

The impact of graduated driver licensing restrictions on young driver crashes in New Zealand

Begg, D.J.; Alsop, J. Langley, J.D.

Injury Prevention Research Unit
Department of Preventive and Social Medicine
University of Otago

P.O.Box 913 Dunedin, New Zealand

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Abstract

Graduated driver licensing (GDL), as introduced in New Zealand in 1987, included three main driving restrictions: a night-time curfew (10pm-5am), no carrying of young passengers, and a blood alcohol limit of 30mg/100ml of blood. The aim of the present study was to determine the impact that these restrictions had on young driver crashes. For this study the New Zealand Police traffic crash reports were linked to the national hospital inpatient records (1980-1995). Multivariate binomial regression was used to compare car crashes involving a young driver licensed before the GDL (pre-GDL, n=2252) with each of the graduated licence groups: full GDL (n=1273); restricted licence (n=980); or learner licence (n=399). The results showed that, compared to the pre-GDL group, restricted licence drivers had fewer crashes at night ($p=0.024$), fewer involving passengers of all ages ($p=0.034$), but did not differ where alcohol was suspected. The learner licence drivers had a higher proportion involving passengers ($p=0.023$), but night-time and alcohol suspected crashes did not differ. The full GDL drivers did not differ significantly from the pre-GDL drivers for any of the factors examined. These results suggest that the graduated driver licensing restrictions, especially the night-time curfew, have contributed to a reduction in crashes involving young drivers. Particularly encouraging were the results for the restricted licence drivers who are the licence group most affected by the restrictions.

Introduction

Like other motorised countries (1), New Zealand has a problem of traffic-related injury among young drivers. Over recent years, the most important policy initiative addressing this problem, has been the introduction of the graduated driver licensing system (GDLS). The New Zealand

system, as introduced in August 1987, consisted of three licensing stages: learner, restricted, and full. At the learner licence stage, the young driver must be supervised at all times (a supervisor must be at least 20 years old, had a full licence for two years, and is currently fully licensed), and there is a blood alcohol limit of 30mg/100 ml of blood (0.03). At the restricted licence stage, the main driving restrictions include: no driving between 10pm and 5am (without a supervisor), no carrying of passengers (without a supervisor), and a 0.03 blood alcohol limit. Evaluations of the GDLS (2, 3) have shown that since it was introduced in 1987 there has been a significant reduction in the number of young people seriously injured in traffic crashes. After accounting for other known factors that may have influenced this reduction (e.g. unemployment), it was considered that around 8% of this reduction was due to the GDLS (3). These earlier studies, however, were not able to directly determine the impact that the GDLS driving restrictions had on young driver crashes. A sharp decrease in the number of young licensed drivers, immediately following the introduction of the GDLS, suggested that the GDLS may have deterred young people from applying for their licence, thereby indirectly increasing the age at which licensing began. Unless this was accompanied by an increase in unlicensed driving, this delay in licensure would have resulted in less driving by young people, which may have been an important contributing factor to the reduction in injury.

Up until recently a major hindrance to investigating the impact of the GDL driving restrictions on young driver crashes was the lack of a data set that contained a) the crash information relevant to the GDL restrictions, and b) was free from known biases with respect to the factors to be investigated. This has been overcome by linking the official police crash records to the hospital inpatient data, thus creating a single database that contains cases selected on a criterion that is free from any known biases with respect to the factors being examined (i.e. admission to hospital), and includes many relevant details about the crash event (police crash data).

The aim of the present study was to determine whether young drivers with a graduated driver licence had proportionately fewer crashes involving the specific factors targeted by the GDLS, than those licensed before graduated licensing. The specific hypotheses to be tested were: a young driver licensed under the graduated driver licensing system (learner, restricted or full licence) would have proportionately fewer crashes that: occurred at night-time; included young passengers (15-19 year olds); involved alcohol, than a young driver licensed under the old system.

Materials and Method

The data base created for this study linked the New Zealand Police traffic crash reports (TCR) for 1980-1995 to the New Zealand Health Information Services (NZHIS) hospital inpatient records, for the same individuals (4). The cases selected for this study were motor vehicle occupants (excluding motorcyclists) injured in traffic crashes that occurred between 1980 and 1995, inclusive, and involved a driver aged 15-19 years.

The licence status of the driver was used to define the groups that were examined in the analyses. The pre-GDL group included the drivers who were licensed before the GDLS, and this group was compared with each of the GDL licence groups: the learner licence, restricted licence, and full GDL groups.

Night-time crashes were identified using the information in the TCR on time of day (hour and minute) when the crash occurred. The presence of passengers in the crashed vehicle is recorded in the TCR but the age of passengers is only recorded if the passenger is a casualty (i.e. injured). The involvement of young passengers, therefore, could not be directly determined. Instead, the involvement of any passengers was examined, and then for the crashes where there were passenger casualties, the age of the casualties was examined. In New Zealand blood or breath alcohol measurements are not routinely collected from non-fatal motor vehicle crash victims. The police officer attending the crash assesses whether "the driver was thought to have been drinking" and this is recorded in the TCR. There is some evidence that, if alcohol is present, this is a reasonably accurate indicator of alcohol involvement (5) and was the measure used in this study.

Separate multivariate binomial regressions were performed to investigate differences between the pre-GDL group and each of the three GDL groups (learner, restricted, full) licence for each of the three outcomes (i.e. crashes that occurred at night, crashes involving passengers, crashes where alcohol was suspected). Gender, age, and the year in which the crash occurred, were included as covariates in the models.

Results

For each licence group, the number of young drivers involved in a crash, the proportion of crashes that occurred at night, the proportion that involved passengers, and the proportion that were suspected of involving alcohol, are given in Table 1. Compared with the other licence groups, relatively few of the crash-involved drivers held a learner licence (n=399). The learner licence drivers had the highest proportion of crashes involving a passenger, but the pre-GDL group had the highest proportion at night and the highest proportion where alcohol was suspected.

Table 1: The number of young driver crashes, proportion that involved passengers, the proportion that occurred at night (10pm-5am), and the proportion where alcohol was suspected, by type of licence

Licence status	No. of crashes	Prop. passengers	Prop. at night	Prop. alcohol
Pre-GDL	2252	0.62	0.37	0.28
Full GDL	1273	0.62	0.31	0.21
Restricted licence	980	0.58	0.27	0.20
Learner licence	399	0.73	0.32	0.26

The results from the binomial regression analyses (Table 2) show that compared to the pre-GDL group, the learner, restricted and full licence groups all had a smaller proportion of crashes occurring at night, but the difference was only significant for those with a restricted licence (p=0.024). Compared to the pre-GDL group, the restricted licence group had significantly fewer crashes involving passengers (of all ages) (p=0.034) and the learner licence group had

significantly more ($p=0.023$). The age distribution of the injured passengers showed that in the crashes where the driver held a pre-GDL, a full GDL, or a restricted licence, around 70% were aged 15-19 years. For crashes involving a learner licence driver, just over half the passengers were aged 15-19 years, and 39% were at least 20 years of age. The results (in Table 2) showed that the proportion of crashes where alcohol was suspected did not differ between the pre-GDL group and the full, restricted or learner licence groups.

Table 2 Crashes involving a pre-GDL licensed young driver compared with those involving young drivers with a full-GDL, a restricted licence or a learner licence, for each of the GDL driving restrictions

GDL Driving restrictions	Odds ratio	95% confidence interval	p-value
Night-time Crashes			
Pre-GDL	1.00		
Full-GDL	0.80	0.63-1.03	0.078
Restricted licence	0.74	0.57-0.97	0.024
Learner licence	0.96	0.69-1.33	0.782
Passengers (all ages)			
Pre-GDL	1.00		
Full-GDL	0.96	0.75-1.22	0.719
Restricted licence	0.76	0.59-0.98	0.034
Learner licence	1.47	1.05-2.07	0.023
Alcohol suspected			
Pre-GDL	1.00		
Full-GDL	0.85	0.65-1.09	0.192
Restricted licence	0.94	0.72-1.24	0.672
Learner licence	1.31	0.94-1.83	0.109

Discussion

Earlier research (2,3) showed that there has been a significant reduction in traffic-related injury among young people in New Zealand since the GDLS was introduced. The results from this research indicate that the specific driving restrictions of the GDLS have contributed to this reduction. The clearest evidence to support this comes from the results examining night-time crashes, and in particular for the restricted licence group who had significantly fewer night-time crashes than the pre-GDL group. The drivers with a full-GDL also had a substantially smaller proportion of night-time crashes, than those licensed under the old system. This could indicate some ongoing safety benefit of the night-time driving restriction, beyond the period when the restrictions applied. Alternatively, it could be due to some other factors that affected night-time driving (e.g. compulsory breath testing), that were not examined in this study.

The lack of detailed crash data hindered the evaluation of the impact of the passenger restriction. Nevertheless, the available evidence showed that the restricted licensed drivers had significantly fewer crashes involving passengers than the pre-GDL drivers. While some of these passengers may have been acting in a supervisory role, the age distribution of the injured passengers showed that the majority were between 15 and 19 years old, and therefore too young to be a supervisor. This suggests that these young drivers may have been violating the conditions of their licence, which has been identified as a problem with the GDLS as introduced in 1987 (2, 6, 7). This was due in part to the absence of any effective penalties for violations of the conditions, making enforcement of the driving restrictions difficult for the police.

Evaluating the impact of the alcohol restriction was also hampered by a lack of quality data, but perhaps more importantly, other changes would have also had an impact on the results presented in this study. In particular, the change in legislation that extended the 30mg per 100 ml of blood alcohol limit to all young drivers under 20 years of age, irrespective of the type of licence, would have directly impacted on the results presented here. In addition to this, a range of other strategies have been implemented (e.g. compulsory breath testing, media campaigns) and these may have had some effect on the behaviour of young drivers.

It was expected that the learner licensed drivers, who are required to be supervised at all times, would have a smaller proportion of crashes at night and involving alcohol, than the fully licensed pre-GDL drivers. This was not the case in this study. It should be noted, however, the number of crashes involving a learner licensed driver was quite small (n=399) suggesting that young supervised drivers may be less likely to be in a crash, than unsupervised drivers. Also, when the age of the drivers was examined it was found that 49% of the learner licence drivers were aged 18-19 years. This is somewhat older than was expected, given that licensing can commence at 15 years of age. Failure to progress through the stages of the graduated licensing system has been previously noted (8), and this may have been exacerbated by the absence of effective penalties for violations of the driving restrictions. Prior to May 1999, the maximum penalty that could be applied for breaches of the GDL restrictions was an extension of six months to the current licence. An extension to their licence is of little consequence to a young driver who blatantly disregards the driving restrictions.

In May 1999, several changes were made to the New Zealand graduated driver licensing system, which should go some way to addressing the problems associated with non-compliance of the driving restrictions. Included in these changes was a penalty regime consisting of monetary fines and demerit points for violations of the conditions. Breaches of a condition of either the learner or restricted licence will incur 25 demerit points and a \$400 infringement fee. If 100 demerit points are accumulated within a two year period, the licence will be suspended for three months. This new penalty regime should provide a strong disincentive for young people to disregard the conditions of their licence, and thereby improve compliance with the restrictions, and the overall effectiveness of this licensing system in reducing traffic related injury among young adults.

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