



# Adolescent Health Risk Behaviors in Jeju, South Korea

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## = Abstract =

**Background:** Adolescent risk behaviors are of concern because they are dangerous in themselves and have negative influences on adult health. **Objectives:** This study explored six health risk behaviors of a sample representing the adolescent population in Jeju. **Methods:** Frequency and percentage of risk behaviors were calculated. Additionally, the chi-square test was used to explore whether differences in experimentation with risk behaviors exist relative to gender and schooling levels. **Results:** There were six major findings in this study: (a) a lower rate of lifetime and current cigarette use among female students compared to male students, (b) a substantial portion of heavy drinkers, (c) a higher rate of lifetime drug use among female students than among male students, (d) a higher prevalence of suicide ideation among female students than among male students, (e) substantial percentages of students who did not usually wear seatbelts, motorcycle helmets, or bicycle helmets, and (f) a substantial portion of students who were not involved in vigorous physical activities. **Conclusions:** Since a substantial portion of adolescents have been involved with diverse risk behaviors, it is urgent to implement effective intervention strategies to reduce the rates of these behaviors.

Key words : Adolescents; Health risk behaviors; South Korea

## INTRODUCTION

During adolescence, individuals experience rapid physical and mental growth and are preparing for adulthood (Dusek, 1996). Most adolescents are physically healthy, and thus it is easy for health professionals to give adolescent health a lower priority. Of the top five causes of death among South Korean adolescents (aged 10-19 years), car accidents rank first, followed by cancer, suicide, drowning, and falls (Korean

Institute for Health and Social Affairs, 2001). With the exception of cancer, the major causes of death in adolescence are not linked with diseases, but rather with risk behaviors. Despite potentially tragic consequences, many adolescents experiment with diverse risk behaviors (Grunbaum et al., 2004). Additionally, risk behaviors formed during this period often last throughout life, with negative effects on health in adulthood (Lee, Tsang, Lee, & To, 2001). Considering these facts, adolescent risk behaviors merit special attention.

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The Centers for Disease Control and Prevention (CDC) in the USA developed the Youth Risk Behavior Surveillance System (Kolbe, Kann, & Collins, 1993), and have collected information on young people's risk behaviors (e.g., smoking, drinking, drug use, suicide behavior, seatbelt/helmet use, sexual behavior, and physical activity) biannually since 1991 (Grunbaum et al., 2004). This surveillance system has been pivotal to a deeper understanding of American adolescent risk behaviors. The South Korean government recognizes the necessity for a similar surveillance system; however, the system is still being developed, and results representative of the South Korean adolescent population are not currently available (Park & Hyun, 2005). The Korea National Health and Nutrition Examination Survey has collected information on adolescent risk behaviors with a relatively large sample on a regular basis. However, because interviewers have collected information in person, there is a possibility that the respondents might not have reported their behavior frankly. Thus, it is essential to understand adolescent risk behaviors accurately. This understanding will be used as a basic foundation to develop and implement effective approaches with which to assist adolescents in forming a healthy lifestyle and prevent unnecessary negative health outcomes (Kann, Brener, Warren, Collins, & Giovino, 2002).

The aim of this study was to investigate the prevalence of adolescent risk behaviors in a relatively large sample of adolescents in Jeju province, South Korea. This study selected subjects residing in Jeju city because there was no information on health risk behaviors among adolescents in this city. For this study, six risk-related behaviors were selected based on the YRBSS and examined: smoking, drinking, drug use, suicide behavior, seatbelt/helmet use, and physical activity. Gender and schooling-level (i.e., middle vs. high schools) differences in risk behaviors were explored. One thing to note is that this study included suicide behavior, which is not included in the YRBSS, since this behavior has been an issue among South Korean adolescents.

## METHOD

### Subjects

The sample was chosen in Jeju province. Jeju, which is located in the southern part of South Korea, is one of the 16

local governments, and consists of four regions (two cities and two counties). In this province, there are approximately 41,000 secondary school students, and 72 secondary schools. This study used cluster sampling for sample selection. First, Jeju was divided into eight strata formed by cross-classifying two levels of school (i.e., middle and high schools) and four regions. In each stratum, schools (clusters) were chosen at random. The number of schools selected for the study was in proportion to the total number of schools in each stratum. In the chosen schools, one class per grade was selected at random, and all of the students in the selected classes were encouraged to participate in the survey. The total number of participants was 2,998 from 89 classes at 29 middle/high schools. Approximately 96% of the subjects filled out questionnaires. These subjects accounted for approximately 2.4% of the population of middle and high schoolers in Jeju.

### Instrument

The Korea Centers for Disease Control (KCDC) developed the Korean Youth Risk Behavior Survey Questionnaire (KYRBSQ) based on the Youth Risk Behavior Survey Questionnaire (YRBSQ) in America. 95 self-report items related to 11 health risk behaviors were used for the KYRBSQ. These items' reliabilities were satisfactory in a pilot study (Korea Centers for Disease Prevention and Control, 2005). Among the 95 items, those linked with smoking, drinking, drug use, suicide behavior, seatbelt/helmet use, and physical activity were used for this study. More specifically, the following was examined: (a) current and lifetime experiences of smoking, drinking and drug use; (b) suicide-related ideation, plans, attempts, and medical treatment; (c) frequencies of seatbelt, motorcycle, and bicycle helmet use; and (d) levels of physical activities.

### Data Collection and Analyses

The survey was conducted in June 2005 with the support of the Office of Education in Jeju. School nurses and classroom teachers provided assistance in conducting the survey, and guidelines for data collection were distributed to them in order to collect accurate data. It took about 50 minutes for students to complete the questionnaire. Before data collection, school nurses or classroom teachers explained to the students their right to decline to participate in the study, and obtained informed consent from those who agreed to become respondents.

Confidentiality on the respondents' private information was assured to encourage accurate responding. For data analysis, descriptive statistics (frequencies and percentages) were calculated. In addition, the chi-square test was used to explore differences in experimentation with risk behaviors relative to gender and schooling levels.

## RESULTS

### Demographic Characteristics

The number of subjects was 1,452 (50.47%) for males and 1,468 (50.8%) for females. The percentage of subjects in each grade ranged from 16.06 to 17.61%. Most of the subjects resided in urban areas (62.27%). Regarding academic performance, most subjects (55.92%) identified their performance level as belonging to the middle of three categories (i.e., top, average, and bottom). At the time of the survey, most subjects lived with their family (94.74%), and the majority reported that their socioeconomic status was middle class (75.62%) (Table was not shown).

### Cigarette Use

A gender difference in cigarette use emerged: among both lifetime (i.e., those who have tried cigarettes, at least a few puffs during their lifetime) and current (i.e., those who have

smoked on at least 1 day during the past 30 days) cigarette users, the percentage of males was significantly higher than that of females. Of the male subjects, 38.80% and 10.83% were lifetime and current cigarette users, respectively. However, there was no significant gender difference regarding the number of days of smoking during the past month: for both males and females, more than 40% of the current cigarette users smoked for 20 days or more per month.

The proportion of both lifetime and current cigarette users was significantly larger among high school students than among middle school students. Approximately 40% of high school students were lifetime cigarette users. Approximately 15% of high school students were current cigarette users, which is about five times that of middle school students. In addition, current cigarette users at high schools smoked cigarettes more frequently than those attending middle schools. Among current cigarette users, more than half of middle school students (62.50%) smoked for one or two days per month; more than half of high school students (54.46%) smoked for 20 days or more per month <Table 1>.

### Alcohol Use

There was no statistically significant gender difference for either lifetime (those who have ever tried alcohol, even one or two sips during their lifetime) or current (those who drank alcohol on at least 1 day during the past 30 days) alcohol use.

<Table 1> Cigarette use

Category	Frequency (%)				Total <sup>§</sup>
	Gender		Schooling level		
	Male	Female	Middle school	High school	
Lifetime cigarette use <sup>†</sup>					
Yes	558 (38.80)	364 (25.87)	346 (24.45)	590 (40.27)	922 (34.41)
No	880 (61.20)	1,043 (74.13)	1,069 (75.55)	875 (59.73)	1,923 (67.59)
Chi-square (p-value)	54.31 (<.0001)		84.55 (<.0001)		-
Current cigarette use <sup>‡</sup>					
Yes	152 (10.83)	101 (7.44)	46 (3.35)	210 (14.76)	253 (9.16)
No	1,251 (89.17)	1,257 (92.56)	1,327 (96.65)	1,213 (85.24)	2,508 (90.84)
Chi-square (p-value)	9.56 (.0020)		109.32 (<.0001)		-
Days of smoking					
1 - 2 days/month	41 (28.08)	30 (31.58)	25 (62.50)	47 (23.27)	71 (29.46)
3 - 19 days/month	27 (18.49)	27 (28.42)	10 (25.00)	45 (22.28)	54 (22.41)
≥20 days/month	78 (53.42)	38 (40.00)	5 (12.50)	110 (54.46)	116 (48.13)
Chi-square (p-value)	4.93 (.0852)		29.75 (<.0001)		-

<sup>†</sup> Those who have tried cigarettes (even one or two puffs) at some time during their lifetime

<sup>‡</sup> Smoking on at least 1 day during the past 30 days

<sup>§</sup> Total frequency (%) based on that of females and males

Approximately 56% of males and 54% of females were lifetime drinkers, and approximately 21% of males and 20% of females were current drinkers. In addition, 57% of males and 60% of females reported that they drank alcohol one or two days per month.

The proportion of lifetime alcohol users was significantly larger among high school students (69.76%) than among middle school students (39.65%). The proportion of current alcohol users was also higher among high school students (31.23%) as compared to middle school students (8.95%). Among current drinkers, high school students drank alcohol more frequently than did middle school students. Approximately one-fifth of current high school alcohol users drank on 20 days or more per month, which is almost twice the proportion of

middle-school alcohol users <Table 2>.

### Drug Use

In this study, drugs refer to pain killers, drugs inducing weight loss, sleeping pills, and stimulants as well as narcotics. The proportion of lifetime drug users (those who had tried drugs at some time during their lifetime) was significantly greater among female adolescents (7.12%) than male adolescents (4.44%). However, the proportion of current drug users (those who used drugs on at least 1 day during the past 30 days) between males and females was almost the same (2%). Although the proportion of both lifetime and current drug users was greater among high school students than among

<Table 2> Alcohol use

Category	Gender		Schooling level		Total <sup>§</sup>
	Male	Female	Middle school	High school	
Lifetime alcohol use <sup>†</sup>					
Yes	801 (55.70)	772 (54.29)	565 (39.65)	1,029 (69.76)	1,582 (55.14)
No	637 (44.30)	650 (45.71)	860 (60.35)	446 (30.24)	1,287 (44.86)
Chi-square (p-value)	0.58 (.4477)		268.04 (<.0001)		-
Current alcohol use <sup>‡</sup>					
Yes	296 (21.10)	270 (19.61)	123 ( 8.95)	451 (31.23)	566 (20.35)
No	1,107 (78.90)	1,107 (80.39)	1,251 (91.05)	993 (68.77)	2,214 (79.64)
Chi-square (p-value)	0.95 (.3294)		218.83 (<.0001)		-
Days of alcohol use					
1 - 2 days/month	157 (56.88)	153 (59.53)	82 (74.55)	229 (54.01)	310 (58.16)
3 - 9 days/month	79 (28.62)	57 (22.18)	18 (16.36)	118 (27.83)	136 (25.52)
≥10 days/month	40 (14.49)	47 (18.29)	10 ( 9.09)	77 (18.16)	87 (16.32)
Chi-square (p-value)	3.50 (.1737)		15.24 (.0005)		-

† Those who have tried alcohol (even one or two sips) at some time during their lifetime

‡ Drinking alcohol on at least 1 day during the past 30 days

§ Total frequency (%) based on that of females and males

<Table 3> Drug use

Category	Gender		Schooling level		Total <sup>§</sup>
	Male	Female	Middle school	High school	
Lifetime drug use <sup>†</sup>					
Yes	60 ( 4.44)	95 ( 7.12)	65 ( 4.83)	90 ( 6.56)	155 ( 5.77)
No	1,292 (95.56)	1,239 (92.88)	1,280 (95.17)	1,281 (93.44)	2,531 (94.23)
Chi-square (p-value)	8.89 (.0029)		3.78 (<.0517)		-
Current drug use <sup>‡</sup>					
Yes	32 ( 2.38)	31 ( 2.36)	24 ( 1.81)	39 ( 2.87)	63 ( 2.37)
No	1,313 (97.62)	1,281 (97.64)	1,304 (98.19)	1,318 (97.13)	2,594 (97.63)
Chi-square (p-value)	0.0008 (.9779)		3.33 (.0679)		-

† Those who have tried drugs at some point in their lifetime

‡ Used drugs on at least 1 day during the past 30 days

§ Total frequency (%) based on that of females and males

middle school students, the difference in drug use between the two groups was not statistically significant. Of high school students, about 7% had used drugs at least once in their lifetime and about 3% had used drugs during the 30 days prior to the survey <Table 3>.

### Suicide Behavior

There were significant gender differences in suicide ideation, plans, and attempts. As compared to males, females had a significantly greater tendency to experience suicide ideation (23.34%), plans (10.99%), and attempts (6.42%). Of the participants in this study, 16 males and 19 females had obtained medical treatment due to suicide attempts; this difference is not statistically significant. The proportion of youth who had suicide ideation was about the same between middle school students (17.28%) and high school students (19.67%). The proportion of those who had suicide plans and attempts was greater among high school students than among middle school students, but this trend did not reach statistical significance. Nine middle school students and 26 high school students had obtained medical treatment as a result of a suicide attempt <Table 4>.

### Seatbelt/Helmet Use

With respect to seatbelt/helmet use, females were not significantly different from males. A noteworthy finding was that approximately half of the subjects did not usually wear seatbelts (51.63% of males and 48.95% of females). Furthermore, compared to seatbelt use, both males and females were even less likely to wear either motorcycle or bicycle helmets: more than 70% of the entire subjects did not usually wear either one.

Regarding seatbelt and bicycle helmet use, there was no significant difference between middle and high school students. Approximately half of middle and high school students did not usually wear seatbelts and about 99% did not usually wear bicycle helmets. However, motorcycle helmet use significantly differed between the two groups: middle school students wore motorcycle helmets more frequently than high school students. Despite this fact, it should be noted that a substantial percentage of middle school students (66.53%) did not usually use motorcycle helmets <Table 5>.

### Physical Activity

The study showed that males were more frequently involved in physical activities. The proportion of those who were involved in moderate physical activities for 3 days or more per week was greater among males (38.67%) than among females (30.37%). Regarding vigorous physical activity, the proportion

<Table 4> Suicide behavior

Category	Gender		Frequency (%)		Total <sup>§</sup>
	Male	Female	Middle school	High school	
Suicide ideation					
Yes	197 (13.61)	331 (23.34)	247 (17.28)	283 (19.67)	528 (18.43)
No	1,250 (86.39)	1,087 (76.66)	1,182 (82.72)	1,156 (80.33)	2,337 (81.57)
Chi-square (p-value)	45.09 (<.0001)		2.70 (<.1004)		-
Suicide plans					
Yes	101 ( 6.98)	156 (10.99)	120 ( 8.40)	137 ( 9.52)	257 ( 8.97)
No	1,345 (93.02)	1,263 (89.01)	1,309 (91.60)	1,302 (90.48)	2,608 (91.03)
Chi-square (p-value)	14.10 (.0002)		1.11 (.2924)		-
Suicide attempts					
Yes	47 ( 3.25)	91 ( 6.42)	62 ( 4.34)	78 ( 5.42)	138 ( 4.82)
No	1,400 (96.75)	1,327 (93.58)	1,368 (95.66)	1,360 (94.58)	2,727 (95.18)
Chi-square (p-value)	15.69 (<.0001)		1.83 (.1762)		-
Medical treatment due to SA <sup>†</sup>					
Yes	16 ( 1.31)	19 ( 1.60)	9 ( 0.74)	26 ( 2.16)	35 ( 1.45)
No	1,209 (98.69)	1,168 (98.40)	1,200 (99.26)	1,179 (97.84)	2,377 (98.55)
Chi-square (p-value)	0.37 (.5453)		8.44 (<.0037)		-

<sup>†</sup> Suicide attempts

<sup>§</sup> Total frequency (%) based on that of females and males

<Table 5> Seatbelt/helmet use

Category	Frequency (%)				Total <sup>§</sup>
	Gender		Schooling level		
	Male	Female	Middle school	High school	
Frequency of seatbelt use					
Usually not	729 (51.63)	678 (48.95)	679 (48.57)	742 (51.64)	1,407 (50.30)
Usually	344 (24.36)	377 (27.22)	371 (26.54)	360 (25.05)	721 (25.78)
Always	339 (24.01)	330 (23.83)	348 (24.89)	335 (23.31)	669 (23.92)
Chi-square (p-value)	3.22 (.1999)		2.67 (.2631)		-
Frequency of motorcycle helmet use					
Usually not	427 (73.88)	343 (73.92)	328 (66.53)	451 (80.25)	770 (73.90)
Usually	70 (12.11)	57 (12.28)	71 (14.40)	58 (10.32)	127 (12.19)
Always	81 (14.01)	64 (13.79)	94 (19.07)	53 (9.43)	145 (13.92)
Chi-square (p-value)	0.02 (.9923)		27.78 (<.0001)		-
Frequency of bicycle helmet use					
Usually not	1,201 (98.93)	1,000 (98.62)	1,143 (98.79)	1,085 (98.73)	2,201 (98.79)
Usually	4 (0.33)	7 (0.69)	8 (0.69)	3 (0.27)	11 (0.49)
Always	9 (0.74)	7 (0.69)	6 (0.52)	11 (1.00)	16 (0.72)
Chi-square (p-value)	1.49 (.4765)		3.79 (.1503)		-

§ Total frequency (%) based on that of females and males

<Table 6> Physical activity

Category	Frequency (%)				Total <sup>§</sup>
	Gender		Schooling level		
	Male	Female	Middle school	High school	
Moderate physical activity <sup>†</sup>					
Never	322 (22.31)	365 (25.72)	286 (20.04)	415 (28.12)	687 (23.96)
1 - 2 days/week	563 (39.02)	623 (43.90)	549 (38.47)	653 (44.24)	1,191 (41.54)
≥3 days/week	558 (38.67)	431 (30.37)	592 (41.49)	408 (27.64)	989 (34.50)
Chi-square (p-value)	21.84 (<.0001)		65.78 (<.0001)		
Vigorous physical activity <sup>‡</sup>					
Never	318 (22.02)	677 (47.68)	434 (30.35)	579 (39.28)	995 (34.74)
1 - 2 days/week	611 (42.31)	532 (37.46)	543 (37.97)	616 (41.79)	1,143 (39.91)
≥3 days/week	515 (35.66)	211 (14.86)	453 (31.68)	279 (18.93)	726 (25.35)
Chi-square (p-value)	262.10 (<.0001)		66.06 (<.0001)		
Muscle building activity					
Never	560 (38.75)	910 (64.08)	644 (45.03)	843 (57.11)	1,470 (51.31)
1 - 2 days/week	455 (31.49)	337 (23.73)	454 (31.75)	354 (23.98)	792 (27.64)
≥3 days/week	430 (29.76)	173 (12.18)	332 (23.22)	279 (18.90)	603 (21.05)
Chi-square (p-value)	210.25 (<.0001)		42.89 (<.0001)		

† Exercise that does not result in labored breathing

‡ Exercise that results in sweating

§ Total frequency (%) based on that of females and males

of males who exercised for 3 days or more per week was approximately twice that of females. About 61% of males and 36% of females were involved in muscle-building activities. A comparison of middle and high school students revealed that middle school students were more frequently involved in various physical activities. The proportion of middle school students who participated in moderate physical activities, vigorous physical activities, and muscle-building activities for at least 3 days per week was 41.49%, 31.68%, and 23.22%,

respectively. These figures are significantly higher than those for high school students. In this finding, there are two issues of note. One is that a substantial portion of middle and high school students (more than one-quarter of the sample) did not work out at all, and the other is that high school students were significantly less involved in physical activities than middle school students <Table 6>.

## DISCUSSION

The results of this study are consistent with findings of Kang (2000), in which estimated lifetime prevalences of cigarette use, alcohol use, suicide ideation, and drug use were about 34%, 65%, 12%, and 4%, respectively. In addition, our results are in line with Kang's findings that the majority of adolescents did not wear seat belts (70%), bicycle helmets (98.4%), or motorcycle helmets (69%). Other than Kang's study, the KNHANES III in 2005 provides noteworthy information on adolescent risk behaviors. Regarding cigarette use, ages of smoking onset has been younger: the mean age of smoking initiation was 13.5 years in 1998 and 11.9 years in 2005. Regarding drinking, 61.6% of male adolescents and 62.7% of female adolescents were heavy drinkers. In the current study, the percentages of subjects who drank more than 20 days per month were 15% of male drinkers and 18% of female drinkers. Regarding suicide ideation in the KNHANES III in 2005, the proportion of those who had this idea was 9.8% of males and 20.8% of females. The finding showing that females are at greater risk for suicide ideation than males is consistent with the current finding. Regarding helmet use, the percentages of those who wore bicycle helmets all the time were 0.3% for the subjects aged 12-14 years, and zero percent for the subjects aged 15-18 years. Regarding seatbelt use, the percentage of those who wore seatbelts all the time was 51.1% of the total sample. In a comparison of findings between the KNHANES III and the current study, the percentage of those using seatbelts always in the KNHANES III was twice that in this study, while the percentage of those using helmets was more than twice that in the KNHANES III. Considering the fact that more than 90% of adolescents did not wear bicycle helmets, there are safety concerns (Ministry of Health and Welfare & Korea Institute for Health and Social Affairs, 2006) in South Korea.

Compared to U.S. adolescents' risk behaviors from the U.S. 2005 Youth Risk Behavior Surveillance System report (Center for Disease Control and Prevention [CDC], 2006), adolescents in Jeju were less likely to report lifetime cigarette use (34.4% vs. 54.3%), current cigarette use (9.2% vs. 23.0%), lifetime alcohol use (55% vs. 74.3%), and current alcohol use (20.4% vs. 43.3%), to make suicide plans (9.0% vs. 13.0%), to attempt suicide (4.8% vs. 8.4%), or to receive medical treatments due to suicide attempts (1.5% vs. 2.3%). In addition, drug use was less problematic in South Korea (approximately 4% of males and 7% of females) than in the

U.S. (e.g., 2.4% for heroin use and 38.4% for marijuana use). There was one noteworthy difference between the USA and South Korean cohorts with respect to drug use: in the USA, males were more likely to use drugs in their lifetime, whereas in South Korea, the females were more likely to be drug users. However, lack of seatbelt/helmet use was more problematic in South Korea. The percentages of not using seatbelts, motorcycle helmets, and bicycle helmets among adolescents in Jeju were 50.3% (vs. 10.2% in the U.S.), 73.9% (vs. 36.5% in the U.S.), and 98.8%, (vs. 3.4% in the U.S.), respectively.

In another comparison of the findings of risk behaviors among high school students between South Korea and Japan, the subjects in Jeju less reported being current cigarette users (14.76% vs. 17.4%) or current alcohol users (31.23% vs. 38.4%). However, high school students in Jeju were more likely to have suicidal ideation (19.67% vs. 10.1%), not to use seatbelts (51.64% vs. 29.8%), and not to be involved in vigorous physical activities (81.07% vs. 41.4%) (Takakura, Nagayama, Sakihara, & Willcox, 2001). Although the results of this study are not directly comparable to those obtained in America and Japan, there appear to be distinctive trends regarding levels of involvement in risk behaviors in the three countries. In particular, adolescents in Jeju seem to be at greater risk of injuries due to lack of use of seatbelts or helmets and at greater risk of health problems due to lack of exercise, as compared to the other two countries.

In this study, there are six issues to consider. The first issue is that the smoking rate was lower among females than among males in South Korea. This lower rate of cigarette use among females is also found among South Korean adults. According to a national survey in South Korea, 62.3% of male adults and 6.8% of female adults are smokers (Ministry of Health and Welfare & Korea Institute for Health and Social Affairs, 2006). A possible reason for this marked difference in cigarette use between the genders may be explained by Korean culture. Korean society has been rooted in Confucianism, which stresses the importance of males. This perspective has become weaker in recent times, and females have become freer from the social constraints that it imposed. However, it remains difficult for females to achieve their goals in South Korea (Kim, 2005). Another feasible explanation may lie in parental influences. It is well known that parental smoking is strongly associated with adolescent smoking (Barman, Pulkkinen,

Kaprio, & Rose, 2004; Fagan & Najman, 2005). Since smoking among male adults is more prevalent in South Korea, adolescents are likely to have a father who smokes as role model, and may therefore take male smoking for granted. As a result, South Korean adolescents may form more favorable and acceptable attitudes toward male smoking (Kim, 1999). Similarly, female adolescents may recognize these less favorable attitudes toward smoking for women, and these attitudes may affect their decision to commence smoking.

The second issue is the higher level of involvement in drug use among females than males in South Korea compared to the USA, where more men are involved than women. Different types of drugs and different definitions of drug use in the two countries may account for inconsistent findings between the two countries. The American study focused mainly on illicit drugs such as marijuana, cocaine, and LSD; however, the present study included use of nonprescribed drugs (e.g., pain killers, drugs inducing weight loss, and stimulants) as well as illicit drugs. If the subjects used any of these drugs, they were considered drug users. Most drugs used by the respondents in this study were the nonprescribed drugs rather than illicit ones. Empirical evidence has illustrated that females tend to use these nonprescribed drugs more frequently than males. For instance, South Korean female adolescents have a greater tendency to use drugs to lose weight because of distorted body image (Park, 2001a): female adolescents often use harmful drugs for the purpose of weight loss when their weights are within the normal range (Park, 2001b). Another study of South Korean adolescents also supports this assertion, demonstrating that females use pain killers, sleeping pills, and tranquilizers more frequently than males (Lee, 2002). Therefore, the lack of differentiation between drug types in these two studies may in part explain the higher lifetime prevalence of drug use among South Korean females. In addition, a lower rate of illegal marijuana and cocaine use among South Korean adolescents should be noted. Compared to the USA, illicit drug use is not a problem in South Korea, even among the adult population. This is because these drugs are not easily accessible due to the South Korean government's active attempts to curb their availability (Korean Association Against Drug Abuse [KAADA], 2002).

The next issue is the higher likelihood of injury due to lack of seatbelt/helmet use in South Korea than in the U.S. and Japan. Lack of seatbelt and helmet use in South Korea can be

attributable to lack of safety education. In South Korea, school nurses play a major role in teaching health education. The school nurses have focused mainly on the prevention of cigarette, alcohol, and sexual behaviors rather than on safety issues (Park, Yoo, Cho, Lee, & June, 2005). Therefore, South Korean adolescents may not have enough opportunities to learn the significance of safety, and may not realize the importance of seatbelt and helmet use (Park, 2003).

The fourth issue is the lower involvement in physical activities among South Korean adolescents. This trend may be associated with the relatively high academic study load of South Korean adolescents. The present study showed that this trend becomes more pronounced when South Korean adolescents attend high school. This may be because high school students spend a significant amount of time preparing for the national college entrance examination (Korea Institute for Special Education, n.d.), and thus their study load may prevent physical activity at this time.

Other than the above four risk behaviors, drinking and suicide behavior must be considered as well. These two behaviors in South Korea are not as serious as those in America. However, considering the fact that a substantial portion of adolescents were heavy drinkers and had suicide ideation, health professionals must provide guidance for young people not to experience these negative health behaviors. However, little is known about causes triggering these behaviors among adolescents, and thus it is urgent to make an attempt to understand them through research (Ministry of Health and Welfare & Korea Institute for Health and Social Affairs, 2006).

Although this study provides valuable knowledge about the prevalence of South Korean adolescent risk behaviors, it is subject to three limitations. First, the findings are based on self-reported information. In order to obtain valid information, confidentiality was stressed to the participants. Nonetheless, it was possible that reported information might not be accurate because of recall or social desirability bias. Second, the study collected data from students who attended middle/high schools in the Jeju province exclusively, and hence it was not possible to explore risk behaviors among school dropouts. It is known that school dropouts are more likely to engage in a variety of health-risk behaviors (Brener & Collins, 1998; Lowry, Kann, Collins, & Kolbe, 1996). Therefore, the findings from this study must be interpreted with caution. Third, reliabilities of



questions used in this study were not tested. However, the KYRBSQ, which used the same questions, had showed satisfactory reliabilities.

## CONCLUSIONS

The findings of this study showed (a) a higher prevalence of cigarette use among male adolescents, (b) a substantial portion of heavy drinkers, (c) a higher prevalence of drug use among female adolescents, (d) a higher prevalence of suicide ideation among females, (e) a tendency among both male and female adolescents not to use seatbelts or helmets, and (f) a lack of physical activity among both male and female adolescents. To help these adolescents form healthy habits, approaches at two levels are necessary. One is the school level and the other is the government level.

At the school level, to resolve issues related to cigarette, alcohol, and drug use, and suicide ideation, school nurses must systematically provide health education to students. In order to obtain satisfactory outcomes through education, it is necessary to utilize qualified content and effective teaching methods first. The following messages must be delivered effectively to students: (a) the harmful consequences of cigarette, alcohol, and drug use; (b) methods to release stress to prevent depression and suicide ideation; and (c) the correction of distorted body image so as to reduce strong desires for becoming abnormally thin. Also, to resolve issues related to lack of seatbelt and helmet use and insufficient physical exercise, it is recommended that: (a) effective educational programs regarding the importance of using helmets and seat belts be implemented, and (b) programs that help adolescents engage in diverse physical activities be provided.

Since adolescents spend most of their time at school, providing health education and conducting programs at school will be effective for sound adolescent health. However, to obtain better outcomes, support at the governmental level is essential. Especially, at this level, the following strategies are urgently needed: (a) examination of the prevalence of youth risk behaviors in order to understanding these behaviors, (b) development of education programs or intervention strategies, (c) research on the effectiveness of the developed programs, and (d) guidance about how to approach problems at the school level (e.g., disseminating developed programs).

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