

Understanding time spent on unpaid care work in India through a machine learning approach

Keywords: Unpaid care work, time-use survey, machine learning, gender disparities, India.

Extended Abstract

Unpaid care work (UCW) is a crucial source of support for families, communities, and economies, encompassing tasks such as cooking, cleaning, laundry, child and elderly care, and resource collection (ILO, 2018). However, the disproportionate allocation of UCW responsibilities between genders is a significant concern in India. Studies reveal that women in India spend an average of 6 hours per day on UCW, whereas men engage in similar activities for only 36 minutes per day (Radhakrishnan et al., 2020). Moreover, excessive time spent on UCW is associated with adverse health, mental health, social, and economic outcomes (Azcona & Bhatt, 2020; Chopra & Zambelli, 2017).

This research employs Sen's (1980) capability framework, which considers a woman's autonomy, opportunity, and ability to engage in valuable outcomes while accounting for external influences. Inadequate resources, low employment and education status, social exclusion, systemic oppression, and negative consciousness can result in a lack of capability and increased engagement in UCW, perpetuating intergenerational disadvantage (Qi & Dong, 2017).

Given the complexity of UCW in the Indian socio-cultural context, this study utilizes machine learning techniques to identify patterns in a vast dataset with numerous covariates. The study aims to answer two research questions: (1) whether machine learning methods are more effective than traditional statistical methods in predicting time spent on UCW, and (2) which sociodemographic factors predict increased time spent on UCW across different gender identities.

Using data from the first comprehensive Indian 2019 time-use survey, a nationally representative sample of 272,117 individuals in rural areas and 173,182 individuals in urban areas, the study compares the predictive performance of various sociodemographic factors using machine learning prediction methods such as ordinal least square (OLS), lasso, ridge, random forest, mean decrease impurity (MDI), and feature permutation.

The results show that machine learning methods outperform traditional regression methods, with random forest analysis showing an almost 9% improvement in predictive performance. The study finds that gender, employment status, marital status, age, and monthly household expenditure are significant predictors of time spent on UCW. Young married women with non-employed status are particularly vulnerable to increased time commitment to UCW, which compounds the risks and challenges associated with UCW.

The study highlights two implications for practice and policy. Firstly, the findings identify target areas for improving the reduction of time spent on UCW at the systems level in India. Secondly, the study emphasizes the need to eliminate gender disparities in UCW through policies, programs, and care initiatives. The study recommends promoting the 'dual-earner care model' prevalent in Nordic countries and increasing female labor force participation in India through flexible working arrangements and care initiatives to reduce the gender disparity in time spent on UCW (OECD, 2019). Findings re-iterate the Connelly et al., (2018) argument of building a care system in the country that addresses the caregiving

constraints impeding women's capabilities to benefit equally from the new economic policies and reforms.

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