

Role of affordability, accessibility, and awareness (3As) in adoption of cleaner cooking technologies (LPG) in rural India

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819 million people primarily rely on traditional biomass stoves for cooking¹



Background: Status of Traditional Cooking in India

0.48 million premature mortality in 2017 due to continued exposure to household air pollution²



¹World Energy Outlook, 2016 ²Balakrishnan et. Al., 2019



Aim 1 Results

Table 1: Binomial logistic regression with outcome variable: adoption of LPG by households

Model 1 (Demogra	aphic)	Model 2 (3As)	
OR (95% CI)	p value	OR (95% CI)	p value
Demographic predictors	-		•
Age (years) 0.97 (0.95-0.99)	0.01**	0.99 (0.97-1.02)	0.62
Literacy: Highest education of male			
decision maker			
Below or up to class 4: 0.42 (0.15-1.12)	0.09	0.19 (0.05-0.71)	0.02*
<i>Class 5 to class 8:</i> 0.84 (0.50-1.38)	0.49	0.4 (0.20-0.77)	<0.01**
Class 9 to class10: 1.23 (0.66-2.31)	0.52	1.09 (0.50-2.40)	0.82
Class 11 to class 12: 0.90 (0.28-3.05	0.86	0.65 (0.16-2.87)	0.56
<i>College:</i> 0.96 (0.33-2.89)	0.94	0.27 (0.56-1.35)	0.10
<i>Not Applicable:</i> 0.40 (0.12-1.30)	0.14	0.51 (0.11-2.31)	0.39
(Reference: No education)			
Caste			
<i>OBC</i> 0.64 (0.34-1.15)	0.14	0.68 (0.29-1.49)	0.34
<i>SC/ST</i> 0.11 (0.05-0.20)	< 0.001***	0.11 (0.04-0.2)	<0.001
Other religious minorities 0.47 (0.05-3.55)	0.46	0.36 (0.02-4.36)	0.42
(Reference: General)			
Affordability			
Income of the respondent			
INR		1.0006 (1.0003-1.0009)	<0.001***
Income of the household			
INR		1.0002 (1.00003-1.0004)	0.03*
Accessibility			
Nearest Tarmac from the			
household Kms		0.74 (0.57-0.96)	0.02*
Availability of free biomass near			
the household			
Yes		0.01 (7e-4-3.3e-02)	<0.001***
(Reference: No)			
Distance of the biomass source			
Kms		1.20 (1.00-1.44)	0.03*
Awareness			
Perception of LPG explosion			
Yes		0.11 (0.03-0.3)	<0.001***
(Reference: No)			
Campaigns attended			
Yes		17.51 (4.09-122.25)	<0.001***
(Reference: No)			
AIC 635.64		484.42	
McFadden's R square 0.15		0.43	

Pic Courtesy: Praveen Kumar

Barriers to LPG adoption and sustained use



Study aims

Aim 1: To understand how below poverty line (BPL) LPG adopters vary from other BPL households on factors of affordability, accessibility, and awareness of LPG

Aim 2: To determine extent of LPG and traditional stove usage in adopter households

Approach

Aim 1:

- Case Control Study (N = 510 Households); Case: 255 LPG and traditional stove users; Control: 255 traditional stove users
- Multistage random sampling
- Household adoption questionnaire

Aim 2:

- 18 months monitoring of 60 Households from case group
- Use of stove use monitor systems [data loggers (Figure below)]
- Focus Groups



***p<0.001; **p<0.01; *p<0.05; Ref: Non-adoption of LPG; only significant predictors are shown</pre>

Aim 2 Results



Months

---LPG ---Traditional

Discussion

- Uptake of LPG is a function of factors pertaining to affordability, accessibility, and awareness (3As)
- Households proximal to free biomass source (forests) have lower likelihood to take up LPG
- Perception of LPG explosion decreases while campaigns on LPG increases LPG uptake
 - Despite LPG uptake in households, stacking with traditional cookstoves is routine
- Use of LPG is not more than average 45% of the cooking duration for 18 months of monitoring

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