

Promoting Vaccination Take-up at the Last Mile: Evidence from a Randomized Controlled Trial in Rural Indonesia

Asad Islam¹ Gita Kusnadi² Jahen Rezki³ Armand Sim¹ Giovanni van Empel⁴ Michael Vlassopoulos⁵ Yves Zenou⁶

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¹ CDES, Monash University

² CISDI

³ University of Indonesia

⁴ CHE, Monash University

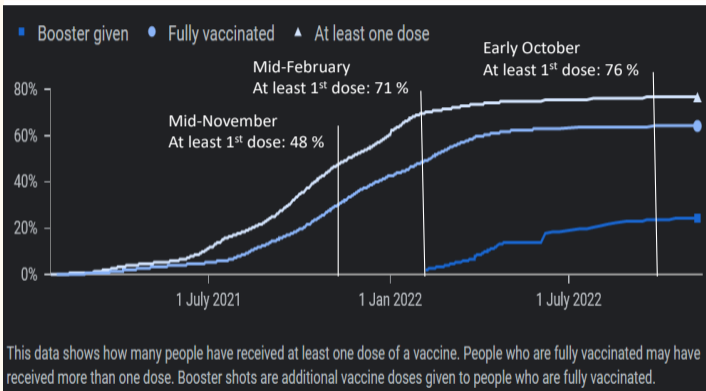
⁵ University of Southampton

⁶ Monash University

Vaccination key to control pandemic but puzzling adoption far from universal

- Vaccination is one of most accepted preventive health behaviors (Brewer, 2021)
- Confidence in vaccines is low recently even during the pandemic (Solís Arce et al., 2021)
- Vaccines prevented 20 million excess deaths in 1st year rollout (Watson et al., 2022)
- BUT Only 61 countries met the WHO goal of 70 % full-vaccination rate (June 2022)
- Why? Three possible explanations
 - Misinformation during pandemic (WHO, 2020; Bursztyn et al., 2022)
 - Insufficient incentives to vaccine take-up (monetary or non-monetary)
 - Supply and accessibility issues, especially for LMIC (Reza et al, 2022)
- We focus on addressing misinformation in Indonesia and West Java, in particular

Vaccination progress in Indonesia seems to have plateaued once hit 70 %



- **Misinformation** issue stalled the progress?
- **4 in 10** people—mainly in rural—reluctant to get vaccines due to misconception (LSI, 2021; SMRC, 2021)
- **6 in 10** people unable to distinguish hoaxes from facts (Katadata and MoCIT, 2020)

Police and intelligence agency forced to administer vaccines!

Ridwan Kamil Ungkap Hambatan Vaksinasi, Warga Anggap Pandemi Usai

Yudha Maulana - detikNews
Jumat, 03 Des 2021 15:27 WIB

0 komentar

BACKKAN



December 2021

March 2022

Aparat Polda hingga BIN masifkan vaksinasi COVID-19 di Jawa Barat

© Ratu, 8 Desember 2021 23:01 WIB



Gelar Vaksin di Polres Cimahi Berhadiah Minyak Goreng dan Beras

YATTI CHAIHYATI — Senin, 14 Maret - 20:39:06



Usai di vaksin, warga mendapatkan minyak goreng sebagai hadiah dari program vaksinasi di Polres Cimahi, Selasa (14/3/2022). (Foto: @sahadiprati)

BIN Jabar Kian Gencar Tingkatkan Capaian Vaksinasi Covid-19

WARZA MULTIMEDIA
8 September 2022



September 2022

Counter misinformation and promote vaccination

- Behavioral science-based information campaign crucial (Bavel et al., 2020)
- Information campaign (virtual) **successful** in promoting vaccines in **early phase** rollout (Alsan and Eichmeyer, 2021; Dai et al., 2021)
- Unclear if same approach effective in later phase → population with different attitude
- Is vaccine promotion study in later phase still relevant?
 - One-dose global vaccination rates **71 % (Nov 2022)** but stalled in some regions
 - **COVID-19 pandemic still here**—new variant may emerge → cases & deaths ↑
- **Lack of evidence** on strategies to promote COVID-19 vaccine esp in developing countries

This study

- Research question: Does personal information delivery and encouragement from different type of ambassadors promote vaccination?
- Cluster RCT promoting COVID-19 vaccine in rural West Java in a later phase
 - Vary type of ambassadors in each village—one ambassador per village
 - 3 districts with **lowest vaccination rates** (in Nov 2021 45-50 %)
- Test effectiveness of health cadres, nominated persons, and laypersons
- Interpersonal communication approach to promote vaccination and deliver evidence-based information through **door-to-door campaign**

Main objectives and contribution

- Test whether health cadres more effective than local leaders in boosting vaccination
 - **Health workers** (Alsan et al., 2020; Breza et al., 2021), **public figures** (Banerjee et al., 2019; Alatas et al., 2021), and **laypersons** (Alsan and Eichmeyer, 2021) all effective in raising awareness of COVID-19, flu vaccines, and immunization
 - **Unclear** which type is more effective. Study evaluating **all types** together underexplored
- Local ambassadors → social proximity → helpful in boosting vaccination
 - Shared characteristics, local traits, and identities → social proximity → compliance to social norms (Bicchieri et al., 2022)
 - Social proximity effective in countering misinformation about COVID-19 in India (Armand et al., 2021) and flu vaccination in the US (Alsan and Eichmeyer, 2021)

Connection to literature

- Information campaigns and preventive health behaviors and COVID-19 vaccination
 - Use combination of **virtual media** to disseminate information SMS and/or phone calls (e.g., Dai et al., 2021; Milkman, et al., 2021; Siddique et al., 2022)
 - **Video and/or audio** recordings (e.g., Alsan et al., 2020; Banerjee et al., 2020; Breza et al., 2021; Torres et al., 2021)
 - *We use **personal home visits** in later phase of COVID vaccine rollout*
- Mixed evidence on strategies to promote COVID-19 vaccine promotion in later phase
 - **Positive impacts** of providing access to vaccines in rural Sierra Leone conducted in March/April 2022 (Mobarak et al., 2022)
 - **Null impacts** of information campaign using Facebook to disseminate vaccine promotion videos by health workers to millions of people in US and France conducted between December and February 2022 (Ho et al., 2022)
 - *We also find **null impacts** of having local ambassadors personally deliver information and promote vaccines*

Outline

Background

Research design

Results

Conclusion

Why West Java?

- One of hardest-hit areas at one time: Cases and deaths account for 16 % and 10 %
- High vaccine supply but high **prevalence of misinformation** issues
 - Survey findings: **strong opposition** against vaccines (4 in 10) and many also believe strong immune sufficient (8 in 10)
 - Feb 2022 statistics: 360,000 **dropouts** (took 1st dose but not 2nd dose within 6mo); > 5 million almost dropouts—alserthighest in Indonesia
- History of vaccine hesitancy: diphtheria outbreak in 2017 due to low vaccination rate
- Lack of demand for modern health care, e.g., child birth services, fueled by traditional medical practices (Titaley et al., 2010)

Outline

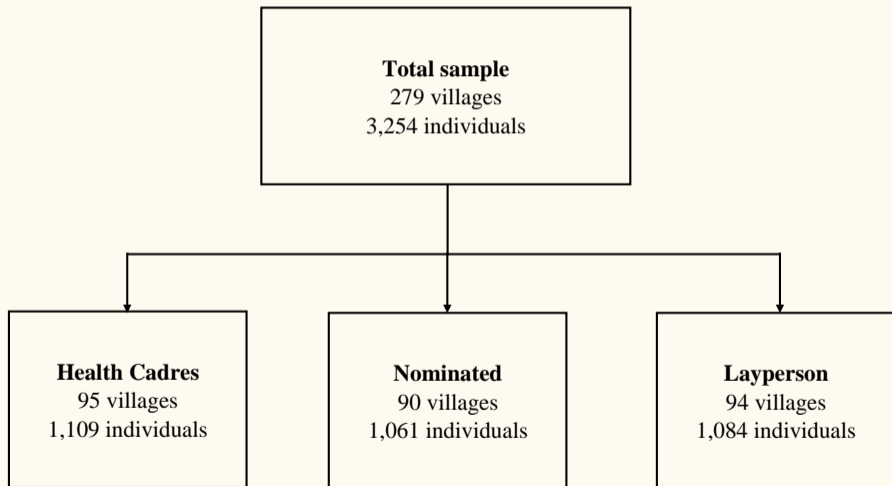
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Design overview



Research design

- ALL treatment groups received information through personal home visits and pamphlet 
- Health cadres
 - Community volunteers mainly performed simple health services, e.g., child immunization
- Nominated persons
 - Respondents nominated respected, trusted, and credible persons (up to 3)
- Laypersons
 - (Ideally) Neither health workers nor government officials (e.g., village heads)
 - Control group

Information delivery: Personal visits and pamphlet

- Ambassadors paid **two weekly personal visits** to respondents and gave pamphlet
- Information contents
 - Efficacy of first and second dose of vaccine and key population
 - Personal benefits of vaccines
 - Social and economic benefits of vaccines
 - Social norms of vaccination (e.g., majority have got vaccinated)
 - Practical topics of vaccination (e.g., where to get vaccines)

Data collection

- Our sample consists of unvaccinated individuals aged 18+
- Three districts in West Java with lowest 1st dose vaccination rates
- Baseline survey: mid-February until early April
- Intervention: June-July
- Endline survey: mid-August until early October
- **Attrition** rate $\approx 14\%$
- **Final sample** in baseline and endline: 2,801 in 279 villages

Participants' characteristics

- Average respondent 48 years old and **majority female** (58 %)
- **Low to lower-middle income**: 55 % unemployed, 70 % primary school or lower, 78 % received social assistance benefits
- Average respondent reported **1 of 8** health conditions—37 % high blood pressure
- An average respondent **vaccine hesitant** (2.5 out of 5-scale)
- Respondents well-balanced across groups (14 baseline characteristics) [▶ Table](#)

- We recruited 279 ambassadors out of targeted 287 villages (97 % success rate)
- Average ambassador relatively young, 40 years old
- 90 % health cadres female, much higher than laypersons (60 %) and nominated persons (34 %)

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Empirical analysis: Main results

- Baseline specification

$$Y_i = \alpha + \beta \text{Cadres}_i + \gamma \text{Nominated}_i + \theta Y_{0i} + \tau X_{vi} + \epsilon_i$$

Y_i outcomes of individual i in the endline, such as vaccine take-up, registration, and intent

Cadres_i indicator for health cadres ambassadors group, Nominated_i for nominated ambassadors group; and *Layperson* reference group

X_{vi} baseline covariates: demographic and socio-economic characteristics, morbidity history, village-level variables

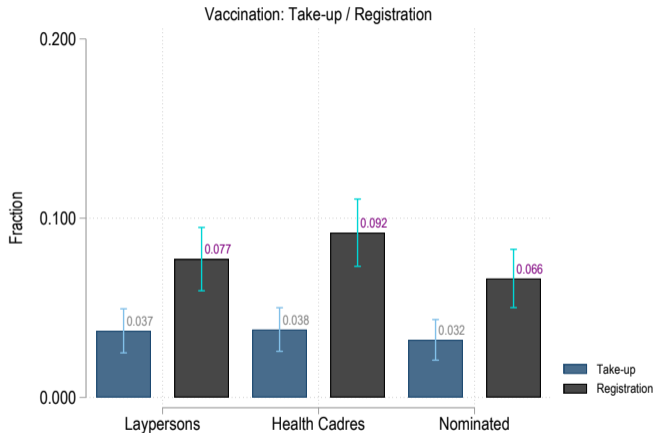
Y_{0i} baseline value of outcomes

ϵ_i standard error clustered at village level

Did intervention promote vaccination (take-up, registration, and intent) ?

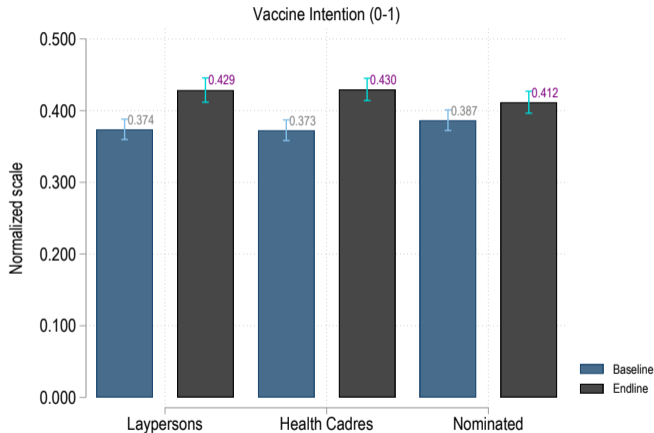
- Take-up (verified by physical or digital proof when available) (0/1)
- Registration (0/1)
- Take-up / registration (0/1)
- Vaccine intent
 - Likert-scale 1 (strong opposition) to 5 (strong support) re-scale (0 to 1)
- **Preferred outcome:** Vaccine take-up/registration → more objective

No difference in vaccine take-up/registration across groups



- Take-up rate 3.57 % evenly distributed across groups
- **Relatively low** compared to national progress 5 pp: 71 % - 76 % (Feb-Oct 2022)
- Registration rate, 7.8 %, relatively **more pronounced** in *Health Cadres* group

No difference in vaccine intent across groups

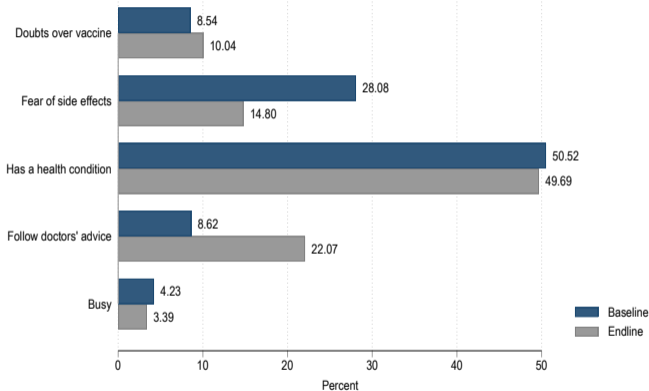


- Slight increase in intent but the change and level **similar** across groups

Null treatment effects on vaccination outcomes

	(1)	(2)	(3)	(4)
	Vaccinated or registered	Vaccinated	Registered	Vaccine intent
Panel A				
Non-layperson	-0.001 (0.025)	-0.003 (0.013)	0.003 (0.022)	-0.008 (0.016)
R^2	0.020	0.015	0.036	0.072
Panel B				
Health cadres	0.015 (0.029)	-0.000 (0.015)	0.016 (0.026)	0.003 (0.018)
Nominated	-0.017 (0.026)	-0.006 (0.013)	-0.011 (0.023)	-0.018 (0.018)
N	2,778	2,778	2,678	2,467
R^2	0.021	0.015	0.037	0.073
Control mean	0.111	0.037	0.077	0.429
p -value: Health cadres vs Nominated	0.440	0.835	0.508	0.439

Misconception about COVID-19 vaccines improve but similar across groups



Pearson's chi-squared test for equality: p-value = 0.000

- **Health condition**, fear of side effects, and doubt over vaccine $\approx 90\%$
- “**Fear of side effects**” \downarrow (28 % to 15 %) and “**Follow doctor's advice**” \uparrow (9 % to 22 %) (Chi-squared $p < 0.001$)
- Distributions **not statistically different** between groups ▶ Figure

Nominated ambassadors seem to be perceived better than other types

	(1)	(2)	(3)	(4)
	Perception on [...]			
	Perception (index)	Information session	Ambassador's ability to promote vaccines	Vaccine benefits information
Panel A				
Non-layperson	0.022 (0.088)	0.002 (0.008)	0.003 (0.014)	0.003 (0.014)
R^2	0.024	0.022	0.018	0.017
Panel B				
Health cadres	-0.125 (0.102)	-0.007 (0.009)	-0.021 (0.016)	-0.021 (0.016)
Nominated	0.192* (0.098)	0.012 (0.009)	0.032** (0.015)	0.030** (0.015)
N	2,302	2,302	2,302	2,302
R^2	0.040	0.028	0.040	0.038
Control mean	0.000	0.733	0.709	0.711
p -value: Health cadres vs Nominated	0.006	0.087	0.003	0.004

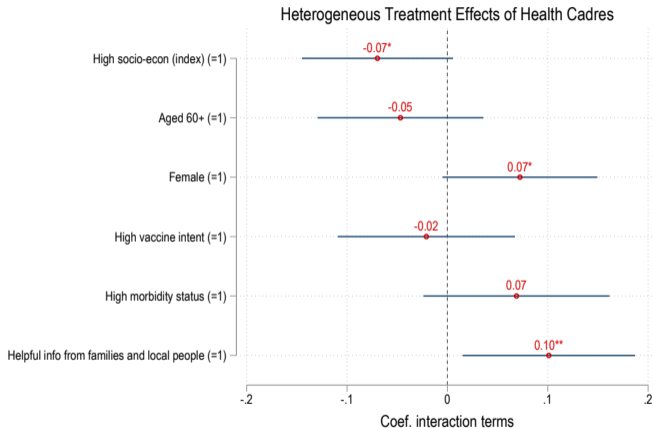
Despite better perception, no evidence that intervention improves knowledge

	(1)	(2)	(3)	(4)	(5)
	Knowledge (index)	Knowledge about COVID (index)	Severity of COVID impacts (index)	Benefits of COVID vaccine (index)	Distinguish COVID fake news & facts (index)
Panel A					
Non-layperson	0.022 (0.063)	0.017 (0.052)	-0.029 (0.084)	0.054 (0.064)	0.059 (0.064)
R^2	0.029	0.026	0.028	0.070	0.029
Panel B					
Health cadres	-0.007 (0.072)	0.024 (0.058)	0.004 (0.100)	0.051 (0.076)	0.001 (0.073)
Nominated	0.052 (0.071)	0.009 (0.065)	-0.063 (0.091)	0.057 (0.071)	0.117 (0.071)
N	2,778	2,778	2,778	2,778	2,777
R^2	0.030	0.026	0.029	0.070	0.031
Control mean	0.000	0.000	0.000	0.000	0.000
p -value: Health cadres vs Nominated	0.647	0.918	0.691	0.694	0.144

No impacts on health behaviors but health cadres help reduce COVID stress

	(1)	(2)	(3)	(4)	(5)
	Mental health (general)	Mental health (covid)	Compliance (extensive)	Compliance (intensive)	COVID positive post-intervention
Panel A					
Non-layperson	-0.041 (0.074)	-0.129* (0.071)	-0.038 (0.098)	0.044 (0.089)	0.005 (0.005)
R^2	0.060	0.082	0.166	0.043	0.010
Panel B					
Health cadres	0.047 (0.094)	-0.142* (0.082)	-0.134 (0.121)	-0.045 (0.099)	0.004 (0.006)
Nominated	-0.131 (0.079)	-0.116 (0.081)	0.060 (0.104)	0.131 (0.113)	0.005 (0.006)
N	2,777	2,777	2,778	2,677	2,777
R^2	0.065	0.082	0.172	0.047	0.010
Control mean	0.000	0.000	0.000	0.000	0.014
p -value: Health cadres vs Nominated	0.107	0.185	0.228	0.318	0.650

Health cadres treatment effects by individual characteristics



- Low socio-economic status
- Female
- Those valuing information from close circle and locals
- All positive response to health cadres

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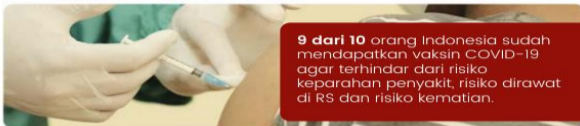
Results

Conclusion

Conclusion

- Personal approach by non-laypersons local ambassadors did not increase vaccination
- Null effects on knowledge, beliefs, and sources of hesitancy → our respondents very hesitant and complacent
- Even door-to-door vaccination drives by police and BIN \neq accelerated progress
- Suggestive evidence of health cadres treatment effects w.r.t. SES, gender, and helpful source of information
- When information is already widespread as in this context, different strategies are needed to push higher vaccination rate

Thank You!



9 dari 10 orang Indonesia sudah mendapatkan vaksin COVID-19 agar terhindar dari risiko keparahan penyakit, risiko dirawat di RS dan risiko kematian.



"Saya punya penyakit penyerta"

Jika Anda punya penyakit penyerta, seperti darah tinggi, pernafasan, diabetes, atau jantung, Anda tetap dapat divaksin setelah konsultasi dengan tenaga kesehatan. Justru kalau tidak divaksin, tubuh akan lebih lemah dan rentan dari penyakit akibat COVID-19.



"Saya takut efek samping vaksin"

Tidak semua orang yang sudah divaksin akan mengalami efek samping vaksin. Umumnya efek samping ini ringan, dan akan hilang sendiri. Efek samping menunjukkan bahwa vaksin sedang membangun daya tahan tubuh supaya bisa mengusir virus yang masuk, jadi kita tidak sakit, atau sakit parah bahkan meninggal.



Yuk Segera Vaksin Dengan Lengkap!

Dengan mendapatkan vaksin lengkap, kita lindungi diri sendiri, orang-orang yang kita sayangi, dan orang lain di sekitar kita.



BUKU SAKU DUTA VAKSIN COVID-19

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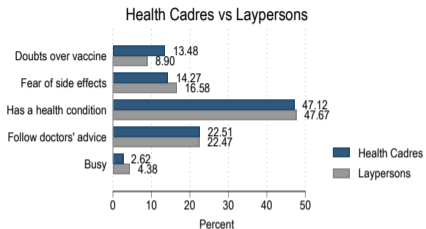
Participants' characteristics balance across baseline characteristics [▶ Back](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean				Difference between Groups (<i>p</i> -value)		
	N	Laypersons	Health Cadres	Nominated	Health Cadres vs Laypersons	Nominated vs Laypersons	Health Cadres vs Nominated
Female	3254	0.565	0.585	0.595	0.474	0.290	0.729
Age	3254	48.669	48.925	48.978	0.797	0.753	0.956
Married	3254	0.741	0.732	0.747	0.709	0.776	0.545
Unemployed	3250	0.551	0.562	0.534	0.721	0.556	0.318
Primary or lower education	3254	0.709	0.692	0.697	0.519	0.639	0.871
Had childhood immunization	2838	0.709	0.732	0.710	0.612	0.993	0.584
Received any social assistance benefits	3254	0.793	0.777	0.789	0.624	0.890	0.718
Years of schooling	3248	6.040	6.291	6.221	0.313	0.448	0.786
Monthly HH exp. per capita (IDR '000)	3231	676.803	681.258	651.800	0.873	0.361	0.235
Has health insurance	3254	0.625	0.664	0.643	0.268	0.603	0.526
Morbidity index (0–1)	3250	0.134	0.131	0.130	0.737	0.618	0.882
Vaccine intention (1–5)	3254	2.546	2.503	2.547	0.533	0.994	0.514
Nearest distance to a health facility (km)	3254	0.560	0.594	0.549	0.841	0.939	0.770
Distance to subdistrict (km)	3254	3.267	3.093	3.434	0.625	0.672	0.353
<i>p</i> -value: Joint orthogonality test					0.959	0.816	0.914

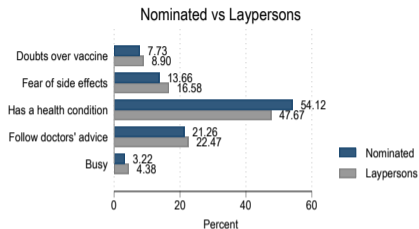
Ambassadors' characteristics: Table [▶ Back](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean				Difference between Groups (<i>p</i> -value)		
	N	Laypersons	Health Cadres	Nominated	Health Cadres vs Laypersons	Nominated vs Laypersons	Health Cadres vs Nominated
Age	270	37.587	40.656	39.906	0.022	0.080	0.553
Female	279	0.617	0.895	0.344	0.000	0.000	0.000
Monthly HH exp. per capita (IDR '000)	244	2173.494	2446.988	2480.769	0.222	0.146	0.879
Secondary or higher education	239	0.864	0.880	0.893	0.771	0.580	0.786
Trust vaccine preventing death	279	0.911	0.888	0.893	0.372	0.495	0.873
Community participation	279	0.387	0.470	0.433	0.037	0.265	0.287
Vaccination status							
2 nd dose	279	0.479	0.516	0.422	0.613	0.444	0.204
3 rd dose	279	0.489	0.453	0.556	0.615	0.372	0.163
1 st dose	279	0.032	0.032	0.022	0.990	0.687	0.695
Occupation							
Government village official	255	0.081	0.135	0.475	0.257	0.000	0.000
Community worker volunteer	255	0.023	0.135	0.025	0.006	0.942	0.007
Employee	255	0.465	0.146	0.275	0.000	0.011	0.042
Housewife	255	0.372	0.562	0.213	0.012	0.023	0.000
Unemployed student	255	0.058	0.022	0.013	0.234	0.109	0.621
Total	279	94	95	90			

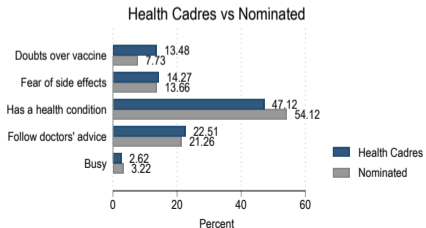
Source of hesitancy across groups at endline [▶ Back](#)



Pearson's chi-squared test for equality: p-value = 0.358

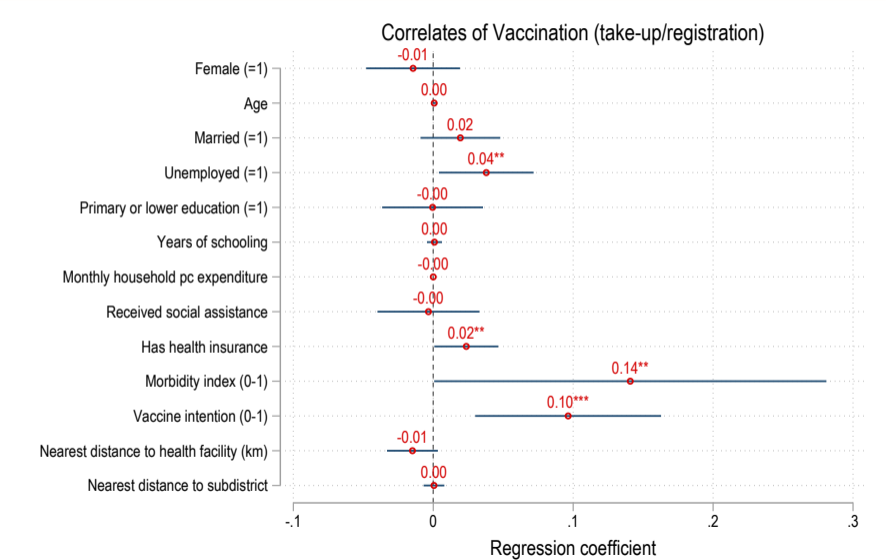


Pearson's chi-squared test for equality: p-value = 0.731



Pearson's chi-squared test for equality: p-value = 0.164

Baseline predictors of vaccination take-up/registration



Baseline predictors of vaccination intention

