

Measures to ensure the effectiveness of drunk driving prevention policies

- Focusing on Korean laws and policies

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Abstract: The existing response to drunk driving focuses on “driver-centered punishment.” However, drunk driving is habitual. Moreover, driving with a suspended or revoked license, and the detection rate of drunk driving is low. Therefore, it is difficult to expect a significant effect of “driver-centered punishment.” Hence, the drunk driving prevention device system (amended Road Traffic Act) was implemented from October 25, 2024. The drunk driving prevention device was an attempt to suppress the recidivism of drivers caught for drunk driving, and could prevent drunk drivers from drinking and driving. However, this device is not an independent and absolute system. Therefore, additional measures, such as improvement education programs, drunk driving prevention education, and drunk-driving prevention publicity activities, are required. For the drunk driving prevention device to have a groundbreaking effect on habitual drunk driving, it should be established legally and institutionally, universally used by the general driving professionals, punishment and education of habitual drivers should be strengthened, and complementary devices should be developed.

Keywords: Drunk driving¹, Traffic accidents², Drunk driving prevention devices³, Drunk driving prevention policies⁴, Drunk driving prevention theories⁵

1. Introduction

Since 2000, the number of traffic accident casualties has been steadily decreasing; however, the number of drunk driving casualties has remained largely unchanged. The causes of traffic accidents are diverse, including drowsy driving, vehicle defects, inexperienced driving, driver negligence, and traffic violations. Among these, accidents caused by alcohol consumption result in the injury of an unspecified number of victims, and the damage caused is often severe and difficult to recover from, making it a significant social hazard. Drunk driving increases the likelihood of accidents; therefore, appropriate measures must be taken to control it.

Drunk driving is closely related to personal habits; hence, it is difficult to achieve results through strict punishment and drunk driving enforcement policies. Harsh penalties are counterproductive in restricting habitual drunk drivers. Furthermore, habitual drunk drivers are aware of their drunk driving yet continue to drive under the influence. Moreover, the consequences are not feared because the chances of being caught drunk driving are low.

Questions have been raised about the effectiveness of penalties for habitual and chronic drunk drivers. Criminal sanctions against repeat drunk drivers have shown little preventive effect. According to recent research, the rate of repeat drunk driving offenses is much higher than other traffic accidents.[1] Therefore, effective and multifaceted efforts need to be made to

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curb drunk driving.[2] Despite the implementation of the “Yoon Chang-ho Law,”² which strengthened penalties for drunk driving in response to a series of fatal accidents caused by drunk driving and widespread public outrage, related accidents continue to occur, including fatal accidents in child safety zones. Drunk driving is a crime with a high rate of recidivism, exceeding 40% annually over the past five years, and a high rate of repeat offenses.[3] This shows that post-incident measures have limitations in eliminating habitual and chronic drunk driving, and proactive measures are necessary.

In South Korea, revisions to the Road Traffic Act and the Special Act on the Handling of Traffic Accidents related to drunk driving included the implementation of the three-strike rule in 2001, the introduction of the offense of dangerous driving causing death or injury in 2007, the strengthening of the offense of dangerous driving causing death or injury and revisions to the Road Traffic Act in 2019, which included stricter blood alcohol concentration limits for drunk driving, and the mandatory installation of drunk driving prevention devices in 2024. However, there is a need for effective laws and policies against drunk drivers who continue to cause accidents. Therefore, this study analyzes the current state and status of drunk driving accidents in South Korea and changes in the law, and considers effective drunk driving prevention policies.

2. Theoretical Considerations

2.1 Concept and Characteristics of Drunk Driving

2.1.1. Concept of Drunk Driving

Drunk driving is generally understood as driving after consuming alcohol. However, driving after consuming alcohol is not prohibited by law. Article 44 of the Road Traffic Act prohibits driving while intoxicated, and Article 148-2, Paragraph 2, sets a blood alcohol concentration of 0.03% or higher as the penalty standard. Hence, there are several definitions of drunk driving.[4] Driving while intoxicated is defined as driving a motor vehicle while exceeding the blood alcohol concentration specified in the Road Traffic Act.[5] Another view defines it as driving while having consumed any amount of alcohol, with legal implications arising when the legally prescribed limit is exceeded.[6] Although there are differences among scholars in defining drunk driving, there is no debate that legal criteria are important. This study defines drunk driving as driving in a state of intoxication that meets the criteria for punishment under the law.

2.1.2. Characteristics of Drunk Driving

Drunk driving has several characteristics due to its unique nature. Even though drunk driving is a violation of the law, it is not punishable unless detected by the police or an accident occurs. Furthermore, even if it has the potential, unlike most crimes that result in damage and victims, drunk driving does not cause damage unless an accident occurs.

Although the perception that drunk driving is as dangerous as murder has increased, it was previously regarded as negligent rather than intentional. Compared to traditional crimes, drunk driving has a short history, as the advent and development of automobiles and other vehicles have been concentrated in the modern era. Furthermore, it is difficult to distinguish between drunk and non-drunk drivers.

² It was enacted in response to the accident of Yoon Chang-ho, who was hit by a drunk driver in Haeundae-gu, Busan, on September 25, 2018 and died on November 9 in a brain-dead state. The main contents of this law are a collective term for the revision of the Act on the Aggravated Punishment, etc. of Specific Crimes and the Road Traffic Act to strengthen the punishment standards for drunk drivers. It lowers the first-time drunk driving offense standard from two to one, raises the alcohol level standard to 0.03% or higher, and strengthens the punishment by imposing life imprisonment or imprisonment for three years or more on drunk drivers who cause the death of the victim.

2.2 Prevention Theories for Drunk Driving

Prevention theories for drunk driving include rational choice theory, prevention theory, brief intervention, social control theory, and addiction theory.

2.2.1 Rational Choice Theory

The rational choice theory posits that humans are free to choose to commit crimes rationally. The prerequisite for this theory is that, based on utilitarianism, people make decisions based on the goal of pursuing pleasure and avoiding pain. Moreover, based on the economic choice theory, people evaluate and select options that satisfy their desires. This suggests that humans commit crimes if they judge that their satisfaction or benefits outweigh the risks and pain involved.[7] Therefore, according to this theory, those who intend to commit a crime compare the benefits and the risks involved. If they judge that the crime will benefit them, they will commit it. Hence, drunk driving can be interpreted as the result of the rational choice of the actor.

2.2.2. Prevention Theory

The prevention theory is divided into general and special prevention. “General prevention” refers to efforts to prevent crime by influencing an unspecified number of people, while “special prevention” refers to efforts to prevent criminals from reoffending.[8] General and special prevention are based on the assumption that criminals can choose whether or not to violate social norms. Therefore, if they lack rational decision-making ability, the effectiveness of prevention is reduced.

Preemptive measures are crucial for drunk driving. In other words, as a form of general prevention, penalties for drunk driving serve as deterrents to other criminals and potential offenders. This requires people to modify their behavior. The preventive effect of punishment depends on its severity, certainty, and swiftness. “Severity” means sufficient punishment to destroy the benefits of the crime, while “certainty” means that criminals will be caught and punished. “Swiftness” refers to the speed of response to the crime.[9]

Therefore, the more certain, strict, and swift the punishment for criminal acts, the greater the general preventive effect. The current policy of strengthening penalties to increase drunk driving prevention is an attempt to enhance the general preventive effect. Since the enactment of the Road Traffic Act in 1961, South Korea has continued to strengthen its system of drunk driving prevention and punishment. However, to enhance the effectiveness of prevention, policies that ensure punishment, along with strengthening penalties through increased strictness, are necessary.

2.2.3. Brief Intervention

Brief intervention refers to effective intervention by various institutions to prevent drinking. This includes seeking to change drivers’ behavior by providing solutions to problematic behaviors, information on drunk driving, and feedback on questions.[10] In particular, it provides appropriate intervention in a short period based on the age, gender, and socioeconomic status of the target population.[11] Brief interventions are effective when combined with simple penalties. Examples include participation in drunk driving enforcement by traffic police and drunk driving enforcement campaigns in local communities, which are effective drunk driving prevention programs.[12] To enhance the effectiveness of brief interventions, it is necessary to intervene early and use convenient information media.[13] Effective education and campaigns are highly effective measures to curb drunk driving.[14]

2.2.4. Social Control Theory

The social control theory explains the effects of moral norms and social support on individual behavior regulation. It states that relationships with others, commitment, values, norms, and beliefs prevent individuals from violating the law. Therefore, when moral norms are internalized and individuals have a stake in the larger community, their tendency to commit crimes is limited. The key elements of social control theory are guilt and shame.[15] If individuals and society tolerate drunk driving, one cannot expect behavioral changes. Therefore, drunk driving can be eliminated by changing social norms to change individual behavior. A representative example of citizen activism is the 1980s American organization Mothers Against Drunk Driving (MADD). This organization changed social norms by raising awareness about the negative effects of drunk driving on society through a change in social perceptions about drunk driving.[16]

2.2.5. Addiction Theory

Among addiction theories, the cognitive-behavioral model suggests that self-efficacy, stress, environmental situations, and coping skills are important factors in drunk driving. Hence, problematic behavior change strategies, that is, behavior change strategies and reinforcement measures centered around the stages of change, are applied to prevent recurrence.[17] In particular, motivation enhancement focuses on pursuing behavioral change to prevent drunk driving by helping individuals initiate changes in their behavior.[18] Harm reduction approaches are a policy approach in which international organizations and countries actively regulate alcohol in response to the impact of drunk drivers on society as a whole and those around them.[19] Therefore, the harm reduction approach is a method in which the government takes the lead in actively responding to changes in drinking culture, managing alcohol consumption, revising laws and regulations, and managing relevant data. It is important to carry out preventive activities, such as public service announcements and campaigns, to prevent drinking.[20] Additionally, drunk drivers who cause traffic accidents need therapeutic intervention from the government.

3. Current Status of Drunk Driving Accidents and Related Regulations

3.1. Current Status of Traffic Accidents

Over the past 10 years, the number of traffic accidents peaked at 220,917 in 2015, showed a slight decrease until 2018, before increasing to 229,654 in 2019 (Figure 1). The number continued to decrease, falling below 200,000 cases starting in 2022. Traffic accident fatalities have steadily decreased since 2014, when they reached 4,762. In 2023, the number decreased to 2,551. However, the number of traffic accident fatalities per 100,000 people was 6.5 in 2019 in South Korea, which is slightly higher than the United Kingdom (2.7), Germany (3.6), France (5.0), Australia (4.7), Sweden (2.2), Japan (3.1), and the OECD average (5.2). South Korea has continued its efforts to reduce traffic accident fatalities through traffic accident prevention activities and improvements in public awareness of traffic regulations. However, compared to major OECD member countries, South Korea ranks in the lower-middle range, indicating the need for further efforts in traffic accident prevention.

<Figure 1> Number of traffic accidents in the last 10 years (2014-2023)



Source: National Police Agency (www.police.go.kr)

3.2. Current Status of Drunk Driving Accidents

3.2.1. Statistics and Analysis on Drunk Driving

The annual statistics on drunk driving accidents provided by the National Police Agency target drunk driving as a single crime, and incidents involving both drunk driving and traffic accidents. As shown in Table 1, there was a significant decrease in drunk driving accidents between 2015 and 2016 and between 2018 and 2019.

<Table 1> Status of drunk driving accidents (2014-2023)

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incidents (incidents)	24,043	24,399	19,769	19,517	19,381	15,708	17,247	14,894	15,059	13,042
Deaths (people)	592	583	481	439	346	295	287	206	214	159
Injuries (people)	42,772	42,880	34,423	33,364	32,952	25,961	28,063	23,653	24,261	20,268

Source: National Police Agency (www.police.go.kr)

In early 2015, the death of a man known as “the cream bread dad” and the death of Yoon Chang-ho in late 2018 sparked a rapid deterioration in public opinion about drunk driving. This negative sentiment led to a deterrent effect. Notably, while there were revisions, such as stricter penalties from 2018 to 2019, the number of incidents decreased sharply from 2015 to 2016, without any such revisions. However, according to the police’s publicly released statistics on drunk driving enforcement, it is difficult to find a significant correlation between the statistics before COVID-19 in 2019 and after the outbreak in 2020. Moreover, a significant decrease in enforcement can be observed from 2017 to 2018, which is unrelated to COVID-19.

3.2.2. Current Status of Amendments to Domestic Laws and Regulations on Drunk Driving Prevention Devices

The continued occurrence of drunk driving accidents raised the need for the introduction of drunk driving prevention devices. Hence, the “Partial Amendment to the Road Traffic Act (October 25, 2023)” was passed (Table 2). This established the legal basis for prevention devices in South Korea. The Act included defining and establishing drunk driving prevention devices (Article 2, Article 80), introducing a conditional driver’s license system (Article 80), establishing regulations for the installation and registration of drunk driving prevention devices (Article 80, Article 82), and obligatory recording and inspection of the operation of drunk

driving prevention devices (Article 50). Moreover, penalties for violations of the installation and registration regulations (Article 50) were established.

<Table 2> Highlights of the revision of the Road Traffic Act

Legal	Highlights	Details
Section 2, Article 80	Definitions and creating a rule	-Defining and regulating anti-drunk driving devices -Introducing conditional driver's licenses
Article 80, Article 82	Installation and registration	-Mandatory installation and registration for recidivists within five years -Regulations on how to calculate the mandatory period for an anti-driving device -Operating a vehicle with a defeat device after obtaining a conditional license
Article 50	Driving record and inspection obligations	-Requirement to submit logs at least twice a year -Mandatory inspection for anomalies, including normal operation
Article 80	Conditional license	-Operating a breathalyzer on a conditional driver's license -Mandatory traffic safety education on drunk driving prevention
Article 50	Installation and enrollment rules; penalties for violations	-Establish penalties for driving unprotected vehicles, dismantling devices without authorization, and operating equipment by proxy -Failure to submit driving records or inspect for normal operation resulting in a fine

Source: National Law Information Center (www.law.go.kr)

3.2.3 New Provisions Strengthening Penalties for Drunk Driving

The National Assembly amended certain provisions of the Road Traffic Act related to drunk driving on December 24, 2018. The main changes are summarized in Table 3. Following the so-called “cream bread hit-and-run” incident in 2015 and the death of university student Yoon Chang-ho in a drunk driving accident in 2018, public opinion erupted in favor of strengthening drunk driving penalties, leading to the partial revision of the Road Traffic Act's drunk driving-related provisions. The focus was on strengthening penalties, including lowering the blood alcohol concentration (BAC) limit from 0.05% to 0.03%, reducing the criteria for license revocation for repeat offenders from three or more offenses to two or more offenses, and revising the criteria for enhanced penalties for repeat offenders.

However, on November 21, 2021, the Constitutional Court ruled that the details of the enhanced penalties for repeat offenses were unconstitutional, rendering them invalid. The National Assembly reflected the Constitutional Court's ruling and passed supplementary legislation on January 3, 2023, which took effect on July 4. From the judicial perspective, traffic crimes had long been classified into two types: general and hit-and-run accidents, with sentencing guidelines existing only for these two types. Sentencing guidelines for drunk driving (including fines) were newly established on April 24, 2023, and took effect on July 1, 2023.

<Table 3> Comparison of key provisions before and after the introduction of new provisions strengthening penalties for drunk driving

Separation	Before revisions (before 2019)	Post-revisions (2019 and later)
Blood alcohol level lower limit	0.05	0.03
Criteria for revocation of the driver's license for repeat offenders	3 or more times	More than once
Increased punishment for repeat offenders	3 or more times	2 or more times
	1~3 years in prison or a fine of 5~10 million won	2~5 years in prison or a fine of 10~20 million won
Refusal to take an alcohol test	1~3 years in prison or a fine of 5~10 million won	1~5 years in prison or a fine of 5~20 million won
Penalties for blood alcohol concentration	0.2% or more: 1~3 years in prison or a fine of 5~10 million won	0.2% or more: 2~5 years in prison or a fine of 10~20 million won
	0.1~0.2%: Imprisonment for 6 months to 1 year or a fine of 3~5 million won	0.08~0.2%: 1~2 years in prison or a fine of 5~10 million won
	0.05~0.1%: Imprisonment for up to 6 months or a fine of up to 3 million won	0.03~0.08%: Imprisonment for up to 1 year or a fine of up to 5 million won

Source: National Law Information Center (www.law.go.kr)

3.3. Current Status of Drunk Driving Abroad and Penalty Standards

Drunk driving is subject to strict penalties in most countries worldwide. The countries with the strictest legal standards for BAC are the Czech Republic, Hungary, Romania, and Slovakia. These countries set the legal limit at 0.00%. Driving must be performed in a state where no alcohol is detected (Alcohol-Zero). In South Korea, following the Yoon Chang-ho incident, the BAC threshold was strengthened from 0.05% to 0.03%. This is among the higher levels among the countries listed in Table 4. Countries with weaker legal penalties than South Korea include Lithuania, Greece, the Netherlands, the United States, and the United Kingdom.

<Table 4> Drunk driving penalties in major countries

Legal limit (BAC)	Country
0.00	Romania, Slovakia, the Czech Republic, Hungary, etc.
0.02	Sweden, Slovenia, Estonia, Poland, etc.
0.03	Korea, Japan
0.04	Lithuania
0.05	Greece, the Netherlands, Germany, Ireland, and Austria, Italy, France, Australia, etc.

0.08	Malta, United States (on a consolidated basis), United Kingdom, etc.
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Source: National Assembly Research Service (2018)

3.4. Drunk Driving Prevention Devices

3.4.1. Concept

Despite the strengthening of penalties, drunk driving accidents occur regularly. To proactively prevent this, legislation on “drunk driving prevention devices” was passed in October 2023. This was an alcohol-based ignition interlock device BAIID: Breach Alcohol Ignition Interlock Device, also known as an alcohol interlock, alcohol-based ignition lock, or ignition control alcohol detection device. This device prevents the driver from starting the vehicle while under the influence of alcohol. Before starting the vehicle, the driver must blow into the prevention device, and if the blood alcohol concentration exceeds the preset threshold, the ignition is restricted. This electronic system links an alcohol detection device installed in the vehicle with the vehicle’s ignition system. It prevents drunk driving before it occurs.

Although this device is relatively unfamiliar in South Korea, many countries overseas use it to prevent drunk driving accidents. Drivers must blow into the breathalyzer device to verify their identity before driving. If alcohol is detected, the vehicle is stopped. This can be an effective deterrent for drivers at high risk of drunk driving. However, such devices cannot completely prevent drunk driving. This is because of other issues, such as proxy driving, arbitrary removal of devices, and installation costs. Hence, it is necessary to strengthen identity verification procedures by installing cameras and establish regulatory provisions, such as penalties for arbitrary removal. Additionally, social consensus is essential to minimize installation costs.

3.4.2. Current Status and Examples of Alcohol-Based Driving Prevention Devices in Various Countries

3.4.2.1. Current Status

The United States was the first country to initiate discussions on alcohol-based driving prevention devices, and has widespread adoption. As of 2019, 32 out of 50 states require the installation of drunk driving prevention devices for first-time and repeat offenders. Ten states mandate installation for first-time offenders upon detection of BAC above the threshold, five states target repeat offenders, and three states allow states to set their own criteria.

The Canadian province of Alberta was the first to introduce alcohol interlock devices. A pilot program began in 1990, and the system was fully implemented in 1994. The pilot study involved 818 repeat offenders and a control group of 4,110 individuals who were fitted with devices for two years, followed by an effectiveness analysis. After the devices were removed, the recidivism rate for those with devices was 11%, while for those without devices it was 15%. Six years later, the recidivism rates were 18% and 38%, respectively.[21]

Drunk driving prevention devices have a preventive effect of approximately 28-65%. In Sweden, the feasibility of introducing alcohol interlock devices was studied by an insurance company in 1990. Subsequently, the Swedish National Road Traffic Association discussed preliminary preparations for the introduction of such devices. In 1999, a law was enacted allowing a five-year pilot program for alcohol interlock devices, which was implemented in three counties. Initially, the program was voluntary for private passenger vehicles, while later, drunk driving offenders were encouraged to participate voluntarily. Currently, the installation of drunk driving prevention devices is mandatory for people with a history of drunk driving and those employed by state-owned companies in transportation-related jobs.[22]

In European Union (EU) countries, the installation of drunk driving prevention devices is not yet fully implemented; however, positive reviews regarding their introduction are underway. From 2004 to 2005, small-scale studies were conducted in Germany, Spain, Norway,

and Spain as part of an EU research project, along with projects in France (2004), the United Kingdom (2005), and Finland (2005).[23] Among these, France made the most active efforts to introduce alcohol-detecting devices. Since 2010, the installation of drunk driving prevention devices has been mandatory for school buses and newly registered buses, and since September 2015, it has been expanded to all buses. France has a BAC limit of 0.02%, which is stricter than in South Korea. Furthermore, for the general public, voluntary installation is encouraged.

3.4.2.2. Analysis of the Effectiveness of Drunk Driving Prevention Devices

Cases analyzing the effectiveness of drunk driving prevention devices have been found in various countries. McGinty et al. (2017) analyzed the effectiveness of drunk driving prevention devices using National Highway Traffic Safety Administration Fatality Analysis Reporting System (NHTSA FARS) data (1982–2013) on drunk driving fatalities. The results showed a 7% (approximately) reduction in fatal drunk driving accidents for 0.08% or higher BAC, and an 8% (approximately) reduction for 0.15% or higher BAC.[24] Marques et al. (2010) found that the recidivism rate for drunk driving decreased by 40-80% compared to the non-equipped comparison group.

However, after the devices were removed, some states (Maryland and Quebec) showed an increase in recidivism rates compared to before the devices were installed.[25] A NHTSA study (2013) showed that the recidivism rate among habitual offenders decreased by approximately 66% compared to the control group. However, after the devices were removed, there was a slight increase in recidivism rates. Therefore, considering the average recidivism rate after the installation period, there was a decrease of approximately 22% compared to before the installation.[26] Hence, the effectiveness of drunk driving prevention devices has been proven across studies.

3.4.2.3. Technological Trends

In South Korea, technological development in drunk driving prevention devices is currently underway, and the necessary legal and institutional frameworks are in place. Detection methods for prevention devices can be broadly categorized into semiconductor-based, electrochemical, and non-dispersive infrared methods. [27] The semiconductor-based method detects changes in electrical conductivity through catalysis and adsorption. It has excellent responsiveness and is relatively inexpensive; however, it is easily affected by external factors, such as temperature and humidity, resulting in lower accuracy compared to other methods.

The electrochemical method utilizes changes in electromotive force through electrochemical reactions. It has higher precision than the semiconductor-based method. However, it is greatly affected by external factors, such as temperature and humidity; therefore, heaters are typically installed inside the device. Nonetheless, in low-temperature environments, it takes time for the heater to raise the temperature, which is a drawback. Non-dispersive infrared methods utilize the characteristic of alcohol vapor molecules absorbing infrared light of a specific wavelength. They are relatively less affected by external factors and allow long-term measurements. However, they are large and susceptible to vibrations, making them difficult to install in vehicles.

Since each detection method has its advantages and disadvantages, it is necessary to evaluate them before installation. The NHTSA in the United States is conducting collaborative research with global automobile manufacturers. The “Driver Alcohol Detection System for Safety” (DADSS) is developing technology that integrates the vehicle with a drunk driving prevention device, ensuring high measurement accuracy without interfering with the driver’s consciousness. This project uses highly sensitive optical sensors to measure alcohol presence

through everyday breathing. Additionally, methods to measure alcohol in the driver's skin tissue are being developed.

4. Measures to Ensure Policy Effectiveness to Deter Drunk Driving

4.1. Establishment of Specialized Courts for Drunk Driving

In the United States, Driving While Intoxicated Courts (DWI Courts) handle cases involving repeat drunk drivers with alcohol dependency, imposing penalties, such as license revocation or suspension, criminal penalties, and security measures. DWI Courts were established under the recognition that simple abstinence or alcohol treatment is insufficient to achieve effective results in preventing driving under the influence (DUI) recidivism. They were established to implement various alcohol prevention programs and facilitate smooth reintegration into society through measures accompanied by the coercive power of the court.[28]

The DWI Court is located within the court. Judges handle general trials during regular court sessions and are assigned to handle DUI-related cases on designated days. The judge serves as the center of the court, which is composed of a team of court staff, lawyers, investigative agencies, and treatment providers. Participants in the Drunk Driving Specialized Court Program are habitual drunk drivers, most of whom have been convicted of drunk driving twice or more. Even if a person has been convicted only once, they may be allowed to participate if the court recognizes habitual drunk driving.[29]

South Korea does not have a specialized court for drunk driving. Therefore, it is necessary to explore ways to reduce drunk driving by establishing a specialized division for drunk driving in general courts. Furthermore, it is important to form a team specializing in drunk driving, modeled after the specialized courts for drunk driving in the United States, to systematically establish the causes and countermeasures for and reduce drunk driving. Specialized courts would directly conduct alcohol dependence treatment programs and establish sentencing guidelines by considering the attitude of the drunk drivers toward the trial, habitual drinking, and the risk of reoffending. The system should be introduced after reviewing it per the actual conditions of the country, accounting for factors such as race, culture, and traffic awareness.

4.2. Strengthening Preventive Education for Habitual Drunk Drivers

Recurrent drunk drivers have distorted cognitive abilities and weakened self-control, making it difficult for them to benefit from traditional educational methods of conveying information. Therefore, practical, hands-on training is more effective than general lectures.[30] Since general preventive measures are less effective for recurrent drivers, a therapeutic approach to alcohol abuse should be combined with education. In the United Kingdom, group discussions about drinking and its risks, and behavioral change strategies, are implemented.[31] In the United States, educational programs for changing problematic behaviors are provided alongside alcohol dependence treatment.[32]

Such programs consist of traffic safety education for habitual drunk drivers, combined with psychological counseling, alcohol abuse treatment, and lectures led by family members of drunk driving accident victims. The purpose of traffic safety education is to prevent repeat offenses. Enhancing self-control is a key preventive measure against habitual drunk driving.

According to research on traffic safety education in South Korea, discussion-based education reduced the recidivism rate by approximately 12% compared to lecture-based education.[33] The effectiveness of this treatment was demonstrated by significant improvements in attitudes toward drunk driving, subjective norms, perceived self-control, and reduced intentions to engage in drunk driving after counseling. Therefore, it is necessary to combine the certainty of formal deterrence with the substance of educational programs for drunk drivers.

4.3.1. Legal and Institutional Establishment of Drunk Driving Prevention Devices

Drunk driving is a major cause of serious traffic accidents. Various legal and institutional improvements have been made over a long period to eradicate drunk driving. However, since 2011, there have been 5,298 traffic accident fatalities and over 390,000 injuries caused by drunk driving. Over the past four years, the rate of repeat offenders reached 44.6%, indicating that the harm caused by habitual drunk driving remains significant. Regarding habitual drunk driving, there is a need to promote treatment through a conditional prosecution deferral system for voluntary alcohol addiction treatment.

At present, addiction treatment costs are borne by the individual. While installing drunk driving prevention devices is one way to curb drunk driving, such external deterrents may not be sufficient. Therefore, judicial measures, such as probation orders with treatment requirements or mandatory hospitalization orders, should be considered. Additionally, vehicle confiscation is being considered as a measure to prevent drunk driving. For habitual offenders, desensitized to basic penalties, this could be an effective way to separate drivers from vehicles. Furthermore, some citizens remain unaware of the Road Traffic Act revisions. In such cases, education and publicity should be widely conducted to inform the public about the dangers of drunk driving and the drunk driving prevention device.

4.3.2. Universal Use for Driving Occupations

Drunk driving prevention devices are a public interest that should be emphasized as a means of preventing traffic accidents, regardless of license revocation or suspension. Particularly, large bus drivers, truck drivers, school bus drivers, and people engaged in transportation and public transportation perform driving tasks for the benefit of numerous people and are exposed to the dangers of driving. The importance and nature of these occupational groups in road traffic safety are high. Hence, they have a greater responsibility to comply with traffic laws than the general public.[34]

Therefore, compulsory installation of alcohol-detection devices, designated by the state in vehicles operated by individuals in these specific occupations, may be considered. However, the cost may be an issue. One may assume that public transportation drivers, freight truck drivers, and school bus drivers would be unlikely to drive under the influence of alcohol; however, if they do, the consequences would be severe. Therefore, when considering the social costs and compensation of such incidents versus the cost of installing drunk driving prevention devices, the latter is economically viable. Hence, the government and companies can determine a reasonable amount through mutual agreement.

4.3.3. Development of Supplementary Drunk Driving Prevention Devices

Solutions are required to prevent proxy measurements of drunk driving prevention devices to deter drunk drivers from exploiting the “loopholes” due to technical vulnerabilities. To address this issue, integration with biometric authentication technologies, such as facial recognition, is essential. Biometric authentication, utilizing facial recognition, is being employed in the transportation industry to manage attendance and prevent drunk driving through biometric-based alcohol measurement solutions. For instance, an alcohol measurement management system using fingerprint recognition can block the illegal use of drunk driving prevention devices.

Simultaneously, if behavior recognition solutions, such as driver drowsiness prevention, can be utilized along with facial recognition technology, effectiveness can be further enhanced. Video-based artificial intelligence (AI) technology is being widely adopted in solutions, such as driving assistance, driving habit data collection and analysis, and driver safety accident prevention. In the future, as AI-based solutions and services are integrated into various social

safety networks, the activation of related industries is anticipated. Table 5 summarizes the measures to ensure the effectiveness of drunk driving prevention policies.

<Table 5> Measures to prevent drunk driving

Suggestions	Rationale	Expectations
Establishment of a DWI court	United States' DWI court reference	DUI Manage Causes Countermeasures for Systematic
For habitual drunk drivers, increase prevention education	Reinforce traffic safety education	Improving DUI deterrence for habitual drunk drivers
Ensure the effectiveness of drunk driving prevention devices	Legal and institutional settlement	Preventing drunk driving in advance and increasing the effectiveness of drunk driving prevention devices
	General use in the driving profession	
	Anti-DUI devices; developing complementary devices	

5. Conclusion

To date, the global response to drunk driving has focused on punishing drivers through measures such as increasing the length of license suspensions or revocations and expanding the scope of criminal investigations. However, drunk driving is highly habitual and has a low detection rate, even when drivers operate vehicles with suspended or revoked licenses, making “driver-centric penalties” ineffective. Drunk driving prevention devices prevent violators from driving after consuming alcohol. However, such devices are not an absolute system. Therefore, additional measures, such as improved education programs and publicity campaigns, are required. The programs’ effectiveness as a criminal policy must be thoroughly researched and analyzed.

Despite a significant number of unlicensed driving and drunk driving while unlicensed cases, no significant police resources have been allocated to address this issue. This is because it is difficult to identify unlicensed drivers. For the newly implemented drunk driving prevention devices to achieve a groundbreaking effect on habitual drunk driving, the following measures must be implemented: legal and institutional consolidation of the devices, universal adoption among the general driving population, strengthened penalties and education for habitual drivers, and the development of supplementary measures for the devices.

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