

## Are Alcohol Policies Associated with Alcohol Consumption in Low- and Middle-Income Countries?

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A L C O H O L  
R E S E A R C H  
G R O U P

## Presenter Disclosures

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No relationships to disclose

## Background

- ❖ Harmful patterns of alcohol consumption in developing countries (Rehm et al., 2004, 2009); alcohol use the single largest behavioral risk factor for disease and disability in middle-income countries (WHO, 2011)
- ❖ Increasing alcohol consumption in low- and middle-income countries (LAMICs) with rising incomes and expansion of industrial production and marketing of alcohol (Anderson et al., 2009).
- ❖ Evidence of the effectiveness of alcohol policies from high-income countries (Babor et al., 2010)
- ❖ Paucity of policy-relevant cross-national studies on LAMICs

## Aim & Research Question

**Aim:** To examine associations between alcohol control policies in four regulatory domains with alcohol consumption in LAMICs

**Research question:** are alcohol policies concerning restrictions on physical availability of alcohol, alcohol advertising, motor vehicle operation after consuming alcohol, and relative alcohol price levels associated with alcohol consumption in LAMICs, after adjusting for effects of overall drinking culture and living standards?

## Data

- **Alcohol consumption data:**
  - Extracted from the Gender, Alcohol, and Culture: an International Study (GENACIS) dataset, collected from individuals ages 18-65 in 38 countries including 15 LAMICs
- **Alcohol policy Data:**
  - Obtained from the 2004 WHO Alcohol Status Report reflecting the status of alcohol policies as of May 1, 2002
  - Karnataka state data were used for India where alcohol policies are state-based (Gururaj et al., 2011)

## Measures: Drinking Variables (prior 12 months)

- ✓ **Current drinking:** having consumed any alcoholic beverages
- ✓ **Usual quantity:** typical number of drinks in grams of EtOH consumed per drinking day
- ✓ **Drinking frequency:** number of days when alcohol was consumed, calculated using mid-points from 9 categorical responses (never, once, twice, 3–6 times, 7–11 times, 1–3 times a month, once or twice a week, 3 or 4 times a week, and every day or nearly every day)
- ✓ **Binge drinking frequency:** number of days when five or more drinks (approximately 60 grams of ethanol) were consumed in a single day
- ✓ **Drinking volume:** usual drinking frequency multiplied by quantity per drinking day

## Measures: Alcohol Policies

- **Physical Availability**
  - Restrictions on off-premise alcohol retail sales (no restriction vs. government monopoly or license)
  - Restrictions on off-premise outlet density (sum of restrictions—yes vs. no—on beer, wine, spirits outlet density)
  - Restrictions on business hours (none vs. hours/days)
- **Relative alcohol prices**
  - Levels of beer, wine, and spirits prices as fraction of GDP-PPP per capita (low, medium, high)

## Measures: Alcohol Policies (cont'd)

- **Motor Vehicle operation**
  - Level of restriction involving legal blood alcohol concentration(BAC) limit for adults (low, medium, high)
  - Enforcement of random breath testing (RBT) (none, rarely, sometimes) (no LAMICs in our sample enforced this very often)
- **Alcohol advertising**
  - Sum of restrictions on advertising of beer, wine, spirits on four media, national TV, national radio, print media, and billboards (using the scale of no, voluntary/self-regulation, partial restriction, ban)

## Measures: Covariates

- **Gross Domestic Product per capita (as proxy for country-level living standards):**
  - 2004 gross domestic product based on purchasing power parity (GDP-PPP) per capita (World Bank, 2012)
- **Detrimental drinking pattern (DDP) scale (as proxy for country-level drinking culture)**
  - Based on the extent to which frequent heavy drinking, drunkenness, festive drinking at community celebrations, drinking with meals, and drinking in public places are common in a society (Rehm et al., 2003a)

## Analysis

- **Multi-level random intercept models:** allow prediction of variability in average drinking variables across countries after accounting for GDP-PPP per capita and DDP
- **Small number of level-2 units; for ease of interpretation:** associations of each policy variable (or domain composite) with each of the dependent drinking variable were estimated in separate models.
- **Implemented in Stata Version 12**

## Countries Included

Country	Country Income Designation <sup>a</sup>	Survey Year	Age Range	Sample Size	Sampling Frame	GDP-PPP Per Capita <sup>b</sup>	DDP Score <sup>c</sup>
Argentina	upper-middle	2003	18-65	1000	regional	11456	2
Belize	upper-middle	2005	18+	3973	national	6391	4
Brazil	lower-middle	2002	17+	712	regional	8258	3
Costa Rica	upper-middle	2003	18+	2526	regional	9206	3
Czech Republic	upper-middle	2002	18-64	1273	national	16265	2
Hungary	upper-middle	2001	19-65	2243	national	15342	3
India	low	2003	16+	2597	regional	2849	3
Kazakhstan	lower-middle	2002	18+	1170	regional	7196	4
Mexico	upper-middle	1998	18-65	5711	national	9357	4
Nicaragua	low	2005	18+	2030	regional	2482	4
Nigeria	low	2003	18+	2064	regional	920	2
Peru	lower-middle	2005	18-65	1531	regional	5170	3
Sri Lanka	lower-middle	2002	18+	1193	regional	3827	3
Uganda	low	2003	18+	1478	regional	1442	3
Uruguay	upper-middle	2004	18-65	1000	national	12108	3

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## Results

Coefficient Estimates of the Associations between Country-Level Alcohol Availability Policies and Country-Level Average Adjusted Drinking Outcomes

Physical Availability Alcohol Policies	Alcohol Consumption Variable				
	Current Drinking	Usual Quantity	Usual Frequency	Binge Drinking Frequency	Total Drinking Volume
	Exp( $\theta$ ) (95% CI)	$\theta$ (SE)	$\theta$ (SE)	$\theta$ (SE)	$\theta$ (SE)
Physical availability index <sup>a</sup>	<b>0.73**</b> (0.60, 0.90)	<b>-0.23**</b> (-0.40, -0.06)	<b>-0.30***</b> (-0.41, -0.20)	<b>-0.14**</b> (-0.22, -0.06)	<b>-0.52***</b> (-0.75, -0.28)
Government monopoly or licensing system <sup>b</sup>	<b>0.58*</b> (0.34, 0.97)	<b>-0.50*</b> (-0.91, -0.09)	<b>-0.65***</b> (-0.93, -0.38)	<b>-0.23*</b> (-0.45, -0.01)	<b>-1.02**</b> (-1.65, -0.39)
Density of outlets <sup>b</sup>	0.83 (0.65, 1.05)	-0.13 (-0.33, 0.07)	<b>-0.19*</b> (-0.35, -0.03)	<b>-0.11*</b> (-0.20, -0.02)	<b>-0.34*</b> (-0.65, -0.02)
Restrictions on business hours <sup>b</sup>	<b>0.54**</b> (0.36, 0.81)	<b>-0.40*</b> (-0.77, -0.03)	<b>-0.63***</b> (-0.83, -0.44)	<b>-0.30***</b> (-0.46, -0.15)	<b>-0.88**</b> (-1.44, -0.32)

$p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

<sup>a</sup> Treated as a continuous predictor

<sup>b</sup> Categorical predictor with the category 'no restriction' as the reference

## Summary of Findings/Conclusions

- Policies to restrict physical availability associated with lower consumption in LAMICs
  - High level of relative aggregate alcohol prices inversely associated with all drinking variables but average drinking volume
  - Mixed findings on policies on motor vehicle operation
  - Inverse associations between greater restrictions on alcohol advertising, especially for beer
- Some (or most) of the policies found to be effective in high income countries were associated with lower alcohol consumption in LAMICs as well

## Study limitations

- **Cross-sectional design of this study**
  - causal relations cannot be established
- **Measurement challenges**
  - Variations in survey questions
  - Some survey data regional, not generalizable to country
  - High levels of unrecorded consumption in LAMICs
  - WHO's alcohol policy data collected through country self-reports with little external validation
- **Low statistical power with 15 level-2 units**
- **DDP captures country-level drinking cultures to a limited degree**

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