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Title: Cigarette smoking experimentation among rural fifth grade students.

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Approximately 90% of all tobacco use initiation occurs among persons ages <18 years, and the prevalence of tobacco use among adolescents is increasing.(1-4) The majority of research on adolescent smoking has been focused on junior high and high school students, in essence older adolescents. Chen and Winder(5) found in one study that between sixth and ninth grades the number of students who smoked cigarettes increased sixfold. Huetteman et al.(6) found that a noticeable increase in the number of students accepting either a cigarette or a can of beer occurred in Grade 5.

However, the research on smoking initiation and associated variables is not exhaustive. A noticeable paucity in the literature is that of smoking by adolescents in the rural United States, in particular, by rural African-American adolescents in grades lower than seventh. The purpose of this study was to analyze the prevalence and correlates of tobacco experimentation by rural fifth grade students, in five public middle schools, in a predominantly rural southern state. In essence, what is the relationship between rural fifth graders who experiment with smoking and selected demographic (gender, age, race), behavioral (alcohol, physical activity), and environmental (mother, father, or best friend smokes) variables?

METHODOLOGY

Subjects

Subjects for this study were recruited from fifth grade classes in five public schools from two rural school districts in a southern state. Although these two school districts are separated geographically, they were closely matched on selected sociodemographic and academic factors, in particular eligibility for free/reduced price lunch. All fifth grade subjects were eligible for participation in the study. Standard guidelines for the ethical treatment of human subjects in research were followed. Administrators at the school and school district levels provided consent for participation. Subsequently, parents or guardians of each student received an informed consent letter and an assent statement to endorse. The participation rate for this "active" form of parental consent was 76%.

	Frequency	Percentage
Whites		
Males	53	14.2
Females	50	13.4
Black		
Males	129	34.5
Females	142	38.0
Age		
10	26	33.7
11	204	54.5
12	41	11.0
13	3	0.8

Data were collected from 401 fifth grade students. Missing information on one or more of the demographic or behavior variables of interest resulted in the exclusion of 27 (17%) respondents. This 17% attrition rate was acceptable and did not alter the demographic characteristics of the sample. For this investigation, the sample consisted of 374 fifth grade students. As depicted in Table 1, 72.5% (n=271) of the sample was African-American, 51.3% (n=192) was female, and ages ranged from 10 to 13 (m=11, sd=0.66).

Instrumentation

Subjects completed demographic and tobacco and alcohol use items selected from the National CDC School Youth Risk Behavior Survey,(7) designed to assess the adolescent risk behaviors associated with the leading causes of premature death and disability in the United States. A recent study has established the content validity and reliability of the self-report YRBS.(8) The YRBS items of interest for this study involved having ever tried cigarettes (even a few puffs) and having ever tried alcohol (other than a few sips).

Items utilized to assess best friend and mother/father use of tobacco and alcohol were selected from a study by Lowe et al.(9) and Hansen et al.(10) with established validity and reliability. Mother's and/or father's use of tobacco and alcohol was measured by 3-point scale items (yes, no, don't know). Best friend's tobacco and alcohol use was measured by dichotomous (yes, no) items.

Physical activity was examined in this study due to its potential as a protective factor for these rural youth. After-school physical activity was measured by the Previous Day Physical Activity Recall (PDPAR).(11) Validity for this scale was established via concurrent observation with motion sensors and heart rate monitors, and test-retest reliability has been reported at 0.98. The PDPAR elicited self-report data on the type and intensity level (very light, light, medium, and hard) of physical activity. Thirty-five common activities were listed on the form, and the subject entered the primary activities performed in 30-minute blocks, from 3:00pm to 11:00pm. The PDPAR was administered in the classroom on 3 consecutive days. A daily PDPAR score was determined by obtaining the number of 30-minute blocks with activity rated at 3 METS or more (moderate/vigorous activity). Scores for each day were averaged across 3 days to calculate an estimate of student physical activity.

Data Collection

Questionnaires were administered over a 10-week period during the spring of 1994. Data were collected under the supervision of trained data collectors who answered subjects' questions, protected anonymity, ensured

privacy, and administered the questionnaire in an unbiased and uniform manner. Tobacco and alcohol questionnaires were administered to students in each fifth grade classroom of the five rural schools during one class session. For the physical activity measures, each student participated in three data-collection sessions that took approximately 30 minutes per session. Our procedures for this investigation were approved by the reference university's board for the review of rights for human subjects in research.

	Total N=374		Males N=182		Females N=192	
	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Gender						
Males	26	1.9*				
Females	16	(1.1-3.1)				
Race						
White	25	1.4	25	0.9	26	2.4*
Black	20	(0.8-2.4)	27	(0.4-1.0)	13	(1.1-5.3)
Mother/Woman smokes						
Yes	30	1.8*	35	1.7	24	1.9
No	19	(1.0-3.3)	24	(0.8-3.7)	15	(0.8-4.7)
Father/Man smokes						
Yes	31	2.4*	32	1.6	29	3.8*
No	16	(1.5-4.0)	22	(0.8-3.2)	10	(1.8-8.3)
Best friend smokes						
Yes	53	4.6*	55	3.7*	50	5.5
No	20	(1.8-12.2)	25	(1.1-11.9)	15	(0.9-33.0)
Ever drink alcohol						
Yes	45	9.0*	42	5.2*	49	6.4*
No	8	(5.3-15.1)	12	(2.6-10.6)	6	(7.6-35.9)
Physical activity \geqhr/\geq3 METS)						
No	17	0.7	28	1.1	13	0.6
Yes	23	(0.4-1.2)	26	(0.5-2.5)	19	(0.3-1.3)

* Odds Ratios statistically significant at alpha=.05.

Data Analysis

Univariate Mantel-Haenszel crude odds ratios (OR) were calculated for the demographic variables (age, race, and gender), behavioral (alcohol use and physical activity) and environmental variables (mother, father, best friend smokes). Using the dichotomous dependent variable, ever tried cigarette smoking (yes, no), and the dichotomous demographic, behavioral, and environmental variables with potential association to smoking experimentation, a backward multiple logistic regression analysis was performed. After following a backward, step-wise elimination procedure, race, age, and all variables retaining significance at the 0.10 alpha level were included in the model.

	Total Odds Ratio 95% CI	Males Odds Ratio 95% CI	Females Odds Ratio 95% CI
Race	-----	-----	2.5 0.9-07.1
Age	2.2 1.4-03.4	2.0 1.2-03.6	2.9 1.2-07.0
Father/Man smokes	2.5 1.4-04.5	-----	4.6 1.7-12.4
Best friend smokes	3.7 1.1-12.0	3.7 1.0-14.5	-----
Ever tried alcohol	8.2 4.5-14.9	5.1 2.3-10.6	16.4 6.0-44.6
Model Chi-square	90.47, 4 df p<.0001	31.63, 3 df p<.0001	58.57, 4 df p<.0001

RESULTS

Approximately 26% of male and 16% of female rural fifth graders reported having tried cigarette smoking (Table 2). In regard to race, white and black 5th graders in this study were comparatively close in smoking experimentation at 25% and 20% respectively. Of those students who reported having tried cigarette smoking, 30% reported that their mother (or adult female in house) smokes, and 31% of the same students reported that their father (or adult male in house) smokes cigarettes. In regard to having a best friend who smokes, 53% of this sample who had tried cigarette smoking reported that their best friend smoked. In addition, 45% of these rural fifth grade students reported that they had also consumed alcohol.

After backward elimination, the multivariate logistic analysis (Table 3) indicated that for this sample (n=374), when considered simultaneously, increasing age (OR=2.2), having a father (adult male in house) who smokes (OR=2.5), having a best friend who has tried smoking (OR=3.7), and having ever tried alcohol (OR=8.2) were significant correlates of having ever tried cigarette smoking. Further examination of data in Table 3 indicates a race gender difference from this study. Even after controlling for differences in the multivariable model, there was an observed race difference between females in this study. White females were twice as likely as black females (OR=2.5) to experiment with cigarette smoking. For "best friend smokes" this study found differences for male and female fifth grade students. When examined separately, male smoking experimentation remained associated with "best friend smokes" (OR=3.7) whereas no significant association was determined for females. Examination by gender also identified a significant disparity for "ever tried alcohol" and its association with smoking experimentation. Male smoking experimenters had an increased risk (OR=5.1) if they, had "ever tried alcohol," whereas the female smoking experimenters risk (OR=16.4) was about three times greater.

Neither having a mother (adult female) who smokes nor being physically active was significantly associated with having tried cigarette smoking in the multivariate regression model.

DISCUSSION

These data suggest that a significant number of rural fifth grade preadolescents are at risk of becoming regular smokers. These findings on parental influence are consistent with the adolescent literature regarding smoking onset. Bauman¹² found a consistent relationship between parental and adolescent smoking in a cross-sectional study of 12 through 14-year-olds in 10 urban areas in the southeastern United States. A similar influence of parental smoking was noted by Chassin et al.¹³ for females in a longitudinal study of 12-18-year-olds from the midwestern United States. Conrad et al.¹⁴ found mixed results from a meta-analysis of 27 prospective studies published since 1980. In 15 of these studies, parental smoking factors were investigated,

and smoking was predictive in seven studies, predictive only for females in two studies, and not predictive in six others. Chassin et al.¹⁵ suggested that parental smoking may influence the preparatory or initial trying stages, as well as the stability of smoking patterns from adolescence to adulthood, but parental smoking appeared to be less influential during the transition to regular smoking.(16)

The influence of peers has been suggested as the single most important factor in determining when and how cigarettes are first tried. Results from this study are consistent with multiple cross-sectional and longitudinal studies worldwide substantiating the relationship between peers' (or friends') smoking.(17-19) Bauman et al.(12) found that smoking most often occurred in the presence of best friends. Best friend's smoking predicted both smoking experimentation and prevalence among San Diego adolescents from a variety of ethnic groups²⁰ and among white and black 8- through 17-year-olds in Louisiana.(21) A positive association of peer smoking with onset of smoking in 88% of the more rigorous, longitudinal studies suggests a clear link between peers' smoking and cigarette use.(12)

Results of this study found that having ever tried alcohol increased the risk of smoking by 5 times for males and 16 times for females. These findings are consistent with the results from previous studies with adolescents. Kandel²³ found that studies of the progression of drug use in the 1970s showed cigarette smoking and alcohol use generally preceded marijuana smoking and other illegal drug use. These findings, primarily among white youths, have been repeatedly extended and replicated.(24, 25) The 1985-1989 Monitoring the Future Project(27) found that first use of tobacco had occurred at the same grade (7th-8th) as first use of alcohol for 33% of the sample and that cigarettes were used before alcohol by 49% of the sample. Henningfield et al.(26) showed that 12- through 17-year-olds who had smoked cigarettes in the past 30 days were approximately 3 times more likely to have consumed alcohol, 8 times more likely to have smoked marijuana, and 22 times more likely to have used cocaine in the past 30 days than were those who had not smoked cigarettes. A similar trend was also documented by Johnson et al.(26) in their 4-year national study of adolescents.

It should be noted again here that the majority of students in this study (73.6%) were African-American, from five rural schools in a southern state. Suggestions for intervention should consider cultural competence in combination with recommendations from the current literature on drug use prevention for all child and adolescent race/gender groups.

Huetteman et al.(6) in their rural, midwestern K-8th grade study, found a noticeable shift in attitudes toward alcohol and tobacco occurring at Grade 5. In this regard, a concerted educational effort to address knowledge, attitudes, and the social skills of resistance to drug use should be implemented,(10, 28) especially during the middle school grades. Early intervention is imperative for substance use prevention for children and adolescents.(5, 29)

Fox et al.(30) indicated that the essential elements of curriculum for elementary school children are (a) development of coping skills, (b) resistance to peer pressure, (c) enhancement of self-esteem and assertion skills, and (d) development of problem-solving skills. For later grades, these skills should be extended and also include (a) an understanding of the short-term effects and consequences of substance use, (b) why adolescents use substances, (c) attitudes toward use and users, (d) factors associated with dependency, and (e) analysis of advertising techniques.

Parents and guardians are also important sources of tobacco and alcohol information. This study found a significant association between smoking experimentation and father (significant adult male) smoking behavior. Parent teacher organizations (PTOs) should be involved in prevention efforts. In addition, modeling has been

documented as the most important manner in which parents/guardians affect their children's health- promoting and damaging behavior.³¹ In particular, attitudes and actual use patterns of parents and peers tend to correlate with youth tobacco and alcohol use.(32, 33)

In closing, it should be noted that the rationale for intervening to deter smoking initiation before this behavior is ingrained is well established.(34, 35) From a recent summary of 12 National Heart, Lung and Blood Institute studies of children and adolescents, Stone et al.⁴ identified the following needs for further research on child and adolescent cigarette smoking: (a) further explanations for the difference in smoking prevention effectiveness for girls and boys (Differences in the causes of smoking onset for boys and girls also need further study); and (b) identification of ethnic differences in relationships among risk factors and behavioral, cognitive, social, and institutional factors to help tailor interventions.

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