Reference group; [a] = Not Significant

Table 5. Logistic Regressions Predicting Black Adult Smoking of Bidis and of Kreteks/Cloves

		Bidis				Kreteks/Clove Cigarettes			
Variables Entered		Wald	P	OR	95% CI	Wald	P	OR	95% CI
STEP 1: Demographics									
Age	45 and older (REF)								
	18-24	4.634	.031	4.74	1.15,19.55	0.000	.997		
	25-34	3.256	.071			3.540	.06	5.79	.929,36.04[a]
	35-44	5.000	.025	4.43	1.20,16.32	7.265	.007	11.09	1.928,63.79
Gender	Women (REF)								
	Men	1.970	.160			0.179	.672		
Education	Not HS Grad (REF)								
	HS Grad/GED	.000	.990			0.033	.855		
	College and higher	.013	.910			1.447	.229		
Income	Less than $10,999 (REF)								
	$11,000 - $25,999	1.044	.307			0.758	.384		
	$26,000-$49,999	.119	.731			0.812	.367		
	$50,000 and higher	.089	.776			0.229	.632		
Employment									
	Employed(REF)								
	Unemployed	1.719	.190			0.116	.734		
STEP 2: Cigarette Smoking									
Smoking	Non-Smoker (REF)								
	Smoker	2.126	.145			0.000	.996		
Type	Non-Menthol(REF)								
	Menthol	.753	.386			4.365	.037	0.205	.046,.907
	Both	2.341	.126			0.488	.485		

REF = Reference group; [a] = Not Significant

DISCUSSION

There was a high (49.3%) prevalence of polytobacco among Black adult cigarette smokers that held for men (57.3%) and women (40.6%). Substantial smoking of non-cigarette products also was found among non-cigarette smokers, with 19.5% of men and 12.1% of women non-smokers smoking at least one non-cigarette product in the past 30 days. The odds of smoking most non-cigarette products generally were higher for men than women (ORs = 2.5 to 3.0), and for cigarette smokers than non-smokers (ORs = 3.2 to 5.3); however, gender did not contribute to smoking bidis or kreteks, and cigarette smoking did not

contribute to smoking bidis, kreteks, or blunts. Smoking of any non-cigarette product and of each specific product generally was highest among adults ages 18-24 years (ORs = 3 to 15.9) as in prior studies [13-16], and decreased as age increased. The exception was smoking kreteks/cloves; for these, older adults were more likely to be users. Moreover, unlike the well-known relationship between cigarette smoking and low SES[1,3-5], for these non-cigarette products, SES was related only to smoking blunts, with higher incomes a predictor. Type of cigarette smoked contributed to smoking non-cigarette products in general, and to smoking *Phillies/Blacks* specifically, with higher odds for those who smoked both menthol and non-menthol cigarettes, rather than one or the other; menthol smoking generally did not predict use of other products.

These findings suggest a problematically high prevalence of polytobacco use among Black smokers that is strongly associated with gender and young-adulthood but not associated with low income, low education, or menthol-smoking. Polytobacco users were mostly young men of varied SES who smoked all types of cigarettes along with non-cigarette products, i.e., a possible pattern of smoking whatever is available. Given that low-SES was not a risk factor for this, polytobacco use might perhaps instead be related to the social risk-factors for cigarette smoking among Blacks that have been identified in prior studies, i.e., racial segregation[27-29] and racial discrimination[30-32]. High levels of residential segregation (with high exposure to targeted tobacco advertising and easy access to single cigarettes in Black neighborhoods), and high levels of (the stress of) racial discrimination might be associated with smoking any cigarette and non-cigarette product available. Studies of the possible role of these factors in polytobacco use among Blacks are needed.

The 14.9% prevalence of past 30-day smoking of non-cigarette products by non-cigarette smokers also is a concern. Smoking blunts and bidis was not associated with cigarette smoking but was strongly associated with youth. This suggests that smoking blunts and bidis might reflect youthful experimentation [13,15,17], and raises questions about whether young Blacks try these before they try cigarettes[13]. Studies of age of initiating smoking of cigarettes versus blunts and cigarillos among Blacks are needed to clarify this.

This study also found a substantial prevalence of smoking products that are not assessed in most population smoking surveys of adults (e.g., marijuana, cigarillos, blunts). Hence, it would be beneficial for surveillance studies to assess smoking of blunts, bidis, and (in particular) cigarillos such as *Phillies, Black & Mild,* and *Swisher Sweets*. Smoking of cigarillos may need to be assessed by brand name because young Blacks often do not categorize them as cigars[18], and hence their reports of cigar use increase significantly when these brand names are included[18]. That these cigarillos are sold individually and come in a variety of flavors (e.g., chocolate, apple, cherry) may contribute to not categorizing them as cigars or as cigarettes. Such assessment will provide a more comprehensive picture of smoking among Black adults, and would match the complexity of recent (2011) assessments of youth smoking that included bidis, kreteks and cigarillos [35].

This study has several limitations, including use of self-reports that may be lower than biologically-validated data[25], lack of assessment of some forms of tobacco use (e.g., pipes), and a California sample whose data might not generalize to other states. In addition, we treated age as a categorical instead of a continuous variable, and this may have limited the sensitivity of analyses. We note however that the age categories used here are similar to those used in prior studies of polytobacco use in which the highest prevalence found was for 18-24 year olds [e.g., 13-16]. Moreover, to decrease the number of consecutive significance tests, potentially-interesting interaction effects (e.g., gender X age, gender X income) were not examined; such effects however generally are not examined in basic, epidemiologic studies of product-use [e.g., 35] and is a limitation of this study and of similar studies. Likewise, because more than 90% of these Black cigarette smokers consumed 10 or fewer cigarettes per day, potential relationships between number of cigarettes smoked and smoking of other products were not examined. In addition, prevalence of smoking the products may have changed since this study. This is particularly the case for kreteks (clove cigarettes) that were banned by the 2009 *Family Smoking Prevention and Tobacco Control Act* [36]. The CDC's 2011 study of youth [35] revealed that youth still smoke kreteks despite the ban, and this suggests that adults also might still smoke them. How youth and adults acquire banned and illegal products is worthy of investigation.

Despite these limitations, this study is the first to highlight the magnitude and complexity of smoking among a random, community sample of Black adults, and the first to underscore the need to improve its assessment in research and practice. More comprehensive, population-level assessment of multiple-substance smoking might yield data that in part explain Black difficulty quitting tobacco despite smoking only a few cigarettes per day[5-6], and likewise might yield findings that in part explain the puzzling high-incidence of smoking-related cancers at young ages among Black men [7,33]. Similarly, it would be beneficial for healthcare providers to include non-cigarette products such as bidis and blunts in 5A (ask, advise, assess, assist, arrange) assessment of smoking [34] among cigarette smokers and non-smokers alike, young adults in particular. Smoking cessation interventions also might be enhanced by assessing and addressing cessation of smoking such products. However, whether evidence-based smoking cessation interventions and nicotine replacement therapy are effective with polytobacco users remains unknown. Studies are needed to assess the possibility that hidden polytobacco use might contribute to the relative failure of standard smoking cessation programs with Black smokers[5-6], and research on the possible need for new cessation interventions for polytobacco users is needed as well.

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Author Contributions

Irma Corral made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Hope Landrine made substantial contributions to 1) study conception and design, acquisition of data, and analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Jukelia Bess made substantial contributions to 1) analysis and interpretation of data; to 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

Denise Adams Simms made substantial contributions to 1) study conception and design, and acquisition of data, 2) drafting the article or revising it critically for important intellectual content; and gave 3) final approval of the version to be published.

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any pre-specified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe **all statistical methods**, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.