COST-EFFECTIVENESS OF MASS MEDIA CAMPAIGNS TO REDUCE DRUNK DRIVING INCIDENCE IN VIETNAM

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Abstract

Background: Rapidly increasing motorization and a significant rise in alcohol consumption in Vietnam have placed road traffic injury among the leading causes of death, there remain gaps in the current regulations on alcohol. ***Objective:*** This study aimed to estimate the cost effectiveness of mass media to reduce drunk driving incidence in Vietnam by using the Assessing Cost Effectiveness (ACE) drunk driving model. ***Methods:*** CostIt (WHO) provided the analytical framework for estimating costs. Costs of interventions were estimated over a 10-yearfull implementation. The ACE-drunk driving model was used to estimate costs and cost effectiveness of the intervention. Input parameters were adjusted to Vietnam's case. In the cost-effectiveness analysis of the intervention, the ratio was expressed as cost per DALY averted. A multi-state and multiple cohort life table approach was adopted to evaluate outcomes over the lifetime. The model simulates the impact of intervention on a population's health. ***Results:*** The mass media campaign for the whole population has a net incremental cost of 129 billion VND (95% UI: 109 billion VND – 149 billion VND). The health gain achieved from the media campaign for the whole population is estimated at an additional 176.5 DALYs averted (95% UI: 147.7-208.5). The drunk driving mass media campaign targeting the whole population is *not* cost-effective based on its ICER of US$45,682 (95% UI: US$35,814 - US$57,294). ***Conclusions:*** Mass media campaigns bear weak evidence and are not cost-effective. Although there are uncertainties in some aspects of the analysis, the results from this study provide policymakers with clear evidences on how cost effective the intervention of mass media on drinking-and-driving problems in Vietnam can be.

Keywords: cost effectiveness analysis, drunk driving, mass media campaigns.

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1. INTRODUCTION

In most high-income countries, about 20 percent of fatalities have blood alcohol concentration (BAC) that exceed the legal limit [11]. In low- and middle-income countries, it was estimated that between 33 percent and 69 percent of fatalities had consumed alcohol before their accidents [7].

Rapidly increasing motorization and a significant rise in alcohol consumption in Vietnam have placed road traffic injury among the leading causes of death. An analysis of the BAC levels of patients with traffic injuries in two hospitals in Hanoi showed that 56.4 percent of samples were positive of alcohol. The proportion of BAC samples that were over the limit of 0.08g/100ml and 0.05g/100ml were 29.4 percent and 33.4 percent, respectively [10]. Another study on male accident victims in a hospital in Central Vietnam [9] indicated that 60 percent of those admitted in its Emergency Department due to traffic injuries had a BAC level beyond the legal limit of 0.08g/100ml. The study also showed that most of the respondents over-estimated the number of drinks they could consume and tolerate in one hour in order to drive safely and legally. Most even never planned to avoid driving after drinking alcohol.

In many economically developed countries over the past few decades, the improved laws, enhanced enforcement, and higher public awareness campaigns by concerned citizens have led to a dramatic decline in drinking and driving [8]. Creating a social norm or normative belief for control of drinking and driving is essential. Studies in developed countries have shown that at a general level, communities tend to hold negative views regarding drunk driving and consider it a serious social problem [4]. It has been recommended that public policy interventions designed to deter or prevent drunk driving depend, in part, on modifying

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beliefs in the risks, social acceptability and immorality of driving under the influence of alcohol [3]. Research findings indicate that public awareness of and tolerance for the problem of drinking and driving have changed dramatically [1].

The Vietnamese government recently made some positive reforms, especially in restricting alcohol consumption in public places [5]. However, there remain gaps in the current regulations on alcohol. This study aimed to estimate the cost effectiveness of mass media to reduce drunk driving incidences in Vietnam by using the Assessing Cost Effectiveness (ACE) drunk driving model.

2. METHODS

- **Mass media campaigns on the dangers of drinking and driving**: This intervention is defined as the implementation of a series of mass media campaigns through television, radio, newspapers, journals, internet, and electronic billboards. The intervention here targeting the whole population to raise awareness of drunk driving. The scope of the intervention includes development of educational messages for different media, overall management, and operational activities.
- **Study perspective:** In estimating both costs and benefits, this study adopted the public health sector's perspective. Thus, its analysis gathered expenditures on diagnosis, treatment, emergency from health service providers or health insurance companies; and expenditures from patients and their family. Costs of interventions were estimated over a 10-yearfull implementation. Time horizon for the analysis was longer.
- **Modelling Approach**

The ACE-drunk driving model, which estimates cost and cost effectiveness of interventions, was adapted after the technique created by Professor Jan Barendregt (University of Queensland) and Professor Chris Doran (University of New South Wales). Input parameters were adjusted to Vietnam's case.

- **Key Input Parameters of the Model**

Injury models

- All mortality and disability rates were derived from the country's health information profile (Vietnam-Western Pacific Region Health Databank, 2005 version).
- Data on the prevalence of alcohol dependence were from the results of an epidemiology survey on Alcohol Use and Alcohol Consumption-Related Problems in Rural Vietnam by Giang et al. [2]. Meanwhile, the level of alcohol consumption was based on the Health Strategy and Policy Institute's (HSPI) survey on alcohol consumption in Vietnam in 2008.
- Relative risks of mortality or disability from alcohol-related traffic accidents were assumed to be similar to those found in the study of Tam et al. [8] and the figures after an intervention were assumed to be similar to the trends in the Australian model [4].

Cost of interventions

- CostIt (developed by WHO) provided the analytical framework for estimating costs. The bottom-up "ingredient approach" was used predominantly in the measurement phase while the top-down approach was used in generating estimates of unit prices from the budget and other government reports/documents.
- Costs of healthcare services cover treatment, care, diagnosis, emergency care, follow-up consultations, and rehabilitation. Non-health care costs such as travel cost, accommodation cost, and indirect costs such as the cost of workday losses were considered.
- Estimates on the cost of interventions assume that the interventions were implemented at their full potential; that trained personnel were available to deliver the intervention; and that the necessary infrastructure was available. Costs were collected from different secondary sources.
- Costs were measured by multiplying the quantity of the resource unit by its relevant price at the time of data collection. Prices were adjusted using a deflator.
- For those resource costs with no available data for Vietnam, the estimated costs from other countries were used and adjusted to the Vietnamese context. Estimation methods included:
  - Method 1: Unit cost of other countries was converted to international dollars.
  - Method 2: A conversion factor was calculated based on the percentage of the gross domestic product (GDP) dedicated to the resource (*f*) of the country

$$\text{Unit cost of other country} \times \frac{f(\text{Vietnam})}{f(\text{the country})}$$

- Cost was expressed in Vietnam dong and US dollars.

Effects of interventions

- Effects of the intervention were largely based on existing literature. Health gains arising

from the interventions were expressed as Disability-Adjusted Life Years (DALY) averted.

Cost-effectiveness ratios

- In the cost-effectiveness analysis of each intervention, the ratio was expressed as cost per DALY averted.
- An incremental cost-effectiveness ratio (ICER) was used to compare two alternative interventions. This was done by dividing the different total net costs and the different DALY averted between the two alternative interventions.
- A discount rate of 3 percent was applied to all costs and effects.
- In the guidelines proposed by the WHO Commission on Macroeconomics and Health, a cost-effectiveness ratio that is less than the per-capita GDP is described as "very cost-effective", while one that is less than three times the per-capita GDP is described as "cost-effective" (WHO 2001). These standards are used by this paper in evaluating the intervention in Vietnam.

- **Modeling**

- A multi-state and multiple cohort life table approach was adopted to evaluate outcomes over the lifetime. The model simulates the impact of intervention on a population's health. A reduction in alcohol consumption due to the intervention affects the incidence, prevalence, and mortality of alcohol-related injuries, which in turn, influence the overall mortality and disability rates of the population. The model was built in Excel and used the Ersatz software for the uncertainty analysis.

- **Data Sources**

- Population: Census 1999, Population Change Survey 2006
- Alcohol prevalence: HSPI Survey 2009
- Intervention costs: State Budget Regulations, Government Expenditures, NGO rates, existing literature on the subject
- Cost-offsets: Hospital data based on guidelines of the Ministry of Health on diagnosis and treatment
- Disease parameters: Burden of Disease study 2008 [6]

- **Uncertainty Analysis**

The uncertainty analysis was carried out with epidemiological parameters and intervention cost and effect estimates.

3. RESULTS

Table 1. Target Groups of Intervention and Effects of Intervention

Intervention	Target Group	Mean Effect In Target Group
Mass media - for whole population	100% population aged 18+ years	- 2% g/day consumption

Table 2. Intervention Costs (VND Billion)

Intervention	Cost Offset	Intervention Cost	Net Cost
Mass media campaign directed at whole population	-0.76 (-0.96 to -0.57)	129 (109 - 149)	129 (109 - 148)

Results suggest that the health gains that can be achieved, measured by DALYs, is 129.5 (95% UI: 43.8-286.4) for the mass media campaign on drunk driving (Table 3).

Table 3. Health Gains and Incremental Cost-Effectiveness Ratio (ICER, VND per DALY)

Intervention	DALYs Averted	Median ICER (VND/DALY)	ICER (US$/DALY)
Mass media campaign directed at whole population	176.5 (147.7-208.5)	0.73 billion VND (0.57bil. -0.91bil.)	45,682 (35,814-57,294)

The drunk driving mass media campaign targeting the whole population is *not* cost-effective based on its ICER of US$45,682 (95% UI: US$35,814 - US$57,294) (Table 3). The implementation and enforcement of campaigns directed at the whole population is estimated to cost around 129 billion VND, with potential cost offsets estimated at 0.76 billion VND (95% UI: 0.96 - 0.57 million VND) (Table 2).

The mass media campaign for the whole population has a net incremental cost of 129 billion VND (95% UI: 109 billion VND – 149 billion VND) (Table 2). The health gain achieved from the media

campaign for the whole population is estimated at an additional 176.5 DALYs averted (95% UI: 147.7-208.5).

The cost-effectiveness charts on the mass media campaign for the whole population in Figure 1 show that the intervention is not cost-effective.

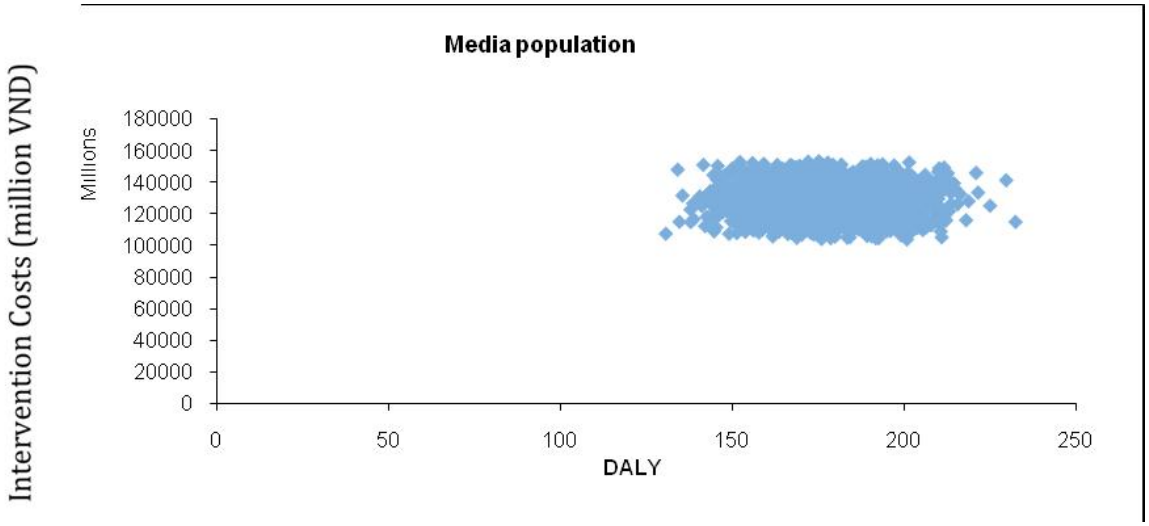

Figure 1. Cost-Effectiveness Chart on Mass Media Campaigns Targeting the Whole Population

4. DISCUSSION

This research aims to provide a comprehensive analysis of cost-effectiveness of mass media to reduce the burden of harm associated with drinking and driving in Vietnam.

In conducting these analyses, the limitations should be acknowledged. For one, this study encountered difficulties in creating a model that shows the time gap between the change in drunk driving behavior and injuries or health outcomes. Example, the assumption that drunk driving risks do not decrease quickly with every shift in drinking-and-driving behavior was not reflected in the analysis due to the probable influence of other factors.

Mass media campaigns targeting the general population is not cost-effective. The issue of equity in the mass media campaigns tends to be a minor one. After all, any restrictions (e.g., alcohol restrictions) espoused by the campaign would affect the population as a whole. It is also feasible since the infrastructure is already in place, and there has been a precedence in alcohol restrictions. The program will be sustainable as long as there are ongoing additional resource input and monitoring in place.

Although the evidence base on this intervention is weak, a campaign is widely promoted as an important component of any strategy to minimize alcohol abuse and one that fits well alongside Random Breath Test (RBT). However, the sustainability of the intervention's effectiveness is an important unknown in this study's analysis.

5. CONCLUSIONS

This study is one of the first attempts to provide evidences on the cost effectiveness of mass media to reduce drunk-driving interventions in Vietnam. Mass media campaigns bear weak evidence and are not cost-effective. However, these are widely promoted as an important component of any strategy to minimize alcohol abuse and one that fits well with RBT. Although there are uncertainties in some aspects of the analysis, the results from this study provide policymakers with clear evidences on how cost effective the intervention of mass media on drinking-and-driving problems in Vietnam can be.

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