

BRIEF REPORT

Current helmet and protective equipment usage among previously injured ATV and motorcycle riders

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Injury recidivism among trauma patients may be related to an individual pattern of high risk behaviors. The extent to which an injury episode modifies this behavior pattern is unknown. A self report, voluntary, anonymous, cross sectional survey was administered to motorcycle and all-terrain vehicle (ATV) riders at a popular recreation site. Data included demographics, injury history, and current usage of helmet and protective gear. Two hundred eighty surveys were completed. History of ATV/motorcycle related minor and major injury were reported by 21% and 9%, respectively. Persons with a history of minor ATV/motorcycle injury only were less likely to use a helmet or protective equipment (78% v 74%, $p=0.58$ and 49% v 41%, $p=0.29$). Persons with a history of any major ATV/motorcycle injury were also less likely to use a helmet or protective equipment (77% v 56%, $p=0.03$ and 48% v 40%, $p=0.53$). These findings suggest a pattern of persistent high risk behavior among previously injured persons.

Injury recidivism among trauma patients is well documented and may result from an accumulation of risk factors such as male gender, adolescent and young adult age groups, heavy alcohol or drug use, abuse, poverty, and geographic origin.^{1–6} Additionally, these persons may be less likely to adopt proactive behaviors such as use of seatbelts and helmets, use of a designated driver, obeying traffic laws, and avoidance of volatile psychosocial situations.⁷ The extent to which an individual injury episode modifies this pattern of high risk behaviors is unknown.

An identified population at increased risk for injury is riders of motorcycles and all-terrain vehicles (ATVs).^{8–10} Many countries and all states in the United States have laws governing the use of these vehicles. Nevertheless, protection from injury requires the individual rider to electively use a helmet and protective equipment on a routine basis. This study compares the use of helmets and protective equipment by motorcycle and ATV riders with and without a history of previous ATV/motorcycle related injury.

METHODS

A self report, anonymous survey was distributed over a four week period to ATV and motorcycle users at a popular recreation site. The survey gathered data regarding demographics, motorcycle and ATV usage, and injury history. The survey required approximately 10 minutes for completion, and surveys were sealed in an unmarked envelope by each subject. Participants were offered a candy bar or soda as an incentive. Children younger than age 15 were required to complete the form with parental assistance. Data entry and analysis were completed at a separate time and location. Questions included in the survey were adopted from the Behavioral Risk Factor Surveillance System, but the questionnaire itself was not independently validated.

Minor ATV/motorcycle related injuries were defined as any traumatic injury requiring evaluation by a health care provider in a professional setting but not requiring hospitalization. Major injuries included those requiring at least overnight hospitalization. Further injury details were not collected and injury reports were not verified. Usage of helmets and protective equipment was evaluated using a five point scale ranging from "never" to "always". Protective equipment was defined as protective clothing and included

pads, masks/goggles, gloves, and hearing protection. For analysis, persons reporting either "always" or "almost always" using helmets and/or protective equipment were recorded as "users" of these devices. Data were analyzed with standard statistical software using the χ^2 test (SPSS for Windows, version 11.5, 2002).

RESULTS

Two hundred eighty surveys were completed. One hundred eleven (40%) of respondents were ages 16–21, with 16% being 15 years of age or younger (age range 4–61). Seventy percent of the subjects were males, 52% were from rural areas or small towns, and 9% (of adults) had less than a high school education with 25% being college graduates (see table 1).

A lifetime history of minor ATV/motorcycle injury only was reported by 21% of respondents and major injuries by 9%. The rate of injury was greatest in the 16–21 age group and among males and those from rural areas. Current helmet use was reported by 75% overall, and the use of protective equipment by 47%. Use of a helmet was lower for persons of a younger age, rural background, and with less education. These trends were similar for use of protective equipment (see table 2).

Persons with a history of a minor ATV/motorcycle injury only were less likely to use a helmet or to use protective equipment (78% v 74%, $p=0.58$ and 49% v 41%, $p=0.29$). Persons with a history of major injury were also less likely to use a helmet or protective equipment (77% v 56%, $p=0.03$ and 48% v 40%, $p=0.53$). Persons with a history of either minor or major injury were also less likely to use a helmet and protective equipment (78% v 68%, $p=0.09$ and 49% v 47%, $p=0.23$) (see table 3).

DISCUSSION

Persons with a history of both minor and major ATV/motorcycle related injury were less likely to report current use of either helmets or protective equipment compared to persons without a previous injury. Subjects with a history of major ATV/motorcycle injury have the greatest impetus for behavioral changes and would be expected to have the highest rate of protective equipment usage. Yet, subjects in this study with a history of major injury were the group least likely to report both current helmet and protective equipment

Table 1 Comparison of the demographics of subjects with and without a history of any ATV/motorcycle injury; values are number (%)

	All	History of minor injury only	p Value	Any history of major injury	p Value	History of any injury	p-value
Overall	280 (100)	54 (21)		25 (9)		79 (28)	
Gender			<0.01		0.02		<0.001
Male	195 (70)	47 (27)		22 (11)		69 (35)	
Female	85 (30)	7 (8)		3 (3)		10 (12)	
Age group (years)			<0.01		0.12		<0.001
≤ 15	45 (16)	4 (9)		1 (2)		5 (11)	
16–21	111 (40)	33 (34)		15 (14)		48 (43)	
22–30	55 (20)	9 (18)		4 (7)		13 (24)	
≥31	69 (25)	8 (12)		5 (7)		13 (19)	
Hometown			0.15		0.02		0.08
Rural	128 (46)	33 (28)		9 (7)		42 (33)	
Small town	17 (6)	3 (25)		5 (29)		8 (47)	
Medium sized town	36 (13)	5 (16)		5 (14)		10 (28)	
Small city	67 (24)	8 (13)		5 (8)		13 (19)	
Large city	32 (11)	5 (16)		1 (3)		6 (19)	
Education/parental education			0.95		0.92		0.93
Less than high school	26 (9)	4 (17)		2 (8)		6 (23)	
High school graduate	88 (31)	17 (22)		9 (10)		26 (30)	
Some college	97 (35)	19 (22)		9 (9)		28 (29)	
College graduate	69 (25)	14 (22)		5 (7)		19 (28)	

usage. Though only one of the individual results reaches statistical significance, it is important to note that in each individual subgroup analysis, persons with a history of injury were less likely to use helmets or protective equipment. The largest absolute difference in usage rates was for helmet use among persons with a history of major injury. The helmet is the single most important protective device for avoidance of severe injury for riders of ATVs and motorcycles, and is the most widely publicized and legislated. It is important, then, that only one half of persons with a previous major ATV/motorcycle injury were currently using a helmet.

These findings certainly suggest a pattern of persistent high risk behavior among previously injured persons, even when those injuries are severe. Whether this pattern of behavior is modified in comparison to pre-injury behavior cannot be ascertained from these data. However, these findings do suggest that persons with a history of injury remain at higher risk for recurrent traumatic injury than those persons not previously injured.

These findings support the previously described theory in which risk taking is a constellation of behaviors.^{7 11 12} Injury recidivism likely results from a combination of continued high risk behaviors and a failure to adopt proactive, protective behaviors. This study demonstrates that previously injured persons engaging in a high risk activity do not utilize readily available protective equipment at the same rate as non-injured persons. Therefore, behavior modification interventions in the trauma population must focus not only on avoidance of negative behaviors but also on reinforcing the adoption of protective behaviors. As previously demonstrated, the target group for intervention should be adolescent and young adult males from rural areas or small towns. This study also supports the assertion that the greatest risk factor for traumatic injury is the history of a previous traumatic injury, as the injury episode does not appear to have a significant impact on modifying high risk behaviors. Future research of this type should focus on identifying the motivation for use and non-use of protective equipment. This

Table 2 Use of protective equipment stratified by demographic variables; values are number (% of group using)

	"Always" or "almost always" use helmet	p Value	"Always" or "almost always" use protective clothing	p Value
Overall	211 (75)		131 (47)	
Gender		0.13		0.36
Male	152 (78)		95 (49)	
Female	59 (69)		36 (42)	
Age group (years)		0.02		<0.001
≤ 15	32 (71)		25 (56)	
16–21	75 (68)		29 (26)	
22–30	44 (80)		33 (60)	
≥31	60 (87)		44 (64)	
Hometown		<0.001		<0.001
Rural	84 (66)		39 (30)	
Small town	12 (71)		5 (29)	
Medium sized town	23 (64)		16 (44)	
Small city	62 (92)		46 (69)	
Large city	30 (94)		25 (78)	
Education/parental education		<0.01		<0.001
Less than high school	13 (50)		2 (8)	
High school graduate	63 (72)		36 (41)	
Some college	79 (81)		51 (53)	
College graduate	56 (81)		42 (61)	

Table 3 Use of protective equipment stratified by history of ATV/motorcycle related injury; values are number (%)

	"Always" or "almost always" use helmet	p Value	"Always" or "almost always" use protective clothing	p Value
No history of minor injury (only)	157 (78)	0.58	99 (49)	0.29
History of minor injury (only)	40 (74)		22 (41)	
No history of major injury	197 (77)	0.03	121 (48)	0.53
History of major injury	14 (56)		10 (40)	
No history of any injury	157 (78)	0.09	99 (49)	0.23
History of any injury	54 (68)		131 (47)	

on-site, questionnaire-type study was effective in that there was a high rate of participation and it benefited from a large percentage of the participants having experienced previous traumatic injury.

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