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Screening and Brief Intervention for Tobacco Use by Student Health Providers on College Campuses

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Abstract

Objective—This study assessed college students' reports of tobacco screening and brief intervention by student health centers providers.

Participants—3800 students from eight universities in North Carolina participated.

Methods—Web-based survey of a stratified random sample of undergraduates.

Results—53% reported ever visiting their student health center. Of those, 62% reported being screened for tobacco use. Logistic regression revealed screening was higher among females and smokers, compared to nonsmokers. Among students who were screened and who reported tobacco use, 50% reported being advised to quit or reduce use. Brief intervention was more likely among current daily smokers compared to current nondaily smokers, as well as at schools with higher smoking rates. Screening and brief intervention were more likely at schools with lower clinic caseloads.

Conclusions—Results highlight the need to encourage college health providers to screen *every patient at every visit* and to provide brief intervention for tobacco users.

Keywords

Tobacco; Smoking; Cessation

Cigarette smoking by college students increased throughout the United States during the 1990s. Wechsler, Rigotti, Gledhill-Hoyt, and Lee [1] sampled students from 116 nationally representative 4-year colleges and found that between 1993 and 1997, self-reported current (30-day) cigarette smoking rates increased from 22.3% to 28.5%. Although current smoking

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rates by college students peaked at 30.6% in 1999 and have since fallen (17.9% in 2008), smoking remains a prominent health problem on college campuses.[2]

Recently, there has been a tendency toward initiation of cigarette smoking during the college years.[1, 3, 4] This may be related, in part, to the tobacco industry targeting this population. Ling and Glantz [5] reported that tobacco industry documents contain information demonstrating the industry's recognition of the opportunity to market to new smokers and reinforce existing smoking patterns by capitalizing on the stress students undergo as they transition to college. The industry utilizes bars that are located close to college and university campuses as promotional outlets in order to attract students to smoke.[6]

In June 2000, the United Stated Public Health Service (PHS) published a clinical practice guideline, *Treating Tobacco Use and Dependence*, which provides clinicians and healthcare systems with evidence-based practices for tobacco control and treatment.[7] In 2008, the PHS guidelines were updated to incorporate evidence of substantial improvements in the treatment of tobacco addiction. The PHS guidelines are based on solid research indicating that screening and brief intervention for smoking cessation is effective. The majority of smokers (70%) visit a physician each year, thus presenting an excellent opportunity for screening and brief intervention.[8] Evidence suggests that even interventions as brief as three minutes can significantly increase quit rates.[7] The guideline recommend the following: (1) identify and document tobacco-use status of all patients seen in healthcare settings at every clinic visit; (2) encourage all patients willing to make an attempt to quit to utilize the counseling and medication treatments shown to be effective in the guidelines; (3) provide all patients using tobacco the evidence-based brief clinical interventions, at minimum; and (4) use motivational treatments outlined in the guidelines with tobacco users unwilling to make a quit attempt.[9]

While the PHS guidelines offer clear, evidence-based practices for identifying and treating tobacco dependence in adult smokers, there is less research focused specifically on college students. Student health centers offer a variety of services for college and university students living on and off campus. Campus clinics see a large number of students and provide students with the majority of their healthcare needs.[10] These healthcare services include prevention and intervention efforts, placing college health centers in a unique position to target tobacco use.[11] Most students want to quit tobacco use and frequently do not succeed on their own, but physician intervention has been shown to be successful in helping smokers quit.[4, 12] Therefore, campus health centers can reach a large number of tobacco users and promote cessation through a variety of methods, including distribution of self-help materials and physician interventions.[7, 13, 14]

However, there is evidence that health care providers often do not identify college students who use tobacco and are not fully utilizing opportunities to intervene with these young adults regarding their use. Early research of college student tobacco use found that only 26% of first year college students recalled being asked about their use of tobacco at their last physician visit; the authors did not specify the percentage of these physician visits that occurred at a college or university health center.[15] Although college students reported low rates of screening at their last health care visit, reports that they had ever been screened for tobacco use were much higher. Koontz and colleagues[16] found that 73% of college students surveyed reported having been asked about their smoking behavior by a healthcare provider at some point in their lifetime. While 77% of the smokers in the study reported they were asked about their tobacco use, only 57% stated that they were encouraged by their healthcare provider to quit.

Few studies have focused on the tobacco screening and interventions practices in college student health centers specifically, but more importantly, the literature that has been presented is primarily self-reported data by health care providers themselves, not students. A study of Canadian university health clinics found that only 20% of physicians reported asking all or nearly all patients about tobacco use, and 25% of the doctors reported asking fewer than half.[11] Of those who reported screening for tobacco use, campus physicians reportedly advised 96% of smokers to quit and 72% reported offering assistance.[11] So while rates of self-reported screening by college health physicians were low, brief interventions were common once a patient was identified as a smoker. Data from a survey of members of the American College Health Association revealed that when physicians felt knowledgeable about cessation counseling practices, they reported being motivated to counsel and had high levels of self-efficacy.[17] Barriers to counseling included lack of reimbursement, training, and resources for follow-up. While student health center providers report feeling motivated and efficacious in counseling for smoking cessation, they also recognize barriers to intervention. However, to our knowledge, no data exist regarding college students' reports of screening and brief intervention for tobacco use by health care providers at their campus student health center.

The present exploratory study aimed to assess screening and brief intervention for tobacco use among college students who visited their student health center. Additionally, individual- and school-level factors associated with screening and brief intervention were examined.

Methods

Participants

In fall 2007, a stratified random sample of undergraduate students from eight universities in North Carolina were asked to complete a Web-based survey as part of a randomized group trial of an intervention aimed at preventing high-risk alcohol use behaviors and their consequences (Study to Prevent Alcohol Related Consequences [SPARC]).[18] Undergraduate students were randomly selected from enrollment lists provided by each school. The goal was to have 448 students (112 each: freshman, sophomore, juniors, & seniors) from each university to complete the survey, for a total sample size of approximately 3500. The number of participants selected was based on power considerations for the overall SPARC trial as well as anticipated response rates based on previous Web-based surveys of college students.[19, 20] The website was closed soon after the target numbers from the eight schools were reached. The overall response rate was 22.5% and varied greatly across the eight universities (15–37%). In order to estimate possible nonresponse bias, we compared demographics of our sample with publically available school-level demographics for each participating college, using data from the Statistical Abstracts of Higher Education in North Carolina. In terms of gender and percent of freshmen, our sample of students was quite similar to the population of students at each of our participating schools. The SPARC sample had, on average, somewhat fewer males and seniors than in the entire school population. Pearson correlations between sample and population distributions were 0.90 for gender and 0.58 for percent seniors.

Procedure

Students randomly selected to participate were sent an email invitation which contained a hyperlink to a secured website where they could complete the survey. The Dillman approach [21] was the basis for the email notification protocol, which included multiple, frequent reminders for students to participate in the Web-based survey.[22] Each student who finished the survey was sent an email containing a $10.00 PayPal award. From the list of completions, one student from each school was randomly selected to win $100. The Wake

Forest University School of Medicine (WFUSM) Institutional Review Board (IRB) approved the protocol and several of the participating schools required their institution's IRB approval or set up oversight agreements with the WFUSM IRB.

Measures

The Web-based College Drinking Survey (CDS) was adapted from items previously used in surveys of alcohol use and other health behaviors.[23–25] The survey measured demographic characteristics, alcohol consumption behaviors, and consequences experienced from alcohol use. The survey also assessed other health risk behaviors, including tobacco use.

Demographics—Demographic variables included in this study were year in school (coded as Freshmen, Sophomore, Junior, Senior or 5th yr. undergraduate) and gender. Race and ethnicity were coded as White vs. non-White.

Student Health Screening and Brief Intervention—Students were first asked whether they had ever been seen at their student health center (coded as yes/no). Screening and brief intervention for tobacco use during the last visit to student health services was measured for students who reported having visited student health services. For screening, they were asked "*During your last visit, did a health care provider at the student health center ask you whether you use tobacco products (smoking, smokeless tobacco, etc.)?*" If they were screened during their last visit, brief intervention was measured by asking "*Did the health care provider recommend you quit or reduce your tobacco use?"* Response options included "No, I do not use tobacco products"; "No"; "Yes".

Tobacco Use—Tobacco use was measured by two items, one item assessing ever use and one item assessing past 30-day use of cigarettes. Participants were asked, *"How old were you when you smoked a whole cigarette for the first time?"* Response options included, "I have never smoked a whole cigarette in my lifetime" and age measured continuously from "8 or younger" to "22 or older". To assess current smoking, participants were asked, *"On how many of the past 30 days did you smoke cigarettes?"* Responses options included: "0 days, 1–2 days, 3–5 days, 6–9 days, 10–19 days, 20–29 days, or all 30 days".[26] These two items were combined and collapsed to form four mutually exclusive categories: never smokers (who had never smoked a whole cigarette); former smokers/experimenters (who had smoked a whole cigarette in their lifetime but who had smoked on zero of the past 30 days); current nondaily smokers (who smoked on at least one but less than 30 days); and current daily smokers (who reported smoking on all of the past 30 days).

School-level Covariates—We measured the overall institutional smoking rate which represents the proportion of those reporting past 30-day smoking to the institutional population. We were also interested in a measure of student health clinic caseload at each of the participating schools. Each student health clinic was contacted by a member of the study team to determine the number of health care provider hours per week (during the regular school year). Providers included physicians, physician assistants and nurse practitioners. This number was averaged per 1000 students to establish a proxy for clinic caseload.

Statistical Analyses

The goal of the statistical analysis was to explore the relationship between smoking status and 1) visits to student health, 2) self-reported screening, and 3) brief intervention by health care providers while adjusting for demographics and school-level characteristics. Frequencies, means (sd) and percentages were used to describe the total and screened samples. Logistic regression analysis for clustered data using generalized estimating equations (GEE) was used to assess individual-level (race, gender, year in school, smoking

status) and school-level (institutional smoking rate, clinic caseload) correlates of screening and brief intervention. The multivariate logistic models were used to evaluate if there was a significant increase in the probability of visiting the campus student health center, reporting being screened for smoking status or being advised to quit smoking. Students within school were treated as forming a cluster, thereby adjusting for the intra-school correlation. Multicollinearity diagnostics such as variance inflation factors (VIFs) were checked using regression models and modeling adequacy was supported (all VIF's < 1.11). Adjusted odds ratios (AOR) and 95% confidence intervals were estimated. All descriptive and inferential statistics were performed using SAS (Version 9.2). The criterion for statistical significance was a two-sided p-value <0.05.

Results

In fall 2007, 3813 students from eight colleges in North Carolina completed the web-survey; however, complete data on the variables of interest in this paper were available from 3800. Students were 62% female, 81% White, and approximately equally divided by class year (see Table 1).

Just over half (N=1980, 52.1%) reported at least one visit to their student health center. Those who visited student health were more likely to be female, seniors (compared to all other classes), and smokers (see Table 2). Compared to never smokers, current nondaily smokers were more likely to visit student health; however, no differences between current daily (vs. never smokers) and former/experimenters (vs. never smokers) were found. Of those who visited student health, 62% (N=1225) reported being screened for tobacco use by a campus health care provider.

Screening rates varied by school (48%–75%). Multivariate results showed that screening was higher among females (AOR=1.47, p<.01). Compared to never smokers, those who reported current daily smoking (AOR=2.25, p<.001) and current nondaily smoking (AOR=1.36, p<.001) were more likely to be screened. Screening did not differ between never smokers and former/experimenters, although there were significant differences between current daily smokers compared to current nondaily smokers (AOR=1.65, p<.01). Screening was less likely among freshmen (AOR=0.61, p<.01) and sophomores (AOR=0.81, p<.05) than seniors. Screening was also less likely at clinics with higher caseload (AOR=0.99, p<.01). Screening was not associated with students' race or institutional smoking rate (see Table 3).

For those who were screened, we assessed whether health care providers at their student health center recommended quitting or reducing tobacco use. Among those screened, 72.3% (N=886) reported that they did not use tobacco products. Of those who were screened and did report using tobacco products (N=339), 50% reported that their health care provider recommended quitting or reducing tobacco use (i.e., brief intervention). Results from the logistic regression analysis revealed that brief intervention was more likely among current daily smokers (AOR=2.61, p<.0001) compared to current nondaily smokers, and among juniors (AOR=1.69, p<.01) compared to seniors. Brief intervention was more likely at schools with a higher institutional smoking rate (AOR=1.07, p<.01) and at schools with a lower clinic caseload (AOR=0.99, p<.05) (see Table 4).

Comment

Results from this study provide the first data on college students' reports of screening and brief intervention by health care providers from their campus health center. In our large sample of students from eight schools in North Carolina, we found that among those who visited their student health center, almost a third were not screened for tobacco use during

their last visit. Among those who were screened and reported using tobacco, only half (50%) received brief intervention. This is substantially lower than the 71.2% of commercially insured adult smokers who reported receiving cessation advice in 2005.[27]

Results revealed that visits to student health centers and screening were both higher among females, but no gender differences were found for brief intervention. The increase in visits to student health may be the result of females being seen for their annual gynecological exams. Similarly, the finding that females are more likely to report being screened for tobacco use may be due to the contraindication of taking birth control pills and smoking.[15] According to data from the American College Health Association's (ACHA) National College Health Assessment, 59% of college women used birth control pills to prevent pregnancy the last time they had sexual intercourse.[28] This is likely an underestimate of the number of college women who use birth control pills, which may be used for purposes other than preventing pregnancy.

Compared to seniors, visits to student health were less likely among all other classes of students. This may be due to the increased time in school and therefore, the increased opportunity to visit student health during their college career.[16] Compared to seniors, screening for tobacco use was less likely among freshmen and sophomores. One possible explanation for this findings is that desire to quit smoking is greater among older students than young college students.[29] College health providers may be attuned to this increased desire to quit and may therefore focus more attention on screening for tobacco use among older students. However, readiness to quit can only be ascertained through screening patients, again highlighting the need to screen every patient. Additionally, older students may be more open to screening and brief intervention from health care providers; therefore, the increased reporting of screening by older students may be the result of a recall bias.

We also assessed two school-level covariates: clinic caseload and institutional smoking rate. Both screening and brief intervention were less likely at clinics with higher caseload. Although the odds ratios appear to suggest the differences are not clinically meaningful, since the variable is averaged per 1,000 students, even small odds ratios are clinically relevant. Given how little time clinicians have with patients, it stands to reason that clinics with a higher patient caseload may not engage in screening and brief intervention for tobacco use. Limited time during clinical visits is one hypothesized reason providers may not engage in screening and brief intervention.[16] These findings suggest that decreasing the clinic caseload by adding more health care providers could be one potential way to increase screening and brief intervention for tobacco use.

Results showed that students at schools with a higher institutional smoking rate were more likely to report brief interventions, but not increased screening One possible explanation for this finding is that screening is more routine (62% of students reported being screened) and may be done during patient intake or triage; therefore, less likely to be influenced by external factors such as smoking visibility. However, brief intervention may be done by the physician or physician assistant and these providers may be more attuned to smoking on campus. More research is needed to better understand this finding.

Visits to student health were more likely among current nondaily smokers, but not current daily smokers, compared to never smokers. This finding is surprising given the increased health risks associated with daily smoking. Current daily smokers and current nondaily smokers were more likely to be screened than nonsmokers. This finding may be the result of health care provider smelling smoke on the clothing of smoking patients, therefore prompting them to screen those patients. Additionally, the patient's smoking status may have been noted in the medical chart, providing a cue for the health care provider.[15] Once

screened, daily smokers were two and a half times more likely to receive a brief intervention than nondaily smokers. A similar finding among a national adult sample has been reported. Using data from the 2000 National Health Interview Survey, Tong and colleagues [30] found that nondaily smokers were less likely than daily smokers to report that they had been screened for tobacco use by their physician in the last year. This study also revealed that nondaily smokers were more likely to report wanting to quit in the next six months, but less likely to receive physician advice to do so. However, for both types of smokers, physicians' advising patients to quit significantly predicted their desire to quit. These data suggest that nondaily smokers may be a group already motivated to quit, but physicians are not capitalizing on the intervention opportunities. This is particularly important among health care providers at college health centers because the majority of current smokers (71.4%) are nondaily smokers.

Student health clinicians need to recognize that nondaily smoking is associated with greater health risks and nicotine dependence[33] when compared to nonsmokers. [31, 32] Because the majority of college student smokers are nondaily smokers, it is essential that college health care providers screen for tobacco use in a way that will elicit an accurate response from nondaily smokers. Because these students have intermittent smoking behaviors that are frequently only associated with social situations, they often do not identify as smokers.[34, 35] Recommendations about how health care providers screen for tobacco use in this population include asking specifically about smoking behavior, rather than asking whether the person is a smoker, which is a label that nondaily smokers do not use. Halperin and colleagues also recommend using a screening question that includes a sufficient time period to capture intermittent smoking behaviors such as, "*In the last 3 months, have you smoked cigarettes at all, even a puff?*".[36] By using a screening question based on a specific behavior rather than a label, nondaily smokers may be more likely to admit smoking.

Limitations

The results of this study must be viewed in light of its limitations. This study is based on a large but geographically limited sample of undergraduate students from 4-year institutions in a single state. Therefore, its generalizability to other types of colleges or schools in other states is not known. A second limitation is that the reason for the students' visit to the campus health center was unknown and may have been related to the likelihood of screening and brief intervention by the health care provider. For example, if a patient presents with a respiratory illness, clinicians may be more likely to screen and provide brief intervention. However, if a patient presents with a completely unrelated primary complaint, screening and brief intervention may be less likely to occur. Understanding the relationship between primary complaint and provider behavior is important and should be the focus of further study. However, the PHS guidelines highlight the need for screening *every* patient at *every* visit, in order to capitalize on the "teachable moment." This study underscores the missed opportunity for prevention and intervention around tobacco use that should be a focus in student health centers. Finally, the response rate for the Web-survey was relatively low; however, it was similar to what others who study college students' health risk behaviors have found [19, 20]. Because of the low response rate, we assessed nonresponse bias by comparing sample demographics to school-level demographics publically available. Our sample of students was quite similar to each school's population in terms of gender and percent seniors.

Conclusions

Screening and brief intervention for tobacco use differed based on individual- and school-level factors, highlighting a need to encourage all college health providers to screen *every patient* for tobacco use *at every visit*. Future research is needed to better understand why

student health care providers screen certain students, but not others, for tobacco use. Additional research is also warranted to address why only half of tobacco users report receiving brief interventions by student health care providers. These areas of research would allow for the development of much needed interventions to increase screening and brief interventions by student health care providers. The results of this study are similar to those using a national adult sample which also shows that nondaily smokers are less likely to be advised to reduce or quit smoking than daily smokers.[30] Our results, along with similar findings from other studies, emphasize missed opportunities for increasing cessation, especially among nondaily smokers, who represent the majority of college smokers.

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Table 1

Sample Demographics

Characteristic	Total Sample of Students N=3800* N (%) or mean, sd	Students Seen in Student Health Center N=1980 (52.1%)* N (%) or mean, sd	Students Screened for Tobacco Use N=1225 (61.8%)* N (%) or mean, sd	Smokers who Received Brief Intervention N=161 (50%)* N (%) or mean, sd
Gender				
Male	1441 (38.0)	660 (33.4)	375 (30.7)	63 (39.1)
Female	2348 (62.0)	1314 (66.6)	847 (69.3)	98 (60.9)
Race/Ethnicity				
Non-Hispanic White	3056 (80.7)	1634 (82.7)	1021 (83.6)	148 (91.9)
Other	733 (19.3)	342 (17.3)	200 (16.4)	13 (8.1)
Classification				
Freshman	1024 (27.2)	374 (19.0)	213 (17.5)	26 (16.3)
Sophomore	966 (25.7)	544 (27.7)	329 (27.0)	38 (23.7)
Junior	886 (23.6)	492 (25.0)	309 (25.4)	58 (36.3)
Senior	769 (20.4)	480 (24.4)	319 (26.2)	29 (18.1)
Other	116 (3.1)	77 (3.9)	48 (3.9)	9 (5.6)
Smoking Status				
Never smokers	1934 (51.4)	961 (48.9)	576 (47.3)	-
Former/Experimenter	859 (22.8)	453 (23.1)	273 (22.4)	-
Current nondaily smokers	693 (18.4)	396 (20.2)	254 (20.8)	82 (50.9)
Current daily smokers	278 (7.4)	154 (7.8)	116 (9.5)	79 (49.1)
Institutional Smoking Rate	25.7 ± 6.1	26.3 ± 6.2	26.6 ± 6.5	26.4 ± 6.1
Clinic Caseload	132.1 ± 33.6	132.7 ± 33.1	130.84 ± 33.9	130.0 ± 30.9

*Categorical totals may differ from sample totals due to missing responses.

Table 2

Logistic Regression Analysis for Visits to Student Health (N=3653)

Characteristic	AOR	95% CI	P-value
Gender			
Female vs. Male *RC*	1.65	1.38, 1.98	<0.0001
Race			
White vs. Non-White *RC*	1.17	0.97, 1.41	
Class year			3 df p<0.0001
Freshmen	0.32	0.25, 0.41	<0.001
Sophomore	0.73	0.58, 0.92	0.007
Junior	0.71	0.63, 0.80	<0.001
Senior/5th year *RC*	-	-	-
Smoking Status			3 df p<.0001
Never smoker *RC*	-	-	-
Former/Experimenter	1.04	0.86, 1.25	0.703
Current nondaily smokers	1.38	1.21, 1.58	<0.001
Current daily smokers	1.09	0.75, 1.59	0.655
Institutional Smoking Rate	1.02	0.99, 1.05	0.057
Clinic Caseload	1.00	0.99, 1.01	0.392

Note:

RC Reference Category, AOR (Adjusted Odds Ratio)

Table 3

Logistic Regression Analysis for Tobacco Use Screening of College Students (N=1971)

Characteristic	AOR	95% CI	P-value
Gender			
Female vs. Male *RC*	1.47	1.16, 1.86	0.001
Race			
White vs. Non-White *RC*	1.07	0.81, 1.42	0.637
Class year			3 df p=0.014
Freshmen	0.61	0.46, 0.83	0.001
Sophomore	0.81	0.67, 0.99	0.041
Junior	0.84	0.62, 1.15	0.279
Senior/5th year *RC*	-	-	-
Smoking Status			3 df p<0.001
Never smoker *RC*	-	-	-
Former/Experimenter	1.05	0.84, 1.30	0.681
Current nondaily smokers	1.36	1.17, 1.58	<0.001
Current daily smokers	2.25	1.64, 3.10	<0.001
Institutional Smoking Rate	0.98	0.94, 1.02	0.340
Clinic Caseload	0.99	0.989, 0.998	0.006

Note:

RC Reference Category, AOR (Adjusted Odds Ratio)

Table 4

Logistic Regression Analysis for Brief Interventions among College Student Smokers (N=286)

Characteristic	AOR	95% CI	P-value
Gender			
Female vs. Male *RC*	0.90	0.60, 1.36	0.625
Race			
White vs. Non-White *RC*	1.47	0.97, 2.22	0.068
Class year			3 df p=0.039
Freshman	0.81	0.51, 1.29	0.378
Sophomore	1.02	0.66, 1.57	0.925
Junior	1.69	1.54, 2.49	0.007
Senior/5th year *RC*	-	-	-
Smoking Status			
Current nondaily smokers *RC*	-	-	-
Current daily smokers	2.61	1.65, 4.13	<.0001
Institutional Smoking Rate	1.07	1.02, 1.12	0.004
Clinic Caseload	0.99	0.986, 0.999	0.041

Note:

RC Reference Category, AOR (Adjusted Odds Ratio)