Invitations, incentives, and conditions: a randomized evaluation of demand-side interventions for health screenings in Armenia

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Overview

Personalized messages and financial incentives increased screenings for hypertension and diabetes in Armenia and have been incorporated into the national screening program.
The global challenge of NCDs

- Global annual number of premature deaths due to non-communicable diseases (NCDs) = 15 million
- Percentage of premature global NCD deaths in low-and-middle income countries = 85%
- Global NCD cost, medical spending and productivity losses, 2011-31 = US$ 23 trillion

World Health Organization, 2020; Bloom et al., 2011
Under-adoption of screening (secondary prevention) for early diagnosis of NCDs

- Complications, including stroke, cardiovascular diseases.
- Mortality, including premature deaths.

Percentage not diagnosed, of people living with hypertension in LMICs (61%)

Percentage estimated failure to achieve blood pressure control, among all cases (90%)

Saeedi et al., 2019; Geldsetzer et al., 2019
Stylized fact = low demand for (primary) preventive care in LMICs

- Under-adoption of preventive care e.g., deworming, despite relative low cost and significant long-term gain.
- Demand at zero or small non-zero prices is high.
- Increases in price lead to steep drop off in demand.
Why might demand for preventive care be low?

- Inaccurate perceptions of risk and returns
- Sensitivity to price and hassle
- Present bias and procrastination

Kremer et al., 2018
Why might demand for preventive care be low?

Inaccurate perceptions of risk and returns

- NCDs are complex diseases, individual risk uncertain.
- Lack of access to accurate information, e.g., low literacy.
- Overweighting some data points over others

- Information that is easy to understand and available.
- Personalized, including benefits and risk.
- Social learning, observing peers, shown to be effective.

Kremer et al., 2018; Kremer et al., 2019; Dupas, 2011
Why might demand for preventive care be low?

- Sensitivity to price and hassle

- Revealed preferences smaller than stated preference valuation.

- High demand elasticity to price and inconvenience.

- Consistent finding for preventive care, including bed nets and deworming.

- Reduced hassle and price.

Kremer et al., 2018
Why might demand for preventive care be low?

Present bias and procrastination

- Immediate costs, delayed benefits, and naivete leads to procrastination.
- For screening, travel cost, laboratory test fees, waiting time, stress of diagnosis? Long-term, better health.
- Evidence suggesting people underestimate the extent of their present bias – naivete is common.
- Time-limited incentives.
- Deadlines.
- Increased awareness of the intention-action gap.

O'Donoghue and Rabin, 2001; Augenblick and Rabin, 2018; Kremer et. al, 2018
Non-communicable diseases (NCDs) lead to 93% of deaths in Armenia.

In 2017, the economic cost of NCDs was 6.5% of annual GDP.
Since 2013, the Disease Prevention and Control Project, a national program aimed at increasing screening rates...

Supply side
- Financial incentives for doctors
- Screening training and supplies

Demand side
- Mass media campaign
In 2016, gaps in screening uptake persisted...

Less than 50% of people above 15 years were screened for hypertension annually

Less than 25% in the same group were screened for diabetes annually
Focus group discussions with service users in 2018 that had not been screened in the previous year...

**Inaccurate perceptions of risk and returns?**
- How to schedule appointments?
- Uncertainty over benefits?
- Credibility of information from mass media campaign?

**Sensitivity to price and hassle?**
- The need for a repeat visit for fasting blood sugar screen for diabetes.
- Need to pay out-of-pocket?

**Present bias and procrastination?**
- I plan to visit the health facility. I just haven’t gotten it done yet.

**Accurate information via a credible channel**

**Reduce hassle and price**

**Time-limited incentives and deadlines**

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**Accurate information via a credible channel**
Objective:

To examine the impact of incentives, invitations, and conditions, on screening rates for hypertension and diabetes, among adults aged 35 to 68, who had not been screened in the past year.
# Interventions designed with Ministry of Health and its Project Implementation Unit

<table>
<thead>
<tr>
<th>Intervention Group 1</th>
<th>Personal invitation from physician for diabetes and hypertension screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention Group 2</td>
<td>Intervention group 1 plus information on screening among peers</td>
</tr>
<tr>
<td>Intervention Group 3</td>
<td>Intervention group 1 plus labelled pharmacy voucher incentive (AMD5000 or ~$10), not conditional on being screened</td>
</tr>
<tr>
<td>Intervention Group 4</td>
<td>Intervention group 1 plus pharmacy voucher incentive (AMD5000 or ~$10), conditional on being screened</td>
</tr>
<tr>
<td>Control Group</td>
<td>No personal invitation for screening or voucher but exposed to national campaign</td>
</tr>
</tbody>
</table>

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**Dear [Name, Surname],**

We cordially invite you to visit [Name of the medical facility] of [Name of the community] at the following address [Address] to be screened for diabetes and hypertension.

According to official records in your personal medical card, in past 12 months you have not been screened for diabetes and hypertension at a medical facility. In terms of prevention and control of diseases, your visit to the medical facility is extremely important to ensure your personal healthcare.

Please, prior to the visit make a call to your doctor for a proper appointment, using the telephone number presented in the bottom of this invitation.

**Note:** for a credible measurement of diabetes you must visit the doctor fasting since midnight, which means you should not eat or drink anything except water. The screening is free-of-charge, painless and not time-consuming.

We highly recommend that you visit the medical facility soonest possible and to use the free-of-charge medical services of the primary healthcare facility.

Looking forward to seeing you,

[DATE]

[DOCTOR]

[Signature]

Intervention group 1: screening is important; signed by doctor; not time-consuming, painless and free; location of clinic; scheduling; pre-screen preparation.
Randomly selected 35 to 68 years old patients from the e-health database in 4 provinces, who did not screen for hypertension and diabetes in the previous year.

Random pre-assignment to study groups. 

n = 6934

Allocated to
Group 1
n = 1314

Allocated to
Group 2
n = 1318

Allocated to
Group 3
n = 1230

Allocated to
Group 4
n = 1332

Allocated to
Control Group
n = 1740

Reached by phone and eligible 

n = 2047

Final study groups according to random pre-assignment 

n = 2000

Contacted by phone, excluded (n = 4887)
- Out of reach (n = 1966)
- Out of the community (n = 1893)
- Screened at pre-selected HF (n = 386)
- Screened at another HF (n = 255)
- Refuse to talk (n = 251)
- Will leave for 6 months (n = 77)
- Member of the same HH (n = 39)
- Dead (n = 18)
- Duplicated ID (n = 1)
- Wrong age group (n = 1)

Excluded (n = 47)
- Did not grant consent (n = 31)
- Temporarily out of reach (n = 8)
- Out of community (n = 3)
- Not contacted (n = 5)

Intervention
Group 1
n = 400

Intervention
Group 2
n = 400

Intervention
Group 3
n = 400

Intervention
Group 4
n = 400

Control
Group
n = 400
Data sources

Health clinic administrative records
• To assess screening attendance

Baseline survey
• To collect socio-demographic data
• Between July and September 2019 for intervention groups, with distribution of invitations and vouchers (for intervention group 3)
• In January 2020 for the control group to avoid contamination with information on screening
Baseline characteristics and balance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.5 (0.5)</td>
<td>0.5 (0.5)</td>
<td>0.5 (0.5)</td>
<td>0.5 (0.5)</td>
<td>0.5 (0.5)</td>
<td>0.5 (0.5)</td>
</tr>
<tr>
<td>Age</td>
<td>51 (9.6)</td>
<td>51 (9.6)</td>
<td>51 (9.8)</td>
<td>50 (9.5)</td>
<td>51 (9.8)</td>
<td>51 (9.3)</td>
</tr>
<tr>
<td>Married</td>
<td>0.86 (0.3)</td>
<td>0.83 (0.4)</td>
<td>0.85 (0.4)</td>
<td>0.86 (0.3)</td>
<td>0.86 (0.3)</td>
<td>0.88 (0.3)</td>
</tr>
<tr>
<td>Higher education</td>
<td>0.16 (0.4)</td>
<td>0.13 (0.3)</td>
<td>0.17 (0.4)</td>
<td>0.18 (0.4)</td>
<td>0.15 (0.4)</td>
<td>0.15 (0.4)</td>
</tr>
<tr>
<td>Subjective welfare*</td>
<td>0.50 (0.5)</td>
<td>0.43 (0.5)</td>
<td>0.49 (0.5)</td>
<td>0.55 (0.5)</td>
<td>0.48 (0.5)</td>
<td>0.55 (0.5)</td>
</tr>
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</table>

Sample means with standard deviations in parentheses

*Our income is sufficient for family basic needs, such as food, clothing, utilities, but not enough for big purchases, such as equipment or a car

Differences between groups in the distribution of widowed, self-employed, and subjective welfare

No statistically significant differences across groups for all other variables at baseline
Impact on screening for hypertension and diabetes

From a baseline of no screening, in 6 months …

- Comparison: 3.5%
- Invitation Only: 18.5%
- Invitation + Infographics: 18.0%
- Invitation + Non-Conditional Voucher: 17.7%
- Invitation + Conditional Voucher: 34.3%

Note: OLS regressions controlling for facility and regional fixed effects, age, gender, and other sociodemographic variables
Average cost per person screened (USD)

- Invitation Only: $64.15
- Invitation + Infographics: $63.87
- Invitation + Non-Conditional Voucher: $127.18
- Invitation + Conditional Voucher: $62.24
## Limitations

<table>
<thead>
<tr>
<th>Control group not surveyed at baseline</th>
<th>Intervention-control differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Surveyed at endline</td>
<td>• Differences in post-allocation attrition</td>
</tr>
<tr>
<td>• Information at baseline may have influenced participants</td>
<td>• Baseline differences on covariates</td>
</tr>
<tr>
<td>• Stable socio-demographic variables</td>
<td>• Controlled for in regressions</td>
</tr>
<tr>
<td>• Survey + intervention effect</td>
<td></td>
</tr>
</tbody>
</table>
Policy lessons and next steps

Personalized messages and financial incentives have the potential to increase screening uptake and primary health care use, which has historically been low.

Messages and conditional incentives were equally cost effective, unconditional incentives less so, because Group 3 was twice as costly as Groups 1 and 2, but equally effective.

Simple messages were less expensive than but equally cost-effective as conditional incentives.

Personalized invitations will be sent to encourage screening in the Disease Prevention and Control Project.
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