

Home Production, Technology, and Women's Time Allocation in Rural India

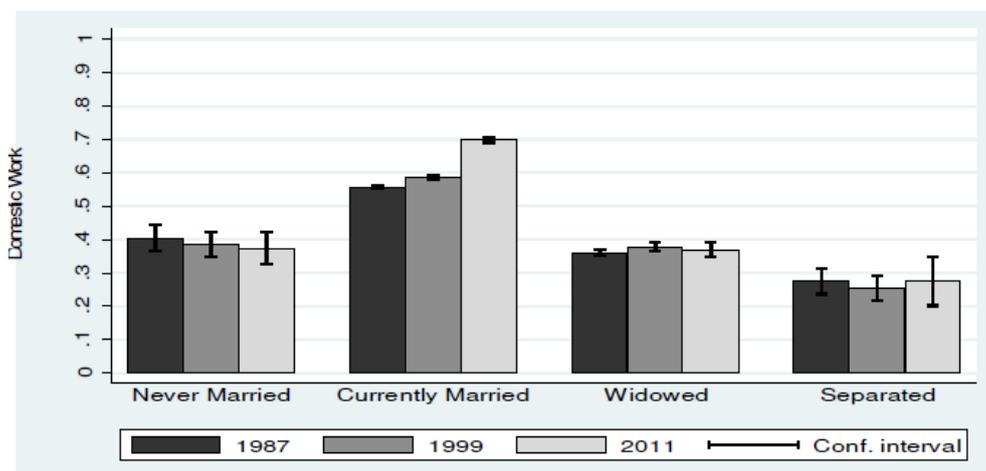
Executive summary

The gender gap in time use, especially related to cooking and fuel collection, constrains women's participation in remunerative activities. Further, use of solid fuels for cooking has disproportionately more adverse health impacts for women since their exposure is much more than that of the men in the household. More efficient technology of home production – in the form of LPG (liquefied petroleum gas) usage for cooking – may enable women to invest the saved time and effort in more productive activities, and increase their wellbeing. This study involves a 'cluster-randomised controlled trial' in rural Madhya Pradesh, aimed at inducing households to switch to LPG for cooking, through information campaigns on the health benefits of clean fuels and the existing LPG subsidy. It builds on a novel programme launched by Government of India in 2016, *Pradhan Mantri Ujjwala Yojana*, which seeks to expand access to clean fuel among rural households.

Introduction – context and rationale

Traditional gender norms dictating the type of work assigned to women and men is a potential source of gender-based inequality. Women bear a considerably higher burden of unpaid domestic chores, including cooking and fuel collection, limiting their labour market participation. Studying three Himalayan villages, Saksena *et al.* (1995) found that women spent 4-6 hours in solid fuel collection. Shailaja (2000) finds a disproportionate division of labour in that women collect over 56% of firewood, whereas they contribute far less to household income. Solid fuels have disproportionately more adverse health impacts for women since their exposure is more than that of the men in the household. Using LPG for cooking may enable women to invest the saved time and effort in more productive activities.

Figure 1. Burden of domestic work on females by marital status (25-65 year olds)



Source: Afridi, Dinkelman and Mahajan (2018).

There has been a steady reduction in female labour force participation (FLFP) in rural India in recent decades – from 49% in 1999 to 41% in 2011 and further to 28% in 2017 (Periodic Labour Force Survey, 2017-18). Lack of access to efficient, clean fuel may contribute towards low FLFP and women’s psychosocial wellbeing.

Evidence from other countries shows that improvements in home-production technology increase women’s labour supply by saving time spent on domestic work: for instance, Greenwood *et al.* (2005) study the advent of washing machines and refrigeration in developed countries, and Dinkelman (2011) analyses the effect of mass electrification of rural households in South Africa.

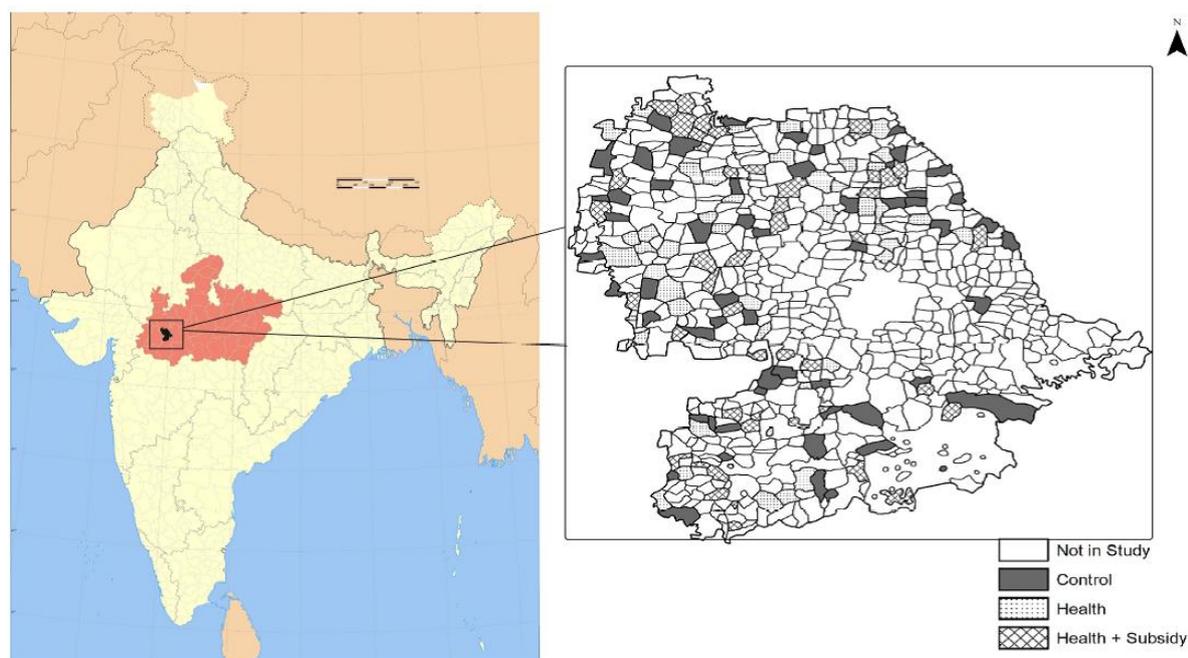
This project involves a ‘cluster-RCT’ (randomised controlled trial) in rural Madhya Pradesh, aimed at inducing households to switch to LPG (liquefied petroleum gas) for cooking. It builds on a novel programme launched by the Government of India in 2016 to provide subsidised access to LPG to disadvantaged households. While the programme has been an enormous success, with over 80 million households gaining access by September 2019, average annual LPG usage by existing and newly connected rural households remain under half of what is thought to be needed to eliminate solid fuel use. One reason is that despite subsidisation, the cost can be considerable for poor households. Most rural households are either unaware of the cash-back on LPG purchases or do not understand the extent of subsidy they receive

on refills. Additionally, and irrespective of income, there is low awareness of the long-term health hazards of solid fuel combustion.

Brief description of the study

The cluster-RCT was conducted in 150 villages in the Indore district of Madhya Pradesh during 2018-2019. It aimed at increasing awareness about the health hazards of cooking with solid fuels and the universal financial subsidy scheme for LPG. The intervention had two ‘treatment’ arms: one in which awareness about the adverse health effects of cooking with solid fuels was provided to households, and a second which, in addition to health awareness, explained the existing cash-back payment deposited directly to consumers’ bank accounts after they purchase an LPG refill at market price. No awareness campaign was conducted in the third group of villages – the ‘control’ group.

Figure 2. Map of the study area by ‘treatment’ status of villages



Notes: Indore block and the urban areas of the district (viz. the city of Indore, in the middle of the district) were not part of the study. The southern part of the district has few habitats due to significant forest cover.

To buy subsidised LPG, consumers have to obtain a 'connection' – register with one of the three state-owned oil marketing companies (OMCs) that are the only suppliers of LPG. A consumer has to pay a connection charge, a deposit for a cylinder and pressure regulator, and purchase a rubber pipe at any OMC's local distributor or 'dealer'. This is an upfront cost of about Rs. 3,200, which could easily be two weeks' worth of household income in rural areas.

Since 2013, all residential LPG consumers in India, irrespective of income, receive a 'direct benefit transfer' (DBT) for up to 12 cylinder refills in a year. This means that when a consumer with an LPG connection buys a cylinder of LPG, s/he pays the market price to the dealer and receives a transfer to his/her bank account for the amount of the subsidy to which s/he is entitled, within the next 2-3 days. The market price of a cylinder varied between Rs. 654 and Rs. 879, during November 2017-October 2018, in tandem with the price of imported liquefied natural gas. The government has kept the subsidised price very stable at around Rs. 500 so that the corresponding subsidy varied between Rs. 159 and Rs. 376.

To expand LPG access, the Government of India launched the *Pradhan Mantri Ujjwala Yojana* (PMUY) in April 2016. PMUY is the most extensive programme on access to clean fuel in the world. It mandates that a woman in a rural, socioeconomically disadvantaged household, obtaining an LPG connection (giving a right to buy subsidised gas) bears no upfront cost. The security deposit, and administrative charges for a connection, are covered by the government. The beneficiary also receives an interest-free loan from the OMC for the purchase of the stove and the first LPG cylinder.

While the government and OMCs engage in outreach to encourage LPG use, they have not emphasised the health benefits or financial subsidy. Although the programme has been successful in significantly improving rural households' access to LPG, actual LPG usage remains limited.

There are several factors – besides income – that are important in explaining the low demand for LPG, particularly in rural India. In forested areas, there is easy access to firewood. Habit, familiarity, and custom can lead to a preference for traditional fuels even in the areas that do not have freely available firewood (Aklin *et al.* 2015), and LPG costs less than buying firewood from the market.

Furthermore, many rural households are unaware of the LPG subsidy because it is deposited in a bank account that they may not monitor often. Text messages to registered phones intimating customers about the transfer to their bank account are in English and not the local language. Physical or remote access to account information on fund availability is limited, especially for women. Both features of the subsidy scheme – variation in subsidy amount and cash-back – suggest that uneducated and liquidity-constrained consumers may not be able to either comprehend or take advantage of the subsidy. Finally, lack of awareness of the health consequences may cause rural households to continue using solid fuels even if they can afford LPG.

A baseline survey of the 150 villages was conducted during November-December 2018. In each village, 20 households were selected randomly and asked about their cooking fuel collection and usage patterns, household characteristics, health expenditures, health awareness, and time use and wellbeing of the primary cook. If the household had an LPG connection, details such as unique consumer ID and the number of refills in the past year were recorded from their consumer booklets. LPG consumption data were matched with sales data from OMCs for validation.

Twenty-four-hour recall was used to obtain information on time use, under the categories of personal care, household chores, providing care, work, leisure, and other activities. The psychosocial wellbeing of the primary cook was assessed by asking them to rate their feelings on patience, frustration, tiredness, happiness, capability, and being content, on a scale of one to five, when they cooked a meal.

Figure 2. Psychosocial wellbeing of primary cook



Note: All questions were in reference to the last meal prepared by the primary cook.

In January 2019, the intervention to increase adoption and regular usage of LPG was initiated for nine months. The villages were randomly assigned to one of three treatment arms with 50 villages each: (i) Health awareness (ii) Health and financial subsidy awareness (iii) no awareness campaign (control group). The intervention leveraged the existing public health system by engaging Accredited Social Health Activists (ASHA) to provide information to households in a door-to-door campaign.

The endline survey was conducted between late October and December 2019, during which the households surveyed in the baseline were revisited to assess the impact of LPG usage on women's time use and wellbeing.

Major findings

- Having an LPG connection reduces time spent on household chores – cooking and possibly fuel collection – by women.
- Regular usage of LPG may increase leisure time for women in better-off households.
- There is suggestive evidence that in poorer households, LPG usage releases more time for income-generating work (paid and unpaid) by women.
- Preliminary results indicate that more efficient technology of home production can improve women's welfare.
- An intervention providing information on the health benefits of LPG and available subsidies can induce households to choose a cleaner and more efficient home production technology.
- Causal effects on time saving are very small.

Policy recommendations

- This study provides suggestive evidence on the effectiveness of increasing clean fuel usage as an instrument for enhancing women's psychosocial wellbeing.
- Preliminary evidence suggests that use of LPG, an efficient and cleaner fuel, relaxes the time-use constraint for the primary cook, who is mostly female in this study.

- The saved time enables women to spend more time in leisurely activities. But, there is little evidence that their labour market participation increases.

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Within the initiative, four projects are being led by Prof. Farzana Afridi at the Indian Statistical Institute. This research has been conducted under one of the projects.