Drinking and Driving Project in Guangxi

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Poster Presentations

Abstract:

The drinking and driving project in Guangxi is a four-year project with multisector participation. The project involves three cities in China:

- Nanning and Liuzhou in Guangxi province as intervention cities
- Changsha in Hunan province as the control city.

The project has gone through the process of a situational survey (baseline survey), intervention and evaluation:

- The situational survey (include both roadside survey and crash survey) helped to find out the nature and scope of problem related to drinking and driving in the three cities, as well as the issues (people, time and places) that should be the focus during the intervention.

- The intervention was developed using the findings of the baseline survey. It was carried out at the intervention cities with both components of a public education campaign and enhanced law enforcement. The purpose was to raise public awareness of the risk of drinking and driving behaviour, reduce prevalence of drinking and driving, as well as the number of related casualty crashes.

- The post-intervention survey helped to evaluate the effectiveness of the intervention and better understand the experiences and lessons learned from it.

The outcomes showed the success of the intervention. Nearly 75 percent of people interviewed in Nanning and 79 percent of people interviewed in Liuzhou aware of our public education campaign. And, the BAC positive rate in Nanning and Liuzhou was significantly decreased from 6.8 percent to 1.6 percent (X^2=375.883, df=1,p<0.001). On the contrast, the BAC positive rate in Changsha was increased from 3.1 percent to 4.4 percent (X^2=12.109, df=1,p<0.001).

1. Background:

Guangxi Drinking & Driving Project (hereafter referred to as the Project) has been conducted from 2006 to 2009. There are three cities involved in the project:

- Nanning - the capital of Guangxi province

- Liuzhou - an important industrial city in Guangxi province
- Changsha - the capital of Hunan province.

Nanning and Liuzhou were selected as the intervention cities for the project, while Changsha was selected as the control city.

The Project was divided into two phases:

- phase I - baseline survey (August 2006 to July 2007)
- phase II - the intervention (August 2007 to November 2008) and evaluation (December 2008 to September 2009).

The baseline survey was carried out in the three cities, which included both roadside (December 2006 to March 2007) and crash surveys (December 2006 to July 2007). This research was focused on accurately determining the prevalence of drinking and driving in a representative and random sample of drivers in Nanning, Liuzhou and Changsha as well as determining the proportion of crashes that were associated with alcohol intoxication.

The intervention phase included two components, which were public education and enforcement. It was conducted in three stages - preparation, implementation and evaluation. During the implementation time period (May to Nov. 2008), two rounds of a public education campaign and two rounds of an enhanced enforcement were carried out, in order to reduce both prevalence and proportion of crashes related to drinking and driving.

The post-intervention survey was carried out during December 2008 to July 2009. For the before/after data analysis, both roadside and crash surveys were repeated at the post-intervention.

The project was financially supported by the Global Road Safety Initiative (GRSI). Project partners include:

- World Health Organization (WHO)
- Global Road Safety Partnership (GRSP)
- Health Human Resource Development Center (HHRDC) of the Ministry of Health (MOH), P.R. China
- Clarity Public Relations (the P.R. company)
- Guangxi Institute of Occupational Health
- Nanning Municipal Center for Disease Control and Prevention (Nanning CDC)
- Nanning Traffic Management Bureau
- Liuzhou Municipal Center for Disease Control and Prevention (Liuzhou CDC)
- Liuzhou Traffic Management Bureau
- The School of Public Health, Xiangya Medical College of Central South University
- Changsha Traffic Management Bureau

2. Objectives:

- To understand the actual scale of the problem of alcohol impaired driving in the two cities.
- To reduce prevalence of drinking and driving in Nanning and Liuzhou.
- To reduce numbers of casualty crashes related to drinking and driving.
- To improve public awareness about road safety, and drinking and driving.
- To increase knowledge about risks and penalties toward offence of the drinking and driving law.
- To assess the effectiveness of the intervention.

3. Methods:

Roadside survey

A multi-stage sample selection method was adopted for both the baseline survey (December 2006 to March 2007) and post-intervention survey (December 2008 to March 2009). Motor vehicle drivers in the three cities (both automobiles and motorcycles) at different survey locations (23 in Nanning, 21 in Liuzhou and 18 in Changsha) were randomly stopped for a breath test and questionnaire interview in the high-risk periods of alcohol related crashes in the afternoon (1:00 - 5:00 p.m.) and evening (8:00p.m. - 12:00 a.m.). The survey was conducted during workdays, weekends and holidays (Chinese New Year). The sample size design was for at least 4800 drivers (1600 at workdays, 1600 at weekends and 1600 at holidays) in each city.

Epidata 3.1 software was used for the data entry procedure. To ensure the accuracy of data entry, double-entry method was adopted. Each questionnaire was entered by two staff separately, then the check function of EpiData3.0 was applied to compare the two matrix data files from the double entry. If any difference was found, the staff was to check the original questionnaire and make corresponding revisions. Data was then exported to SPSS 11.5 statistical software packages for cleaning, management and analysis.

Traffic Crash survey

This was carried out at both baseline survey (December 2006 to July 2007) and post-intervention survey (December 2008 to July 2009) in the three cities.

All road traffic crashes (involving a motor vehicle) included in the study were:

   a) the crashes occurred on a public road of those selected districts/counties in the period of study
   b) the crashes resulting in at least one person seriously injured or died from their injuries (within 7 days). 'Sserious injury' was defined as major fracture, caniocerebral trauma or other severe injuries that should involve hospitalization.

The Traffic Police Crash Handling Sections of the selected districts/counties undertook the investigation by completing questionnaires developed for this study. The main items of the questionnaire include date and time of crashes, number of vehicles involved, number of killed and injured persons, circumstances of the crash, characteristics of drivers and victims.

Blood samples were collected by nurses under the supervision of local traffic police officials. The concentrations of blood samples were tested at designated laboratories of the three cities. Copies of blood alcohol concentration testing results were provided by official designated organizations. The questionnaires and BAC results were examined and collected from the offices of the district/county Traffic Police Bureau by investigators in the collaborating agencies (Guangxi Institute of Occupational Diseases in Nanning, CDC in Nanning, CDC in Liuzhou and Xiangya Medical College in Changsha). The local investigators were responsible for checking and collecting the questionnaires and BAC result reports from the Traffic Police Accident Investigation Sections regularly.

The designed sample size was no less than 100 cases in each city.

Public education program - Information campaign

Clarity Public Relations was selected as the PR company to assist in designing material for the campaign and implementing the public education activities. The project logo, theme slogans, the project Ambassador and a series of promotional items were designed for the public education campaign. The activities of campaign included:

   • media programs via TV, radio, newspapers and the Internet
   • bus body and roadside advertisements
   • promotional items delivery(refer to examples listed blow).

Enhanced Law Enforcement

Two rounds of enhanced law enforcement were carried out during May to November 2008 in the cities of Nanning and Liuzhou. The first round was during the June to July; the second round was during September to October. Unlike the method of random sampling used in the surveys, the enforcement activities in the two rounds of enforcement focused on designated time locations and suspicious drivers. The targeted areas included major junctions, nightspots, restaurants and bars/entertainment centers. Police roadblocks and alarm lights were used at the checkpoints to achieve maximum visual effect. Large numbers of police and police vehicles were deployed and the checkpoints were frequently changed during the enforcement activities in order to:

a) Create the perception from the driving population that "if you drink and drive, you will be caught at any time, any where".
b) Remind all passing drivers, as well as other road users, that drinking and driving is an illegal and immoral behaviour - if you offend you will be subject to legal penalty.
c) Along with the public education campaign, increase the commitment from the driving population to the message that "if you drink, do not drive and if you drive, do not drink".

4. Intervention Activities:

During the 6-month implementation of the intervention (May to -November 2008), two rounds of the public education campaign and two rounds of enhanced law enforcement were carried out in both Nanning and Liuzhou:

- 1st round of public education campaign   May to July
- 1st round of enhanced law enforcement   June to July
- 2nd round of public education campaign   August to November
- 2nd round of enhanced law enforcement   September to October

Public education campaign

A. Media Program

- Four major formats of mass media, namely TV, radio, news papers and the Internet, were utilized in the campaign, along with SMS for the enhanced effect of publicity.
- There was significant publicity about the background of the Project, the rules and regulations regarding drinking and driving, and the physical impact of alcohol. This was released in the form of "Quiz-Gift" questions through major forms of mass media.
- There was extensive news coverage for the follow-up reports, including the Project launch events in the two cities, traffic police involvement in the law enforcement, volunteers' contributions in promotional item delivery, quizzes rewards and interviews with experts.

B. Bus body and Roadside Advertisements

- 13 buses in Nanning, and 18 buses in Liuzhou were chosen for the campaign.
  The bus routes covered densely populated area from all directions of the city.

Bus ad. in Nanning   Bus ad. in Liuzhou

- 75 small-sized road signs were produced and put up on major roads and intersections in Nanning. In Liuzhou 7 large-sized road signs were erected on the major roads and streets during the campaign.

Road signs in Nanning   Road signs in Liuzhou

C. Distribution of Promotional Items

Distribution of promotional items was one of the integral parts of the public education campaign. Led by CDC in both cities, distribution work was mainly carried out by volunteers (100 in Nanning and 280 in Liuzhou) with the support of local traffic police and transport agencies.

The following chart lists the relevant information concerning distribution of promotional items in Nanning and Liuzhou during May to -November 2008:

Items	Distribution Spots	Nanning (PCS)			Liuzhou (PCS)		
		Actual	Target	%	Actual	Target	%
Posters	Communities and Restaurants	4,320	4,376	98.7%	2,600	2,624	99.1%
Table Displays	Restaurants and Bars	6,400	6,400	100%	2,980	3,000	99.3%
Cupmats	Restaurants and Bars	6,936	7,000	99.1%	4,000	4,000	100%
Vehicle Stickers	Vehicles, Gas Stations and Parking Lots	38,151	80,000	47.7%	40,000	40,000	100%

D. Exhibition Boards

16 exhibition boards were produced for the campaign (8 for Nanning and 8 for Liuzhou). They were displayed in turn at the halls of vehicle administration departments and bus terminals within Nanning and Liuzhou to promote the drinking and driving related laws and relevant information.

E. DVD Films

Two short DVD films were designed for the public education campaign. They were released to the general public via TV/radio programs and cable TV system/net in public places, such as in the Vehicle Registration Office, the terminals for long distance bus, municipal government owned buildings in the two cities (Nanning and Liuzhou), as well as on the song-ordering systems in 56 major Karaoke bars of Nanning during the break time.

Enhanced Law Enforcement

A. Nanning

A total of 14 consolidated city level law enforcement activities were carried out by the Nanning Traffic Police during June to July and September to October 2008. They were conducted at 30 random check points covering six districts. The information below shows the special efforts made by the Nanning Traffic Police during the 2 rounds of enforcement:

		Traffic Police (persons)	Vehicle / Equipment		The Number of Inspected Drivers		
			Breath Test Equipment	Police Vehicles	Police Motorcycles	Motorcycle Drivers	Automotive Drivers
2nd round law	Sept.	520	14	260	520	8,111	6,864
	Oct.	390	16	234	429	5,148	5,499
enforcement	Total	910	30	494	949	13,259	12,362
1st round law enforcement	June	253	13	114	96	849	1,303
	July	512	39	284	239	2,122	3,257
	Total	765	52	398	335	2,971	4,560

B. Liuzhou

The law enforcement activities in Liuzhou were somewhat different from the ones in Nanning. Instead of the consolidated city level activities, the law enforcement activities in Liuzhou were conducted on a regular day-to-day basis in four different districts. In total there were 25 checkpoints scattered throughout the city. The information below showed the special efforts made by the Liuzhou Traffic Police during the two rounds of enforcement.

		Checkpoint Staff		Checkpoint Equipment			Drivers Tested	
		Traffic police	Traffic Assistants	Breath Test Equipment	Police cars	Police motorcycles	Motorcycle Drivers	Automotive Drivers
2 Round Law Enforcement	Sep	161	390	92	117	54	1,916	2,902
	Oct	150	318	76	99	55	2,904	3,255
	Total	311	708	168	216	109	4,820	6,157
1st Round Law Enforcement	Jun	63	156	35	42	59	1,021	1,028
	July	84	194	48	60	49	930	1,230
	Total	147	350	83	102	108	1,951	2,258

5. Result:

According to the GB19522-2004 issued by General Administration of Quality Supervision, Inspection and Quarantine of China, the legal BAC limits l is divided into four categories:

A) No alcohol (0 mg%)
B) Low BAC (below 20mg%)
C) Drink driving (20-80mg%)
D) Drunk driving (over 80mg%)

Roadside survey

The roadside survey is made of two components: random breath testing and questionnaire interview. The following is the main findings from the baseline (before) and post-intervention (after) surveys in the three cities:

■ Total drivers intercepted: 32,101
  • BAC positive (BAC >0): 1,289 (4.0%)
  • BAC > 20mg: 889 (2.8)
  • The highest BAC found: 413mg

■ Type of vehicles intercepted:
  • Motorcycles: 9,502 (29.6%)
  • Drink-drivers: 105 (1.1%)
  • Cars: 22,599 (70.4%)
  • Drink-drivers: 1175 (5.8%)

There are significantly more car drivers that drink-drive than motorcycle drivers. (X^2=292.906, df=1, p<0.001)

■ Drivers intercepted at different time:

	Driver intercepted		Drink -Drivers	
	Number	%	Number	%
Day time	15023	46.8	270	1.8
Evenings	17078	53.2	1025	6.0
workdays	13418	41.8	483	3.6
weekends	11011	34.3	462	4.2
holidays	7576	23.6	333	4.4

There are significantly more drink-drivers at evenings than that at daytime (X^2=364.975, df=1, p<0.001). The drinking and driving rate is significantly higher at weekends and holidays than it at workdays. (X^2=9.421, df=2, p=0.009)

■ Gender distribution:
- Male driver incepted: 28,345 (88.3%)
- Drink-drivers: 1,247 (4.4%)
- Female driver intercepted: 3,756 (11.7%)
- Drink-drivers: 32 (1.0%)

Note: Drink-driving rate for men is significantly much higher than it is for women.
(X^2=109.096, df=1,p<0.001)

■ Age distribution:

	Driver intercepted		Drink -Drivers	
	Number	%	Number	%
≤24	1,990	6.2	38	1.9
25-34	11,588	36.1	406	3.5
35-44	12,102	37.7	520	4.3
≥45	6,356	19.8	318	5.0

The drinking and driving rate is significantly higher among the elder drivers
(X^2=49.494, df=3,p<0.001)

The following charts shows the comparison of BAC positive rate in the three cities before and after intervention

Comparison of BAC Positive rates of three cities pre- and post-intervention
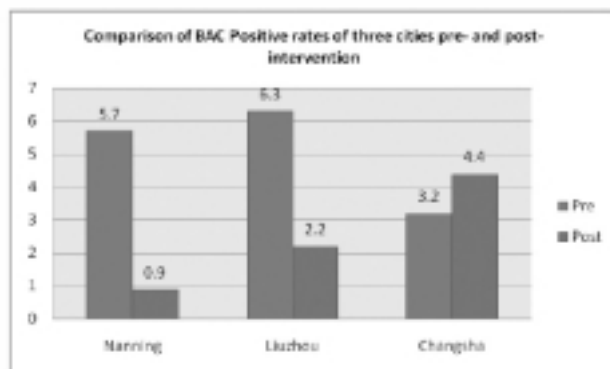
The following tables provide the outcome comparison of random breath testing at the baseline survey (before) and post-intervention (after) in the three cities:

a) Nanning

	Type of Drivers	Number of the Drivers Tested	0<BAC< 20mg	20-80mg	>80mg	≥20mg%
Baseline	Motorcycles	835	23	23	3	26
	Cars	4287	87	178	33	211
	Trucks	5	0	0	0	0
	Sub-total	5127	110	201	36	237
Postintervention	Motorcycles	2639	8	10	5	15
	Cars	2706	3	17	7	24
	Trucks	65	0	0	0	0
	Sub-total	5410	11	27	12	39

Compared with the baseline survey, the outcome of the post intervention survey in Nanning showed that the number of drink-drivers (BAC at 20-80mg) was reduced from 201 to 27 and the number of drunk-drivers was reduced from 36 to 12.

b) Liuzhou

	Type of Drivers	Number of the Drivers Tested	0<BAC< 20mg	20-80mg	>80mg	≥20mg%
Baseline	Motorcycles	2698	51	97	15	112
	Cars	2684	82	116	19	135
	Trucks	176	2	1	0	1
	Sub-total	5558	135	214	34	248
Postintervention	Motorcycles	2104	15	13	6	22
	Cars	3411	25	41	20	61
	Trucks	79	0	0	0	0
	Sub-total	5594	40	57	26	83

Compared with the baseline survey, the outcome of the post intervention survey in Liuzhou showed that the number of drink-drivers (BAC at 20-80mg) was reduced from 214 to 57 and the number of drunk-drivers was reduced from 34 to 26.

c) Changsha - the control city

	Type of Drivers	Number of the Drivers Tested	0<BAC< 20mg	20-80mg	>80mg	≥20mg%
Baseline	Motorcycles	39	0	0	0	0
	Cars	5218	62	94	9	113
	Trucks	125	1	0	0	0
	Sub-total	5382	63	94	9	113
Postintervention	Motorcycles	4	0	0	0	0
	Cars	4911	35	114	67	181
	Trucks	115	3	0	1	1
	Sub-total	5030	38	114	68	182

While in the control city Changsha, the outcome of the post intervention survey showed that number of drink-drivers (BAC at 20-80mg) was increased from 94 to 114 and the number of drunk-drivers was increased from 9 to 68.

The following table provide the before/after data comparison between the intervention site (Guangxi) and the control site (Changsha) on some of the information obtained from the questionnaire interview.

Roadside Survey Result - Guangxi vs. Changcha								
Item	Nanning & Liuzhou				Changcha			
	Before		After		Before		After	
	number	%	number	%	number	%	number	%
Total Driver intercepted	10685	100	11004	100	5382	100	5054	100
Total Driver investaged	10666	99.8	11004	100	5373	99.8	5054	100
Total Driver tested	10685	100	11004	100	5382	100	5030	99.5
Drink-drive status								
BAC Positive	730	6.8	173	1.6	166	3.1	220	4.4
BAC 20-80mg%	415	3.9	77	0.7	94	1.8	112	2.2
BAC>80mg%	70	0.7	40	0.4	9	0.2	72	1.4
The hightes BAC Level found in the survey	259.5		413		241		280	
Drivers' Knowledge of the national BAC limit								
unaware	9093	85.3	7769	70.6	4919	91	4410	87.3
aware	1565	14.7	3235	29.4	463	9	603	11.9
aware and give the right answer	510	4.8	998	9.1	94	1.7	153	3
Enforcement status								
perceptions of being caught	7871	73.8	6448	58.6	2368	43.7	2204	43.6
stopped by the police during the last 2 years for BAC check	2295	21.5	3543	32.2	720	13.4	657	13
fined due to drink-drive	39	0.4	76	0.7	7	0.1	14	0.2
being stopped by others for drinking and driving	2671	24.9	3433	31.2	2772	51.5	2911	57.6

Poster Presentations

Traffic crash survey

A. Baseline survey

The following are the main findings from the baseline survey in the three cities:

- Average 24.9% of drivers (Nanning: 17.6%; Liuzhou: 38.6%) involved in these crashes had a BAC reading in excess of 20 mg.
- Average 35.2% of crashes (Nanning: 25.8%; Liuzhou: 51%) were involved Alcohol.
- The mean alcohol level for the drink drivers was 156.7mg%;
- The highest blood alcohol concentration level among those drivers was 310mg
- Motorcycles were involved in two-thirds of all crashes (65.6%).
- Alcohol related crashes were more likely to occur late at night and early in the morning.
- Most of the drivers involved in the crashes were male, and 25-45 years of age, with over 10 years driving experience.
- During the baseline survey, only 3 crashes out of 100 in Changsha involved alcohol, one driver was a drink-driver and the other two were drunk-drivers.

B. Post-intervention Survey

The data analysis of post-intervention survey was still in the process at the time of writing this paper.

- ■ Project Awareness Survey
  In order to assess the public awareness of the Project and to find out how the public got to know about the Project in Nanning and Liuzhou, two project awareness surveys were carried out in both cities. One was in late July (after the 1st round of the campaign); the other one was in mid-December 2008 (after the 2nd round of the campaign). The surveys were conducted on a random sample basis by inviting passers-by to fill in the questionnaire forms on the spot. The interviewees were restricted to the local residents in both cities. The table below shows the outcome of the two surveys.

City	People interviewed -1st round	People claim aware -1st round	Project awareness Rate (%) - 1st round	People interviewed - 2nd round	People claim aware - 2nd round	Project awareness Rate (%) - 2nd round
Nanning	320	103	32.1	321	240	74.8
Liuzhou	348	188	54	376	295	78.5

6. Discussion and Conclusions:

Drinking and driving is a leading contributor to road traffic injuries and deaths in most countries. In most high-income countries about 20 percent of fatally injured drivers have a blood alcohol concentration (BAC) in excess of the legal limit. In contrast, studies in low and middle income countries have shown that between 33 percent and 69 percent of fatally injured drivers and between 8 percent and 29 percent of non-fatally injured drivers had consumed alcohol before their crash.[1]

Drinking and driving is also considered as one of the major risk factors on the road in China. The Chinese Government is paying more and more attention to the issue and has launched many different levels of anti-drinking and driving interventions during recent years. However, the following two characteristics make this project unique and different from other government interventions:

a) The project involved multi-sector cooperation with a wide range of partners, which included national and local government agencies, academic institutions, private sector and international agencies. The local partners (the traffic police and representatives from the health sector) in the cities of Nanning, Liuzhou and Changsha played a crucial role to the success of the project and the strengths of each partner were fully utilised in the project.

b) International good practice in the field was adapted and a systematic/scientific method was used. This is the first of this kind of project to follow the international good practice in the Drinking and Driving Manua[2]l. Evidence based decision making and the process and outcome evaluations conducted during

the intervention are the highlights of the project. The intervention activities were designed taking into account the findings of baseline survey, which made the them more targeted and more effective. The evaluations provided a clear picture of whether or not the intervention implemented as planned and whether or not the actions taken in the intervention were effective. Both the experience gained and lessons learned from the project will be shared with the relevant stakeholders and hopefully to be used as reference for similar projects in the future.

Although the result of the post-intervention crash survey has not come out, the result of post-intervention roadside survey has shown the effectiveness of the intervention. The drinking and driving behaviour in the intervention cities (Nanning and Liuzhou) has been greatly reduced, while it increased in the control city (Changsha). Through the two rounds of public education campaign, the general public and drivers in Nanning and Liuzhou began to realize that "drinking and driving is an illegal and immoral behaviour to the society".

It is acknowledged that the six months of implementation of the intervention is too short for changing public attitudes and behaviours, and this was also shown in the results of the questionnaire interview. Raising public awareness requires unremitting efforts by relevant stakeholders of society, especially with the support from government. Continuous robust law enforcement in combination with repeated public education campaigns are a must to prevent drink-driving. It is hoped that this pilot project has planted a "seed" to encourage greater attention to the issue from government and the relevant agencies, and that it has raised public awareness of the problem. It is also hoped that more and more drivers will realize the risks of drink-driving and will make the commitment to "if you drink, do not drive; if you drive, do not drink!"

Reference:

1. Drinking and Driving - a road safety manual for decision-makers and practitioners, GRSP 2007

2. Drinking and Driving - a road safety manual for decision-makers and practitioners, GRSP 2007

Poster Presentations