# Lifestyles and Health Risks of Collegiate Athletes

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*Background.* No study has comprehensively assessed the health behaviors of intercollegiate athletes. To determine whether they may be at increased risk for unhealthy lifestyle behaviors, we compared the lifestyle and health risk behaviors of a group of college athletes with those of their nonathletic peers.

*Methods.* A confidential survey questionnaire addressing preventable lifestyle behaviors was given to 109 intercollegiate athletes and 110 nonathlete controls.

*Results.* Athletes had a significantly ($P < .05$) higher proportion of "risky" lifestyle behavior patterns compared with the nonathletes in the following areas: quantity of alcohol consumed; driving while intoxicated with alcohol or other drugs; riding with an intoxicated driver; use of seatbelts; use of helmets when riding a motorcycle or moped; use of contraception; number of sexually transmitted diseases; and number of sexual partners.

*Conclusions.* College athletes appear to be at higher risk for certain maladaptive lifestyle behaviors. Comprehensive lifestyle assessment and preventive health intervention deserve further study to determine whether they can facilitate the adoption of positive lifestyle behaviors in this high-risk group.

*Key words.* Sports; risk factors; lifestyle; preventive medicine. *J Fam Pract 1991; 33:585-590.*

A majority of diseases and premature deaths in the United States are associated with unhealthy lifestyles.[1,2] In contrast, epidemiologic studies have correlated certain positive lifestyle behaviors with increased longevity or improved quality of life or both.[2–5] A nationwide focus on prevention is thus emerging. Because maladaptive lifestyle behavior patterns, which are often formed early in life, may increase risk for degenerative diseases as well as premature death, it is imperative that physicians target primary prevention at younger age groups.

Other than for sporadic acute illnesses or accidents, the typical healthy adolescent or young adult has few, if any, physician office visits throughout the year. The focus of physician examinations in these acute illness visits is usually disease- or problem-oriented. Education about the prevention of accidents, substance abuse, sexually transmitted diseases, contraception, nutrition, exercise, and mental health often receives little attention.[6,7] Yet these health-related areas represent the leading causes of morbidity and mortality in this age group.[1]

It is assumed by many that individuals actively involved in sports activities are healthier and more attuned to their overall well-being. Participation in sports, however, often causes additional stresses, emotional, physical, and mental. Those involved with the care of athletes may be aware of certain maladaptive behaviors that often evolve, possibly as the result of these additional stresses or owing to other psychosocial, environmental, or genetic variables. No published comprehensive study, however, has evaluated the differences that may exist in lifestyle behavior patterns and health risks between athletes and nonathletes. Addressing this issue, we undertook a pilot study to assess a broad range of lifestyle and health-risk behaviors, as well as interests in preventive health, of college athletes and their nonathletic counterparts.

## Materials and Methods

### *Subjects*

Two hundred nineteen students were asked to participate in the study by completing a confidential survey questionnaire about their personal lifestyle and health-risk behaviors. All participants were undergraduate students at a major collegiate institution and were surveyed during the spring quarter of 1989.

The study group consisted of 109 undergraduate intercollegiate athletes. Specific sports teams were chosen so that there were a variety of athletes included and a relatively equal number of male and female participants.

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Table 1. Participation of Athletes in Health Risk Behavior Survey, by Intercollegiate Sports Team

| Sport Representation | Total No. of Athletes on Team* | Athletes Participating in Survey No. (%) |
|---|---|---|
| Men's teams | | |
| Cross-country/track | 87 | 11 (13) |
| Football | 111 | 17 (15) |
| Soccer | 20 | 15 (75) |
| Volleyball | 32 | 10 (31) |
| Water polo | 35 | 8 (23) |
| Other | 155 | 0 (0) |
| Total | 440 | 61 (14) |
| Women's teams | | |
| Basketball | 13 | 13 (100) |
| Cross-country/track | 55 | 13 (24) |
| Gymnastics | 15 | 12 (80) |
| Volleyball | 18 | 10 (56) |
| Other | 59 | 0 (0) |
| Total | 160 | 48 (30) |
| Total (men's and women's teams) | 600 | 109 (18) |

**Number of athletes on intercollegiate athletic teams at the time of the study.*

Table 2. Demographics of Athletes and Nonathletes

| Variables | Athletes (%) | Nonathletes (%) |
|---|---|---|
| Sex | | |
| Male | 56 | 44 |
| Female | 44 | 56 |
| Age (y) | | |
| 18–19 | 45 | 80 |
| 20–21 | 42 | 15 |
| >21 | 13 | 6 |
| Ethnicity | | |
| White | 67 | 47 |
| Afro-American | 17 | 5 |
| Asian | 4 | 30 |
| Mexican-American | 3 | 7 |
| Other | 9 | 11 |
| Living situation | | |
| Dormitory | 48 | 54 |
| Sorority/Fraternity | 2 | 4 |
| Off Campus | 50 | 43 |

An attempt was made to have the sport representation of each team in the study group reflect that of the true college athlete pool. Those teams that were actually able to participate in the study were also a reflection of the availability of the team players as determined by the sports season in which the study was undertaken.

The questionnaire was administered to athletes present at a mandatory team meeting. The athletes were not aware of the nature of the meeting. A convenience sampling method was used for administration of the questionnaire. All athletes who were asked to participate in the study completed the questionnaires.

Nine teams were surveyed, representing seven different sports (women's teams: basketball, gymnastics, cross-country/track, and volleyball; men's teams: football, water polo, soccer, volleyball, and cross-country/track). Eighteen percent of the total intercollegiate athlete population (N = 600) was surveyed. The sport representation and percentage of athlete participants from each team are given in Table 1.

The control group of nonathletes included students enrolled in an Introduction to Psychology course at the same institution. The intercollegiate athletes in the class were asked not to participate. Systematic sampling, selecting every second student seated in the classroom, was used for administration of the questionnaires in this group. One hundred ten nonathletes were asked to complete the questionnaire.

Demographic information, including sex, age, ethnicity, and living situation, was obtained from each group and is summarized in Table 2.

## *Study Instrument*

A questionnaire was used to assess information on the lifestyle and health risk behaviors of the subjects. In collaboration with Innovative Health Systems (Seekonk, Mass),[8] we designed this comprehensive lifestyle questionnaire specifically for the college student. The questionnaire was piloted with both athletes and nonathletes, but had not been previously validated.

The questionnaire consisted of 83 multiple-choice questions regarding the subjects' health behaviors over the previous 12 months. Behaviors were assessed in the following areas: nutrition, exercise, motor vehicle safety, substance abuse, sexually transmitted diseases and contraception, mental health, cancer prevention, and general preventive health issues. The subjects were also asked to identify whether they were interested in learning more about a number of health-related topics. Completion of the questionnaire took 8 to 10 minutes.

To assure confidentiality and anonymity, the subjects did not record their names on the questionnaire. Rather, a six-digit identification (ID) number was chosen by the subject and recorded on the questionnaire. In an effort to use the study as an opportunity for health intervention, the researchers arranged for participants to receive individual feedback from their health assessments, provided that they remembered their ID number. The feedback was provided within 2 months of completion of the questionnaire.

The personalized health assessments included suggestions for lifestyle improvement based on those areas in which risk was scored highest. Results of the study were reviewed with each team participating in the study, as well as with the nonathlete group. In an effort to maintain anonymity, individual participants' results were not discussed. At the conclusion of the study, however, the subjects were given the option to discuss and personally review their assessments with one of the researchers or another physician.

### *Statistical Analysis*

The chi-square test at the 5% significance level was used for statistical analysis of the athlete and nonathlete groups to assess differences in reported lifestyle and health risk behaviors and differences in reported interest in a health topic, given that the subject was at risk for the related behavior or health problem. A cutpoint was used for "positive" vs "negative" responders. The observed proportions were adjusted for age, sex, race, and living status using a logistic regression model.[9] The $P$ value reported is for the adjusted proportion comparison.

The questions that were chosen for comparison were those that seemed to be the most clinically significant. In a few instances, some items were not included because the comparisons were confounded or were based on low sample size, or both. A chi-square test of trends was not used because of the limited number of subjects in each group and the difficulty of controlling for covariates.

## Results

A total of 216 of the 219 students (109 athletes and 107 nonathletes) completed the questionnaires for a response rate of 99% (100% athletes, 97% nonathletes). The athlete group had more "high risk" lifestyle behaviors compared with the nonathletes (Figure 1). The lifestyle behaviors that placed the athletes at significantly ($P < .05$) higher risk included a greater quantity of alcohol consumed per sitting (athletes, 54%; nonathletes, 36%; $P < .002$); more frequent driving while intoxicated from alcohol or drugs (athletes, 39%; nonathletes, 12%; $P < .001$); more frequent riding with a driver who was intoxicated or under the influence of drugs (athletes, 49%; nonathletes, 26%; $P < .002$); less frequent use of seatbelts (athletes, 47%; nonathletes, 29%; $P < .014$); less frequent use of helmets when riding a motor scooter or motorcycle (athletes, 49%; nonathletes, 33%; $P < .05$); less frequent use of contraception (athletes, 40%; nonathletes, 26%; $P < .032$); increased frequency of sexually transmitted diseases (athletes, 11.6%; nonathletes, 2.8%; $P < .018$); increased number of sexual partners (athletes, 28%; nonathletes, 12.7%; $P < .009$); and infrequent rest days from aerobic exercise (athletes, 25%; nonathletes, 9%; $P < .002$). Family history of alcohol and/or drug abuse was also greater in the athlete group (athletes, 22%; nonathletes, 9.5%; $P < .032$). Health problems that athletes reported at a significantly ($P < .05$) higher frequency compared with nonathletes included irregular menses (athletes, 29%; nonathletes, 9%; $P < .022$), and a history of stress fractures (athletes, 19%; nonathletes, 8%; $P < .019$).

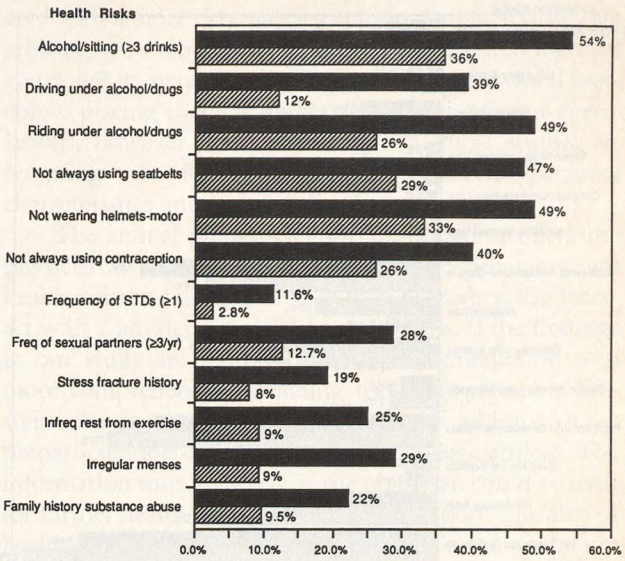


Figure 1. "Riskier" lifestyle behaviors and health risks in athletes (solid bars) compared with nonathletes (hatched bars). For all risk behaviors except "Driving under alcohol/drugs," $P < .05$; for "Driving under alcohol/drugs," $P < .001$.

There were trends for the athletes to use bicycle helmets less frequently ($P < .07$), to have more difficulty maintaining their optimal weight ($P < .08$), and to have more problems with amenorrhea ($P < .06$) compared with the nonathletes, although these did not quite reach statistical significance (Figure 2).

There was no significant difference between the two groups with respect to frequency (not quantity) of alcohol consumption or use of marijuana, amphetamines, cocaine, anabolic steroids, cigarettes, or smokeless tobacco. Other lifestyle behaviors in which no statistical significance was demonstrated between the athletes and nonathletes included frequency of consuming high fat and cholesterol foods, use of drastic weight loss methods, having annual Papanicolaou smears, performing monthly testicular self-examination, performing monthly breast self-examination, and consideration of suicide (Figure 2).

Athletes had healthier lifestyle behaviors with regard to eating breakfast daily (athletes, 49%; nonathletes,

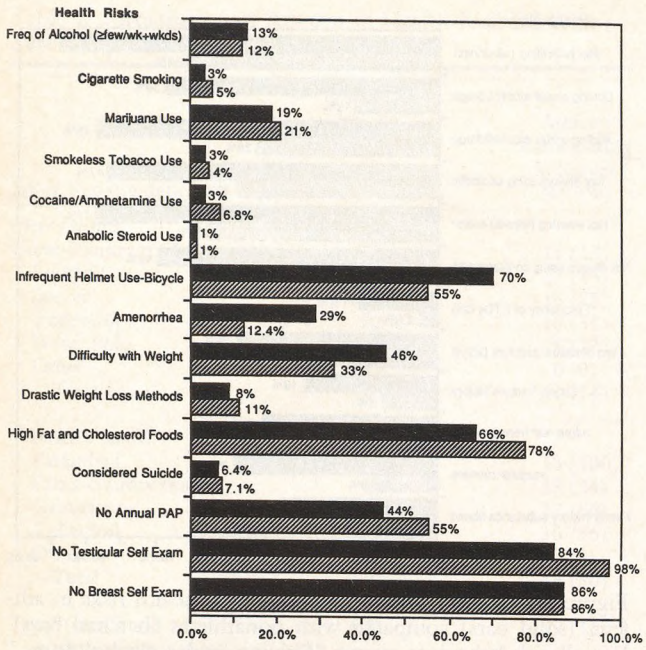


Figure 2. Trends in lifestyle behaviors and health risks in athletes (solid bars) compared with nonathletes (hatched bars). $P$ = NS throughout.

29%; $P < .008$) and participating in more frequent aerobic exercise (athletes, 81%; nonathletes, 48%; $P < .001$). Athletes who were at risk for certain health problems tended to express less interest in learning more about these problems, specifically with respect to motor vehicle safety, contraceptive education, and eating disorder counseling. Female athletes who did not have annual Papanicolaou smears expressed less interest in cancer prevention than the nonathletes ($P < .019$).

## Discussion

Although this was a pilot study, the findings have clinical implications for physicians and other professionals who care for athletes. The significantly higher proportion of athletes with high-risk lifestyles as compared with their nonathlete counterparts has not been reported previously. Some studies, however, have compared athlete and nonathlete populations with respect to specific health risks of concern, such as drug and alcohol use,[10,11] eating disorders,[12–14] and irregular menses.[15,16]

Our results were consistent with most studies comparing frequency of alcohol and drug use between athletes and nonathletes, with athlete use reported as similar or slightly less than that of nonathletes.[10,11] There were differences in our study, however, with respect to use of anabolic steroids and smokeless tobacco. Most studies report use of these drugs to be greater in athletes.[17,18] The fact that our results showed no significant difference in use of steroids by the athletes may have been due to the effect of an existent drug testing and education program formulated by the Department of Intercollegiate Athletics. The absence of baseball from our experimental group may explain why we did not find a significant difference in use of smokeless tobacco between athlete and nonathlete groups.[18]

That the experimental group consumed a greater quantity of alcohol per sitting was alarming, especially since this group also reported a much higher incidence of drinking and driving, riding with an intoxicated driver, wearing seatbelts less frequently, and using helmets less frequently. This group also had a tendency to be less interested in learning about accident prevention than the nonathletes. Of interest is that the athlete group had a significantly higher family history of alcohol and/or drug abuse than the nonathlete group. This factor may have contributed to the higher reported incidence of binge drinking among athletes. Statistical analysis, however, showed a significantly higher percentage of students who consumed more drinks per sitting in the athlete group following adjustments for family history.

Our finding of a higher frequency of irregular menses in the female athletes has been well documented in other studies.[15,16] Decreased bone mineral density seen in female athletes with oligomenorrhea and amenorrhea may lead to premature osteoporosis[19,20] and a tendency toward an increased frequency of stress fractures.[21,22] The infrequent rest days from aerobic exercise (<1 day per week) in the athlete group may also have contributed to the higher frequency of stress fractures reported.

The sexual behaviors of the athletes were also cause for concern. There were significantly more incidences of sexually transmitted diseases, frequency of sexual partners, and less frequent use of contraception in the athlete group. Such behavior deserves special note, given the increased incidence of HIV disease recently reported in the college population.[23]

The generalizability of the findings in this study are partially dependent on the representativeness of the samples. The athlete group included a wide variety of sport representation, although not all sports were sampled. This selection bias needs to be taken into account when generalizing the results to all college athletes. A random sampling of the athlete pool would have eliminated the biases introduced with the convenience sampling method used in the present study. Whether noncollegiate athletes of younger or older age groups have similar high-risk lifestyle behavior patterns has yet to be determined and cannot be extrapolated from the present study.

The differences in age and ethnicity between the athlete and nonathlete groups may have introduced some sample biases (Table 2). Although the majority of students in both groups were between 18 and 21 years of age, the nonathlete group had a significantly larger representation of younger students (18 to 19 years of age) as compared with the athlete group. While the largest ethnic representation in both athlete and nonathlete groups was white, there was a significant difference in the distribution of Afro-Americans and Asians in the two groups. There was no statistically significant difference between groups with respect to either sex or living situation.

Some other sample biases that may have existed are worth mentioning. The socioeconomic status of the students and their parents was not assessed, and may have played a role in the lifestyle behaviors of the sample populations studied. Other biases may have included the geographic location of Los Angeles, as well as its urban environment. A multicenter study that included subjects from several locations would help control for this factor. Lastly, the results from the study are based on the subjects' self-reports of their behaviors. Although the validity of this method of data collection has been well documented,[24,25] it is possible that estimation of certain behaviors was over- or underreported.

There are several possible explanations that may account for the findings that athletes are at higher risk for several unhealthy lifestyle behavior patterns compared with their nonathlete counterparts. Sports psychologists have described athletes who participate in high-risk sports as possibly having a predisposing type of personality.[26–28] Farley[29] has postulated a "type T" personality by which high-risk athletes (eg, skydivers, mountain climbers) may be categorized. Type T individuals, according to Farley, thrive on thrill-seeking behavior, excitement, and stimulation through physical activity. Ogilvie,[30] who has studied high-risk athletes and competitors, has used several psychological tests, including the Minnesota Multiphasic Personality Inventory, to assess possible correlations between athletes' behavior patterns and personality. However, no significant correlations relating these variables have been found. Nevertheless, it is conceivable that the high risk-taking behavior demonstrated in our athlete group may have been attributable to such a personality type.

Personal beliefs about the extent to which a person feels in control of his own health (internal vs external locus of control) has also been examined as a possible predictor for certain health behaviors.[31] For example, Desmond et al[32] hypothesized that seatbelt use would be associated with a more internal locus of control in high school students, and non–seatbelt use would be associated with a more external orientation. It may follow that athletes, who tend to have more of an external locus of control,[33–35] may be expected to have behavioral outcomes placing them at higher risk. No consistent correlations, however, have been found in most studies attempting to find associations between personal characteristics and behavioral outcomes.

The annual preparticipation examination offers the physician a means for assessing lifestyle behaviors and health risks in individuals who may not otherwise interact with a physician or health care system. If the findings in our study are reproduced, the implementation of a more comprehensive screening tool that addresses lifestyle behaviors may prove to be a valuable addition to the preparticipation examination for the college athlete. The information thus gathered by the physician could be used for further health education and intervention. The area of health-risk appraisal is still in its infancy in the age group studied, and therefore, more research needs to be done to determine its validity, reliability, and role in behavior change.[36,37]

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*For editorial comment, see page 573.*