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Drinking & driving in Viet Nam: prevalence, knowledge, attitudes, and practices in two provinces

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KEYWORDS

Viet Nam
Drink-driving
Breath alcohol
Road safety
Enforcement

ABSTRACT

Objective: Viet Nam is experiencing a shift in its burden of disease profile with injuries becoming more prominent. A history of high alcohol involvement in road traffic crashes despite stringent laws led to increased enforcement by police, enhanced public education messaging and targeted social marketing campaigns in Ha Nam and Ninh Binh provinces in Viet Nam. This study aims to illustrate the changes in prevalence (November 2010 to December 2011) and knowledge, attitudes and practices (KAP) around alcohol use and drink-driving for the year 2011.

Methods: Breath Alcohol Concentration (BrAC) was collected through police enforcement checkpoints in the two provinces. The proportion of drivers with BrAC above the legal limit was plotted over time for both provinces. The trend in prevalence of drink-driving over time was further assessed using Poisson regression models. Prevailing KAPs were determined through surveying randomly selected road users over the age of 17 years at gas stations at quarterly intervals. Cross tabulations of key variables as well Chi-Square statistic were used to assess associations.

Results: A total of 8,404 drivers were tested for BrAC levels of which less than 0.25% were female. Of 1,639 drivers displaying BrAC levels in excess of the legal limit, 87.3% were car drivers, 7.9% motorcyclists and 86% were between the ages of 25 and 44 years. KAP surveys captured 1,661 drivers over the study period. The prevalence of self-reported drink-driving increased 6 percentage points among respondents aged 27-36. Between 44% (January 2011) and 49% (December 2011) of respondents indicated awareness of a drinking and driving Blood Alcohol Concentration (BAC) or BrAC limit and only 25% of all study participants recalled being penalized for a traffic violation - none of which were for drink-driving.

Conclusion: While there has been some reduction in drink-driving prevalence, inadequate or incorrect knowledge on drink-driving legislation appears to be an impediment to greater gains. Increased attention needs to be paid to enforcement activities and social marketing campaigns need to be part of a multi-faceted programme that also works on improving existing legislation, takes into consideration gender issues, and enhances visible enforcement of the laws.

Introduction

Viet Nam, a middle-income country in South-East Asia, is experiencing a shift in its burden of disease profile, with chronic conditions and injuries becoming more prominent among the leading causes of the burden of disease in the country. Injuries are now among the top ten causes of (premature) death for all ages,[1-3] with road traffic injuries (RTIs) accounting for about half of these deaths.

Aside from the health burden, RTIs pose a significant and growing threat to Viet Nam's development. Estimates have shown that RTIs cost the Vietnamese economy about $US 885 million, or 2.5% of the country's GDP each year.[4] This is at par with other estimates published by the World Health Organization (WHO), which put the economic impact of RTIs at between 1% and 3% of countries' GDPs.[5] With increasing motorization and development, RTIs are on an upward trajectory globally and in Viet Nam; without interventions, it is expected that both the health and economic consequences will continue to increase over time.[3,6]

Alcohol has been consistently shown to be a major risk factor for road traffic crashes and resulting injuries and death.[6-8] Studies have shown that alcohol acts through multiple pathways

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in increasing the risk for road traffic crashes and injuries. Among other effects, alcohol impairs judgment and perceptions of individuals, thereby limiting the ability of an individual under the influence to make rational decisions, subjecting the person to risky behaviors; it impairs vision, making the identification of potentially dangerous situations on the road difficult; and increases reaction times, reducing the chances of avoiding a crash.[9-11] Drink-driving has therefore been linked with both, an increased likelihood of a crash, as well as increased severity.[12-15] These effects, combined with the less than ideal road conditions and environment, traffic mix, and the large groups of vulnerable road users often found in low- and middle-income countries (LMICs), are problematic for road safety in these settings.

Viet Nam has among the more stringent laws against drink-driving in the South East Asia region. Beginning with a Blood Alcohol Concentration (BAC) limit of 80 mg/dl in 2001 for all vehicles, this level was revised in 2008, and now stands at zero for cars, and 50 mg/dl for motorcyclists.[16,17] Breath Alcohol Concentration (BrAC) levels for motorcyclists are now 25 mg/dl. However, this has not translated in the reduction of drink-driving in the country, where studies have consistently shown alcohol to be a factor in road traffic crashes and injuries.[18,19] As a result, there has been an increased focus on addressing the issue in Viet Nam.

One such effort is through a five year, multi-partner Global Road Safety Programme funded by the Bloomberg Philanthropies that began in 2010, with a focus on two provinces in Viet Nam – Ha Nam and Ninh Binh.[20] Interventions for drink-driving as part of this programme have involved widespread social marketing campaigns as well as enhanced enforcement by the police.

In October 2012, the Vietnamese Government issued Decree No.71 which enacted higher fines stipulating a maximum penalty for motorcyclists with a BAC >0.08 g/dl of up to 3 million VND (approximately US$150), loss of license for 60 days license suspension and vehicle impoundment for 10 days. For drivers of all other vehicles, a BAC of >0.08 g/dl will attract a fine of up to 15 million VND (approx US$750), loss of license for 60 days license suspension and vehicle impoundment for 10 days.[21-23] Refusal of a BAC or BrAC test is subject to the same penalties. The law states that if a road crash fatality was a result of drink-driving then the driver is subject to a maximum jail time of 10 years.[24] However, prosecution is rare[25] and without greater policy enforcement and monitoring, the prevalence of drink-driving is likely to remain high.

Given these efforts, the aim of the present study is to assess the trend for prevalence of drink-driving in Ha Nam and Ninh Binh for the period November 2010 to December 2011. This study also follows up on a previous study exploring prevailing knowledge, attitudes and practices (KAPs) for drink driving,[26] and explores changes over the two-year period in the two provinces. This study will be useful in examining any effect of interventions on contributing to changes in prevalence, knowledge, attitudes and practices around alcohol use and drinking and driving in Ha Nam and Ninh Binh, as well as guide further implementation of the programmes in these or other provinces in Viet Nam.

Methods

Two sources of data were used to estimate the prevalence, and knowledge, attitudes, and practices (KAP) for drink-driving in Ha Nam and Ninh Binh provinces of Viet Nam.

Breath Alcohol Concentration (BrAC) testing at police checkpoints was used to estimate the prevalence of drink-driving in the two provinces in Viet Nam. BrAC tests were administered between November 2010 and December 2011 at enforcement checkpoints set up by the provincial traffic police (PC67) in two districts of each province. Test results were recorded on a standard form developed collaboratively by the Hanoi School of Public Health, the World Health Organization (WHO) Viet Nam Country Office, and the Johns Hopkins International Injury Research Unit (JH-IIRU). Other variables collected included time of day, day of week, vehicle type, and sex of individual being tested. Police manning the checkpoints were equipped with alcohol fuel cell breathalyzers and trained for administering the tests and collecting necessary data prior to commencement of the enforcement exercises in 2010, with refresher trainings conducted throughout the course of the study.

KAP surveys were also conducted to gain a better understanding of factors associated with drink-driving in the two provinces. Four surveys were conducted in the same two districts of each province over one year (between January and December 2011). The structure and composition of the survey as well as the sampling scheme have been described in detail previously.[23] Each district consisted of seven gas station locations where interviews were conducted, and a team of two to three data collectors conducted the interviews, depending on the expected traffic volume at each location. Interviews lasted approximately 20-30 minutes each, and sampling continued until the target of 105 drivers per district (210 per province) was achieved.

All data were cleaned, processed and analyzed using Epi Data and STATA 12.[27] The proportion of drivers with BrAC above the legal limit was plotted over time for both intervention provinces, and different vehicle types. The trend in prevalence of drinking and driving over time was further assessed using Poisson regression models. For the KAP data, descriptive analysis was first done using tabulations and cross tabulation of key variables. Chi-Square statistic was used to assess associations between self-reported drinking and driving and committing a traffic violation. The threshold for statistical significance for all analyses was set at 0.05.

The study was reviewed and approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health, USA and the Hanoi School of Public Health, Viet Nam.

Results

Prevalence of Drink-driving

A total of 8,404 drivers were tested for Breath Alcohol Concentration (BrAC) at random police checkpoints in the four intervention districts in Ha Nam (3,731) and Ninh Binh (4,673) between November 2010 and December 2011. Although there was a two-month break in data collection (April 2011-May 2011) in Ha Nam due to logistical issues relating to police enforcement in the province, these data show a significantly higher prevalence of drink-driving in Ha Nam (33%) on average than in Ninh Binh (8.1%) (Figure 1). Among all drivers stopped at these checkpoints, 29% were motorcyclists, 61% car drivers and 11% bus or truck drivers. Out of 1,639 drivers displaying BrAC level in excess of the legal limit (0.25 mg/L for motorbikes and 0.00 mg/L for all other vehicles) 87.3% were car drivers, 7.9% motorbike drivers, and 4.8% truck or bus drivers. While this may indicate drinking and driving being more of an issue with cars as compared to motorcycles, it is important to note the different legal limits applied to these vehicles. Interestingly, when the limit of 0.25mg/L is applied to car drivers, the average proportion of car drivers over the limit drops from 39.1% (1,201/3,071) to 3.5% (106/3,071) in Ha Nam and from 11.4% (230/2,013) to 1.64% (33/2,103) in Ninh Binh over the study period.

Poisson regression analysis was used to assess the trend in prevalence of drink-driving over the study period. When current limits were applied in Ha Nam, there was a slight upward trend

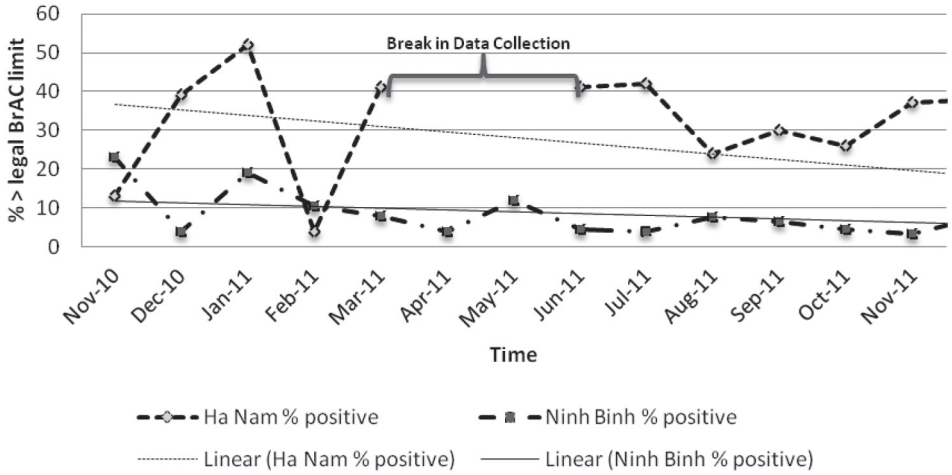

Figure 1. Proportion of drivers over the legal alcohol limit in Vietnam, November 2010 - December 2011. Source: NTSC, Viet Nam.

in the prevalence of drink-driving (RR: 1.03, p<0.05). However, when legal limits for cars were changed to match the limit for motorcycles at 0.25 mg/L, the incidence rate of violations decreased by a factor of 0.85 (P<0.05) on average in subsequent rounds.

In Ninh Binh however, results demonstrate a decreasing trend in drink-driving over time by a factor of 0.94 (P<0.05) monthly at current legal thresholds for cars as well as for motorcycles. Increasing the legal limit to 0.25 mg/L for cars does not seem to indicate a statistically significant change in the incidence rate over time.

It is worth noting that of the 8,404 drivers who were tested for BrAC, less than 0.25% were female (n=20) and of those only two tested positive. Among 1,636 males in violation of the law, 86% were between the ages of 25 and 44 years.

Knowledge, Attitudes and Practices (KAP)

We conducted 4 rounds of KAP surveys over the year (2011), with a total of 1,661 participants approximately equally divided between the two provinces (N=833 in Ha Nam; N=828 in Ninh Binh). Respondent ages ranged between 17 and 78 years with the gender distribution being skewed towards men (71%; N=1,174) (Table 1). Majority of the respondents (64.3%) were 36 years of age or younger. Twenty percent of male respondents and 29% of female respondents reported having attended college or having a higher education indicating a total of approximately 22% of all respondents at this level. The proportion of respondents having completed high school was 29.6%, with only 3% of the surveyed sample (n=49) having less than a secondary education. Expectedly, motorcyclists comprised the majority of the respondents (89%) with the remainder comprising car drivers (4%), taxi drivers (5%), and truck drivers (2%) amongst others.

Almost all respondents (96%) conceded that "accidents" result from violating traffic laws. However, a troubling trend emerged in perceptions about the correlation between alcohol use and road traffic crashes whereby over the course of the year the proportion of respondents who associated driving under the influence with an increased risk of crash fell from 60.5% in January 2011 to 42.1% by the end of the year in December, in Ninh Binh. In Ha Nam, this proportion fluctuated over the course of the year from 61.9% in January to 41.4% and 51.7% in April and August, respectively, ending at 67.5% in December. This is paralleled by increasing proportions of respondents reporting that decreasing one's alcoholic consumption has no effect on one's driving ability: 6% in January, 14% in December in Ninh Binh. This is more pronounced in Ha Nam where the proportions rose from 6% to 17.3% over the said period.

It is not surprising therefore to find that of the 552 participants responding to the question on having driven within two hours of consuming several alcoholic beverages in the month prior to the survey, more than half of the respondents (n=278) admitted to such practices. This proportion of drink-driving was higher in Ha Nam (Average: 58.6%; Range: 50-68%) compared to Ninh Binh (Average 47.1%: Range: 40-57%) (Figure 2).

This study also sought to examine respondents' experiences and perceptions about traffic law enforcement in the two provinces. We found that 430 (26%) of all surveyed participants recalled being penalized for a traffic violation - 22.2% in Ha Nam and 29.6% in Ninh Binh. There seems to be a significant gender differential with a disproportionate amount of penalties issued to men: 31.9% vs 11.5%. Of those who recall being fined, 330 (76.7%) were motorcyclists and 48 (11.2%) were taxi drivers.

In Ha Nam, the proportions of reported penalties rose slightly from 25% to 31% between the first two rounds, but surprisingly dropped to 20% and 13% for the remainder of the year. In Ninh Binh, the proportions seemed to remain steady, averaging at 30% over the year. Figure 3 presents reported fines for each of the rounds, and interestingly, while fines for violations such as lack of helmet use, speeding, and running a red light were quite prevalent, those for drink-driving hovered at about 1%. It is important to note, however, that being under the influence would lead to other risky behaviors, and therefore, while the primary infraction may not have been drink-driving, alcohol may have very well have been associated with it.

In order to test this hypothesis, we examined reported traffic fines among individuals who reported to have been driving or operating a vehicle within two hours of drinking in the month prior to the survey. These results (Table 2) show that only about 50% of those who drove under the influence were fined for any traffic violation. Chi squared analysis of the association between driving after using alcohol within the last month and receipt of penalty due to breaking the law was statistically significant in January ($\chi^2 = 5.94$, P<0.05) and December 2011 only ($\chi^2 = 10.48$, P<0.05)

We also further examined alcohol specific enforcement activities. On average, only 582 (35%; Range 31%-39%) respondents remembered having been stopped by police and their breath alcohol concentration checked over the period of the study. Of those, 34 out of 443 (7.7%) drivers who responded to

Table 1
Demographic information on study participants in Ha Nam Province and Ninh Binh province, Viet Nam across all four rounds in 2011

	Male n (%)		Female n (%)		Total n (%)	
Province						
Ha Nam	539	(45.9)	294	(60.4)	833	(50.2)
Ninh Binh	635	(54.1)	193	(39.6)	828	(49.9)
Total	**1,174**	**(100)**	**487**	**(100)**	**1,661**	**(100)**
Age groups						
17-26	292	(24.9)	151	(31.0)	443	(26.7)
27-36	430	(36.6)	195	(40.0)	625	(37.6)
37-46	232	(19.7)	93	(19.1)	325	(19.6)
47-56	168	(14.3)	44	(9.0)	212	(12.8)
57+	52	(4.4)	4	(0.8)	56	(3.4)
Total	**1,174**	**(100)**	**487**	**(100)**	**1,661**	**(100)**
Education level						
No school	7	(0.6)	4	(0.8)	11	(0.7)
Incomplete schooling	10	(0.9)	1	(0.2)	11	(0.7)
Primary school	18	(1.5)	9	(1.8)	27	(1.6)
Secondary school	283	(24.1)	82	(16.8)	365	(22.0)
High school	382	(32.5)	109	(22.4)	491	(29.6)
Intermediate level	237	(20.2)	141	(29)	378	(22.8)
College/university/higher	237	(20.2)	141	(29)	378	(22.8)
Total	**1,174**	**(100)**	**487**	**(100)**	**1,661**	**(100)**
Occupation						
Paid job	490	(41.7)	245	(50.3)	735	(44.3)
Unpaid job	424	(36.1)	131	(26.9)	555	(33.4)
Student	56	(4.8)	40	(8.2)	96	(5.8)
Housework	3	(0.3)	34	(7)	37	(2.2)
Retired	72	(6.1)	12	(2.5)	84	(5.1)
Unemployed	26	(2.2)	15	(3.1)	41	(2.5)
Other	103	(8.8)	10	(2.1)	113	(6.8)
Total	**1,174**	**(70.7)**	**487**	**(29.3)**	**1,661**	**(100)**

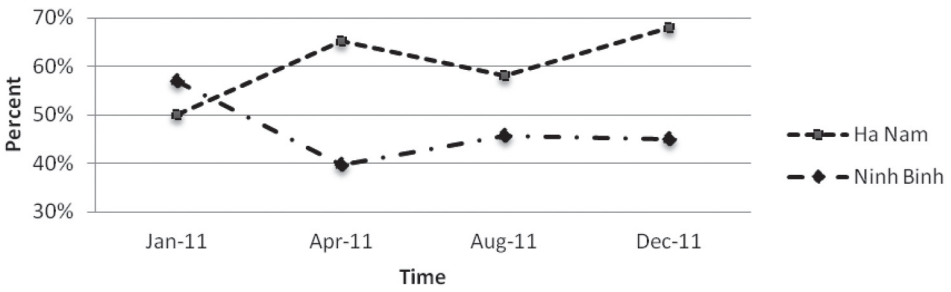

Figure 2. Self reported driving within 2 hrs of drinking in the last month across provinces.

the question on drink-driving reported having consumed alcohol prior to being stopped at the checkpoint, and only 19 (55%) of them received a penalty for a traffic violation, but surprisingly none of them were penalized for the offense at hand – drink-driving. Additionally, 75.4% (Range: 63.5-84.3) of respondents believed better enforcement of the drink-driving legislation by the police would be effective in reducing the prevalence of alcohol-related road traffic crashes.

When analyzed by gender, results indicate that 11 out of 32 (35%) females reported a history of driving within 2 hours of using alcohol as compared to 51% (267/520) of males. Over time however, there has been a slow decline in such practices among males, with self-reported instances dropping from 56% in January 2011 to 49% in December 2011.

To better understand the attitudes that could explain drink-driving practices observed above, we explored factors that lead individuals to engage in the practice. When asked why they drink and drive, 83% (331) of the respondents indicated that it was because they "felt conscious", 26% stated that they had no other alternative, and 17% mentioned being close to home or work at the time. The results above imply that perhaps respondents associate dangers of drink-driving to distance travelled and reduced speed rather than to compromised physiological and mental faculties.

Based on the KAP interviews, knowledge among drivers seems to have increased over 2011 but remains quite low with only between 44% (January and April) and 49% (December) of respondents indicating that they were aware of a drinking and driving blood or breath alcohol limit. However, when disaggregated by province, the variation was stark with only 20% of respondents in Ha Nam knowing the legislation versus 72% of those in Ninh Binh. An encouraging finding was that the percentage of road users who indicated knowing that intoxication can be tested rose steadily from 83% to 96% over the year, with most gains observed in Ha Nam (Ninh Binh maintained over 90% prevalence of this knowledge). Of those who were aware of methods for testing alcohol use, 85% of respondents in January and 98% in December indicated knowledge of BrAC tests, but only 10% of respondents, on average, indicated knowledge of BAC tests.

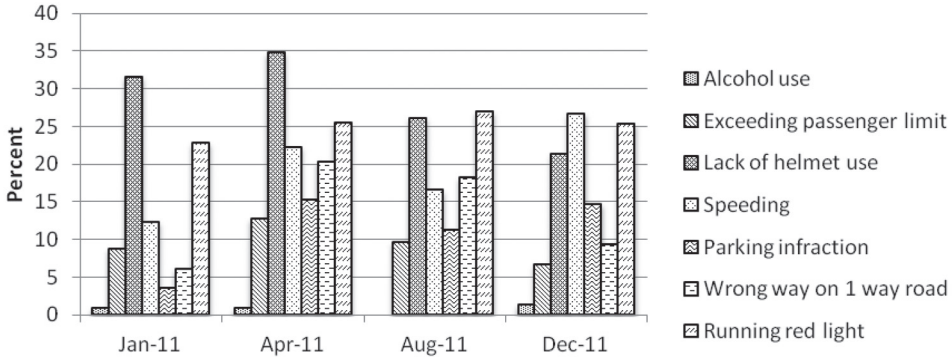

Figure 3. Distribution of traffic violations among drivers for 2011.

Table 2
Relationship between reported traffic violations and reported alcohol consumption among drivers in Viet Nam

	Admit to having driven within 2 hours of using alcohol				
Have been fined for a traffic violation	Jan 2011	Apr 2011	Aug 2011	Dec 2011	Total n (%)
Yes	41 (46.6)	34(52.3%)	30 (51.8%)	30 (50%)	135 (100%)
No	47(51.7)	31 (47.7%)	28 (48.3%)	30 (50%)	136 (100%)
Total	88(100%)	65 (100%)	58 (100%)	60 (100%)	271 (100%)

Discussion

It is clear from our results that the prevalence of drink-driving remains relatively high, especially in Ha Nam, and among car drivers. It is important to note, however, that the law specifies different limits for car and motorcycle drivers - 0.00 mg/L breath for cars, and 0.25 mg/L for motorcycles.[15] Numerous studies have been conducted to examine the effects of different levels of alcohol concentration on human cognition and ability to safely operate a motor vehicle.[13,14,28-33] While research has shown that any level of alcohol in the system can lead to some level of impairment in the ability to safely operate a motor vehicle, in a country like Viet Nam, where alcohol consumption is prevalent, the practicality of having and enforcing a zero tolerance policy for drink-driving may be problematic.[34-37] While there is no consensus on a single limit, the World Health Organization's Global Status Report on Road Safety recommends BAC limits of less than or equal to 0.05 g/dl.[6] Therefore, instituting a non-zero limit could potentially reduce the volume of violations without compromising safe limits for driving and consequently also reduce the burden on law enforcement officers. Seeing from our analysis of enforcement data above, when a BrAC of 0.25 mg/L limit (equivalent to a BAC of 0.05 g/dl) is applied to car drivers, the prevalence of drink-driving among this group drops by almost ten-fold.

In LMIC settings such as Viet Nam, where there is a constant strain on police human resources, this may be a critical factor to consider and may lead to an improvement in enforcement of the drink-driving legislation – particularly as we are witnessing disconcerting accounts of drink-driving incidents being released without penalty. Possible reasons for this have been previously documented as insufficient human resources and equipment required for drink-driving enforcement.[22] Results from our KAP surveys also point towards a need to improve enforcement of drink-driving legislation.

On examining the reasons that respondents to the KAP surveys cited for engaging in drink-driving, the majority indicated that they did so because they either "felt conscious" or needed to drive only a short distance. This is an important finding as it indicates that while people may be aware of the risks of drink-driving, they may be unaware of how much alcohol it may take to compromise their physiological and mental faculties, and may reduce their perceptions of risk and hazards.[29,38] Furthermore, more attention may need to be paid to the types of trips that are a focus of any drink-driving intervention, as even the shortest of trips could pose a significantly increased risk for a crash when driving under the influence. Social marketing campaigns could focus their messages around making people aware of what constitutes being under the influence in terms that they can relate to, such as the number and types of drinks, as well as highlighting the risk posed by drink-driving even for short distances or at slow speeds.

Drink-driving is an issue of concern among younger male drivers - while the general self-reported drink-driving went down over the course of the year in other age groups, it trended upwards in individuals between the ages of 27 to 46. Among this group, more than half of the respondents who reported being aware of the increased risk of a crash after having consumed alcohol, still engaged in the practice. This finding is consistent with other studies that indicate this demographic, and men in particular, are more likely to engage in risk taking behaviors such as drink-driving.[39,40]

While yielding useful data for guiding current and future efforts to prevent drink-driving in Viet Nam and other similar setting, this study provides reported prevalence estimates for drink-driving which are not independently obtained. The enforcement checkpoints from which they were collected are visible efforts that may lead an individual to choose a different route of travel if under the influence or to alter his or her driving behavior in advance of the checkpoint. This could lead to the underestimation of the true prevalence of drink-driving in the country. As seen from the findings, self-reported prevalence of drink-driving obtained through KAP surveys is higher than that obtained through enforcement data. However, efforts are being made to ensure that these checkpoints are conducted in a random fashion both in terms of when and where they operate. Additionally, police who manage these checkpoints are regularly trained on how best to collect and record data as well as the significance of the data they collect. Important to note also is that the KAP surveys relied on self-reported behaviors regarding

drink-driving. Being a socially sensitive issue, self-report of this practice has the potential to be affected by social desirability bias.[41,42] Therefore, even estimates of self-reported drink-driving behavior obtained through the KAP surveys may be an underestimation of the true prevalence of drink-driving.

Despite these limitations it is clear that drink-driving is a major issue that needs to be urgently addressed in Viet Nam. This study highlights key areas that could be a focus of ongoing and future interventions to address this problem. Additionally, there are useful lessons to be learnt from Viet Nam's history when it comes to addressing risk factors for RTIs, namely helmet wearing: the critical success of this effort was largely due to a coordinated multi-pronged approach that included political buy-in, legislative changes, targeted social marketing campaigns and visible enforcement.[43-45] Similarly, addressing drink-driving will need strong legislation, visible enforcement, and good social marketing interventions.[26,46-48] Otherwise Viet Nam is losing precious lives each day on the roads.

Conflict of interest

All authors have no competing interests to declare.

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Disclaimer

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