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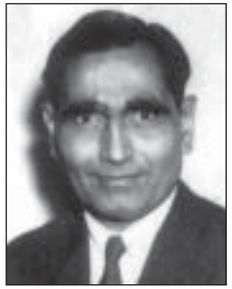

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HEALTH-RISK BEHAVIORS RELATED TO ROAD SAFETY AMONG ADOLESCENT STUDENTS

RAHUL SHARMA, VIJAY L. GROVER*, S. CHATURVEDI**

ABSTRACT

BACKGROUND: Injuries are now a major cause of death and disability among the adolescents in the world. Road accidents are the main cause of death of young men worldwide. OBJECTIVE: To study health-risk behavior related to road safety amongst adolescent students in south Delhi and its epidemiological correlates. STUDY DESIGN: Cross-sectional study. SETTING: Three schools and two colleges in south Delhi. Participants: Five hundred fifty adolescent students aged 14-19 years selected by cluster sampling. STATISTICAL ANALYSIS: Proportions, Chi-square test, multivariate logistic regression. RESULTS: More than half (52.4%) reported 'not always' wearing a seat belt. About 72.1% (300) of two-wheeler riders reported 'not always' and 23.3% (97) reported 'never' wearing a helmet. Nearly 20% (91) students rode with a driver who had alcohol before driving, and 37.3% (185) subjects had driven with a driver not possessing a driving license, in the past 30 days. Such 'road–hazard' behaviors were found to be significantly more in males and in lower-age groups. Logistic regression analysis revealed that the significant correlates of such behaviors were gender of the respondent and living status of the parents. Almost 77.5% (426) of the respondents were 'at risk' as far as behaviors related to safety on roads are concerned. CONCLUSION: The results should evoke earnest responses from the government, policy makers and all personnel concerned with adolescent welfare on how best to reduce the extent of this preventable problem.

Key words: Adolescent, behaviors, road safety, students

INTRODUCTION

Injuries are now a major cause of death and disability among the adolescents in the world. These may include unintentional injuries, such as involvement in road-traffic accidents; injuries resulting from violence towards self, such as suicides; or injuries from interpersonal violence, such as involvement in physical fights.

Road accidents are the main cause of death of young men worldwide. Of the estimated 195,000 adolescents killed each year in traffic accidents, more than 60% are boys.[1] For every young person killed in a traffic accident, another 10 are seriously injured or disabled for life. In a large study regarding adolescent mortality in Israel, death rates were found to be twice

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higher for males. Accidents were the major cause of death (37.7% of total mortality), with the male-female ratio being 3.4:1 among the accident cases.[2]

This study was carried out with the purpose of finding out the prevalence of various health-risk behaviors among the adolescent student population in one region of Delhi. It also sought to study the association, if any, of the health-risk behaviors with various socio-demographic characteristics of the subjects. In this paper, the findings concerning 'road safety'-related behavior among the adolescent students are presented.

MATERIALS AND METHODS

The study was a cross-sectional analysis of the subject population. The units of the study were 14-19 years old adolescents studying in various schools and colleges in south Delhi. The study, being a doctoral thesis research, was reviewed and approved by the institutional ethics committee.

The metropolitan city of Delhi is also the capital of India. It has a population of nearly 13.8 million (as per the 2001 Census of India), in an area of 1,483 square kilometers. From January 1997, the city is divided into nine districts.[3] For the purpose of the present study, two districts of Delhi – south Delhi and southwest Delhi – were together considered as south Delhi region.

All the schools and colleges in south Delhi region were included in the sampling frame. A two-stage cluster-sampling design was used to draw a representative sample of school-going students studying in classes IX, X, XI and XII; and students of first- and second-year classes of graduation in colleges. These classes were chosen as they correspond to the desired age group of 14-19 years old students.

The first stage was random selection of three schools from the list of schools, using a table of random numbers for the purpose. Similarly, two colleges were randomly selected from the list of colleges. The second stage comprised of random sampling of one class each from standards IX, X, XI and XII, in each selected school. In the selected colleges, two classes each were randomly chosen from among the first- and second-year classes of graduation. All students in the selected classes present on the day of the survey were eligible to participate, allowing for anonymous and voluntary participation. At the time of data analysis, the forms of respondents who had stated their age to be either less than 14 years or more than 19 years were excluded from analysis. A written permission and consent from the principals was obtained prior to conducting the study in their school/ college. Written consent was also obtained directly from the subjects who were above the age of majority.

A pre-tested, semi–open-ended and self-administered questionnaire was used in the study. The information thus collected on the tools was converted into a computer-based spreadsheet using Microsoft Excel software. Statistical analysis of the data was done on the SPSS software, using cross-tabulation with the chi-square test. Binary logistic regression was applied to analyze the relationship between risk behavior related to road safety and various independent variables under study.

RESULTS

The mean age of the respondents was 16.5 ± 1.5 years. Overall, among the 550 respondents, there were 67.1% males and 32.9% females. A large majority of the respondents were Hindus (492, or 89.6%). A majority of subjects (343, or 62.4%) reported their place of residence as being a private colony or a separate bungalow. Three-fourths (407) belonged to a nuclear family, and the remaining were part of a joint family.

The students were asked about five behaviors related to personal safety of the individual while on road. While the total number of respondents was 550, the total 'n' varies for each of these five behaviors [Table 1]. The reason for this is that the questions related to seat-belt use, helmet use and obeying traffic rules had the option 'not applicable to me' for the students that may not have travelled in vehicles or on road, while the questions about riding with a driver who had been drinking alcohol or a driver without license had the option 'can't say' for the students that may not have been aware of the drinking or license status of the driver, e.g., of public transport.

Table 1 presents the prevalence of the various risk behaviors concerning traffic-related safety. Of the 424 pupils that had ever taken a ride on the front seat of a four-wheeler, more than half (52.4%) reported 'not always' wearing a seat belt while doing so. About 8.5% (36) never wore a seat belt, while nearly 1 in 10 (42 of 424) reported wearing it only rarely. Among the students that had ever been on a two-wheeler, a large number (300, or 72.1%) reported 'not always' wearing a helmet, including 23.3% who mentioned 'never' wearing a helmet.

A total of 155 subjects (29.8%) reported that they knowingly disobeyed traffic rules. One out of five subjects (91, or 19.9%) had been in a vehicle whose driver had drunk alcohol before driving, within the past 30 days. About 37.3% (185) subjects had knowingly been in a vehicle whose driver did not possess a driving license, one or more times in the past 30 days. All the risk behaviors related to personal safety on roads, with the exception of non-use of helmets, were found to be more in males.

As shown in Table 2, significant correlation was observed between the various risk behaviors concerning traffic-related safety. For example, the students who regularly fastened a seat belt while riding in the front seat of a four-wheeler were less likely to have been with a driver who had alcohol before driving (correlation

Table 1: Behaviors concerned with personal safety on roads

Behavior	*Males*		*Females*		*Total*	
	N (out of Total)	*%*	*N (out of Total)*	*%*	*N (out of Total)*	*%*
Not always wearing a seat-belt	160 (280)	57.1	62 (144)	43.1	226 (424)	52.4
Not always wearing a helmet on a two-wheeler	220 (313)	70.3	80 (103)	77.7	300 (416)	72.1
Knowingly disobeying traffic rules always/most times/sometimes	107 (350)	30.6	48 (170)	28.2	155 (520)	29.8
Riding with a driver who had alcohol before driving, ≥1 time in past 30 days	78 (303)	25.7	13 (155)	8.4	91 (458)	19.9
Riding with a driver without license ≥1 time in past 30 days	135 (285)	47.4	30 (157)	19.1	165 (442)	37.3

Table 2: Correlation between the various behaviors concerned with personal safety on roads

		Wearing seat-belt	*Wearing helmet*	*Knowingly disobeying traffic rules*	*Riding with a driver who had alcohol before driving*	*Riding with a driver not having driving license*
Wearing seat-belt	*P*	1.000	-	-	-	-
	P value	-	-	-	-	-
Wearing helmet	*P*	0.445	1.000	-	-	-
	P value	<0.001	-	-	-	-
Knowingly disobeying traffic rules	*P*	-0.112	-0.074	1.000	-	-
	P value	0.024	0.137	-	-	-
Riding with a driver who had alcohol before driving	*P*	-0.132	-0.027	0.160	1.000	-
	P value	0.011	0.613	0.001	-	-
Riding with a driver not having driving license	*P*	-0.245	-0.138	0.279	0.355	1.000
	P value	<0.001	0.010	<0.001	<0.001	-

[*P* = Spearman's correlation coefficient (Rho)]

coefficient Spearman's rho = −0.132, *P* = 0.011). Similarly, students that knowingly disobeyed traffic rules were more likely to have travelled with a driver not possessing a driving license (Spearman's rho = 0.279, *P* < 0.001).

The association of 'at risk' behavior regarding road safety (defined as an affirmative answer to any of the five questions related to individual risk behaviors) with various socio-demographic factors was explored. No statistically significant association was observed with the type of school attended, the current institute or the type of residence of the subject's family. A linear declining trend was observed in relation to the subject's increasing age, with the prevalence being maximum in the lower-age group (14-15 years) [Pearson's X^2 = 5.04, df = 2, *P* = 0.08]. Such road-hazard behaviors were found to be more in males (80.5%) than in females (71.3%), significantly so [Pearson's X^2 = 5.91, df = 1, *P* = 0.015].

Binary logistic regression was applied to explore the association of the health-risk behaviors with various socio-demographic variables. Table 3 shows the variables found to be significant correlates. Males were more likely to indulge in risk behaviors on road than females (odds ratio 1.757, 95% CI: 1.121-2.754). Students with a deceased parent were found to be more cautious regarding on-road safety, being 70% less likely to be at risk compared to those with both parents alive.

DISCUSSION

The students were asked to mention about five behaviors related to personal safety of the individual while on road. Wearing a seat belt while riding in a car or other such vehicle is a requirement for safety of the occupants of vehicles as mandated by law and is compulsory in Delhi for the occupants of front seats of cars or other four-wheeler vehicles. Almost 52.4%

Table 3: Correlates of health-risk behaviors concerned with personal safety on roads

Correlates	*Categories*	*Adjusted odds ratio (95% confidence interval)*	*P* value
Gender	Female	1 (Reference)	-
	Male	1.757 (1.121-2.754)	0.014
Living status of parents	Both parents alive	1 (Reference)	-
	A parent not alive	0.318 (0.104-0.968)	0.044

of the students in the present study reported 'not always' wearing a seat belt while riding in the front seat of a vehicle; about 18.4% 'never' or 'rarely' wore them, a figure that was higher than the 10.2% in a national survey of school students in United States.[4]

Not wearing a helmet was the only risk behavior which was found to be prevalent more in females (77.7%) than in males (70.3%). The explanation for this is that wearing of helmet while riding a motorized two-wheeler is only mandatory for male riders currently in Delhi. However, though not mandated by law, protection of a helmet is still advisable for female riders too, considering its vital role in preventing head injuries in case of an accident. It also needs to be brought to focus that despite being compulsory by law for them, 70.3% males still reported 'not always' wearing them.

About 91 (19.9%) students had been in a vehicle whose driver had alcohol before driving, once or more within the past 30 days. This is an alarming figure, as the negative effects of alcohol on driving ability are proven and its direct implication in causing road accidents well documented. Our finding means that one in five adolescents either did not comprehend fully the risks involved or knowingly jeopardized their safety by riding with a driver who had alcohol before driving. The prevalence was similar to that in Bangkok, where 18.8% of the students had reported travelling with a driver who had consumed alcohol.[5]

One hundred sixty-five (37.3%) subjects had knowingly been in a vehicle whose driver did not possess a driving license, in the past 30 days. No prevalence figures were available in past literature to compare this finding with. However, this risk behavior of taking a ride while being aware of the fact that the driver does not possess a valid driving license, also suggests a measure of complacency among the students regarding their own safety.

All the risk behaviors were found to be more in males than in females (the only exception being helmet use). Among our study population, almost 77.5% of the respondents were 'at risk' as far as behaviors related to safety on roads are concerned. Disregard for traffic rules among the adolescents can be an important factor for increasing road-traffic accidents and deaths among them. This should evoke earnest responses from the government, policy makers and all personnel concerned with adolescent welfare on how best to reduce the extent of this preventable problem. One of the key recommendations of a recent workshop by the Indian Council of Medical Research (ICMR) was that prevention of road-traffic injuries needs to be given a high priority in our nation.[6]

Prevalence was found to be significantly associated with lower age and male gender. A recent Taiwan study of accidents involving motorcyclists had also found that young and male riders were more likely to disobey traffic regulations.[7] The students in adolescence phase may derive a thrill out of taking risks on road – not realizing, or ignoring, the consequences such risks may have. Males are more likely to show off or attempt to impress their friends and prove their individuality and freedom by breaking traffic rules. Excitement-seeking among adolescents has been shown to be significantly correlated to risky-driving behavior and collisions.[8]

A distinctive finding was that risk behavior while on road was lesser in subjects with a parent not alive than in those students with both parents living (odds ratio 0.318, 95% CI: 0.104-0.968). This was a novel finding, as by and large the other health-related behaviors with a negative connotation, such as consuming tobacco, alcohol and other drugs; and sexual-risk behaviors, were found to be more prevalent among adolescents with a deceased parent.

The explanation can be that these negative behaviors are a vent for emotional and socioeconomic stresses that such adolescents may be experiencing, and they may be resorting to these habits more under duress than as risk-taking. While travelling on roads, they may be more careful in their behavior and may be curbing their thrill-seeking or adventurous instincts. Another factor can be that some of these subjects may have lost their parent in a traffic accident itself, due to which they would tend to be conscious in their behavior on roads.

WHO mentions that more than 60% of adolescents killed each year in a traffic accident are boys.[1] In many countries, adolescence is the only age group for which mortality is on the increase, with the rise being due to violent death and particularly due to road accidents.[2,9] A recent review of European trends regarding young drivers' accident risk has found that young male drivers' relative risk is rising.[10] Death in this young-age group is particularly poignant because of the loss of so many potential years of productive life. While possibly all factors leading to the causation of road accidents cannot be taken care of, indulgence in risk behaviors on roads by adolescents is certainly a preventable aspect.

A limitation of the present study is that the findings and their interpretations are restricted to adolescent students only. Further studies are needed that cover the groups of adolescents that are out of school or college, as the prevalence of health-risk behaviors is likely to be higher among such adolescents. Also, qualitative research methods like Focused Group Discussions can be utilized in further studies to have in-depth analysis of the reasons for on-road risk behaviors amongst adolescent students.

Recommendations

School is the basic institution where the early phase begins, leading to middle and late phases of adolescence. It is then and there that we can formulate an intervention towards health promotion, prevention and treatment. Interactive and novel methods should be used to involve and motivate adolescents. As friends are among the chief sources of information, as well as main influencing factor in molding many adolescent behaviors, their role must be acknowledged in any program aiming at reducing health-risk behaviors. The role of television as a powerful medium of communication to disseminate information effectively to adolescents should be appreciated and made use of to educate them.

REFERENCES

1. World Health Organization. Orientation programme on adolescent health for health-care providers - handout. The World Health Organization: Geneva; 2003.
2. Wilf-Miron R, Gurvich R, Barell V. Cause-specific mortality among Israeli adolescents in the 1980s. J Adolesc Health 1994;15:186-91.
3. Introduction. Deputy Commissioner (South), Delhi. [Last accessed on 2006 Apr 16]. Available from: http://dcsouth.delhigovt.nic.in/introduction.htm.
4. Eaton DK, Kann L, Kinchen S, Ross J, Hawkins J, Harris WA, *et al*. Youth risk behavior surveillance - United States, 2005. MMWR Surveill Summ 2006;55:1-108.
5. Ruangkanchanasetr S, Plitponkarnpim A, Hetrakul P, Kongsakon R. Youth risk behavior survey: Bangkok, Thailand. J Adolesc Health 2005;36:227-35.
6. Division of Non-Communicable Diseases, Indian Council of Medical Research. Workshop on development of a feasibility module for Road Traffic Injury surveillance: A report. ICMR: New Delhi; 2006.
7. Hsin-Li C, Tsu-Hurng Y. Motorcyclist accident involvement by age, gender and risky behaviors in Taipei, Taiwan. Transportation Research Part F. Traffic Psychol Behav 2007;10:109-22.
8. Oltedal S, Rundmo T. The effects of personality and gender on risky driving behaviour and accident involvement. Safety Sci 2006;44:621-8.
9. World Health Organization. The health of young people: A challenge and a promise. The World Health Organization: Geneva; 1993.
10. Twisk DA, Stacey C. Trends in young driver risk and countermeasures in European countries. J Safety Res 2007;38:245-57.

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