Research Articles

Selected Health Status Indicators and Behaviors of Young Adults, United States—2003

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ABSTRACT

This study examined the prevalence of selected clinical preventive health services, health status indicators, health risk behaviors, and health-promoting behaviors among adults aged 18 to 24 years in the general U.S. population. The study analyzed data from the 2003 Behavioral Risk Factor Surveillance System. Nearly 30% of young adults lacked health care coverage. When 21- to 24-year-olds were compared with 18- to 20-year-olds, a 32% increase was noted in current cigarette smoking, a 37% increase in current binge drinking, a 48% increase in current alcohol use, a 27% increase in overweight and obesity, and an 8% decrease in engaging in sufficient physical activity. Results from this study reveal several areas for concern regarding the health of young adults. Continuation of education beyond high school and being married are associated with some health benefits. Carefully crafted health promotion programs and appropriate policies need to be placed in locations that are accessed by this population.

INTRODUCTION

The changing social roles and responsibilities characteristic of young adulthood (ages 18–24) often are accompanied by lifestyle changes that are associated with negative health outcomes.[1] For example, behavior changes previously documented during the transition from adolescence to young adulthood include decreased physical activity and fruit and vegetable consumption,[2] increased fast food consumption,[3] and increased alcohol use,[2,4–6] tobacco use,[2,3,5,6] illicit drug use,[3,6] and participation in high-risk sexual behavior.[2] The increase in risk behaviors during this life stage is of particular concern since it can lead to immediate negative health consequences and increase the risk of chronic disease later in life.

Despite the pivotal nature of young adulthood, the transition from late adolescence to adulthood has been understudied. Often, studies are conducted with adults without distinguishing young adults aged 18–24, even though this is a unique life stage. Studies that have focused on young adults tend to be narrow in scope, including only specific subpopulations, such as women[7] or college students,[7–13] or have focused on a specific behavior, such as smoking.[4,14] A recent article provided a review of existing nationally representative data on health status and selected behaviors of young adults.[6] Following their review, the authors stated that there is a paucity of data for young adults on specific health behaviors and protective factors, and the authors therefore called for additional research on these topics.

The purpose of this study is to examine the prevalence of selected clinical preventive health services, health status indicators, health risk behaviors, and health-promoting behaviors among young adults aged 18 to 24 years in the civilian, noninstitutionalized U.S. population, using data from the 2003 Behavioral Risk Factor Surveillance System (BRFSS). Prevalence estimates are examined by sex, race/ethnicity, age category, educational attainment, and marital status. Adjusted odds ratios (AORs) are calculated to identify the independent associations of each demographic characteristic with behavior and health outcomes.

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METHODS

Data Source

Data from the 2003 BRFSS were analyzed. The BRFSS is an ongoing random-digit-dialed telephone survey operated by state health departments in collaboration with the Centers for Disease Control and Prevention (CDC). The survey is conducted in each state and the District of Columbia to collect data on many of the behaviors and conditions that place adults (aged ≥18 years) at risk for chronic disease. BRFSS uses a multistage design to select a representative sample from each state's noninstitutionalized civilian adult population. Individuals living in group homes (e.g., sorority and fraternity housing), vacation homes, and institutions (e.g., college dormitories, military barracks) are not included in the sampling frame. Additional details on the BRFSS sampling strategy are available elsewhere.[15] Most questions on the core BRFSS questionnaire demonstrate moderate to high reliability and validity.[16] All BRFSS questionnaires and data are available at www.cdc.gov/brfss.

This study included respondents aged 18–24 years from the 50 States and the District of Columbia. Female respondents who indicated they were currently pregnant (n=555), were not sure if they were pregnant (n=31), or refused to answer the pregnancy question (n=23) were excluded from the analysis since their health-seeking and risk behaviors are likely different from non-pregnant female respondents, leaving a final analyzable sample of 16,925. The data were weighted according to the age, sex, and racial/ethnic distributions in each state. Representative state estimates were aggregated and data from all states were pooled to produce nationally representative estimates.

Study Variables

Current health care coverage was assessed ("Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?"). Two clinical preventive health behaviors were assessed: ever had blood cholesterol checked ("Have you ever had your blood cholesterol checked?") and ever been tested for HIV infection ("Have you ever been tested for HIV?"). Responses for each of these questions were "yes" or "no."

Five health status variables were assessed: overweight or obese (defined as ≥25 kg/m^2 as calculated from the metric conversion of self-reported height in inches and weight in pounds); high blood cholesterol ("Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is too high?"), high blood pressure ("Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?"), described health as fair or poor ("Would you say that in general your health is excellent, very good, good, fair, or poor?"), and activity limitation ("Are you limited in any way in any activities because of physical, mental, or emotional problems?"). Responses to the high blood cholesterol, high blood pressure, and activity limitation questions were "yes" or "no."

Four risk behaviors were assessed: current alcohol use ("During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage?"), current binge drinking ("Considering all types of alcoholic beverages, how many times during the past 30 days did you have five or more drinks on an occasion?"), current cigarette smoking (smoked at least 100 cigarettes during lifetime and now smoke every day or some days), and HIV-related high-risk behavior (engaged in any of the following behaviors in the past year: IV drug use, treated for a sexually transmitted disease, given or received money or drugs in exchange for sex, had anal sex without a condom).

Three health-promoting behaviors were assessed: engaged in sufficient physical activity (during a usual week engaged in moderate physical activity ≥30 minutes per day for ≥5 days per week and/or engaged in vigorous physical activity for ≥20 minutes per day for ≥3 days per week), consumed ≥5 servings of fruits and vegetables per day, and trying to lose or maintain weight (combined responses to "Are you now trying to lose weight?" and "Are you now trying to maintain your current weight, that is, to keep from gaining weight?"). Responses to all behavior variables were dichotomously coded as engaged in the behavior or not.

Demographic factors include sex, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), age category (18–20 years, 21–24 years), educational attainment (high school completion, 1–3 years of college, ≥4 years college), and marital status (unmarried, married). Age was categorized as 18–20 years and 21–24 years, since changes that occur at age 21 years (e.g., legal age for purchase and consumption of alcohol and reduced access to health insurance) may affect behavior and health status. Young adults classified as unmarried include young adults who were never married or were divorced, widowed, separated, or a member of an unmarried couple.

Statistical Analyses

Prevalence estimates and 95% confidence intervals (CI) were computed for each variable overall and by sex, race/ethnicity, age, educational attainment, and marital status. Logistic regression was used to compute AORs and 95% CI for each behavior. Each model included sex, race/ethnicity, age category, educational attainment, and marital status. The AOR allowed for identification of differences in behavior prevalence within demographic subgroups (e.g., males versus females) while controlling for the other demographic characteristics. All analyses were conducted with weighted data using SUDAAN version 9.0, a software package that accounts for complex sampling.[17]

RESULTS

The total unweighted sample size was 16,925. The weighted demographic composition of the sample was as follows: 54.2% male; 61.5% white, 11.7% black, 18.0% Hispanic, and 8.8% of "other" race/ethnicity; 40.4% aged 18–20 years; 51.6% with no greater than a high school diploma, 34.9% with 1–3 years of college education, and 13.5% with 4 or more years of college education; and 84.1% who were not married.

Health Care Coverage and Clinical Preventive Health Behaviors

Overall, 69.8% of young adults currently had health care coverage, 43.8% had ever had their blood cholesterol checked, and 41.5% had ever been tested for HIV infection (Table 1). Differences by sex, race/ethnicity, and age were found. Females had higher odds of having health care coverage (AOR=1.25, 95% CI=1.10–1.42) and ever having been tested for HIV infection (AOR=2.00; 95% CI=1.77–2.25) than males. Compared to white young adults, Hispanic young adults had lower odds of currently having health care coverage (AOR=0.51, 95% CI=0.42–0.61) and ever having had their blood cholesterol checked (AOR=0.79, 95% CI=0.66–0.95), and black young adults had higher odds of ever having had their blood cholesterol checked (AOR=1.27, 95% CI=1.07–1.51) and ever having been tested for HIV infection (AOR=2.71, 95% CI=2.26–3.24). The odds of health care coverage were lower among young adults aged 21–24 years (AOR=0.56; 95% CI=0.48–0.64) than those aged 18–20 years. However, young adults aged 21–24 years had higher odds of ever having had their blood cholesterol checked (AOR=1.29; 95% CI=1.13–1.47) and ever having been tested for HIV infection (AOR=2.82, 95% CI=2.45–3.25) than those aged 18–20 years.

Compared to young adults with no greater than a high school education, the odds of currently having health care coverage were higher among those with 1–3 years of college education (AOR=2.25; 95% CI=1.95–2.59) and those with ≥4 years of college education (AOR=4.01; 95% CI=3.29–4.89), and the odds of ever having had their blood cholesterol checked were higher among those with 1–3 years of college education (AOR=1.37; 95% CI=1.21–1.56) and those with ≥4 years of college education (AOR=1.73; 95% CI=1.46–2.04). Compared to young adults with no greater than a high school education, the odds of ever having been tested for HIV infection was lower among those with 1–3 years of college education (AOR=0.68, 95% CI=0.60–0.78) and those with ≥4 years of college education (AOR=0.37; 95%

CI=0.31–0.44).

Differences by marital status were found. Compared to young adults who were not married, those who were married had higher odds of having health care coverage (AOR=1.28; 95% CI=1.07–1.52) and ever having been tested for HIV infection (AOR=1.50; 95% CI=1.29–1.74).

Health Status Indicators

Overall, 39.1% of young adults were overweight or obese, 3.7% had high blood cholesterol, 6.4% had high blood pressure, 8.2% described their health as fair or poor, and 10.6% had limitations on their activities because of physical, mental, or emotional problems (i.e., activity limitations) (Table 2). Differences by sex, race/ethnicity, and age category were found. Compared to male young adults, female young adults had lower odds of being overweight or obese (AOR=0.61, 95% CI=0.54–0.68) and having high blood pressure (AOR=0.57; 95% CI=0.46–0.72), but had higher odds of describing their health as fair or poor (AOR=1.39, 95% CI=1.12–1.72). Compared to white young adults, black young adults had higher odds of being overweight or obese (AOR=1.69, 95% CI=1.42–2.02) and having high blood pressure (AOR=1.57; 95% CI=1.14–2.16). Compared to white young adults, Hispanic young adults had higher odds of being overweight or obese (AOR=1.24, 95% CI=1.02–1.50) and describing their health as fair or poor (AOR=2.35, 95% CI=1.84–3.01), but lower odds of having activity limitations (AOR=0.59, 95% CI=0.41–0.84). Young adults aged 21–24 years fared poorer than their younger counterparts on two health status indicators. Compared to young adults aged 18–20 years, those aged 21–24 years had higher odds of being overweight and obese (AOR=1.52, 95%=1.33–1.74) and of describing their health as fair or poor (AOR=1.47, 95% CI=1.16–1.87).

Educational attainment was positively associated with indicators of health status. Compared to having no greater than a high school education, young adults who had 1–3 years of college education had lower odds of describing their health as fair or

poor (AOR=0.42, 95% CI=0.33–0.53). Young adults who had ≥4 years of college had lower odds of being overweight or obese (AOR=0.77, 95% CI=0.65–0.91), having high blood pressure (AOR=0.68, 95% CI=0.47–0.99), describing their health as fair or poor (AOR=0.23, 95% CI=0.16–0.34), and having activity limitations (AOR=0.68, 95% CI=0.51–0.91), compared to young adults who had no greater than a high school education. One exception to this trend was noted: the odds of having high blood cholesterol were higher among young adults with 1–3 years of college (AOR=1.57, 95% CI=1.14–2.17) and ≥4 years of college (AOR=1.85, 95% CI=1.27–2.71) than among young adults who had no greater than a high school education.

Marital status was associated with four of the health status indicators, but the pattern of association was not consistent. Compared to unmarried young adults, those who were married had higher odds of being overweight or obese (AOR=1.44, 95% CI=1.24–1.67) and having high blood cholesterol (AOR=1.38, 95% CI=1.00–1.91) and lower odds of describing their health as fair or poor (AOR=0.74, 95% CI=0.55–0.99) and reporting activity limitation (AOR=0.70, 0.55–0.90).

Risk Behaviors

Overall, 61.3% of young adults reported current alcohol use, 31.3% reported current binge drinking, 29.6% were current cigarette smokers, and 9.8% had engaged in HIV-related high-risk behavior (Table 3). Differences by sex, race/ethnicity, and age category were found. Females were less likely to engage in risky behaviors than males. Compared to males, females had lower odds of current alcohol use (AOR=0.66, 95% CI=0.58–0.74), current binge drinking (AOR=0.42, 95% CI=0.38–0.48), and current cigarette smoking (AOR=0.80, 95% CI=0.71–0.90). Compared to white young adults, the odds of current alcohol use were lower among black (AOR=0.46; 95% CI=0.39–0.55) and Hispanic (AOR=0.68; 95% CI=0.57–0.81) young adults; the odds of current binge drinking were lower among

Table 1. Prevalence and Adjusted Odds Ratios of Health Care Coverage and Clinical Preventive Health Behaviors among Young Adults Aged 18–24 Years, by Sex, Race/Ethnicity, Age, Education Level, and Marital Status—United States, 2003					
	Currently Have Health Care Coverage[a]		Ever Had Blood Cholesterol Checked		Ever Been Tested for HIV Infection[b]	
	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)
Overall	69.8 (±1.3)	—	43.8 (±1.4)	—	41.5 (±1.3)	—
Sex						
Male	66.9 (±1.9)	1.00 (1.00–1.00)	42.1 (±2.0)	1.00 (1.00–1.00)	33.8 (±1.9)	1.00 (1.00–1.00)
Female	73.2 (±1.6)	1.25 (1.10–1.42)*	45.8 (±1.8)	1.09 (0.97–1.21)	50.4 (±1.8)	2.00 (1.77–2.25)*
Race/Ethnicity						
White**	74.5 (±1.3)	1.00 (1.00–1.00)	44.7 (±1.5)	1.00 (1.00–1.00)	37.6 (±1.5)	1.00 (1.00–1.00)
Black**	71.3 (±3.5)	0.98 (0.81–1.19)	48.8 (±4.0)	1.27 (1.07–1.51)*	61.6 (±4.0)	2.71 (2.26–3.24)*
Hispanic	54.4 (±4.0)	0.51 (0.42–0.61)*	36.8 (±3.9)	0.79 (0.66–0.95)*	43.8 (±4.1)	1.14 (0.93–1.39)
Other	67.8 (±5.3)	0.68 (0.52–0.89)*	45.2 (±5.4)	1.03 (0.82–1.28)	37.2 (±5.1)	1.12 (0.88–1.42)
Age Category						
18–20 years	72.4 (±2.0)	1.00 (1.00–1.00)	37.8 (±2.2)	1.00 (1.00–1.00)	29.3 (±2.0)	1.00 (1.00–1.00)
21–24 years	68.1 (±1.6)	0.56 (0.48–0.64)*	47.7 (±1.7)	1.29 (1.13–1.47)*	49.8 (±1.7)	2.82 (2.45–3.25)*
Education Level						
≤HS completion	60.9 (±1.9)	1.00 (1.00–1.00)	38.2 (±2.0)	1.00 (1.00–1.00)	44.6 (±2.0)	1.00 (1.00–1.00)
1–3 years college	77.3 (±1.9)	2.25 (1.95–2.59)*	47.4 (±2.3)	1.37 (1.21–1.56)*	39.8 (±2.2)	0.68 (0.60–0.78)*
≥4 years college	84.2 (±2.2)	4.01 (3.29–4.89)*	55.7 (±3.2)	1.73 (1.46–2.04)*	34.0 (±2.9)	0.37 (0.31–0.44)*
Marital Status[c]						
Unmarried	69.9 (±1.4)	1.00 (1.00–1.00)	43.1 (±1.5)	1.00 (1.00–1.00)	38.3 (±1.5)	1.00 (1.00–1.00)
Married	70.4 (±2.9)	1.28 (1.07–1.52)*	47.3 (±3.1)	1.11 (0.96–1.29)	56.2 (±3.1)	1.50 (1.29–1.74)*

Note: *p<.05. Odds ratios adjusted for sex, race/ethnicity, age category, education level, and marital status. **non-Hispanic
[a]Including health insurance, prepaid plans such as HMOs, or government plans such as Medicare
[b]Not counting tests done as part of a blood donation
[c]Young adults classified as unmarried include those who have never been married, and those who are divorced, widowed, separated, or a member of an unmarried couple.

black (AOR=0.30; 95% CI=0.24–0.37) and Hispanic (AOR=0.71; 95% CI=0.58–0.86) young adults; the odds of current cigarette smoking were lower among black (AOR=0.48; 95% CI=0.39–0.59) and Hispanic (AOR=0.41; 95% CI=0.33–0.51) young adults; and the odds of HIV-related high-risk behaviors were higher among black (AOR=1.72; 95% CI=1.30–2.28) and Hispanic (AOR=1.33; 95% CI=1.01–1.74) young adults. Compared to young adults aged 18–20 years, those aged 21–24 years had higher odds of current alcohol use (AOR=2.70, 95% CI=2.36–3.08), current binge drinking (AOR=1.83, 95% CI=1.59–2.11), and current cigarette use (AOR=2.22, 95% CI=1.93, 2.54).

Higher education was associated with greater alcohol use but less cigarette smoking and HIV-related high-risk behaviors. Young adults with 1–3 years of college had higher odds of current alcohol use (AOR=1.58, 95% CI=1.39–1.79) and current binge drinking (AOR=1.25, 95% CI=1.09–1.44) and lower odds of current cigarette smoking (AOR=0.47, 95% CI=0.41–0.54) and HIV-related high-risk behavior (AOR=0.73, 95% CI=0.59–0.89) compared to young adults with no greater than a high school education. Young adults with ≥4 years of college had higher odds of current alcohol use (AOR=1.88, 95% CI=1.57–2.27), and lower odds of current cigarette smoking (AOR=0.22, 95% CI=0.18–0.27) and HIV-related high-risk behavior (AOR=0.52, 95% CI=0.38–0.70) compared to young adults with no greater than a high school education.

Married young adults were less likely to engage in risky behaviors than young adults who were not married. Compared to unmarried young adults, married young adults had lower odds of current alcohol use (AOR=0.54, 95% CI=0.46–0.63), current binge drinking (AOR=0.45, 95% CI=0.38–0.54), current cigarette smoking (AOR=0.72, 95% CI=0.62, 0.85), and HIV-related high-risk behavior (AOR=0.62, 95% CI=0.46–0.85).

Health-Promoting Behaviors

Overall, 63.6% of young adults engaged in sufficient physical activity, 21.5% consumed ≥5 servings of fruits and vegetables per day, and 68.2% were trying to lose or maintain their weight (Table 4). Compared to males, females had lower odds of engaging in sufficient physical activity (AOR=0.66, 95% CI=0.58–0.74), and higher odds of consuming ≥5 servings of fruits and vegetables

Table 2. Prevalence and Adjusted Odds Ratios of Health Status Indicators among Young Adults Aged 18–24 Years, by Sex, Race/Ethnicity, Age, Education Level, and Marital Status—United States, 2003

	Overweight or Obese[a]		High Blood Cholesterol[b]		High Blood Pressure[c]	
	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)
Overall	39.1 (±1.3)	—	3.7 (±0.5)	—	6.4 (±0.7)	—
Sex						
Male	43.8 (±2.0)	1.00 (1.00–1.00)	3.3 (±0.7)	1.00 (1.00–1.00)	7.9 (±1.1)	1.00 (1.00–1.00)
Female	33.4 (±1.7)	0.61 (0.54–0.68)*	4.2 (±0.7)	1.18 (0.89–1.57)	4.7 (±0.7)	0.57 (0.46–0.72)*
Race/Ethnicity						
White**	36.7 (±1.5)	1.00 (1.00–1.00)	4.0 (±0.6)	1.00 (1.00–1.00)	5.9 (±0.8)	1.00 (1.00–1.00)
Black**	48.5 (±3.9)	1.69 (1.42–2.02)*	4.4 (±1.7)	1.21 (0.77–1.88)	8.7 (±2.3)	1.57 (1.14–2.16)*
Hispanic	43.6 (±4.4)	1.24 (1.02–1.50)*	3.0 (±1.4)	0.84 (0.51–1.39)	6.5 (±2.1)	1.04 (0.71–1.52)
Other	35.7 (±5.2)	0.97 (0.76–1.23)	2.1 (±1.1)	0.53 (0.30–0.94)*	6.9 (±2.9)	1.20 (0.75–1.92)
Age Category						
18–20 years	33.7 (±2.1)	1.00 (1.00–1.00)	3.2 (±0.9)	1.00 (1.00–1.00)	5.9 (±1.2)	1.00 (1.00–1.00)
21–24 years	42.9 (±1.7)	1.52 (1.33–1.74)*	4.0 (±0.6)	1.00 (0.70–1.42)	6.8 (±0.9)	1.26 (0.95–1.66)
Education Level						
≤HS completion	40.4 (±2.0)	1.00 (1.00–1.00)	2.8 (±0.7)	1.00 (1.00–1.00)	7.1 (±1.1)	1.00 (1.00–1.00)
1–3 years college	38.4 (±2.2)	0.95 (0.83–1.08)	4.4 (±0.9)	1.57 (1.14–2.17)*	5.9 (±1.0)	0.83 (0.64–1.07)
≥4 years college	36.4 (±3.1)	0.77 (0.65–0.91)*	5.4 (±1.3)	1.85 (1.27–2.71)*	5.2 (±1.4)	0.68 (0.47–0.99)*
Marital Status[e]						
Unmarried	37.5 (±1.5)	1.00 (1.00–1.00)	3.5 (±0.5)	1.00 (1.00–1.00)	6.3 (±0.8)	1.00 (1.00–1.00)
Married	47.0 (±3.1)	1.44 (1.24–1.67)*	4.8 (±1.2)	1.38 (1.00–1.91)*	7.2 (±1.7)	1.21 (0.90–1.63)

	Described Health as Fair or Poor		Activity Limitation[d]	
	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)
Overall	8.2 (±0.8)	—	10.6 (±0.9)	—
Sex				
Male	7.6 (±1.1)	1.00 (1.00–1.00)	10.8 (±1.4)	1.00 (1.00–1.00)
Female	9.0 (±1.1)	1.39 (1.12–1.72)*	10.2 (±1.0)	0.96 (0.80–1.15)
Race/Ethnicity				
White**	5.8 (±0.7)	1.00 (1.00–1.00)	12.1 (±1.0)	1.00 (1.00–1.00)
Black**	9.0 (±2.4)	1.35 (0.97–1.87)	8.9 (±3.2)	0.68 (0.45–1.02)
Hispanic	14.9 (±2.7)	2.35 (1.84–3.01)*	7.7 (±2.4)	0.59 (0.41–0.84)*
Other	10.5 (±3.9)	2.01 (1.30–3.12)*	7.7 (±2.1)	0.60 (0.44–0.82)*
Age Category				
18–20 years	8.0 (±1.3)	1.00 (1.00–1.00)	10.6 (±1.5)	1.00 (1.00–1.00)
21–24 years	8.4 (±1.0)	1.47 (1.16–1.87)*	10.5 (±1.1)	1.12 (0.90–1.40)
Education Level				
≤HS completion	11.6 (±1.3)	1.00 (1.00–1.00)	11.1 (±1.4)	1.00 (1.00–1.00)
1–3 years college	5.3 (±0.9)	0.42 (0.33–0.53)*	10.3 (±1.3)	0.83 (0.68–1.02)
≥4 years college	3.2 (±1.0)	0.23 (0.16–0.34)*	8.9 (±1.8)	0.68 (0.51–0.91)*
Marital Status[e]				
Unmarried	8.2 (±0.9)	1.00 (1.00–1.00)	10.9 (±1.0)	1.00 (1.00–1.00)
Married	7.9 (±1.8)	0.74 (0.55–0.99)*	8.2 (±1.7)	0.70 (0.55–0.90)*

Note: *p<.05. Odds ratios adjusted for sex, race/ethnicity, age category, education level, and marital status. **non-Hispanic
[a]Body mass index ≥25 kg/m^2.
[b]Ever told by a doctor, nurse, or other health professional that their blood cholesterol was too high.
[c]Ever told by a doctor, nurse, or other health professional that they have high blood pressure.
[d]Limited in any way in any activities because of physical, mental, or emotional problems.
[e]Young adults classified as unmarried include those who have never been married, and those who are divorced, widowed, separated, or a member of an unmarried couple.

Table 3. Prevalence and Adjusted Odds Ratios of Risk Behaviors among Young Adults Aged 18–24 Years, by Sex, Race/Ethnicity, Age, Education Level, and Marital Status—United States, 2003

	Current Alcohol Use[a]		Current Binge Drinking[b]		Current Cigarette Smoking[c]	
	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)
Overall	61.3 (±1.3)	—	31.3 (±1.2)	—	29.6 (±1.2)	—
Sex						
Male	64.9 (±1.9)	1.00 (1.00–1.00)	39.3 (±1.9)	1.00 (1.00–1.00)	32.4 (±1.8)	1.00 (1.00–1.00)
Female	57.0 (±1.7)	0.66 (0.58–0.74)*	21.9 (±1.4)	0.42 (0.38–0.48)*	26.2 (±1.5)	0.80 (0.71–0.90)*
Race/Ethnicity						
White**	67.0 (±1.4)	1.00 (1.00–1.00)	36.5 (±1.4)	1.00 (1.00–1.00)	33.5 (±1.4)	1.00 (1.00–1.00)
Black**	47.7 (±3.8)	0.46 (0.39–0.55)*	14.7 (±2.7)	0.30 (0.24–0.37)*	22.3 (±3.4)	0.48 (0.39–0.59)*
Hispanic	54.5 (±4.0)	0.68 (0.57–0.81)*	27.8 (±3.7)	0.71 (0.58–0.86)*	21.6 (±3.3)	0.41 (0.33–0.51)*
Other	53.1 (±5.4)	0.54 (0.42–0.68)*	23.8 (±4.5)	0.50 (0.39–0.66)*	28.2 (±4.5)	0.79 (0.62–1.01)
Age Category						
18–20 years	47.6 (±2.2)	1.00 (1.00–1.00)	25.7 (±1.8)	1.00 (1.00–1.00)	24.9 (±1.8)	1.00 (1.00–1.00)
21–24 years	70.6 (±1.5)	2.70 (2.36–3.08)*	35.1 (±1.6)	1.83 (1.59–2.11)*	32.8 (±1.6)	2.22 (1.93–2.54)*
Education Level						
≤HS completion	52.8 (±2.0)	1.00 (1.00–1.00)	27.6 (±1.7)	1.00 (1.00–1.00)	35.5 (±1.8)	1.00 (1.00–1.00)
1–3 years college	67.4 (±2.0)	1.58 (1.39–1.79)*	34.6 (±2.1)	1.25 (1.09–1.44)*	25.4 (±1.9)	0.47 (0.41–0.54)*
≥4 years college	77.4 (±2.6)	1.88 (1.57–2.27)*	36.4 (±3.0)	1.16 (0.97–1.39)	17.5 (±2.4)	0.22 (0.18–0.27)*
Marital Status[e]						
Unmarried	62.3 (±1.5)	1.00 (1.00–1.00)	33.3 (±1.4)	1.00 (1.00–1.00)	29.7 (±1.3)	1.00 (1.00–1.00)
Married	55.6 (±3.0)	0.54 (0.46–0.63)*	20.5 (±2.6)	0.45 (0.38–0.54)*	27.5 (±2.7)	0.72 (0.62–0.85)*

HIV-related High-Risk Behavior[d]		
	% (95% CI)	AOR (95% CI)
Overall	9.8 (±0.8)	—
Sex		
Male	10.0 (±1.2)	1.00 (1.00–1.00)
Female	9.6 (±1.1)	1.05 (0.87–1.27)
Race/Ethnicity		
White**	8.6 (±0.9)	1.00 (1.00–1.00)
Black**	15.0 (±3.2)	1.72 (1.30–2.28)*
Hispanic	12.4 (±2.6)	1.33 (1.01–1.74)*
Other	6.2 (±1.7)	0.69 (0.50–0.96)*
Age Category		
18–20 years	10.4 (±1.3)	1.00 (1.00–1.00)
21–24 years	9.4 (±1.0)	1.10 (0.89–1.35)
Education Level		
≤HS completion	11.7 (±1.3)	1.00 (1.00–1.00)
1–3 years college	8.6 (±1.2)	0.73 (0.59–0.89)*
≥4 years college	6.0 (±1.4)	0.52 (0.38–0.70)*
Marital Status[e]		
Unmarried	10.3 (±0.9)	1.00 (1.00–1.00)
Married	6.8 (±1.8)	0.62 (0.46–0.85)*

Note: *p<.05. Odds ratios adjusted for sex, race/ethnicity, age category, education level, and marital status. **non-Hispanic

[a]Had at least one drink of alcohol during the 30 days preceding the interview.

[b]Had five or more drinks on an occasion one or more times during the 30 days preceding the interview.

[c]Smoked ≥100 cigarettes and now smoke cigarettes every day or some days.

[d]Engaged in any of the following behaviors during the year preceding the interview: intravenous drug use, treated for a sexually transmitted or venereal disease, given or received money or drugs in exchange for sex, or had anal sex without a condom.

[e]Young adults classified as unmarried include those who have never been married, and those who are divorced, widowed, separated, or a member of an unmarried couple.

per day (AOR=1.23, 95% CI=1.07–1.41) and trying to lose or maintain their weight (AOR=3.14, 95% CI=2.76, 3.57). In general, health-promoting behaviors did not vary significantly by race/ethnicity. Only one difference existed, with the odds of engaging in sufficient physical activity lower among Hispanic (AOR=0.78, 95% CI=0.64–0.95) than white young adults. Age was associated with only one health promoting behavior. Compared to young adults aged 18–20 years, those aged 21–24 years had lower odds of engaging in sufficient physical activity (AOR=0.81, 95% CI=0.71, 0.94).

Educational attainment was positively associated with two of the three health-promoting behaviors. Young adults who had 1–3 years of college had higher odds of trying to lose or maintain their weight (AOR=1.15, 95% CI=1.00–1.33), and young adults who had ≥4 years of college had higher odds of consuming ≥5 servings of fruits and vegetables (AOR=1.26, 95% CI=1.04–1.53) and of trying to lose or maintain their weight (AOR=1.79, 95% CI=1.46, 2.19) compared to young adults who had no greater than a high school education.

Marital status was not associated with any of the three health-promoting behaviors.

DISCUSSION

Results from this study show that nearly one-third of young adults lack health care coverage. Being male, Hispanic, 21–24 years old, unmarried, and attaining no greater than a high school education were associated with lacking health care coverage. According to overall data from the 2003 BRFSS,[15] the prevalence of lacking health care coverage was nearly twice as high among young adults (30%) compared with all adults (15%). Because of the lack of health care coverage, many young adults may not receive recommended routine preventive care. For example, although one of the *Healthy People 2010* objectives (12–15) calls for 80% of all adults to receive cholesterol screening within the past 5 years,[18] results from this study suggest only 43.8% of young adults have ever had their blood cholesterol checked. To identify if having health care coverage is associated

with cholesterol-screening behavior, we calculated the prevalence of ever having had blood cholesterol checked by current health care coverage status and found the behavior was reported by 35.7% of young adults without health care and 47.6% those with health care coverage. These numbers are consistent with previous research, which documented that young adults who lack health insurance are more likely to report forgoing healthcare than those with health insurance.[6] Thus, increasing health care coverage among young adults likely would result in increased screening and preventive care. Enhanced efforts are needed to improve young adults' access to health care and to increase health care coverage rates.

Thirty-nine percent of young adults are overweight or obese. Being male, black or Hispanic, aged 21–24 years, married, and having no greater than a high school education were associated with overweight and obesity. Overweight and obesity appears to increase during young adulthood. When comparing young adults aged 18–20 years to those aged 21–24 years, the prevalence of overweight and obesity increased 27%. Nearly 70% of young adults are trying to lose or maintain their weight; however, the prevalence was highest among females and those with higher educational attainment, even though males and those with lower educational attainment were most likely to be overweight or obese. In addition, a substantial portion of young adults fail to engage in behaviors that reduce the likelihood of overweight and obesity; approximately one-third do not engage in sufficient physical activity and four out of five young adults consume fewer than five servings of fruits and vegetables per day. When comparing young adults aged 21–24 years to those aged 18–20 years, the prevalence of engaging in sufficient physical activity decreased 8%.

Eight percent of young adults described their health as fair or poor and one in ten young adults reported activity limitations due to physical, mental, or emotional problems. These findings suggest a substantial proportion of young adults suffer from poor health-related quality of life. Though con-

sistent differences by sex, race/ethnicity, and age were not found, those with no greater than a high school education and those who were unmarried were at greatest risk for poor health-related quality of life.

Nearly two out of three young adults reported currently using alcohol, nearly one out of three reported binge drinking and cigarette smoking, and one out of ten reported engaging in HIV-related high-risk behavior. Although black and Hispanic young adults were less likely than white young adults to engage in alcohol and cigarette use, they were more likely to engage in HIV-related high-risk behaviors. Young adults who were female and married were less likely to engage in risk behaviors. Even though young adults aged 21- to 24-years have reached the minimum legal age for the purchase and consumption of alcohol, the increased intensity of use is of concern. In fact, the prevalence of current binge drinking is nearly twice as high among young adults (25.7% among 18- to 20-year-olds and 35.1% among 21- to 24-year-olds) as among all adults (16.4%), according to overall data from the 2003 BRFSS.[15] Alcohol use appears to increase during young adulthood. For example, when comparing young adults aged 21–24 years to those aged 18–20 years, we found a 37% increase in current binge drinking and a 48% increase in current alcohol use. Increases in smoking during young adulthood also were found; our results showed a 32% increase in current cigarette smoking when comparing those aged 21–24 years to those aged 18–20 years.

Even after controlling for sex, race/ethnicity, age, and marital status, education level was independently associated with health care coverage, clinical preventive health behaviors, health status indicators, and risk behaviors. Attaining at least some college education appears to be a protective factor for many of the behaviors examined in this study, a finding that has been documented elsewhere.[19–21] A few exceptions to this pattern should be noted. The prevalence of alcohol use and high blood cholesterol was greater among those who had attended ≥1 year of college than among those with a high

Table 4. Prevalence and Adjusted Odds Ratios of Health Promoting Behaviors among Young Adults Aged 18–24 Years, by Sex, Race/Ethnicity, Age, Education Level, and Marital Status—United States, 2003

	Engaged in Sufficient Physical Activity[a]		Consumed ≥5 Servings of Fruits and Vegetables		Now Trying to Lose or Maintain Weight	
	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)	% (95% CI)	AOR (95% CI)
Overall	63.6 (1.4)	—	21.5 (1.1)	—	68.2 (1.3)	—
Sex						
Male	67.9 (1.9)	1.00 (1.00–1.00)	19.8 (1.6)	1.00 (1.00–1.00)	57.2 (2.0)	1.00 (1.00–1.00)
Female	58.3 (1.9)	0.66 (0.58–0.74)*	23.4 (1.6)	1.23 (1.07–1.41)*	81.1 (1.5)	3.14 (2.76–3.57)*
Race/Ethnicity						
White**	65.1 (1.5)	1.00 (1.00–1.00)	20.8 (1.2)	1.00 (1.00–1.00)	69.2 (1.4)	1.00 (1.00–1.00)
Black**	61.6 (4.4)	0.86 (0.71–1.06)	22.2 (3.2)	1.10 (0.89–1.35)	65.6 (3.8)	0.84 (0.69–1.01)
Hispanic	59.3 (4.4)	0.78 (0.64–0.95)*	21.4 (3.3)	1.09 (0.88–1.35)	67.0 (4.0)	1.01 (0.82–1.24)
Other	63.3 (5.4)	0.87 (0.69–1.11)	25.2 (5.1)	1.28 (0.96–1.69)	66.9 (5.2)	0.94 (0.72–1.23)
Age Category						
18–20 years	66.6 (2.2)	1.00 (1.00–1.00)	21.4 (1.9)	1.00 (1.00–1.00)	65.8 (2.1)	1.00 (1.00–1.00)
21–24 years	61.6 (1.7)	0.81 (0.71–0.94)*	21.5 (1.4)	0.95 (0.81–1.11)	69.8 (1.6)	1.01 (0.87–1.16)
Education Level						
≤HS completion	63.2 (2.1)	1.00 (1.00–1.00)	20.4 (1.7)	1.00 (1.00–1.00)	64.7 (1.9)	1.00 (1.00–1.00)
1–3 years college	64.4 (2.2)	1.09 (0.95–1.24)	21.8 (1.8)	1.07 (0.92–1.25)	69.5 (2.1)	1.15 (1.00–1.33)*
≥4 years college	62.9 (3.2)	1.11 (0.93–1.33)	24.3 (2.7)	1.26 (1.04–1.53)*	78.4 (2.7)	1.79 (1.46–2.19)*
Marital Status[b]						
Unmarried	64.6 (1.5)	1.00 (1.00–1.00)	21.4 (1.3)	1.00 (1.00–1.00)	67.6 (1.4)	1.00 (1.00–1.00)
Married	58.3 (3.1)	0.87 (0.75–1.02)	21.2 (2.6)	0.98 (0.82–1.17)	71.5 (2.8)	0.99 (0.83–1.18)

Note: *p<.05. Odds ratios adjusted for sex, race/ethnicity, age category, education level, and marital status. **non-Hispanic
[a]During a usual week engaged in moderate physical activity for ≥30 minutes on ≥5 days/week and/or vigorous physical activity for ≥20 minutes on ≥3 days/week.
[b]Young adults classified as unmarried include those who have never been married, and those who are divorced, widowed, separated, or a member of an unmarried couple.

school education or below. The association of alcohol use with higher educational attainment is of concern and is consistent with previous findings among young adults attending college.[22–24]

Although those who were married were less likely to lack health care coverage, report poor health-related quality of life, and participate in risky behaviors, marital status was not associated with any of the health-promoting behaviors examined. In addition, those who were married were more likely to be overweight or obese. Similar associations of marital status with health status and obesity have been previously reported among adults, and these associations have been shown to be strongest among younger adults.[25] While the mechanism behind these associations is not well understood, one study found that cohabitation status, which is associated with marital status, may at least partially explain differences found in health status among those who are married and those who are not.[26] Further research on this topic is needed.

LIMITATIONS

Results from this study are subject to several limitations. BRFSS is a landline telephone-based survey and excludes individuals without telephones or who use only cellular phones. BRFSS also excludes individuals who live in institutional settings, such as college dormitories, fraternity/sorority housing, and military barracks, and thus are not generalizable to these subpopulations of young adults. We were unable to identify whether respondents were attending school (full time or part time) or not attending school, even though important differences may exist among these subpopulations.[27] Finally, data are based on self-report, and self-reporting bias may occur.

TRANSLATION TO HEALTH EDUCATION PRACTICE

Results from this study demonstrate that many health-risk behaviors and overweight and obesity increase during young adulthood, and a substantial proportion of young adults lack health care coverage. These findings may be at least partially explained by the weakened connections to supportive institutions, such as family or school, that occur during the transition from adolescence to adulthood.[6] Given the difficulty in reaching young adults, instilling health-related knowledge and skills during childhood and adolescence is essential. Since approximately

95% of adolescents aged 16–17 years are enrolled in school,[28] schools are an important venue for reaching students with health promotion efforts before they disperse into young adulthood. In fact, the American Health Association has endorsed schools and school health programs as essential components of population-based strategies to improve long-term cardiovascular health.[29] Coordinated school health programs can have a positive influence on current and future health.[30] Targeted and effective health promotion outreach for young adults also is needed to bridge the gap from adolescence to adulthood. Outreach can be obtained through carefully placing health care promotion programs in a comprehensive and collaborative combination of settings where young adults can be reached—colleges, work sites, health care facilities, and community locations.[31] In addition, our results showed that specific subpopulations of young adults, such as those who were not married and those with lower levels of education, were at particular risk for poor health status and engaging in behaviors that place them at risk for chronic disease. Thus, health promotion efforts that are tailored to reach these specific subpopulations are needed. Also needed are efforts that increase access to affordable health care for all young adults.

DISCLAIMER

The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

REFERENCES

1. Baranowski T, Cullen KW, Basen-Engquist K, et al. Transitions out of high school: Time of increased cancer risk? *Prev Med.* 1997;26:694–703.

2. Centers for Disease Control and Prevention. Health-risk behaviors among persons aged 12–21 years—United States, 1992. *Morb Mortal Wkly Rep.* 1994;43:231–235.

3. Harris KM, Gordon-Larsen P, Chantala K, Udry R. Longitudinal trends in race/ethnic disparities in leading health indicators from adolescence to young adulthood. *Arch Pediatr Adolesc Med.* 2006;160:74–81.

4. Gfroerer J, Greenblatt JC, Wright DA. Substance use in the U.S. college-age population: Differences according to educational status and living arrangement. *Am J Public Health.* 1997;87(1):62–65.

5. Johnston LD, O'Malley PM, Bachman JG. *Monitoring the Future national survey results on drug use, 1975–2000. Volume II: College students and adults ages 19–40.* Bethesda, MD: National Institute on Drug Abuse; 2001. NIH Publication No. 01–4925.

6. Park MJ, Mulye TP, Adams SH, et al. The health status of young adults in the United States. *J Adolesc Health.* 2006;39:305–17.

7. Hendricks KM, Herbold NH. Diet, physical activity, and other health-related behaviors in college-age women. *Nutr Rev.* 1998;56(3):65–75.

8. Brevard PR, Ricketts CD. Residence of college students affects dietary intake, physical activity, and serum lipid levels. *J Am Diet Assoc.* 1996;96:35–38.

9. Choi WS, Harris KJ, Okuyemi K, Ahluwalia JS. Predictors of smoking initiation among college-bound high school students. *Ann Behav Med.* 2003;26(1):69–74.

10. Douglas KA, Collins JL, Warren C, et al. Results from the 1995 National College Health Risk Behavior Survey. *J Am Coll Health.* 1997;46:55–66.

11. Frost R. Cardiovascular risk modification in the college student: Knowledge, attitudes, and behaviors. *J Gen Med.* 1992;7:317–320.

12. Sax LJ. Health trends among college freshmen. *J Am Coll Health.* 1997;45:252–262.

13. Wechsler H, Rigotti NA, Gledhill-Hoyt J, Lee H. Increased levels of cigarette use among college students: A cause for national concern. *JAMA.* 1998;280:1673–1678.

14. Escobedo LG, Pedicord JP. Smoking prevalence in U.S. birth cohorts: the influence of gender and education. *Am J Public Health.* 1996;86:231–236.

15. Centers for Disease Control and Prevention. *Behavioral Risk Factor Surveillance System Technical Documents and Survey Data.* Available at: http://www.cdc.gov/brfss/technical_infodata/surveydata/2003.htm. Accessed: June 22, 2005.

16. Nelson D, Holtzman D, Bolen J, et al. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Social and Preventive Medicine.* 2006;46(Suppl 1):S3–S42.

17. SUDAAN: Software for the Statistical Analysis of Correlated Data, Release 9.0 [User's Manual]. Research Triangle Park, NC. Research Triangle Institute: 2005.

18. U.S. Department of Health and Human Services. *Healthy People 2010. Understanding and Improving Health.* 2nd ed. Washington, D.C.: U.S. Department of Health and Human Services; 2000.

19. Fiscella K, Franks P. Should years of schooling be used to guide treatment of coronary risk factors? *Ann Fam Med.* 2004;2:469–473.

20. Molla MT, Madans JH, Wagener DK. Differentials in adult mortality and activity limitation by years of education in the United States at the end of the 1990s. *Popul Dev Rev.* 2006;30:625–646.

21. Georgiou CC, Betts NM, Hoerr SL, et al. Among young adults, college students and graduates practiced more healthful habits and made more healthful food choices than did non-students. *J Am Diet Assoc.* 1997;97:754–759.

22. Hingson RW, Heeren T, Zakocs RC, et al. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24. *J Stud Alcohol.* 2002;63(2):136–144.

23. Slutske WS, Hunt-Carter EE, Nabors-Oberg RE, et al. Do college students drink more than their non-college-attending peers? Evidence from a population-based longitudinal female twin study. *J Abnorm Psych.* 2004;113:530–40.

24. Windle M. Alcohol use among adolescents and young adults. *Alcohol Res Health.* 2004;27(1):79–85.

25. Schoenborn CA. *Marital status and health: United States, 1999–2002.* Advance Data from Vital and Health Statistics; No. 351. Hyattsville, MD: National Center for Health Statistics; 2004.

26. Lund R, Due P, Modvig J, et al. Cohabitation and marital status as predictors of mortality—an eight-year follow-up study. *Soc Sci Med.* 2002;55:673–9.

27. Office of Applied Studies, Substance Abuse and Mental Health Services Administration. College enrollment status and past year illicit drug use among young adults: 2002, 2003, and 2004. *The NSDUH Report.* October 21, 2005.

28. Kaufman P, Alt MN, Chapman C. Dropout rates in the United States: 2001. Washington, D.C.: U.S. Department of Education, National Center for Education Statistics; 2004. Report No.: NCES 2005–046.

29. Hayman LL, Williams CL, Daniels SR, et al. Cardiovascular health promotion in schools: A statement for health and education professionals and child health advocates from the committee on Atherosclerosis, hypertension, and obesity in Youth (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation.* 2004;110:2266–75.

30. Institute of Medicine. *Schools and Health: Our Nation's Investment.* Washington, D.C.: National Academy Press; 1997.

31. *Young People's Health Care: A National Imperative.* July 2006. National Institute for Health Care Management Foundation.