

Reaching High-Risk Adolescents in a School Setting: Is It Possible?

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Abstract

The social cost of delinquency, drug use and injury among adolescents is extensive and highlights the need for interventions aimed at preventing such behaviour among children and adolescents. The potential benefits associated with saving one high-risk youth have been estimated to be as large as \$2.7 million (Cohen, 1998). High-risk adolescents engage in a number of risky traffic-related behaviours such as underage driving and motorcycle riding on public roads, driving or motorcycle riding after drinking, and bicycle riding after drinking or without a helmet. This paper examines whether a school-based injury prevention program implemented in several South East Queensland high schools and delivered to Grade 9 students, successfully reached adolescents classified as high-risk. Results suggest that of 391 students in intervention schools who provided baseline or data 24.9% (n = 88) were classified as high-risk adolescents and a further 22.9% (n = 81) as medium-high-risk. Of these youth, 64.8% of high-risk and 75.3% of medium-high-risk adolescents received the program and were retained to one-month follow-up. Preliminary results provide some evidence of the effectiveness to not only reach high-risk adolescent youth, but to also engage their participation in an injury prevention program implemented in high-schools.

Introduction

Injuries are the leading cause of death and hospitalisation among adolescents in Australia (AIHW, 2006) and this trend has been present for over a decade (Jolly, Moller, Volkmer, 1993). Furthermore, it is a trend that is mirrored globally (Blum & Nelson-Mmari, 2004). The cumulative impact of adolescent injuries, both fatal and non-fatal, has considerable social costs (Hambidge, Davidson, Gonzales & Steiner, 2002). Of particular concern is the sheer prevalence of non-fatal injuries compared to fatal injuries. In a study conducted in the United States, adolescent hospitalisations were conservatively estimated to be more than 40 times more prevalent than fatal injuries and emergency department visits more than a thousand times more likely (Fraser, 1996).

In 2004-05, almost a quarter of young Australians reported having sustained an injury in the previous four weeks (ABS, 2006). The most common types of injury among young Australians were cuts (33% of all injuries reported), hitting or being hit by something (16% of those reporting injury), and low falls (19% of those reporting injury). Burns and bites or stings accounted for 6.5 percent of reported injuries each, while physical attacks constituted only 2.3 percent of injuries (ABS, 2006). Death and hospitalisation rates as a result of injury were significantly higher among males and Indigenous youth (AIWH, 2006).

Adolescence has been described as a time of exploration of various behaviours, including physical risk-taking, alcohol use, and even criminal activity (Caces, Stinson & Harford, 1991). While risk taking is often regarded as a normal part of adolescent development (Jessor, 1983) it does increase the likelihood of risk for injury. A number of studies have highlighted the association of risk-taking, delinquency and alcohol use to injury in adolescence, with delinquent adolescents having higher unintentional injury rates than non-delinquent youth (Conseur, Rivara & Emanuel, 1997; Jelalian, et al., 2000; Junger & Wieggersma, 1995). A study linking hospital discharge data with juvenile justice records for adolescents aged 13 to 17 years in the state of Washington showed that hospitalisation for injury was 2.7 times greater for male and 1.6 times greater for female offenders than non-offenders (Conseur, et al., 1997). Delinquent adolescents also seem to be at greater risk for transport related injuries. In a study of male adolescents from an all-boys high school in the United States, it was found that boys with conduct problems were almost twice as likely to report having experienced a motor vehicle related injury in the 6 months prior to the study (Jelalian, et al., 2000).

Furthermore, high-risk behaviours are consistently found to be correlated, lending support to the notion of a “syndrome” of problem behaviour in adolescence (Donovan & Jessor, 1985; Donovan, Jessor & Costa, 1988; Jessor & Jessor, 1977). A number of criminological theories have been applied to deviant behaviour among children and adolescents to attempt to explain the phenomenon. Ajzen’s Theory of Planned Behaviour (TPB) takes into account peer relationships and is perhaps the most appropriate. According to the TPB, adolescent behaviour is influenced by beliefs regarding (i) peers’ expectations (Subjective Norms), (ii) the outcome and evaluation of the outcome of a behaviour (Attitude Toward the Behaviour) and (iii) barriers

or facilitators to performing the behaviour (Perceived Behavioural Control). According to the TPB, these three beliefs lead to the formation of intent to perform a particular behaviour. Intent, along with an adolescent's actual control, then influences the performance of the behaviour (Ajzen, 2002).

Prior research has suggested a plethora of risk factors that are predictive of an increased likelihood of delinquency and antisocial behaviour. Gender has been found to be significantly associated with delinquent and antisocial behaviour, with males more likely to engage in such behaviours than their female counterparts (Jelalian et al., 1997; Nichols, Graber, Brooks-Gunn & Botvin, 2006; Sheehan, Siskind & Schoenfeld, 2004). Other risk factors include poor parent-child attachments (Allen, et al., 2002; Allen, Moore, Kuperminc, & Bell, 1998; Cooper, Shaver, & Collins, 1998) as well as poor parenting skills, poor parental supervision, family dysfunction and familial criminality history (Griffin, Botvin, Scheier, Diaz & Miller, 2000; Hanlon, et al., 2004; Sheehan, et al., 2004). Poor selection of peer-attachments, such as associating oneself most strongly with deviant peers who hold negative attitudes to authority and typically show a high frequency of alcohol use, can also heighten the risk of delinquency and other problem behaviours (Dishion, French, & Patterson, 1995; Hanlon, et al., 2004; Kandel, 1986; Sheehan, et al., 2004; Vitaro, Tremblay, & Bukowski, 2001) have also been shown to be associated with delinquent behaviour, as have poor adjustment to the school environment and a low sense of academic achievement (Hanlon, et al., 2004). Finally, inappropriate approaches to the regulation of emotions, such as such avoidance coping (Cooper, Wood, Orcutt & Albino, 2003), sensation-seeking (Greene, Krmar, Walters, Rubin & Hale, 2000) and impulsivity have also been cited as significant risk factors (Romero, Luengo & Sobral, 2001).

The concept of 'use of leisure time' has been discussed in the literature as providing some explanation for the relationship between delinquency and injury (see Junger and Wiegersma, 1995 for a review). Delinquent adolescents are reported to spend more time in unsupervised peer oriented activities, and to participate less in more conventional and structured activities than non-delinquent adolescents. The unsupervised and unstructured nature of their leisure time means delinquent adolescents find themselves with increased opportunity to participate in risky or criminal activities which may lead to injury (Junger and Wiegersma, 1995).

As well as delinquency, the literature describes a number of other factors associated with adolescent injury rates. One established finding is that adolescent males experience more injuries than do adolescent females (AIHW, 2003; Jelalian, et al., 1997). During the period 1993-94 to 2000-01, injury hospitalisation rates for young Australian males were twice that of females (AIHW, 2003). Emergency Department data from the US also shows that unintentional injury rates for males are double that for females (Spirito, et al., 1997). The explanation for this discrepancy may be that adolescent males participate more in the risk-taking behaviours that lead to injury (AIHW, 2003).

Adolescence is often the time of onset of alcohol use, considered to be one of the most significant risk factors for injury (Lowenfels & Miller, 1984). A number of risk factors have been identified for onset of alcohol use in adolescence including conflict within the family (Caughlin & Malis, 2004; Ellickson et al.,

2001), parent and peer modelling of health-risk behaviours and poor parental supervision (Beal, Ausiello & Perrin, 2001) and access to substances in the home (Resnick et al., 1998). Furthermore, impulsiveness and sensation seeking (Donohew & Hoyle, 1999; Wulfert, 2002), participation in deviant activities (O'Malley, Johnston & Bachman, 1998; Vicary et al., 1998) and poor academic performance and school misconduct (Bryant et al., 2003; Diego, Field & Sanders, 2003; Thomas & Hsiu, 1993) have also been identified as risk factors. Protective factors include disapproval of health-risk behaviours by parents and peers (Beal, et al., 2001) interest in school and academic achievement (Bryant et al., 2003; Resnick et al., 1998), adequate parental supervision, family connectedness and the interest of ones parents in academic performance (Beal, et al., 2001; Bryant et al., 2003; Resnick et al., 1998) and religiosity (Wallace, et al., 2003).

It has been reported that most adolescents in developed countries have had experience with alcohol use and that as many as a third report at least one occasion of alcohol abuse (Sells & Blum, 1996). Healey (2000), in an Australian study, reported that 80% of surveyed high school students reported past alcohol use, with one third reporting use in the week prior to the survey. Another Australian study reported similar results with half of the surveyed adolescents having consumed alcohol within the week prior to the survey and 35% reporting at least one occasion of hazardous consumption (White, Hill & Effendi, 2002). In yet another Australian study, Miller and Draper (2001) reported that approximately one third of surveyed adolescents are regular drinkers of alcohol (at least once per week), while a further 40% report occasional alcohol use.

While the frequency of adolescent drinking is often much lower than that of adults, they tend to drink larger amounts on the occasions they do drink (Bauman & Phongsavan, 1999). This is disconcerting regarding the evidenced association between alcohol use and traffic crashes, suicides and violent behaviour (English, 1995; Hewitt, Elliott & Shanahan, 1995; King & Ghaziuddin, 1996; Lynskey, 2001; Pickett, et al., 2005) as well as other unintentional injuries (Cherpitel, 1993). Indeed, some have argued that alcohol use is the most significant risk factor 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).

Transport related mortality and injury is a serious problem among adolescents and is inexplicably associated with risk taking behaviour (Moon, Meyer & Grau, 1999). Transport-related accidents are the most common cause of injury-related mortality among young Australians, making up 32% of all adolescent deaths (ABS, 2006). Transport related accidents are also the leading cause of hospitalisation among young people (AIHW, 2003). Young people are no doubt overrepresented in Australian road crashes, however of particular concern is the issue of underage drivers. A number of Australian studies have reported findings suggesting underage driving is relatively prevalent. Stevenson and Palamara (2001) found that almost a quarter of surveyed Western Australian young drivers had considerable experiences with driving on a public road prior to obtaining their learners license. In

another study, 35% of unlicensed high school students reported having driven a car on a public road in the past year (Sheehan, et al., 1996). Crashes among underage drivers are often serious, with evidence from one study suggesting 84% result in injury or death of the driver (Lam, 2003).

Some have suggested that greater frequency of risky driving among young drivers somewhat explains adolescent crash statistics. Indeed, Fergusson, Swain-Campbell and Horwood (2003) reported that 90% of surveyed New Zealand licensed drivers aged between 18 and 21 had engaged in some form of risky driving. Furthermore, risky driving behaviour and transport related injury have been found to be associated with other high risk behaviours such as substance use, drink driving, underage drinking and unlawful use of a motor vehicle (Fergusson, Swain-Campbell & Horwood, 2003).

A number of risk factors have been found to be associated with traffic crashes and driving related offences among young drivers. These include substance use (Shope, 2001), peer modelling of health-risk behaviours and a toleration of deviance (Shope, Raghunathan & Patil, 2003) as well as risk taking and sensation seeking (Jelalian et al., 2000). Protective factors include adequate parental supervision, modelling of health-risk behaviours and family connectedness (Shope, 2001; Shope, Waller & Lang, 1996) and association with pro-social peers (Shope, Waller & Lang, 1996).

Drink driving and riding with drink drivers are also risk behaviours that can lead to transport related injuries among adolescents. A number of studies have highlighted the increased risk of a traffic accident associated with higher blood alcohol levels of the driver and suggested that this risk is even greater among less experienced younger drivers (Hingson, 1996; Zador, Krawchuck & Voas, 2000). Studies have reported disturbing statistics regarding exposure to having driven with a driver under the influence. In an Australian study 52% of surveyed students had been a passenger in a vehicle driven by a drink driver in the past month (Sheehan, et al., 1996). In a US study, one third of adolescents reported having been in a vehicle operated by a drink driver within the month prior to being surveyed (Kadel, 1998). Furthermore, 27% of adolescents in the Australian study reported having ridden a bicycle after drinking alcohol. Prevalence rates for driving a car or motorbike after drinking were considerably lower, with 6% and 7% of adolescents reporting these behaviours, respectively (Sheehan, et al., 1996).

A number of risk factors associated with drink driving or being a passenger in a vehicle operated by someone under the influence have been evidenced in prior research. These include impulsiveness (Stanford et al., 1996), sensation seeking (Arnett, 1990), tolerance of deviance (Bingham & Shope, 2004), normative beliefs and expectancies regarding physical risks, friends' disapproval, punishment avoidance and locus of control (Grube & Voas, 1996), school misconduct (Barnes & Welte, 1988), poor academic performance (MacKinnon et al., 1994; Williams, Lund & Preusser, 1986), greater levels of alcohol use (Bingham & Shope, 2004; Wechsler, Rohman, Kotch & Idelson, 1984), earlier age of drinking onset (Hingson et al., 2002) and participation in deviant activities (Williams, Lund & Preusser, 1986). Protective factors include greater levels of academic achievement and religiosity (O'Malley and Johnston, 1999).

An associated problem is driving under the influence of illicit drugs. In Australia illicit drug use among adolescents is far less common than use of alcohol or tobacco, however one study reported that as many as a third of Australian adolescents have used marijuana, around a quarter have used inhalants and 8% have used amphetamines (Miller & Draper, 2001). Driving after use of marijuana has been shown to increase crash involvement of young drivers (Hingson, 1982) and as many as half of adolescents surveyed in one particular American study reported having been a passenger in a vehicle driven by someone under the influence of marijuana and a substantial proportion had driven under the influence of illicit substances themselves (Wechsler, et al., 1984). Studies involving risk factors for adolescent drug-driving are not as common as those for drink driving, however Bingham and Shope (2004) have shown that drug-driving can be predicted by adolescent marijuana use, greater alcohol misuse and tolerance of deviance.

The social cost of delinquency, drug use and injury among adolescents is extensive and highlights the need for interventions aimed at preventing delinquency and antisocial behaviour among children and adolescents. This is especially true for high-risk youth who are at-risk of becoming embroiled in a life of delinquency, substance abuse and participation in risky behaviours that can have a cost on the community running into the millions. In an American study, Cohen (1998) reported that the potential benefits associated with saving one high-risk youth can amount to between \$1.7 and \$2.3 million. Indeed, even a more conservative estimate would be strong evidence of the necessity of prevention programs for high-risk youth. The present study investigates the ability of a high-school based injury prevention program (Skills for Preventing Injury in Youth - SPIY) to reach high-risk adolescents.

The Intervention Program: Skills for Preventing Injury in Youth (SPIY)

The current research investigates the design and implementation of an injury prevention program for adolescents. The program, called 'Skills for Preventing Injury in Youth' (SPIY), was designed to target adolescents in Year 9, who are typically 13-14 years old. Prior to the development of the program, a workshop was held with teachers, guidance officers and school based youth health nurses from several South-east Queensland high schools, who suggested that Year 9 students would be the ideal target of a school-based injury and risk taking prevention program. The literature also suggests that adolescents are beginning to think about and experiment with risk taking behaviour at this age, making it an ideal time to challenge their perceptions of involvement in such behaviour.

The program content was based on the results of several research studies conducted in Queensland and Western Australia by Sheehan, Palamara and colleagues (Palamara & Stevenson, 2003; Sheehan, Siskind & Schonfeld, 2004; Stevenson, Palamara, Morrison, & Ryan, 2001; Western et al., 2003). The results of these studies suggested targeting specific risk-taking behaviours that are frequently associated with injury in adolescents. These behaviours, which became the program's targets for change, included risky bicycle and motorcycle use, interpersonal violence, underage use of a motor vehicle, riding as passengers of risky drivers, and risky behaviour around water. Targeting multiple risk taking behaviours in intervention programs has

been recommended by a number of researchers, including Pickett, Garner, Boyce and King (2002). The program content was guided by the Theory of Planned Behaviour (Ajzen, 2002), which takes the peer relationship into account.

Along with peer protection and injury prevention components, the SPIY program included lessons in first aid. Teaching first aid to adolescents provides them with the skills to manage and control emergency situations and injuries with which they are confronted. Incorporating first aid theory and practice into an injury prevention program may also give adolescents further insight into the potential consequences of risk taking behaviour. The first aid skills selected to be taught as part of the program reflect the more common and potentially serious injuries experienced by adolescents, including treatment of bleeding, fractures, burns, shock, head and spinal injuries, and performing resuscitation.

The program was therefore designed to enable students to develop skills in both injury prevention and control, by combining first aid training with cognitive behavioural prevention strategies. The program consisted of eight lessons, delivered weekly in Year 9 health classes by the class teachers. Each of the lessons was structured similarly. Initially, a scenario would be presented to the class, which involved a group of friends participating in a risk taking behaviour which results in injury. The first half of each lesson would then involve first aid theory and practice, with students learning how to treat the injuries presented in the scenario. The second half of each lesson then focused on prevention, with class activities, including discussions and role plays, being used to assist students to consider methods of protecting their peers and preventing risk taking behaviour and associated injury.

Method

Participants and Procedure

All Year 9 students (n = 450) at two state high schools in South-east Queensland participated in the SPIY program. The Index of Relative Socio-Economic Advantage/ Disadvantage, derived from the 2001 Census, were noted for the areas in which the schools are located. The Index is constructed from measures of educational attainment, income, employment and occupation, and ranges from 1-10, with low values indicating disadvantage and high values indicating relative advantage. One of the participating schools was located in a disadvantaged area, with an index score of 1, while the second school was located in a relatively advantaged area, with an index score of 8 (Australian Bureau of Statistics, 2005).

Ethical approval to conduct the research was initially obtained from the University Ethics Committee and from Education Queensland and individual school principals. As the program was incorporated into the Year 9 health curriculum, parental consent was not required for student participation. Prior to the implementation of the SPIY program, Year 9 health teachers at the participating schools attended a training session, to maximise consistency in program delivery across health classes. The program lessons were then delivered by the teachers in their health classes over eight consecutive weeks. Each lesson varied in length from 52-70 minutes, according to the

schools' allocation for class time. The core lesson material was designed to be delivered within 52 minutes, with supplementary material available for longer lessons.

As part of the program evaluation, a questionnaire was administered to school students in the week prior to the intervention implementation. Immediately following the intervention, all schools broke for two weeks (Easter holidays). In the week following this break, a follow up questionnaire was administered to the program and control school students, a total of one month later. The questionnaire consisted of scales measuring demographic information, relationships with peers, parents and teachers, risk taking behaviour, the school environment, attitudes toward police, and injury. Only results derived from the Australian Self-Report Delinquency Scale, (ASRDS) will be presented in this paper.

The ASRDS is a 37-item questionnaire developed by Mak (1993) and updated by Western and colleagues (2003). The items list risk behaviours and participants are required to respond regarding whether they have engaged in each of these behaviours during the past three months. For the purposes of this research additional changes to those made by Western and Colleagues (2003) were made to the instrument to better accommodate the intended targets. Wording of some items were adjusted and additional behaviours of particular interest to the study were added, such as a number of transport-related risk behaviours.

Results

Of the 450 participating students suitable data was available for 424. Males constituted 50.1% of the sample and the mean age at baseline was 13.41 (sd = .51). A total of 256 students provided both baseline and one-month follow-up data, with a further 98 providing baseline data only and 70 providing one-month follow-up data only. Demographic data did not differ substantially between the 256 matched and 168 unmatched students. Males made up 50.8% of the matched sample and 49.1% of the unmatched sample. Mean ages were 13.43 (sd = .52) and 13.36 (sd = .48) for the matched and unmatched students, respectively.

Prevalence rates for selected substance use and risky transport related behaviour are reported in Table 1 below for all those students providing baseline (n = 391). Use of inhalants and marijuana (8.8% and 8.2%, respectively) was more common than inappropriate use of medication and more serious illicit substances. Substantial prevalence rates of risky transport related behaviour were reported for having ridden a bicycle on the road without a helmet (50.9%), having been a passenger with someone driving dangerously (25.4%), having been a passenger with someone who is drink driving dangerously (22.7%), having driven a motorbike on the road (19.8%), and having driven a car on the road (15%). While less prevalent a number of students also reported having driven a car or motorbike above the speed limit (13.1%), having ridden a bicycle after drinking (11%) and having driven a car or motorbike after drinking (6%).

Risk categories were developed using reported prevalence rates of the entire sample on the ASRDS. The prevalence rate of each item across the entire

baseline sample was inversed and inversed scores were then summed across all items for each individual. For students with less than one third missing data, their total inverse ASDRS score was scaled up. Those with more than one third missing data (n = 26) were excluded from the analysis. Those students with a total inverse ASDRS score of zero (no participation in any of the high-risk activities) were classified as low-risk. The remaining students were divided into tertiles and classified as low-medium risk, medium-high risk, or high risk. Of the 391 students providing baseline data 95 (26.8%) were classified as low risk, 90 (25.4%) as low-medium risk, 81 (22.9%) as medium-high risk and 88 (24.9%) as high risk. Chi-square analysis revealed a significant gender difference ($p < .001$), with more males than females classified as high-risk compared to other categories.

Of the 88 students classified as high risk 57 (64.8%) received the program and were retained to one-month follow-up, compared to 75.3% of students classified as medium/high risk, 76.7% of students classified as low/medium risk and 72.6% of students classified as low risk. Significantly fewer high risk students were retained to follow-up compared to all other students combined ($p < .05$). However, when looking at rates of program participation comparing students classified as either high and medium-high at baseline with those classified as either low or low-medium risk the significance of the effect disappears ($p = .188$).

Considering the 256 students providing both baseline and follow-up data, a significant increase in the number of students classified as low-risk was found ($p < .05$), from 27% at baseline to 37.9% at one-month follow-up. There were also substantial decreases in the number of students classified as low-medium risk (27% to 22.7%) and medium-high risk (23.8% to 18%), however these were not statistically significant. While the proportion of high-risk students decreased from 22.3% at baseline to 21.5% at one-month follow-up, this finding was not significant.

Discussion

There is some evidence to suggest that an injury prevention program targeting high-school students can effectively reach adolescents classified as high-risk due to involvement in multiple risk-taking behaviours. Prevalence of substance use and risky transport related behaviours reported by this sample of Queensland secondary students closely reflects statistics reported in prior research on youth participation in risky behaviours. The study lends further evidence to the prevalence of underage motor vehicle use and the vulnerability of young people to situations where they are a passenger in a vehicle being operated by a driver either driving dangerously or driving under the influence. Furthermore, consistent with previous research males were found to be more likely to be classified as high-risk.

While significantly fewer students classified as high-risk were retained from baseline to one month follow-up compared to students not classified as high-risk, there are still some encouraging trends in the results. Firstly, almost 65% of students classified as high-risk were retained. While not significant, this proportion is nonetheless substantial and suggests some success in the

retention of high-risk adolescents in the program. Moreover, when comparing retention rates of students classified as either medium-high risk or high-risk with those classified as either low-risk or medium-low risk shows no significant difference in attrition is found.

This study has a number of limitations. The sample used, especially when comparing groups classified by risk, was relatively small. Further more, the results presented here are for a one-month follow-up. Finally, while the program was designed to be delivered to two intervention schools, one classified as disadvantaged on the Index of Relative Socio-Economic Advantage/ Disadvantage and the other as advantaged, of the 424 students included in this analysis 313 (73.8%) attended the school located in the more disadvantaged area. While an analysis of the proportions of students classified as high-risk at baseline do not significantly differ between the two schools, this is a point of concern and may have unforeseen implications for the current findings. Indeed, as the developmental cycle of these adolescents progresses differential changes could have a potential impact on findings over time.

Recommendations for further research include data collection with a larger sample and over a longer follow-up period (the evaluation team involved with this program have also conducted a six-month follow-up and results will be available in due time). Replicating the study with a larger sample, over a longer period and with a more equal distribution of students from schools in disadvantaged and advantaged areas is required to further validate findings reported in this paper. However, preliminary results provide some evidence of the effectiveness to not only reach high-risk adolescent youth, but to also engage their participation in an injury prevention program implemented in high-schools.

References for this paper!!

Australian Bureau of Statistics. (2005). *National Regional Profiles*. Canberra: ABS.

Australian Institute of Health and Welfare (2003). *Australia's young people: their health and wellbeing 2003*. Canberra: AIHW.

Blum, R.W. & Nelson-Mmari, K. (2004). The health of young people in a global context. *Journal of Adolescent Health, 35*:402-418.

Caces, M.F., Stinson, F.S. & Harford, T.C. (1991). Alcohol use and physically risky behavior among adolescents. *Alcohol Health & Research World, 15*(3): 228-233.

Cherpitel, C.J. (1993). Alcohol, injury, and risk-taking behavior: data from a national sample. *Alcoholism: Clinical & Experimental Research, 17*(4): 762-766.

Conseur, A., Rivara, F.P. & Emanuel, I. (1997). Juvenile delinquency and adolescent trauma: how strong is the connection? *Pediatrics, 99*(3): 5-11.

Donovan, J. & Jessor, R. (1985). Structure of problem behaviour in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology, 54*(6): 890-904.

Donovan, J., Jessor, R. & Costa, F. (1988). Syndrome of problem behaviour in adolescence: A replication. *Journal of Consulting and Clinical Psychology, 56*(5): 762-765.

Fraser, J.J. (1996). Nonfatal injuries in adolescents: United States, 1988. *Journal of Adolescent Health, 19*:166-170.

Hambidge, S.J., Davidson, A.J., Gonzales, R. & Steiner, J.F. (2002). Epidemiology of pediatric injury-related primary care office visits in the United States. *Pediatrics, 109*(4): 559-565.

Jelalian, E., Alday, S., Spirito, A., Rasile, D. & Nobile, C. (2000). Adolescent motor vehicle crashes: the relationship between behavioral factors and self-reported injury. *Journal of Adolescent Health, 27*(2):84-93.

Jelalian, E., Spirito, A., Rasile, D., Vinnick, L., Rohrbeck, C. & Arrigan, M. (1997). Risk taking, reported injury, and perception of future injury among adolescents. *Journal of Paediatric Psychology, 22*(4): 513-531.

Jessor, R. & Jessor, S.L. (1977). *Problem behavior and psychosocial development: a longitudinal study of youth*. New York: Academic Press.

Junger, M. & Wiegersma, A. (1995). The relation between accidents, deviance and leisure time. *Criminal Behavior & Mental Health, 5*:144-174.

Li, G. & Baker, S.P. (1994). Alcohol in fatally injured bicyclists. *Accident Analysis & Prevention, 26*(4): 543-548.

Lowenfels, A.B. & Miller, T.T. (1984). Alcohol and trauma. *Annals of Emergency Medicine, 13*(11):1056-1060.

Pickett, W., Molcho, M., Simpson, K., Janssen, I., Kuntsche, E., Mazur, J., et al. (2005). Cross national study of injury and social determinants in adolescents. *Injury Prevention, 11*:213-218.

Spirito, A., Rasile, D.A., Vinnick, L.A., Jelalian, E. & Arrigan, M.E. (1997). Relationship between substance use and self-reported injuries among adolescents. *Journal of Adolescent Health, 21*(4):221-224.

References

Ajzen, I. (1985). From decisions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behaviour* (pp. 11-39). New York: Springer.

Arnett, J. J. (1990). Drunk driving, sensation seeking, and egocentrism among adolescents. *Personality and Individual Differences, 11*(6), 541-546.

Barnes, G. M. & Welte, J. W. (1988). Predictors of driving while intoxicated among teenagers. *Journal of Drug Issues, 18*(3), 367-384.

Bauman, A. & Phongsavan, P. (1999). Epidemiology of substance use in adolescence: Prevalence, trends and policy implications. *Drug & Alcohol Dependence, 55*, 187-207.

Beal, A. C., Ausiello, J. & Perrin, J. M. (2001). Social influences on health-risk behaviors among minority middle school students. *Journal of Adolescent Health, 28*, 474-480.

Bingham, C. R. & Shope, J. T. (2004). Adolescent problem behaviour and problem driving in young adulthood. *Journal of Adolescent Research, 19*(2), 205-223.

Bryant, A. L., Schulenberg, J. E., O'Malley, P. M., Bachman, J. G. & Johnston, L. D. (2003). How academic achievement, attitudes, and behaviors relate to the course of substance use during adolescence: A 6-year, multiwave national longitudinal study. *Journal of Research on Adolescence, 13*(3), 361-397.

Caughlin, J. P. & Malis, R. S. (2004). Demand/withdraw communication between parents and adolescents: Connections with self-esteem and substance use. *Journal of Social and Personal Relationships, 21*(1), 125-148.

Cooper, M. L., Wood, P. K., Orcutt, H. K. & Albino, A. (2003). Personality and the predisposition to engage in risky or problem behaviors during adolescence. *Journal of Personality and Social Psychology, 84*(2), 390-410.

Diego, M. A., Field, T. M. & Sanders, C. E. (2003). Academic performance, popularity, and depression predict adolescent substance use. *Adolescence, 38*(149), 35-42.

Donohew, R. L. & Hoyle, R. H. (1999). Sensation seeking and drug use by adolescents and their friends: Models for marijuana and alcohol. *Journal of Studies on Alcohol, 60*(5), 622-631.

Dowd, M. D., Langley, J., Koepsell, T., Soderberg, R. & Rivara, F. P. (1996). Hospitalizations for injury in New Zealand: Prior injury as a risk factor for assaultive injury. *American Journal of Public Health, 86*(7), 929-934.

Ellickson, P. L., Tucker, J. S., Klein, D. J. & McGuigan, K. A. (2001). Prospective risk factors for alcohol misuse in late adolescence. *Journal of Studies on Alcohol, 62*(6), 773-782.

English, D., et al. (1995). *The quantification of drug caused morbidity and mortality in Australia*. Canberra: Commonwealth Department of Human Services and Health.

Fergusson, D., Swain-Campbell, N. & Horwood, J. (2003). Risky driving behaviour in young people: Prevalence, personal characteristics and traffic accidents. *Australian and New Zealand Journal of Public Health*, 27(3), 337.

Grube, J. W. & Voas, R. B. (1996). Predicting underage drinking and driving behaviors. *Addiction*, 91(12), 1843-1857.

Healey, J. (Ed.). (2002). *Adolescent health*. Sydney: Spinney Press.

Hewitt, N., Elliott, B. & Shanahan, P. (1995). *A Review of Risk Behaviours among 15-24 Year Olds*. Canberra: Commonwealth Department of Human Services and Health.

Hingson, R. (1982). Teenage driving after using marijuana or drinking and traffic accident involvement. *Journal of Safety Research*, 13(1), 33-38.

Hingson, R. (1996). Prevention of drinking and driving. *Alcohol Health and Research World*, 20(4), 19-26.

Hingson, R., Heeren, T., Levenson, S., Jamanka, A. & Voas, R. (2002). Age of drinking onset, driving after drinking, and involvement in alcohol related motor-vehicle crashes. *Accident Analysis and Prevention*, 34(1), 85-92.

Jessor, R. (1983). Adolescent development and behavior health. In J. D. Matarazzo (Ed.), *Behavioral health: A handbook of health enhancement & disease prevention*. NY: Wiley.

Kadel, B. (1998). *Wisconsin youth risk behaviour survey. Executive summary and report*. Madison, WI: Wisconsin Survey Research Laboratory.

King, C. A. & Ghaziuddin, N. (1996). Predictors of comorbid alcohol and substance abuse in depressed adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35(6), 743.

Lam, L. T. (2003). A neglected risky behavior among children and adolescents: Underage driving and injury in New South Wales, Australia. *Journal of Safety Research*, 34(3), 315-320.

Lynskey, M. T. (2001). *Alcohol Use and Violent Behaviour among Youth: Results from a Longitudinal Study*. Canberra: Australian Institute of Criminology.

MacKinnon, D. P., et al. (1994). Social influences on adolescent driving under the influence in a sample of high school students. *Alcohol, Drugs and Driving*, 10(3-4), 233-241.

Miller, M. & Draper, G. (2001). *Statistics on Drug Use in Australia 2000*. Canberra: Australian Institute of Health and Welfare.

Moon, L., Meyer, P. & Grau, J. (1999). *Australia's young people: their health and wellbeing 1999*. Canberra: AIHW.

O'Malley, P. & Johnston, L. D. (1999). Drinking and driving among US high school seniors. *American Journal of Public Health*, 89(5), 678-684.

- O'Malley, P. M., Johnston, L. D. & Bachman, J. G. (1998). Alcohol use among adolescents. *Alcohol Health and Research World*, 22(2), 85-93.
- Palamara, P. & Stevenson, M. (2003). *Risk factors for crashing and speeding among young drivers: A three year follow-up of the Western Australian Young Driver Cohort Study*. Paper presented at the joint IRC/RAC (WA) seminar on Young Drivers, Perth, Australia.
- Pickett, W., Garner, M.J., Boyce, W.F. & King, M.A. (2002). Gradients in risk for youth injury associated with multiple-risk behaviours: a study of 11,329 Canadian adolescents. *Social Science & Medicine*, 55, 1055-1068.
- Resnick, M. D., et al. (1998). Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. In R.E. Muuss & H.D. Porton (Eds.), *Adolescent Behaviour and Society: A Book of Readings*. (Vol. 5, pp. 376-395). New York: McGraw-Hill.
- Sells, C. W. & Blum, R. (1996). Current trends in adolescent health. In R.J. DiClemente, W.B. Hansen & L.E. Ponton (Eds.), *Handbook of Adolescent Health Risk Behavior*. (pp. 5-29). New York: Plenum.
- Sheehan, M., Schonfeld, C., Najman, J., Siskind, V., Ballard, R., & Schofield, F. (1996). A three year outcome evaluation of a theory based Drink Driving Education Program. *Journal of Drug Education*, 26(3), 295-312.
- Sheehan, M., Siskind, V., & Schonfeld, C. (2004). *A longitudinal study of adolescent drink driving and other risk taking behaviors: Challenges for the change process*. Paper presented at the 17th Int. Conference on Alcohol Drugs & Traffic Safety, Glasgow.
- Shope, J. T. (2001). Teens, substance abuse, and driving. *University of Michigan Transportation Research Institute Research Review*, 32(3), 6-9.
- Shope, J. T., Raghunathan, T. E. & Patil, S. M. (2003). Examining trajectories of adolescent risk factors as predictors of subsequent high-risk driving behavior. *Journal of Adolescent Health*, 32, 214-224.
- Shope, J. T., Waller, P. F. & Lang, S. W. (1996). Alcohol-related predictors of adolescent driving: Gender differences in crashes and offenses. *Accident Analysis & Prevention*, 28(6), 755-764.
- Stanford, M. S., Greve, K. W., Boudreaux, J. K. & Mathias, C. W. (1996). Impulsiveness and risk-taking behavior: Comparison of high-school and college students using the Barratt Impulsiveness Scale. *Personality and Individual Differences*, 21(6), 1073-1075.
- Stevenson, M. R. & Palamara, P. (2001). Behavioural factors as predictors of motor vehicle crashes: Differentials between young urban and rural drivers. *Australian and New Zealand Journal of Public Health*, 25, 245-249.
- Stevenson, M.R., Palamara, P., Morrison, D. & Ryan, G.A. (2001). Behavioural factors as predictors of motor vehicle crashes in young drivers. *Journal of Crash Prevention and Injury Control*, 2, 247-254.
- Thomas, B. S. & Hsiu, L. T. (1993). The role of selected risk factors in predicting adolescent drug use and its adverse consequences. *International Journal of the Addictions*, 28(14), 1549.

- Vicary, J. R., Smith, E., Caldwell, L. & Swisher, J.D. (1998). Relationship of changes in adolescents' leisure activities to alcohol use. *American Journal of Health Behavior*, 22(4), 276-282.
- Wallace, J. M., et al. (2003). The influence of race and religion on abstinence from alcohol, cigarettes and marijuana among adolescents. *Journal of Studies on Alcohol*, 64(6), 843-848.
- Wechsler, H., Rohman, M., Kotch, J. B. & Idelson, R. K. (1984). Alcohol and other drug use and automobile safety: A survey of Boston-area teenagers. *Journal of School Health*, 54(5), 201-203.
- Western, J., Lynch, M. & Ogilvie, E. (2003). *Understanding youth crime: An Australian study*. Aldershot, Hampshire: Ashgate Publishing Ltd.
- White, V. M., Hill, D. J. & Effendi, Y. (2002). Patterns of alcohol use among Australian secondary students: Results of a 1999 prevalence study and comparisons with earlier years. *Journal of Studies on Alcohol*, 64(1), 15-22.
- Williams, A. F., Lund, A. K. & Preusser, D. F. (1986). Drinking and driving among high school students. *International Journal of the Addictions*, 21(6), 643-655.
- Wulfert, E., Block, J. A., Ana, E. S., Rodriguez, M. L. & Colzman, M. (2002). Delay of gratification: Impulsive choices and problem behaviours in early and late adolescence. *Journal of Personality*, 70(4), 533-552.
- Zador, P. L., Krawchuck, S. A. & Voas, R. B. (2000). Alcohol-related relative risk of driver fatalities and driver involvement in fatal crashes in relation to driver age and gender: An update using 1996 data. *Journal of Studies on Alcohol*, 61, 387-395.