

Monk Prayogshala Working
Paper # 2022-09

Anirudh Tagat

August, 2022

GENDER, WORKFARE, AND HUMAN CAPITAL OUTCOMES IN INDIA

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Anirudh Tagat

Department of Economics, Monk Prayogshala, Mumbai, India
School of Mathematics, Monash University, Melbourne, Australia

Address correspondence to Anirudh Tagat at at@monkprayogshala.in

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This paper was prepared when the author was a doctoral student at the IITB-Monash Research Academy, and submitted to the National Data Analytics Portal (NDAP) Research Paper Competition. All errors are sole responsibility of the author.

Gender, Workfare, and Human Capital Outcomes in India

Abstract

Previous work has argued that exposure to the Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGS) has improved women's bargaining power and therefore child health and education outcomes. In this research note, we examine the role of female NREGS workdays on health and education outcomes at the district level in India. We use data available from NDAP to combine multiple datasets on NREGS, anthropometric measures (NFHS-5), achievement scores (NAS-2017). We find that greater female workdays in particular drives reductions in adverse child nutrition outcomes, and improves test scores. Implications for NREGS program design and targeting are discussed in light of these results.

Keywords: NREGS, health, education, public policy

JEL Codes: I2, I38, J1, O12

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1. Introduction

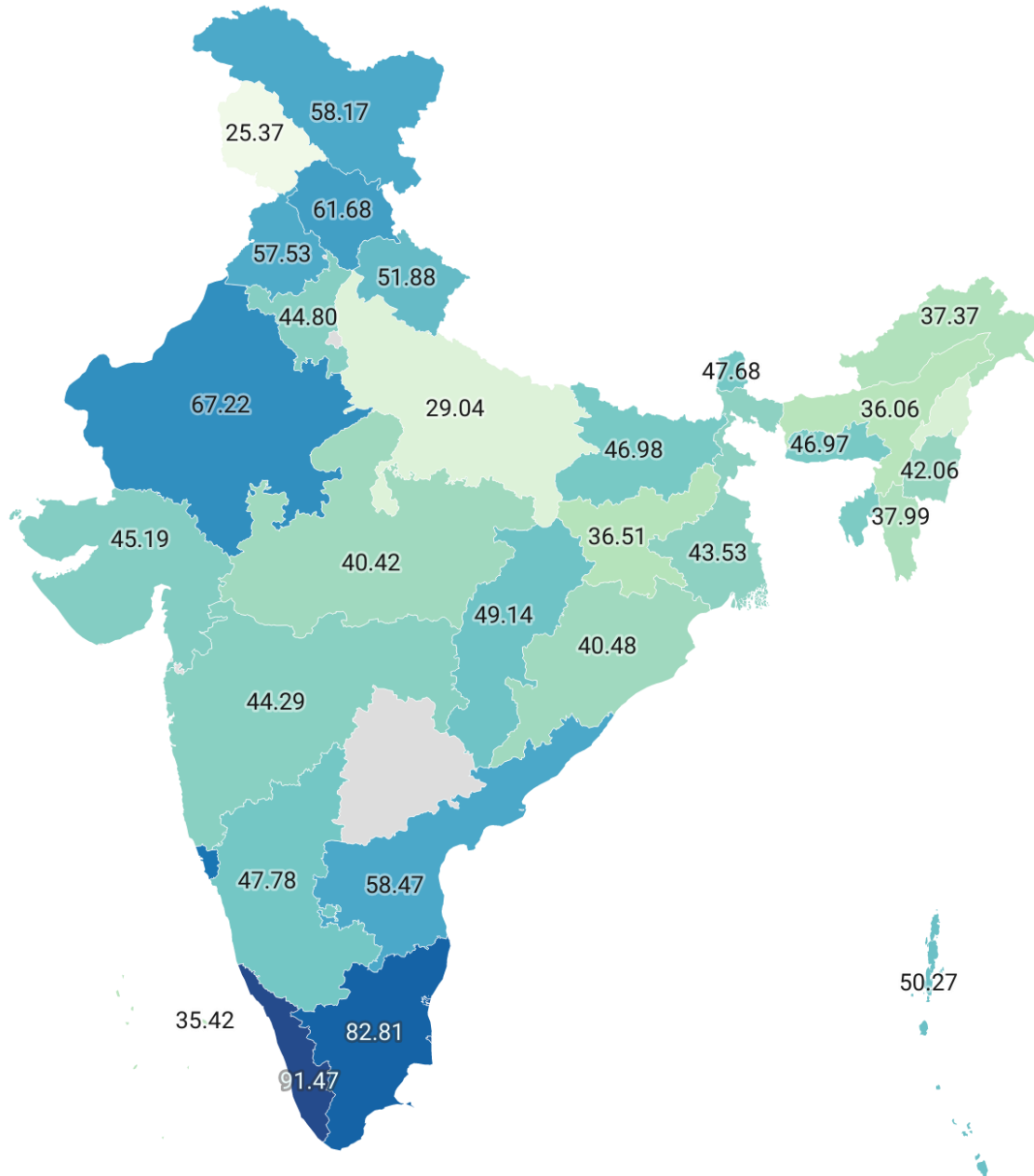
It has now been over 15 years since India's flagship workfare program, the Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGS henceforth) has been implemented. The program is designed to provide 100 days of employment to households that apply for work, and serves as an insurance mechanism for households (especially of marginalized groups such as Scheduled Castes/Tribes and women) to avail gainful employment. In more recent years, fiscal allocations to NREGS have fluctuated, but the current role of the workfare programme continues to dominate the Government of India's approach to social security.

Literature has recently begun examining the longer-term impacts of NREGS on a variety of outcomes related to health (Ravi & Engler, 2015; Chari et al., 2019), domestic violence (Sarma, 2022), empowerment (Tagat, 2021), and educational outcomes (Shah and Steinberg, 2021). This strand of literature has provided extensive insights into the channels as well through which NREGS impacts could operate. For instance, it has been suggested that since women continue to make up a large share of the workdays in many states (see figure 1 below), it is plausible that having access to alternate sources of income allows them to enhance their intra-household bargaining position and divert household resources to nutrition, health, and children's education (Pankaj and Tankha, 2010). This implicitly subscribes to the collective model of intra-household bargaining (e.g., Browning and Chiappori, 1998), where household utility is defined as a weighted sum of individual members' utility functions (weights being an indicator of bargaining power within the household). In this context, the budget constraint subject to which female members of households maximize their utility is assumed to be relaxed or modified when an additional source of personal income becomes available to them.

Women's share of workdays in NREGS (2011-21)

Computed as ratio of average annual female workdays to average total workdays between 2011 and 2021.

Percentage of female workdays



Map: Anirudh Tagat • Source: National Data Analytics Portal (NDAP), NITI Aayog. • Map data: © OSM • Created with Datawrapper

Figure 1: Share of female workdays across states (2011-21)

Source: NDAP District-level NREGS Data (2011-21)

Elsewhere, it has been suggested that this additional source of income (and endowment) enables women to have greater autonomy in household decision-making (Tagat, 2020). Duflo (2013) finds that women have a preference for investments in human capital (e.g., health and education for children) relative to men. Thus, it is plausible that income from NREGS may be linked via women's empowerment to increasing investments in health and education for children (Afridi et al., 2015). Over time, any changes in investments should be observed in terms of changes in child nutrition as well as education outcomes. In contrast, Shah and Steinberg (2021) argue that increasing investments in NREGS lead to wage growth, which in turn could result in children (especially boys) leaving school given the high opportunity cost of schooling.

The remainder of this research note is organized as follows. Section 2 provides an overview of the policy relevance of improving female workdays in NREGS and implications for child nutrition, health, and education. Section 3 outlines the data used, their sources, and section 4 contains the empirical specification and briefly discusses identification issues. Section 5 provides the key results of NREGS workdays on education and health outcomes. Section 6 discusses policy implications from this work and contains concluding remarks, outlining avenues for future work in this domain.

2. Policy Relevance

A workfare program at the scale of NREGS is unique to India, although there are several others in operation in diverse contexts such as the Philippines, Ethiopia, or the United Kingdom (Ariel Acosta and Olfindo, 2016). The implementation of such programs, however, varies according to the administrative constraints within which it is designed to operate. Furthermore, such programs, especially the NREGS, often have the opportunity to take into account skewed social relations as well, serving as a targeted safety net, which provide avenues for marginalized groups (e.g., women) to participate. Thus, the design of these programs (e.g., in terms of targeting) is critical for ensuring how much and through which channels they help intended beneficiaries.

In India, understanding the female-specific impacts of NREGS could help move policy toward better targeting as well as making provisions within the policy that acknowledge channels through which women's participation could impact subsequent health and education outcomes.

3. Data

In this research note, we wish to explicitly examine the links between NREGS and human capital accumulation, extending the current analysis to the latest round of data on health and education indicators. In the case of health, we focus on key anthropometric measures of stunting, wasting, and proportion underweight. In the case of education, we look at cognitive outcomes in the form of scores on the National Achievement Survey (NAS 2017) for class 5 (Senapathy, 2018). Exploiting data on the phased rollout of MGNREGS, we examine at the district level the impacts of women workdays (of total) on health and education outcomes as of 2019.

The data for these indicators come from the National Data & Analytics Platform (NDAP), made available by NITI Aayog recently. The data we use on all these indicators were made available at the district level online, with appropriate weighting. Multiple datasets (details below) were merged and combined online at the district level. Below we outline the specific data sources used for the analysis:

- (a) *NREGS Workdays*: We use data on two indicators from the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) data available at a yearly frequency at the district level on NDAP. This includes the total workdays generated by NREGS for each district (cumulatively summed for 2011 and 2021) and the total female workdays generated (cumulatively summed for 2011 and 2021) in that same district. This constitutes our key independent variable that proxies for female-driven intensity of NREGS participation.
- (b) *Education*: We use data on two indicators from the National Achievement Survey (NAS) 2017: Survey of Learning Outcomes - District report for Class 5 at the district level. We compute a simple average of 12 scores on mathematics tests, and an average of two variables on language scores compiled from the 2017 NAS as our outcome measures.
- (c) *Health*: We use data on four indicators from the 5th round of the National Family Health Survey (NFHS-V) on proportion of children in each district that are severely wasted, wasted, underweight, and stunted. These are available for the year 2019-20. This is our key outcome variable for health.

(d) *Controls*: We use additional data on control variables that are specific to education and health systems at the district level available from NDAP. A general control variable for economic growth at the local level is the percentage of houses with electricity from Census 2011 data. For education, we use data from the Unified District Information System for Education (UDISE) for 2017 on teacher-related data (female to total teachers ratio, regular teachers, total number of teachers); school infrastructure (number of pucca building blocks in school premises, number of functional toilet seats). For health, we use data from the Health Management Information System (HMIS): Performance of Key Health Management Information System (HMIS) Indicators across Districts (2017-18 to 2019-20). This is totaled for these years, contains data on institutional deliveries, number of primary health centres (PHCs), and number of hospitals.

4. Empirical Specification

In order to examine the association between female workdays and education and health outcomes, we estimate the following structure model using ordinary least squares with heteroskedastic-robust standard errors:

$$Y_{id} = \alpha FemWorkDays_d + \beta Control_{id} + \epsilon_{id} \quad (1)$$

Where,

Y_{id} is measured for the i th outcome variable in the d th district refers to the outcome variable of interest (a) percentage of children (b) stunted; (c) severely wasted; (d) wasted; and (e) underweight. Our

is a vector of control variables that is specific to the i th outcome. As detailed previously, for education, we use data on infrastructure and teacher availability at the district level, and for health outcomes we use infrastructure and the level of institutional deliveries at the district level. In both estimations, as a measure of district-level development, we include the percentage of households living with access to electricity. Although these are not comprehensive sets of controls, we believe it captures the broad set of covariates associated with human capital outcomes at the district level. All variables are standardized for ease of interpretation, and all estimates were run in Stata 16.1.

The specification in (1) is not without limitations; the identification strategy relies on the exogeneity of female workdays in a demand-driven workfare program which may be correlated with underlying factors that also influence health and education outcomes. In an ideal context, this could be addressed by controlling for the phased rollout of NREGS in these districts, linking exposure to intensity of female workdays. Given that data on rollout is not available within NDAP, merging such data 'by hand' is left for future iterations of this note. We do, however, conduct additional analysis using the total persondays generated under NREGS in the same period (2011-21) to test whether the mechanism of NREGS works specifically through female workdays. This is done by replacing female workdays in equation 1 with total persondays generated.

For ease of interpretation, we present coefficient plots with 95% confidence intervals of six regression models of women workdays and total persondays generated by NREGS in a particular district on health and education outcomes.

5. Results

The main results are presented as coefficient plots in Figure 2 below. We find that a reduction in the percentage of children under five years who are severely wasted ($B = -0.439, p < 0.01$), wasted ($B = -0.727, p < 0.01$), underweight ($B = -0.885, p < 0.01$), or stunted ($B = -1.25, p < 0.01$) is strongly associated with increase in female workdays generated under NREGS in a particular district. These results are statistically significant. Our analysis for exploring whether female workdays are particularly associated with these reductions shows that overall increase in persondays is also associated with lower adverse health outcomes for children under five in these districts, but is not statistically significant for percentage of children underweight and wasted. Furthermore, the magnitude of reduction in severe wasting and stunting is much larger in the model with female workdays, suggesting that it is not just implementation intensity, but *who* works under NREGS that also matters for these outcomes.

Next, in terms of achievement scores from NAS, we find that an increase in both women workdays as well as overall persondays generated under NREGS was associated with an increase in average mathematics and language scores (similar to Mani et al., 2020). We infer that the results are driven once again by the female workdays generated, as the coefficients are significantly larger in the women workdays model ($B_{\text{math}} = 0.252, B_{\text{lang}} = 0.30$; both $p < 0.01$) relative to the persondays

model ($B_{\text{math}} = 0.163$, $B_{\text{lang}} = 0.20$; both $p < 0.01$). This further indicates that even in the domain of education outcomes, it is likely that improvements are being driven by female workdays rather than overall program effects.

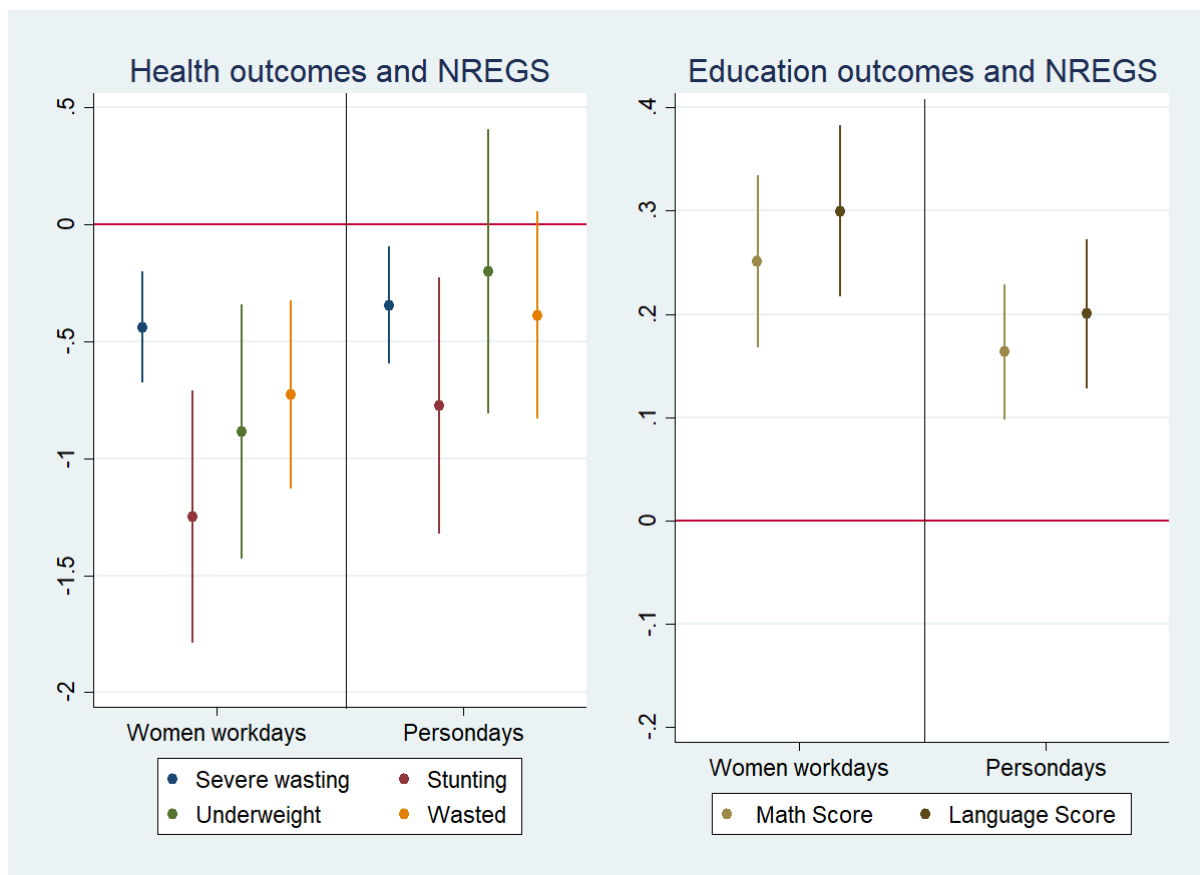


Figure 2: 95% confidence interval coefficient plots for health and education outcomes and NREGS female workdays and total persondays

Note: Each whisker presents the 95% confidence intervals of estimates of Equation (1) of education (right panel) and health (left panel) outcomes on NREGS female workdays and total persondays. Additional controls include percentage of households with access to electricity (for all models), female to total teachers ratio, number of regular teachers, total number of teachers, number of pucca building blocks in school premises, number of functional toilet seats (education models); and institutional deliveries, number of primary health centres (PHCs), and number of hospitals (health models).

6. Policy Implications and Concluding Remarks

This research note examines the association between female workdays under NREGS and key education and health outcomes in Indian districts. The analysis makes use of novel data made available through the NDAP by NITI Aayog and finds that it is increasing female participation in NREGS in particular (distinct from the impact of an overall increase in persondays generated under NREGS) that is associated with reduced adverse health outcomes in terms of percentage of children wasted and underweight. It is also female workdays that leads to a greater increase in education outcomes in the form of scores on mathematics and language. Although there are limitations of this type of analysis in terms of causal inference, it provides valuable directions for future work that tests robust versions of this type of empirical relationship.

The takeaways for policy are clear: there is value in potentially re-orienting a greater share of workdays toward females, as it is potentially associated with an improvement in intra-household resource allocation or decision-making as the literature suggests. This improvement, in turn, is observed to have substantial implications for a range of human capital outcomes, particularly of children. Setting aside a greater number of workdays may assist in ameliorating some of the recent downturns observed in nutritional outcomes in NFHS-5 data. Furthermore, given the disproportionate impact of the COVID-19 pandemic on women (due to burdens of household work, childcare, etc. falling solely on them), it is plausible that future changes to the design of NREGS (even if on a pilot basis) can experiment with allowing women to work more than 100 days under NREGS.

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