

The Effectiveness of a New Law to Reduce Alcohol-impaired Driving in Japan

JMAJ 49(11•12): 365–369, 2006

Takashi Nagata,^{*1–3} David Hemenway,^{*4} Melissa J Perry^{*5}

Abstract

Objectives To estimate the impact of a new traffic law targeting alcohol-impaired driving in Japan

Methods Japan passed a new traffic law in June 2002 with the aim of reducing the incidence of alcohol-impaired driving by reducing the permissible blood alcohol level and increasing penalties. Using data collected from police reports, the number of traffic fatalities and injuries for 7 months in the pre-law period (June 2001 to December 2001) and the same 7 months in the post-law period (June 2002 to December 2002) were compared.

Results Traffic fatalities decreased 7.8% and traffic fatalities involving alcohol-impaired driving decreased 26.7% after the introduction of the new traffic law. Traffic fatalities had been falling since 1993, but fell substantially faster after the law was passed.

Conclusions This study indicates that large, immediate public health benefits resulted from the implementation of the 2002 alcohol-impaired driving law in Japan.

Key words Alcohol, Driving, Traffic, Breath test

Introduction

Traffic injuries are a world-wide public health issue. Annually, more than a million people are killed on the world's roads; in the United States alone, there are over 40,000 motor vehicle fatalities each year.¹ In April 2004, The World Health Organization (WHO) and The World Bank released the *World Report on Road Traffic Injury Prevention*.² The report stated that in 1990, road traffic injuries were the ninth largest contributor to the global burden of disease, but are predicted to become the third largest contributor by 2020 unless appropriate action is taken.

Alcohol-impaired driving is a leading cause of traffic fatalities both in developed and developing countries. A review of studies in low- and middle-income countries found that blood alco-

hol was detected in 33–66% of fatally injured drivers. Although drinking and driving legislation, including administrative measures, random screening, and lowering of the legal blood alcohol limit, has been shown to reduce traffic fatalities, many countries have not implemented such measures.³

In Japan, traffic accident fatality rates have been decreasing 3–4% per year since 1992. The absolute number of traffic deaths has also fallen, from 11,451 in 1992 to 8,877 in 2003. The National Police Department believes that this reduction is due to improvements in policy, roads, vehicle engineering, driver behavior, and the nation's emergency medical system.⁴

In the 1990s, blood alcohol was detected in 14–16% of fatally injured drivers in Japan.⁵ In order to reduce alcohol-related traffic fatalities, in June 2002, the Japanese Government enacted

*1 Takemi Program, Department of International Health, Harvard School of Public Health, Boston, USA; *2 Department of Emergency Medicine, Saint Mary's Hospital, Kurume; *3 Japan Medical Association Research Institute, Tokyo; *4 Department of Health Policy and Management, Harvard School of Public Health, Boston, USA; *5 Department of Environmental Health, Harvard School of Public Health, Boston, USA
Correspondence to: Takashi Nagata MD, Emergency Department, Saint Mary's Hospital, 422 Tsubukuhonmachi, Kurume, Fukuoka 830-8543, Japan. Tel: 81-942-35-3322, Fax: 81-942-34-3115, E-mail: nagata.takashi@gmail.com

Table 1 Incidence of motor vehicle injuries in Japan (2003)

	Total No.	per population (per 100,000)
Total population	127,435,000	
Fatalities (death within 30 days)	8,877	7.0
Severe injuries ^a	75,086	58.9
All injuries	1,181,431	927
Injury fatality rate	0.75%	

^a: injuries that resulted in more than 30 days of medical care

a new Road Traffic Law targeting alcohol-impaired driving. This law lowered the breath alcohol reading allowed when driving from 0.25 to 0.15 mg/L (equal to 0.03% blood alcohol concentration), and increased the penalties for alcohol-impaired driving. The fine increased from approximately 50,000 to 500,000 yen (425 to 4,250 USD) and severe driver's license point deductions were imposed.⁵

This study evaluated the impact of this new law on traffic fatalities in Japan. We compared the occurrence of traffic fatalities between the same 7 month periods before and immediately after the new law was implemented.

Methods

This study utilized data available in the public domain, and received human subjects exemption from the Harvard School of Public Health IRB committee.

Simple counts were made of nationwide traffic fatalities from June to December 2001 (pre-law) and June to December 2002 (post-law), the first seven months after the new law was enacted, and the data for the two periods compared. Data came from police traffic accident reports. In Japan, regional police agencies report to a central national police agency. The national agency had a clear protocol for how the data were to be collected which included using information supplied by emergency medical care professionals.

A traffic fatality was defined as a person who dies within 24 hours of an accident on a road involving a vehicle with an engine, the death being the result of the accident. Thus fatality data included all motor vehicle-related deaths (involving, for example, trucks, motorcars, motor-

cycles, bicycles, and/or pedestrians). The total number of traffic fatalities, alcohol-related fatalities, injuries (non-fatal and fatal), and alcohol-related traffic arrests were compared between the two periods. In Japan, it is illegal to drive a car under the influence of alcohol. Alcohol-impaired driving (AID) is defined as driving with an alcohol reading >0.15 mg/L measured in a breath test.

Data-analysis was performed using STATA ver.8. Chi-square tests were used to compare fatality rates between the two periods.

Results

In Japan in 2003, there were 8,877 traffic fatalities within 30 days of traffic accidents, 7.0 per 100,000 persons (Table 1). Traffic injuries totaled 1,181,431, or 927 per 100,000 persons. Severe injuries, defined as casualties who received medical care for more than 30 days, totaled 75,086, or 58.9 per 100,000 persons. The ratio of traffic fatalities to severe traffic injuries to total traffic injuries was 1:8.4:132.

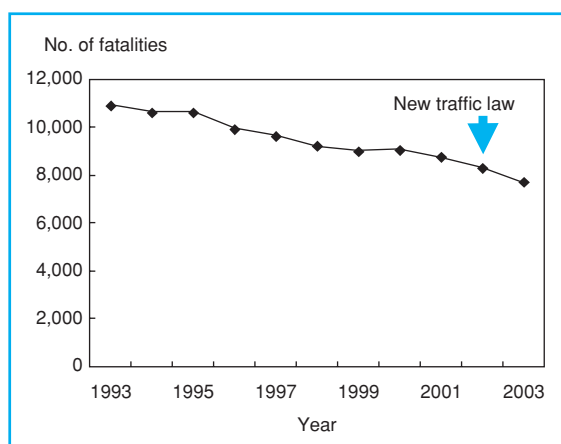
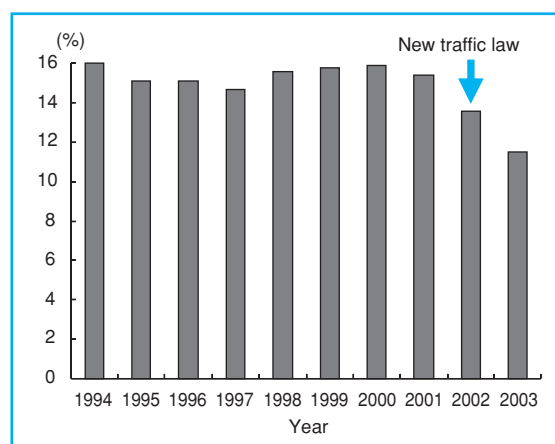
Total traffic fatalities decreased 7.8% after the introduction of the new traffic law ($P<0.05$) (Table 2). Traffic fatalities associated with alcohol-impaired driving decreased by 26.7% ($P<0.0001$). Although the legal drinking threshold was lowered by the new law, the number of drivers arrested for alcohol-impaired driving fell 4.6%.

Traffic fatalities have been decreasing in Japan since 1993 (Fig. 1). In the one year that fatalities did not decrease, 1995, Japan experienced the Great Hanshin Earthquake, and diagnosis coding changed from ICD-9 (International Classification of Diseases, 9th revision) to ICD-10. The average percentage fatality rate decrease between

Table 2 Number of traffic injuries and fatalities in Japan pre- and post-law (June–December 2001 compared to June–December 2002)

	Pre-law	Post-law	Percentage change	
No. of injuries	553,236	535,392	-3.2%	*
No. of injuries related to alcohol-impaired driving	14,861	10,853	-27.0%	
No. of fatalities	4,778	4,403	-7.8%	*, **
No. of fatalities related to alcohol-impaired driving	712	522	-26.7%	**
Total no. of regulated vehicles	6,776,773	6,601,364	-2.6%	
No. of drivers arrested for alcohol-impaired driving	140,460	133,937	-4.6%	

Statistically significant (*: $P < 0.05$, **: $P < 0.0001$), using Chi-square test

**Fig. 1** Occurrence of traffic fatalities since 1993**Fig. 2** The percentage of total fatalities resulting from AID

1993 and 2002 was 2.9% per year. Assuming that this decrease rate was stable on average, we applied it to the results in Table 2. Using this method, we estimated that $4,778 (1 - 0.029) = 4,639$ people would have died in the 7-month post-law period. However, the actual number of traffic fatalities was 4,403, a difference of 236 people ($4,639 - 4,403$).

From 1993 to 2001, the percentage of total fatalities that were related to alcohol-impaired driving was 15.5%; this number fell to 13.6% in 2002, and to 11.5% in 2003 (Fig. 2).

Discussion

Following implementation of the 2002 Road

Traffic Law, which increased the penalties for alcohol-impaired driving, Japan experienced a substantial drop in alcohol-related driving fatalities (26.7%) and a fall in total traffic fatalities. While traffic fatalities in Japan had been decreasing since the early 1990s, it appears that the law accelerated that trend. Shimizu and Imai reported the decrease in traffic fatalities after the new law, but did not measure the effect against the already declining traffic fatalities in Japan since 1993.^{5,10}

Alcohol remains a major contributor to traffic death throughout the world, although much progress has been made. License suspension, illegal and administrative per se laws, selective and regular enforcement patrols, and sobriety check-

points have been effective in reducing the harm caused by alcohol-impaired driving.^{6,7} The introduction of a legal blood alcohol concentration (BAC) limit has been effective in the United Kingdom, Canada, the Netherlands, and Japan. A 1970 law in Japan, which set the legal BAC at 0.05%, seems to have reduced traffic fatalities, but it was not statistically evaluated.^{7,8}

The 2002 law had two major features. First, it set the legal limit for a breath alcohol test reading at 0.15 mg/L, and that for a BAC at 0.03%/mg.

In Japan, breath testing is usually used to measure BAC because it is easy for police to perform.

The second major feature of the law was an increase in the penalty for drunk-driving from 425 to 4,250 USD (50,000 to 500,000 yen), an amount of money higher than the average monthly salary of businessmen who have graduated from university. Moreover, the new law placed responsibility not only on the alcohol-impaired driver but also bartenders who encouraged drinking and passengers who failed to discourage impaired driving.

Japan publicized the new law in a variety of ways, including mass media campaigns. However, the police stated that they did not change their alcohol related activities after June 2002, and the total number of arrests before and after the law was implemented was similar (Table 2). Stronger police enforcement does not appear to have been the cause of the drop in alcohol-related fatalities.

We measured the impact of the new law on the decrease in traffic fatalities in two ways: 1) by assuming that the number of injuries would have otherwise remained the same without the law, and then 2) by assuming that the rate of decrease in the number of injuries from 1993–2001 would have continued through 2002 and 2003. Both approaches showed the impact of the

law to have been significant.

This study has various limitations. First, data were not available on the severity of the non-fatal injuries in general, or on the severity of non-fatal alcohol-related injuries in particular. Second, we used the number of deaths within 24 hours of the traffic accident, not the number within 30 days. In most developed countries, traffic fatalities within 30 days of an accident are the standard measurement. Third, we did not control for possible confounders. However, we do not know of any other changes or events that occurred between 2001 and 2003 that may have had a significant impact on traffic injuries.

Our study reinforces and expands on previous reports that presented early results concerning the law.^{9,10} By all appearances, the law was quite successful. The number of alcohol-related motor vehicle fatalities and injuries fell by over 25%. The percentage of fatalities involving alcohol also fell substantially. However, even before the law, drunk-driving was less of a problem in Japan than in many other countries, representing less than 16% of total traffic fatalities. In the United States, this figure is about 40%. Part of the difference may be due to life style factors; in urban Japan parties are often held in bars, but patrons go home by public transport. The existence and use of an efficient and safe public transportation system may be a prime explanation for the lower rates of drunk-driving problems in Japan, particularly in urban areas.⁹

Our study found that the new Road Traffic Law was immediately followed by a substantial decline in fatal and non-fatal motor vehicle injuries associated with alcohol-impaired drivers, and an overall decrease in motor vehicle deaths and injuries. This Japanese policy appears to have been a very successful public health measure.

References

1. National Highway Traffic Safety Administration. State Laws and Practices for BAC Testing and Reporting Drivers Involved in Fatal Crashes. Washington, DC: US Dept of Transportation; 2004. Report DOT HS 809756.
2. World Health Organization. World Report on Road Traffic Injury Prevention. Geneva; 2004.
3. Mann RE, Macdonald S, Stoduto LG, et al. The effects of introducing or lowering legal per se blood alcohol limits for driving: an international review. *Accid Anal Prev.* 2001;33:569–583.
4. The Police Report about Fatal Traffic Crashes in 2003. Tokyo: National Police Agency; 2004. (written in Japanese)
5. Shimizu S. Tougher penalties for drink driving in Japan. *Addiction.* 2001;96:1866.
6. Wagenaar AC, Zobeck TS, William GD, et al. Methods used in studies of drink-drive control efforts: a meta-analysis of the literature from 1960 to 1991. *Accid Anal Prev.* 1995;2:307–316.
7. Deshpriya EB, Iwase N. Impact of the 1970 legal BAC 0.05 mg% limit legislation on drunk-driver-involved traffic fatalities, accidents, and DWI in Japan. *Subst Use Misuse.* 1998;33:2757–2788.

8. Deshpriya EB, Iwase N. Are lower legal blood alcohol limits and a combination of sanctions desirable in reducing drunken driver-involved traffic fatalities and traffic accidents? *Accid Anal Prev.* 1996;28:721–731.
9. Masahito H, Sorimachi Y, Kurosawa A, et al. Risk of death due to alcohol-impaired driving in Japan. *Lancet.* 2003;361:1132.
10. Imai H. The new traffic law and reduction of alcohol related fatal crashes in Japan. *Inj Prev.* 2003;9:382.