Title	Health risk behaviors of international high school students
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Source	East Asia Educational Administrators Regional Conference of Overseas Schools, 16 November 1993, Singapore

Citation: Ball, J., & Moselle, K. (1993, November). *Health risk behaviors of international high school students.* Paper presented at the East Asia Educational Administrators Regional Conference of Overseas Schools, Singapore.

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Paper presented at the East Asia Educational Administrators Regional Conference of Overseas Schools, held in Singapore on 16 Nov, 1993

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The presentation today will highlight major findings to date of an ongoing epidemiological study of risk behaviours among American and non-American students attending international schools in four continents: Asia, Africa, Europe, and South America.

The research reported here represents a collaborative effort of three investigators: Dr. Jessica Ball, Lecturer at Nanyang Technological University, Dr. Ken Moselle, Psychologist at the Singapore American School, and Dr. Thomas Rodgers, Regional Psychiatrist for the U.S. Department of State, now posted in Santiago, Chile.

Our research focuses on behaviors that are known to put young people (and adults for that matter) at risk for accidental death, the development of a range of physical and mental health problems, and poor social adjustment. These high risk behaviors have quite understandably been the focus of much concern and programmatic effort among educators all over the world, and perhaps particularly in the U.S., where the prevalence of most high risk behaviors have shown steady increases over time. Impetus for the present study came in part from international educators' expressed need for objective measures of the incidence and prevalence of priority risk behaviors, in order to make policy and program decisions, for example, regarding allocation of personnel and other resources to alcohol awareness programs, whether to institute drug screening procedures, how to prioritize topics in health education programs, and so on. A further consideration motivating our study is that international schools present a unique opportunity to explore the relative contributions of ethnicity, country of origin, and international mobility and other factors on youth risk behaviors.

Epidemiological Survey Method.

The most widely used approach to epidemiological surveillance of risk behaviors involves survey questionnaires to obtain self-report data from population sub-samples. Questions might be raised about the authenticity of students' self-reports, especially about behaviors which may be illegal or viewed as social deviant. However, cross-validational research has shown that when self-report methods are used effectively with assurances of anonymity, the data obtained generally meets adequate standards of reliability and validity. In addition, this method is the only practical one: direct observation of the behaviors of interest is not feasible, and these behaviors do not often result in official and/or accessible records that could be called up for review.

The questionnaire that we used to assess risk behaviors among international high school students is called the **Youth Risk Behavior Survey (YRBS)**. This questionnaire was developed by a number of agencies in the U.S., under the direction of the Center for Disease Control (CDC)(see Kolbe, 1990).

In 1988, the CDC established a Division of Adolescent and School Health (DASH). This Division was mandated to serve four functions, providing the impetus for development of the questionnaire that we have used for our research.

(1) To identify the most significant health risks among adolescents;

(2) To monitor the incidence and prevalence of those risks;

(3) To implement and sustain broad national programs to prevent those risks; and

(4) To evaluate periodically and improve the impact of risk prevention programs.

Following up on the first function, a review was conducted by DASH of the leading causes of death among youth aged one to 24 years old in the U.S. (CDC, 1989). This review traced nearly 70% of all death among youth aged one to 24 yrs. to only four causes.

(1) **Motor vehicle crashes cause 33%** of deaths in this age group.

(2) **Other unintentional injuries cause 15%** of all deaths in this age group.

(3) **Homicides cause 10%** of all deaths in this age group.

(4) **Suicides cause 10%** of all deaths in this age group.

Substance abuse (defined for the present purposes to include alcohol and illegal psychoactive drugs) is associated with much mortality and morbidity from these four causes (Jessor & Jessor, 1978; Perrine, Peck & Fell, 1988). Substance abuse is also associated with many other social problems that are not reflected in health statistics.

In terms of **sexual conduct**, teenagers in the U.S. suffer significant health and social problems from over one million unintended pregnancies occuring among teenagers annually. Also, approximately 2.5 million teenagers in the U.S. suffer from one or more of 50 different **venereal diseases** annually.

One in five cases of AIDS that is diagnosed in the U.S. occurs among young adults aged 20-29 years. Given the average 10 year incubation period between HIV infection and AIDS diagnosis, we can deduce that a significant proportion of young adults diagnosed with AIDS are infected as teenagers. In 1987, HIV infection was the ninth leading cause of death among 15-24 year olds (Kolbe, 1990).

Two conclusions can be drawn from a review of epidemiological findings about youth in the U.S.:

(1) Much of the morbidity and mortality of young people is caused by **a small number of high risk behaviors**, such as drinking and driving, and unprotected sexual intercourse.

(2) Much of the morbidity and mortality of young people is **preventable**.

The **Youth Risk Behavior Survey** consists of 70 closed-ended items. Five items ask for the student's age, gender, grade, ethnicity, and self-perception of academic performance relative to classmates. Sixty-five items measure behaviors that are considered to pose the highest risks to health, based on extensive reviews of research. Six categories of behaviors are assessed:

(1) Drug and alcohol use

(2) Tobacco use (not yet defined as a drug by CDC)

(3) Sexual behaviors, especially unprotected sex and sex with multiple partners

(4) Behaviors that result in unintentional and intentional injuries

(5) Dietary behaviors

(6) Physical activity

The results reported in this presentation focus on selected behaviors within the first four of these categorical areas.

Students were asked to respond to the questionnaire voluntarily and anonymously. They were assured that no one in their school would view the completed questionnaires, thereby allaying any fears that some students might have had about their identity becoming known through an interpretation of the demographic information given, and putting to rest any hope that some students might have had of gaining notoriety for engaging in high risk behaviors.

The provided response choices for each question required that the student provide specific quantitative information about the frequency or amount of the behavior in question. For example, in a typical question about the frequency of alcohol use over the 30 days preceding the survey, the response choices were "0 days, 1 or 2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, all 30 days".

Student Sample.

The present report of selected findings of our investigation is based on analyses of questionnaire responses of 2021 students in grades nine through twelve attending 11 international schools on four continents: Asia, Africa, Europe, and South America. The sample included almost equal numbers of boys (n=1012) and girls (n=1017). They ranged in age from 12 to 18 years, with a median age of 16 years. There were slightly more students sampled from the lower secondary grades (Grade 9 n=536; Grade 10 N=609) than from the upper secondary grades (Grade 11 n=498; Grade 12 n=386).

The ethnic composition of the sample was as follows:

45.7% Caucasian, not Hispanic
34.0% Asian and Pacific Islander
5.3% Hispanic
4.4% Black
1.3% Native American
9.4% Other

Within the sample, 31.4% were American, while 68.6% represented 77 other nationalities. There were nearly equal numbers of White Americans (n=476) and White non-Americans (n=443). The vast majority of Asian students who were sampled were non-Americans (n=636 Asian non-Americans; n=48 Asian Americans).

Results.

Results of this study will be presented discursively. With the exception of selected summary results presented below, written reports of findings are not available at this time.

Factor analyses -- Factor analyses revealed that certain high risk behaviors tend to cluster together. That is, students' reports of frequent engagement in one particular behavior tends to go together with, or predict, high frequency of engagement in another particular behavior. Conversely, low frequency or no engagement in a certain behavior tends to go together with, or predict, low frequency of another certain behavior. Three patterns, or clusters, of high risk behaviors were identified.

Pattern 1

Frequency of cigarette smoking
Frequency of alcohol consumption
Frequency of becoming intoxicated
Frequency of sexual intercourse

Pattern 2

Frequency of cocaine use
Frequency of crack use
Frequency of other illegal, psychoactive drug use

Pattern 3

Frequency of driving while under the influence of alcohol
Frequency of carrying a weapon to school
Frequency of getting into a physical fight at school

Correlational analyses -- Correlational analyses revealed a pattern of highly significant intercorrelations among risk behaviors. Behaviors that were found to have a strong co-occurrence included: younger age of first trying substances, higher frequencies of tobacco, alcohol, and marijuana use, higher frequency of suicidal ideation, larger number of sexual partners over the preceding three months, and lower self-perceived academic standing relative to classmates.

More sophisticated statistical analyses will be conducted subsequently to explore which risk behavior(s) predict most powerfully the extent of involvement in other risk behaviors. Other investigations have shown that younger age of onset of substance abuse is a significant predictor of subsequent substance abuse disorders and other health problems. In our study, analyses comparing ethnic groups revealed that White and Hispanic students tended to report earlier "age of onset" of substance use, including alcohol, tobacco, and marijuana, and earlier age of sexual intercourse, compared to Asian students and those of other ethnicities.

In our study, a pattern of highly significant associations was found between episodic heavy drinking (i.e, having at least 5 drinks over the course of a few hours on more than one occasion during the preceding 30 days) and nearly all other high risk behaviors. That is, students who reported episodic heavy drinking also reported engaging in high levels of the other risk behaviors assessed in the survey.

Implications for educators.

Overall, the findings of this study show similar patterns of substance abuse and sexual conduct among Americans attending international schools as have been reported for American youth in the U.S. Like students in the U.S., international school students in general report higher frequency and amounts of alcohol consumption compared to use of other substances. They show relatively low use of illicit psychoactive drugs such as cocaine, crack, hallucinogenic drugs, and I.V. use of drugs. In a review of studies, Newcomb and Bentler (1989) present evidence showing a decline in illicit drug use among adolescents in the U.S. over the 1980's. Although about one third of adolescents have tried at least one illicit psychoactive drug, most drug use involved licit drugs (Newcomb et al., 1989). Adolescent tobacco use has also declined significantly (U.S. Bureau of the Census, 1989).

Fewer gender differences were found among American students at international schools than among non-American students. For example, in the present study, American girls and boys reported similar frequencies of alcohol use, although boys reported greater quantities of alcohol use and more episodes of heavy drinking. In research conducted in the U.S., the percentage of boys and girls reporting having used alcohol is nearly equal (roughly 89% among boys and 87% among girls).

Among non-American students, particularly Asian students, very significant gender differences were found across nearly all dimensions assessed, with boys reporting much higher levels of risk behaviors than girls. Non-American students also tended to report later ages for first engaging in various risk behaviors. With the exception of the regularity and quantity of tobacco use, non-American boys and girls reported lower levels of the risk behaviors in which they did engage (e.g., less alcohol consumed, fewer heavy drinking episodes,

fewer sexual partners, etc.). Findings of ethnic differences in our study suggest that schools could effectively target intervention and prevention efforts at those populations within the school where risk behaviors are found to be most prevalent.

Significant differences were found across schools with respect to the prevalence of some risk behaviors, especially alcohol and drug use. This variability underscores the importance of conducting a needs assessment, or epidemiological survey, within individual schools, in order to ascertain priority risk behaviors in a particular school context.

Significant reduction of the prevalence of health risk behaviors among youth requires coordinated efforts of educators, health workers, families, legislators, law-enforcement officials, media, and community agencies. Primary and secondary schools should use quality school health education programs that provide students with information about the effects of abused substances, the risks associated with unprotected sexual intercourse, and other risk behaviors, and teach skills for avoiding their use. School policies and programmes that advocate substance-free campuses can reinforce health education programs. These might include alcohol and drug screening programs, referral to drug treatment and self-help groups, and soliciting involvement of students in creating a school ethos characterized by choice about lifestyle decisions.

After decades of research on the etiology and maintenance of various risk behaviors, there is overwhelming evidence that the normative expectations and behaviors of the peer group have the most influence on the extent to which a teenager engages in risk behaviors. Therefore, involvement of students in planning, delivering, supporting, and evaluating prevention programs would seem to be imperative. The more that students can be encouraged to articulate and identify with the goals of prevention efforts, to take an active role in developing and delivering prevention strategies, and to have a vested interest in the outcomes of prevention programs, the more likely that positive peer pressures will be brought to bear on changing the behavior and/or the peer social status of students with high levels of risk behaviors.

Research shows that young adults may be less likely to develop serious alcohol and other substance abuse problems if the age when they first use substances is delayed beyond adolescence (e.g., Robins & Przybeck, 1985). Parents serve as role models for young peoples' behaviors with regard to the use and abuse of substance. Many parents may be unaware of the powerful effect of their own behaviors (and not of their expressed attitudes or values) on their children's use of substances. Also, many parents may be unaware or misinformed of the potential long-term consequences of being permissive regarding their youngsters' consumption of alcohol, even in small quantities (e.g., "just one drink" or "only at family celebrations"). Schools and community agencies may be able to make a contribution towards prevention by providing factual information to parents about the risks involved in early exposure to alcohol through seemingly innocuous family practices, as well as their own modelling of alcohol consumption.

Perhaps the most striking findings of our study are those showing the strong predictive significance of episodic heavy drinking. Correlational and factor analyses showed clearly that when teenagers report that they engage in periodic bouts of heavy drinking (e.g., binges once every weekend), they are also much more likely to engage in virtually every other risk behavior associated with adolescent mortality and morbidity (e.g., drinking while under the influence of alcohol, carrying a weapon to school, engaging in physical fights, using illicit drugs, etc.). These students also tend to have low academic self-concepts and to consider suicide more frequently, including reports of higher than average levels of suicidal acts.

These results point to the need for schools to establish and vigorously follow procedures aimed at early identification of students who routinely consume substantial quantities of alcohol. Outreach to these students, along with preventive interventions, can help a school to engender and support a "critical mass" of students in the peer culture of a school in which low frequency risk behaviors are modeled and reinforced.

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