Behaviour and accidents in young children and adolescents

Abstract

The Mater-University Study of Pregnancy recruited a cohort of 8,458 Brisbane women during pregnancy. Subsequent follow-ups of mother and child occurred a few days, 6 months, 5 years and 14 years after birth, with the collection of a wide range of biological, sociological and behavioural information as well as measures of mental and physical health. In anticipation of a further cohort follow-up (funded by CARRS-Q) aimed specifically at examining risk-taking behaviour and road crashes in young drivers, the present paper examines the relationship between child and adolescent behaviour and the occurrence of accidents. This indicates that children with behaviour problems, particularly social and attentional disorders at age 5 years are nearly twice as likely to have had an accident in the past three months. While there is some evidence of continuity of accident occurrence (27% of children whose mother's reported an accident at age 5 years also were also reported to have had an accident requiring medical attention in the last year) this association was weak. Behaviour problems, as measured by the Child Services, police or Juvenile Aid Bureau at age 14 also predict accident occurrence at age 14. 'Binge drinking' (consumption of seven or more alcoholic drinks at a time), while rare in this sample (2%) was associated with a doubling of accident risk. The next phase of MUSP will involve administering a questionnaire focused on risk taking behaviour to adolescents, followed up by later record linkage to accident reports and medical records to obtain end-points of road crashes and accident morbidity.

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Motor vehicles are responsible for the single largest cause of injury in young males, accounting for 30.8 deaths and 510 hospital separations per 100,000 within the ages 15-29 (1). While considerable reductions in crash-related injury have occurred in recent decades, this has primarily resulted from focusing on the vehicle and environmental factors in the causation of injury. It has now been acknowledged that behavioural factors, social determinants and personal characteristics of drivers are significant contributors to the problem (2). Specifically, risk-taking behaviour has been suggested to be the single most important factor in producing the excess of crash occurrence and injury in young males in Australia.

Literature suggests that young men engage in more risky driving procedures (speeding, illegal turns, etc), are more inclined to be sensation seeking, impulsive, aggressive, emotionally unstable or depressed, and are vulnerable to peer pressure and cultural and social norms (3). Lack of negative feedback on risky driving behaviour contributes to its continuation (3, 4). Some evidence exists that adolescents with a history of attention deficit disorders and behaviour problems are more likely to commit traffic offences (5) or to indulge in risk-taking behaviour generally (6). It has also been emphasised that these associations occur in female adolescents (5), for whom crash related injury rates have been increasing in parallel with emerging aggressive driving activity (7).

Effective strategies to prevent the development of risky driving behaviour or changing behaviour requires an improved understanding of the determinants of risk-taking behaviour in adolescents, and the way in which the determinants relate to road crashes.

The Mater-University Study of Pregnancy

The Mater-University of Queensland Study of Pregnancy (MUSP) involves 8,458 pregnant women enrolled between 1981 and 1984 (8). The cohort was recruited at first antenatal clinic visit to the Mater Misericordiae Hospital in Brisbane. The cohort was followed up a day or two after birth, six months after the birth, when the child was aged five, and

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in 1995-98, when the child was 14 years of age. Initial compliance with the study was very high: of 8,556 women approached, only 98 refused. Subsequently, 7,689 of these mothers were confined at the Mater Hospital, with pregnancies of at least 20 weeks gestation. The cohort presently contains approximately 5,000 mother-child pairs. At each time point extensive information regarding social characteristics of the family and psychological and behavioural characteristics of the mother were collected. Biological measures relating to pregnancy, delivery and the neonatal period were extracted from the medical record at baseline. At the five- and 14-year follow-ups, a physical and developmental assessment of the child was made. At the 14-year follow-up, the child completed a questionnaire independently of the mother.

The present paper aims to examine the association between child behaviour and accident occurrence in the MUSP cohort of 5,248 children for whom data are available at age five and 14; and present the research plan for further evaluation of the risk-taking behavior, and collection of road crash and injury end-point.

Measurements and method

Child behaviour problems at age five were measured using selected items from the Child Behaviour Check List (CBCL) of Achenbach and Edelbrock (9,10). The CBCL is not a diagnostic test, but is used to derive standardised descriptions of child behaviours. These are behaviours which caregivers of children are likely to see as being of sufficient concern to warrant consulting a clinician. The CBCL is used for the 4-18 years age group. In this study 33 of the 113 items were selected from the CBCL; excluded items were those which occurred infrequently in the five-year age category. Factor analysis of these 33 items revealed three broad syndromes collectively involving 31 items. Each of these subscales had a high degree of internal consistency. A similar procedure was adopted for the assessment at age 14, with two important improvements. First the full CBCL of 113 items was administered by questionnaire to the mothers, and second a questionnaire containing the identical list (suitably re-worded inn the first person), and then known as the Youth Self Report was completed by the 14-year old.

Accident history in the preceding three months at age five and 14 years were obtained by self-report of the mother. At 14 years, mothers were ask to report only on accidents requiring medical attention (in the last year), or involving fractures or loss of consciousness (ever in lifetime).

Results

At child age five, 385 (7.3%) mothers reported that their child had had an accident in the past three months. The rates of behaviour problems in children reported to have had an accident were nearly twice those in children who had not had an accident (see Table 1). This association between accidents and behaviour problems was strongest for social, attentional and thought disorders.

Table 1: Rates of behaviour problems (percentage) for mother reports (at child age five) for children (not) experiencing any accidents or injuries in the past three months.

Behaviour problem	Accident or injury in the past three months needing a doctor's help	
	No n=4,885	Yes n=385
Aggression	10.1	17.4***
Internalising	11.3	17.1***
Social, attentional disorders	11.7	21.9***

Children whose mothers reported an accident at age five were more likely to have had an accident or injury at the 14-year follow-up, as reported by the mother. A total of 1,057 14-year olds (20.1%) had had an injury requiring medical help in the last year; of these, 18.2% of mothers gave a history of an accident at age five, compared to 9.8% within those with no such injury at age 14. Within the 1,312 14-year olds (25.0%) who had had an injury resulting in fractures, 9.6% of mothers had reported an accident at age five, compared to 6.5% within those with no injury at age 14. Within the 247 14-year olds (4.7%) who had had an injury resulting in loss of consciousness, 10.4% of mothers had reported an accident at age five, compared to 6.0% within those with no such injury at age 14.

Occurrence of injury or accident reported at age 14 was examined in relation to evidence of behaviour problems provided by the mother's completion of the child behaviour checklist, the Youth Self-Report and the mother's reports of any contact with authorities (see Table 2). The strongest association found was between aggression (as reported by the mother) and the occurrence of an injury resulting in loss of consciousness, where the additional risk was almost two-fold. While other associations are not as strong, the pattern for behaviour problems and accident/injury occurrence is consistent. This pattern persisted when contact with children's services, child guidance officers and the police or juvenile aid bureau are examined, again with up to two-fold elevations in risk in some cases. In summary, in this cohort, children with a history of behaviour problems, whether self-reported, reported by their mother, or coming to the attention of external agencies consistently exhibit higher accident or injury rates.

Risk-taking behaviour, as indicated by cigarette smoking and

Table 2: Rates of behaviour problems (percentage) for mother reports (at child age 14) of children having/not having accidents/injuries.

	Accident needing a doctor's help		Accident involving broken bones		Head injury with loss of consciousness	
	No n=4,180	Yes n=1,057	No n=3,936	Yes n=1,312	No n=4,989	Yes n=247
Mother reported behaviour problem						
Aggression	9.3	13.9***	9.3	13.3***	9.8	18.2***
Delinquency	9.0	12.3***	9.1	11.5**	9.3	16.6***
Child reported behavior problem						
Aggression	8.6	11.5**	8.7	10.8**	9.0	12.6*
Delinquency	13.3	17.2***	13.1	16.9***	13.6	21.5***
Contact with authorities						
Child guidance officer	23.4	32.9***	24.2	28.3**	24.8	36.3***
Children's services	4.5	6.8**	4.8	5.7	4.7	10.8***
Police/Juvenile Aid	8.1	14.3**	8.6	11.8***	9.1	14.8**

Table 3: Rates of cigarette smoking and alcohol use (percentage) reported by the child at age 14 according to occurrence of by accidents/injuries.

	Accident needing a doctor's help		Accident involving broken bones		Head injury with loss of consciousness	
	No n=4,180	Yes n=1,057	No n=3,936	Yes n=1,312	No n=4,989	Yes n=247
Cigarette smoking						
Often	5.2	6.0	5.3	5.4	5.4	4.1
Sometimes	8.5	10.8*	8.3	11.0**	8.8	13.6*
Consumption of alcohol						
7 + glasses	1.6	3.0**	1.6	2.9*	1.8	4.5**
Few times month or more	4.9	6.3	5.1	5.4	5.2	6.5
Frequency of playing sports						
Not at all	3.6	5.1	3.9	3.9	3.7	6.9
Nearly every day	21.9	31.2***	22.9	26.6	23.7	26.4

alcohol use reported by the 14-year olds were comparatively rare in this age-group (see Table 3). However 'binge drinking' as measured by the consumption of seven or more drinks on a single occasion was associated with increased injuries resulting in loss of consciousness. While this may be a direct cause and effect relationship, the pattern is similar for other categories of accidents and is also reflected in the relationship between frequency of alcohol use and accidents and injury. Smoking 'sometimes' was 50% more common in those who had experienced an injury resulting in loss of consciousness. As a measure of positive health behaviour, the child's report of participation in regular sporting activities was examined in relation to accident occurrence. Children who did not play sport at all were more likely to experience an accident requiring medical help or an injury resulting in loss of consciousness, although the numbers in this group were too small to provide conclusive results. Of children who played sports at least six times per week, more had experienced an accident requiring medical attention.

The relationships presented above were explored for males and females separately (data not shown). While females had lower rates of the behaviour problems considered and had lower accident rates, the same types and strengths of associations existed.

Conclusions

Data from this longitudinal study show a consistent cross-sectional relationship at ages five and 14 between behavioural problems and accident experience. In addition there is a tendency for children experiencing accidents in early childhood to be more at risk in their early teenage years. These results support others' findings that behaviour problems developing throughout childhood, and here characterised as social, attentional or thought disorders, aggression or delinquent behaviour, might play a role in explaining risk-taking behaviour and subsequent road accidents in-particular.

Future research

The Mater cohort provides a rich source of longitudinal social, biological and behavioural data, with the potential to provide multifactorial aetiological explanations for health end-points. The evidence provided above is suggestive, but requires considerable strengthening with better and more specific measures of risk-taking behaviour in adolescence and a comprehensive longitudinal analysis of the relationship between behaviour and accident and injury outcomes. The Mater cohort of 'children' is now moving into the driving age group and establishing patterns of driver behaviour. With a lifelong history of potential determinants of this behaviour, the MUSP cohort is now planned to undergo a further follow-up in order to measure risk taking behaviour and to obtain consent for record linkage to crash and injury databases held by Queensland Health and Queensland Transport, and to the major hospitals' databases. Crash and injury incidence will be analysed for potential determinants already in the MUSP database as well as those gathered in the risk-taking questionnaire. In particular the predictive power of early and late childhood behavioural disorders will be examined and linked to indicators of risk-taking. The role of mediating factors such as family functioning, maternal mental health and external stressors will be examined. The MUSP team believes this study is in a unique position to contribute knowledge about the causes of one of the major adolescent health problems. We thank the Centre for Accident Research and Road Safety of Queensland for providing support for this research.

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