THE ADOLESCENT INJURY CHECKLIST: AN INVESTIGATION OF TRANSPORT RELATED INJURIES AS REPORTED BY AUSTRALASIAN ADOLESCENTS

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Injury is a leading cause of death among adolescents. Mortality rates resulting from injury among young people reveal strong associations with risk taking behaviour, consistently involving transport (25.5: 100,000 males) and violence (2.3: 100,000 males). The Adolescent Injury Checklist (AIC) (Jelalian et al., 1997; Spirito et al., 2001) is an established self report measure that records injuries experienced by adolescents in the past 6 months (e.g. while driving, bicycling, from physical fights); whether these injuries required medical attention; and whether they occurred in the context of alcohol or other drug use. It is the only adolescent injury questionnaire known to the researchers, and data has only been reported for American adolescents.

This paper reports on the development of a database of adolescent responses to the AIC in an Australasian sample, and specifically on reported experiences of transport injuries. A sample of 661 Grade 9 students (mean age = 13.6 years) were recruited from four South-East Queensland high schools and completed the AIC in class time. The results of this study will be of direct relevance to Queensland and other Australasian health organisations, while also benefiting intervention programs and researchers through the provision of normative figures for Australasian adolescents' injury experiences.

THE PROBLEM OF INJURY IN ADOLESCENCE

Injury is a leading cause of death and disability among Australia's young people, with more deaths among adolescents being a result of injury than all other causes combined (AIHW, 2003). Injury is also a primary cause of hospitalisation among young people (AIHW, 2003).

One consistent finding in adolescent injury research is that there is a higher rate of injury among young males than females (Jelalian et al., 1997). In fact, throughout the period 1993-94 to 2000-01, young Australian males were hospitalised for injury at more than twice the rate of females (AIHW, 2003). Spirito et al. (1997) also report that literature from Emergency Departments reveals that males in the US show a rate of unintentional injury that is double that for females.

Mortality data collected by the Australian Bureau of Statistics (ABS) reveals that more than 1,600 young male deaths each year are caused by injury. The ABS National Health Survey (NHS) 2001 has also collected information from young people aged 12-24 years on injury events that resulted in health action being taken in the 4 weeks prior to the survey. The results of the NHS showed that the incidence rate for injury was 17,682 per 100,000, with the rate for males being 1.5 times that for females (AIHW, 2003).

RISK TAKING AND INJURY

One factor that is likely to contribute to the increased risk of injury during adolescence and particularly among young males is risk taking behaviour. Although risk taking is frequently considered to be a normal part of adolescent development (Jessor, 1983), it can place adolescents at greater risk for injury. Males may experience more injuries than females as a result of their increased participation in risk taking behaviours that lead to injury (AIHW, 2003).

One study investigating the relationship between adolescent risk taking and injury using a self-report questionnaire methodology has revealed a significant relationship across a sample of 1,426 American adolescents (Jelalian et al., 1997). This study also showed that males had significantly higher risk taking scores than females, as measured by several scales including the Adolescent Risk Taking Scale (Alexander et al., 1990), and that there was also a stronger relationship between risk taking and injury among male than among female adolescents.

Recent work has expanded perspectives on risk behaviour to include diverse risk behaviours that frequently co-occur among high risk adolescents (Jessor, 1998). Research on adolescent risk taking has revealed a picture of high risk taking youth as being more frequently male, early school leavers, with peers actively involved in risk taking behaviour, with less parental supervision, who hold negative attitudes to authority and typically show a high frequency of alcohol use (Sheehan, Siskind, & Schonfeld, 2004).

ALCOHOL USE AND INJURY

According to a recent Australian survey, eight out of ten high school students reported having used alcohol, with one third having used alcohol in the week prior to the survey (Healey, 2002). It is noted that while many young people drink less regularly than adults, they tend to drink more heavily in a single session (Bauman & Phongsavan, 1999). This is of particular concern considering that associations exist between drinking to the point of intoxication and road accidents, suicides, homicides and violence (Hewitt, Elliott, & Shanahan, 1995; King & Ghaziuddin, 1996; Lynskey, 2001). In fact, alcohol is considered to be one of the most significant risk factors for injury (Lowenfels & Miller, 1984). Alcohol consumption increases injury risk through increasing exposure to dangerous circumstances or through a direct biological effect which reduces perceptions of and responses to dangerous circumstances (Li & Baker, 1994).

In Australia in 1998, transport was the biggest contributor of alcohol related injury deaths among young males, followed by self-harm and interpersonal violence. Transport factors also appeared as the largest contributor to alcohol related injuries requiring hospitalisation among young males (English, 1995).

TRANSPORT RELATED INJURIES

Mortality rates resulting from injury among young people reveal strong associations with risk taking behaviour, consistently involving transport related injuries (Moon, Meyer, & Grau, 1999). Transport accidents are also the leading cause of hospitalisation among young people (AIHW, 2003). Data involving less serious injuries that do not require hospitalisation show a different causal pattern. A sample of 50 Australian hospitals that volunteered Emergency Department information between 1986 and 1994 revealed that sport made up 23% of the activity undertaken at the time of the injury for males aged 15-29 years, with transport constituting 13% of activities (Moller, 1995).

Young people are overrepresented in Australian road crashes. A proportion of these young people are underage drivers. A study of young drivers in Western Australia showed that 23% of the 1,277 newly licensed participants had been involved in frequent driving prior to obtaining their learners license (Stevenson & Palamara, 2001). A survey study of 4,527 unlicensed Australian high school students also showed that 35% reported having driven a car on a public road in the past year (Sheehan et al., 1996). Lam (2003) undertook a study utilising data collected by NSW police at the scenes of motor vehicle crash incidents during the period 1996 to 2000. A total of 526 crashes involving an underage driver were recorded, with the majority of underage drivers being male and 84% of crashes resulting in the driver being injured or killed (Lam, 2003).

Drink driving and riding with drink drivers are also risk behaviours that can lead to motor vehicle crash related injuries among young people. Kadel (1998) found that one-third of the students surveyed for the Wisconsin Youth Risk Behavior Survey had ridden with a drunk driver at least once in the month prior to the survey. In Sheehan et al.'s (1996) study of Australian high school students, 52% reported having been a passenger of a drink driver at least once in the past month, while drink driving behaviour by the adolescents themselves was not so prevalent, at just 6%. However, 27% reported having ridden a bicycle after drinking alcohol, and 7% reported having ridden a motorcycle after drinking, behaviours which can also have serious repercussions in terms of injury (Sheehan et al., 1996).

THE CURRENT RESEARCH: THE ADOLESCENT INJURY CHECKLIST

The Adolescent Injury Checklist (AIC) is an established self-report measure, which records types of injuries and injury situations experienced by adolescents in the past 6 months, whether any of these injuries required medical attention, and whether they occurred in the context of alcohol or other drug use. This measure has been developed and used in both hospital and high school research in the USA. To date, it is the only self-report, self-completed adolescent injury questionnaire known to the researchers, and data has only been reported for American adolescents. One benchmark study, the Dunedin Multidisciplinary Health and Development Study, did involve regular assessments of injuries for which medical treatment was sought among a cohort of children in New Zealand, and has provided a large amount of detailed adolescent injury data (Chalmers, Cecchi, Langley & Silva, 1989; Lodge, Langley & Begg, 1990). The aim of the current research, however, is to develop a database of adolescent responses using the AIC, a comparatively less expensive general screening measure that can be completed across a relatively short period of time. This provides different injury data; both presented for medical treatment and not presented for medical treatment; and allows for the involvement of large groups of adolescents.

The research questions of interest are:

1) What types of injuries do Australasian adolescents experience and in which situations do these injuries occur?

2) How prevalent are transport related injuries (i.e. injuries sustained as drivers, passengers, motorcycle riders, bicycle riders and pedestrians) among Australasian adolescents and to what degree are these injuries associated with alcohol, drugs and medical treatment?

METHOD

Participants

A total of 661 9th grade students from four high schools in South-East Queensland were surveyed. The Index of Relative Socio-Economic Advantage/Disadvantage, as derived from the 2001 Census, was noted for the Statistical Local Areas in which the four schools are located. The Index is constructed from attributes of the population in the area, such as educational attainment, income, employment and occupation, and ranges from 1-10, with low values indicating disadvantage and high values indicating advantage. Two of the schools are located in relatively advantaged areas, with Index scores of 8, while the other two schools are located in disadvantaged areas, with Index scores of 1 (Australian Bureau of Statistics, 2005).

Five parents/guardians responded to information sheets sent home about the survey, requesting that their children not participate. Some students from two of the schools may also have personally elected not to complete the survey, however these numbers are unknown. All cases were checked for internal consistency and 14 cases (2%) were excluded. These eliminations resulted in a total sample of 647 adolescents (305 males, 335 females) with a mean age of 13.6 years.

Analysis of the final sample indicated that the participants from the four schools did not differ on age [$F(3, 640) = 3.57$, ns], sex [$\chi_(3, N = 640) = 2.77$, ns], or age by sex, $t(638) = 2.55$, ns.

Measure

The AIC is an established self-report, self-completion measure, which requires adolescent respondents to indicate injuries experienced in the past 6 months; whether these injuries required medical treatment; and whether they occurred in the context of alcohol or other drug use. The AIC was originally adapted by Jelalian et al. (1997) from an early version of the Child Health and Illness Profile – Adolescent Edition (Starfield, Riley, & Green, 1995). For the current research, the items of the AIC were separated into sets asking about injury types (e.g. burns, sprains) and injury situations (e.g. fights, falls). A 20-item version of the questionnaire was used for the first three schools. Some modifications were introduced based on feedback from students and advice from hospital staff. 'Concussion/ knocked out' was added, 'cut, bruised or bleeding' was separated from 'being stabbed' and 'being physically attacked' was separated into 'being physically attacked by another person' and 'being attacked by a dog or another animal'. The second 23-item version of the questionnaire was administered to students at the fourth school.

Procedure

Ethical approval for the conduct of this research in the selected high schools was initially obtained from Education Queensland. Individual school principals were then contacted for permission to conduct the research in their schools. Grade 9 students were administered the AIC during school time. Passive parental consent was obtained prior to students' participation by sending an information sheet home about the survey. Parents/guardians were given the option to return a form to the school indicating that they did not wish for their child to take part. Only five such forms were returned. The students for whom forms were returned participated in normal class activities while the questionnaire was being administered.

Questionnaires were administered either during the Grade 9 assembly (two schools) or during health classes. Students were initially given an information sheet outlining the aims and procedures of the research and were asked to sign an attached consent form in order to participate. To ensure confidentiality but in order to enable linking of questionnaires to others given at a later stage, mother's first name, respondent's day of birth, month of birth, age and gender were self-recorded on the survey. A researcher (year assembly administration) or the class teacher (class administration) read out the instructions for completing the questionnaire and began by reading each question to the students. Once the researcher or class teacher were satisfied that the students were completing the questionnaire correctly, they allowed the students to continue completing it themselves. Researchers were available for students who had any questions or who had difficulties in filling out the questionnaire (such as reading difficulties).

RESULTS

All analyses were conducted using the computer software program, SPSS. The significance level was set at $p < .01$, due to the number of comparisons performed.

As shown in Table 1, the most frequent types of injuries experienced in the preceding 6 months were 'cuts, bruises or bleeding' (81% - 93%), followed by 'sprains or pulling muscles' (63%) and 'burns' (32%). The most frequently reported situations in which injuries were experienced included 'team sports, athletic activities or exercise' (56%), 'falls' (52%) and 'being hit by objects, such as rocks or glass' (47%).

Table 1: Number of adolescents reporting each injury category, and proportions of injuries associated with alcohol, drugs and medical treatment

Injury	Number of adolescents reporting injury	% of entire sample	Injuries associated with alcohol		Injuries associated with drugs		Injuries associated with medical treatment	
			n	*% (base: had injury)*	*n*	*% (base: had injury)*	*n*	*% (base: had injury)*
Injury Types								
Cut, bruised or bleeding (School 4; n=148)	139	93.3	17	12.2	5	3.6	17	12.2
Cut, stabbed, bruised or bleeding (Schools 1-3; n=496)	405	81.3	48	11.9	13	3.2	57	14.1
Sprain	409	63.2	25	6.1	8	2.0	105	25.7
Burn	206	31.8	22	10.7	10	4.9	14	6.8
Broken bone	74	11.4	9	12.2	5	6.8	57	77.0
Concussion (School 4; n=148)	16	10.7	7	43.8	4	25.0	2	12.5
Other type of injury (Schools 1-3; n=496)	127	25.5	23	18.1	15	11.8	46	36.2
Other type of injury (School 4; n=148)	31	20.8	2	6.5	2	6.5	14	45.2
Injury Situations								
Sport or activity	359	55.5	0	-	4	1.1	58	16.2
Fall	339	52.4	54	15.9	15	4.4	25	7.4
Hit by object	307	47.4	28	9.1	6	2.0	15	4.9
Fight	277	42.8	33	11.9	6	2.2	14	5.1
Physically attacked – person (School 4; n=148)	49	32.9	3	6.1	1	2.0	5	10.2
Physically attacked – animal (School 4; n=148)	40	26.8	0	-	0	-	4	10.0
Riding skateboard	126	19.5	19	15.1	3	2.4	11	8.7
Physically attacked (Schools 1-3; n=496)	92	18.5	12	13.0	6	6.5	8	8.7
Rollerblading	82	12.7	4	4.9	1	1.2	8	9.8
Near-drowning	78	12.1	6	7.7	2	2.6	1	1.3
Stabbed (School 4; n=148)	7	4.7	0	-	0	-	2	28.6
Shotgun, BB gun or other gun	29	4.5	4	13.8	2	6.9	5	17.2
Other situation (Schools 1-3; n=496)	87	17.5	11	12.6	4	4.6	15	17.2
Other situation (School 4; n=148)	33	22.1	0	-	1	3.0	5	15.2
Transport injury situations								
Riding bike	273	42.2	27	9.9	3	1.1	26	9.5
Riding motorcycle	117	18.1	9	7.7	2	1.7	19	16.2
Passenger in a vehicle	89	13.8	11	12.4	4	4.5	15	16.9
Pedestrian hit by vehicle	38	5.9	8	21.1	2	5.3	6	15.8
While driving	37	5.7	2	5.4	0	-	6	16.2

Transport related injuries

Of the entire sample, 345 (53%) reported that they had experienced at least one transport related injury within the last 6 months. The most common transport injury to be reported was bicycle injuries (42%), followed by motorcycle injuries (18%), passenger injuries (14%), then pedestrian injuries and injuries while driving (both 6%). Of those who had experienced a transport related injury within the past 6 months, 58% reported that they had experienced one of the five injuries, 26% reported that they had experienced two, and 13% reported that they had experienced three or more.

Sex differences for each transport related injury category were examined using Chi-square analyses. Males reported significantly more injuries riding bicycles [χ_(1, N = 629) = 24.20, p < .01], riding motorcycles [χ_(1, N = 625) = 10.18, p < .01] and driving [χ_(1, N = 625) = 7.01, p < .01] than females. No sex differences were found for pedestrian or passenger injuries.

Table 2 presents information on the number of adolescents who reported having had at least one transport related injury, as well as the number who reported transport related injuries associated with alcohol, drugs and medical treatment. Of those adolescents who reported transport injuries, 13% indicated that they had been drinking about the time of at least one of these injuries, 3% indicated that they had been using other drugs, and 16% reported that they required medical treatment for a transport related injury. Chi-square analyses examining sex differences on reports of transport injuries associated with alcohol use, drug use and medical treatment did not reveal any significant results. Reported drug use was considered significantly low so as to not warrant further analysis.

Table 2. Number of adolescents reporting transport related injuries, and transport related injuries associated with alcohol, drugs, and medical treatment

	No. adolescents reporting transport injuries		**Transport injuries associated with alcohol use**		**Transport injuries associated with drug use**		**Transport injuries associated with medical treatment**	
		%	***n***	**% *(base: had injury)***	***n***	**% *(base: had injury)***	***n***	**% *(base: had injury)***
Male	183	61.4	19	10.9	6	3.5	33	19.2
Female	157	47.4	23	14.8	3	2.0	19	12.3
Total	*345*	*53.3*	*43*	*12.5*	*9*	*2.6*	*53*	*16.0*

Chi-square analyses comparing transport injury situations revealed that participants who reported having had one type of transport related injury were more likely to also have experienced another. This was true for all of the transport related injury comparisons, with the exception of bicycle injuries and passenger injuries; i.e. those who reported being injured while riding a bicycle were not more likely to have been injured as a passenger in a vehicle, and vice versa, χ_(1, N = 631) = 4.02, ns.

In order to compare adolescents who reported transport related injuries with those who did not, without confounding with those who had no injuries at all, the sample was divided into three distinct groups – those who had experienced transport related injuries within the past 6 months, those who had experienced one or more of the injury situations but not transport related injuries, and those who reported that they had not sustained injuries within any of the situations. The numbers of adolescents who fell within each of these groups are shown in Table 3. A Chi-square analysis revealed that the groups differed by sex [χ_(2, N = 629) = 31.70, p < .01], with more males than females reporting transport related injuries, and more females indicating that they had experienced injuries, but that they were not transport related. More males than females reported that they had not experienced injuries within any of the situations. An additional Chi-square analysis indicated that the groups did not differ on socio-economic background, as indicated by school, χ_(6, N = 636) = 15.49, ns.

Table 3. Number of adolescents reporting transport related injuries; injuries in one or more situations but not transport related injuries; and no injuries within any of the situations

	Had transport injury		Had injury in 1+ situations, but not transport		Not had injury in any situations	
	n	***%***	***n***	***%***	***n***	***%***
Male	183	61.4	82	27.5	33	11.1
Female	157	47.4	159	48.0	15	4.5
Total	*340*	*54.1*	*241*	*38.3*	*48*	*7.6*

Chi-square analyses were conducted to investigate the types of injuries that participants reported in association with transport related injuries. Adolescents who had not experienced any injury situations were excluded from these analyses. Results revealed that those who reported having had at least one transport related injury in the past 6 months were more likely than those with reported injuries that were not transport related to have had broken bones [χ_(1, N = 582) = 13.97, $p < .01$], burns [χ_(1, N = 582) = 11.45, $p < .01$], and 'other types of injuries' (within Schools 1-3 only); χ_(1, N = 437) = 14.91, $p < .01$.

Adolescents reporting transport injuries were also compared with those who reported injuries, but that were not transport related, on both alcohol use and medical treatment. Chi-square analyses showed that those who had sustained transport injuries were more likely to have reported injury situations associated with alcohol use [χ_(1, N = 556) = 10.06, $p < .01$] and medical treatment [χ_(1, N = 555) = 13.84, $p < .01$], than those who had injury situations that were not transport related.

Motorcycle injuries

A specific set of analyses were conducted relating to motorcycle injuries, considering their high prevalence and the fact that at least some of these injuries may have been associated with illegal risk taking activities (on-road motorcycle use). As previously shown, motorcycle injuries were more frequently reported by males than females; χ_(1, N = 625) = 10.18, $p <$ .01. Chi-square analyses were also conducted to examine which types of injuries the participants were most likely to report in association with motorcycle injuries. Again, those participants who had not reported any injury situations were excluded from the analyses. It was found that those participants who reported having had motorcycle injuries were more likely than those who reported injury situations other than motorcycle injuries to have sustained broken bones [χ_(1, N = 577) = 19.01, $p < .01$], and 'other types of injuries' (within Schools 1-3 only); χ_(1, N = 435) = 15.10, $p < .01$.

Chi-square analyses were conducted to compare adolescents who reported motorcycle injuries with those who did not, on alcohol use and medical treatment, while excluding adolescents who did not report any injury situations at all. These analyses revealed that adolescents who had experienced motorcycle injuries were more likely to report having had injury situations associated with alcohol use [χ_(1, N = 604) = 27.03, $p < .01$] and also medical treatment [χ_(1, N = 602) = 37.36, $p < .01$] than adolescents who had not experienced motorcycle injuries.

DISCUSSION

Adolescent reports of the injuries they had sustained in the past six months reflect previous research concerning injuries of relatively low severity. Consistent with Moller's (1995) study of Australian Emergency Department information, sporting or other physical activities were the leading causes of injury (56%). However, 53% of the adolescents had also experienced at least one transport related injury. Reeder, Chalmers, Langley and Begg (1992) have reported that 113 (13%) of the 849 adolescents aged 14-15 years interviewed for the Dunedin Multidisciplinary Health and Development Study had experienced on-road crashes, including pedestrian, bicycle and motor vehicle accidents, in the 2 years before the interview.

However, the data is not strictly comparable as the Dunedin study focused only on those injuries for which medical treatment was required.

Comparisons with data reported by Spirito et al. (1997), in which the AIC was used with a sample of 1,983 US high school students, reveal that the proportions of adolescents in the current study reporting specific transport injuries are considerably higher than those reported in the US research (e.g. 42% c.f. 15% for bicycle injuries; 18% c.f. 4% for motorcycle injuries; 14% c.f. 5% for passenger injuries). One possible reason for the discrepancies observed in these results may be that Spirito et al. (1997) eliminated from their analysis all cases with missing data, logical inconsistencies, and answers of 'yes' to the majority of items (n = 161 eliminated). It is likely, considering both their lower conscientiousness in completing the questionnaire and their higher proportion of 'yes' responses, that the excluded adolescents were high risk takers, and that had they been included, the proportions reporting transport injuries may have increased substantially. For the current study, elimination of cases was treated on a case-by-case basis, in order to ensure high risk adolescents were included in analysis. All cases with missing data and high proportions of 'yes' responses were individually reviewed to determine consistency and apparent accuracy of responses prior to making decisions to eliminate.

Considering injury types, the present results reflect those of Grimmer, Jones and Williams (2000), in that relatively minor soft tissue injuries were most commonly reported overall. However, those who had experienced transport related injuries had sustained more broken bones, burns and 'other' types of injuries, indicating that the consequences of transport injuries are often more severe than the consequences of other injury situations experienced by adolescents. This is supported in that those who reported transport injuries were more likely than those who had experienced other injuries to have been medically treated for an injury.

Supporting previous research, including Jelalian et al. (2000), it was found that more males than females had experienced transport related injuries; specifically, they were more likely to have been injured while riding bicycles, riding motorcycles and while driving. In terms of substance use in association with transport injuries, alcohol use was highest among adolescents in association with pedestrian injuries, and quite low in association with driving injuries. This result suggests that, for adolescents of this particular age group, there is a need for school-based road safety programs to target underage driving itself, with secondary programs targeting drink driving, a behaviour which is noticeably less prevalent.

Drug use associated with injury was relatively uncommon among the current sample of adolescents, both with transport injuries and other injuries. The highest frequency of drug use at the time of a transport injury was for pedestrian injuries, with just 5% of those who reported a pedestrian injury indicating that they had been using drugs at the time.

There were no differences between males and females on transport injuries associated with alcohol use, drug use or medical attention. Based on hospitalisation and Emergency Department data, as well as the results of the National Health Survey 2001 (AIHW, 2003), it was expected that more males than females would report medical treatment for transport injuries. It appears that, among this particular sample of Year 9 adolescents, although more males reported having had transport injuries, the transport injuries they experienced were not any more severe than those experienced by females. The lack of gender differences in alcohol use associated with transport injuries was also contrary to expectations. However, evidence suggests that the prevalence of alcohol consumption is similar for both female and male adolescents. In fact, a recent report on drug use in Australia has shown that among adolescents aged 12-15 years, slightly higher proportions of females are considered to be 'risky and high risk' drinkers (10% c.f. 6% of males) (AIHW, 2005).

The finding that those adolescents who reported one type of transport injury were more likely to report another reflects current knowledge of risk taking behaviour, in that risk behaviours such as underage driving, motorcycle use, and riding with risky drivers frequently co-occur. Additional results revealed that adolescents reporting transport related injuries were more likely to report injury situations associated with alcohol use and medical treatment. These findings indicate that the group of adolescents who had sustained transport related

injuries may consist largely of high risk takers, in that this group of adolescents appear to have exposed themselves to more high risk transport situations likely to lead to injury, had a higher frequency of alcohol use associated with injury, and were more likely to sustain injuries of greater severity than the other young people in the sample.

Reports of motorcycle injuries were explored separately, considering their high prevalence within the current sample, their potential for more serious injury consequences (as compared to bicycle injuries), and the likelihood that at least some of these injuries may have been related to illegal on-road motorcycling. Motorcycle injuries were experienced more frequently by males than by females, and were most commonly associated with broken bones and 'other' types of injuries. The sub-group of adolescents who had sustained injuries while riding motorcycles appears to include the high risk individuals. Like those who reported transport injuries as a whole, these young people were more likely to have been drinking at the time of their injuries, and experienced more injuries of greater severity (requiring medical treatment).

Findings of the Dunedin Multidisciplinary Health and Development Study have shown that underage motorcycle riding is surprisingly prevalent among adolescents, with 52% of 12-13 year olds and 51% of 14-15 year olds saying they could ride a motorcycle (Reeder, Chalmers & Langley, 1992; Reeder et al., 1992). Considering that large proportions of adolescents have ridden motorcycles and that motorcycle injuries are quite prevalent and often more severe, it is important that road safety programs aimed at adolescents of this age include components on motorcycle safety in addition to the more common driving and passenger related components. Additionally, considering the degree of the association between risky transport behaviours such as motorcycle use and other risk behaviours like alcohol use, it is important that road safety programs are embedded in more general risk taking prevention strategies.

The limitations of this study are similar to those reported in past studies utilising the AIC (e.g. Spirito et al., 1997; Jelalian et al., 2000), including reliance on a self-report measure of injuries, substance use and medical treatment, which may be biased by participant recall or inaccuracy. The validity of responses to self-report questionnaires involving risk behaviours such as drug and alcohol use have been disputed with arguments that adolescents may not want to report sensitive issues and may also give socially desirable responses (Brener, Billy & Grady, 2003). However, a number of studies have supported the reliability and validity of adolescent self-report responses to interviews and school-based questionnaires involving both injury (Begg, Langley & Williams, 1995; Grimmer, Williams & Pitt, 2000) and risk behaviours such as alcohol and other drug use (Shillington & Clapp, 2000; Brener et al., 2002; Lintonen, Ahlström & Metso, 2004). Although the current data does not allow for validation of the AIC, there are several indicators that suggest that adolescents were reporting accurately. For example, no sporting injuries were reported as being associated with alcohol use. There was also a distinction between reporting of alcohol use in association with stabbing injuries and other interpersonal violence related injuries, such as physical fights.

An additional limitation of the current study, also described by Spirito et al. (1997) and Jelalian et al. (2000), is that no definitions of the specific injuries were provided to participants; which means there may have been variability in interpretation across the sample. Despite potential limitations, the results of the current study do have implications for youth risk taking and injury intervention and prevention programs, particularly involving risky transport behaviours. The results of this study also suggest that the Adolescent Injury Checklist may be useful for future research in the area of adolescent injury and risk taking.

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