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ORIGINAL ARTICLE

Why Care for the Care Economy: Empirical Evidence from Nepal

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Abstract

Using data from the Nepal Living Standards Survey-2010/11, and an instrumental variables approach, we find gender-differentiated impact of unpaid care work on employment outcomes. While for an additional hour of caregiving per week, women and men experience commensurate declines in their weekly employment hours, the employment likelihood decreases only for women. The conceptual framework, motivated by the Capability Approach, delineates contemporaneous effects of undertaking unpaid care work on the caregiver and its wider intergenerational and societal effects in a developing country context. The study employs time-use data to provide evidence on the impact of unpaid care work; it is also the first of its kind in the context of Nepal.

Keywords Unpaid care · Development · Employment · Nepal · Gender inequality

JEL classifications I31 · J16 · O15

Introduction

Unpaid care work is an indispensable part of household provisioning, contributing to human development and supporting the economy through the reproduction of labor power on a daily and intergenerational basis. Unpaid care work generally refers to unpaid services provided within households, including care of persons (direct

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care) and domestic chores (indirect care). This work contributes to the well-being of the care recipients—dependent adults and children—by meeting their physical and emotional needs. Moreover, being able to provide care for family member/friends or engage in other satisfying human relationships has been identified as a capability of care provider that positively contributes to their well-being (Nussbaum 2003). However, caregiving also has the potential to negatively impact the care provider's well-being by limiting their capabilities, such as their ability to pursue higher education, take up paid work, and be healthy. Heavy burden of unpaid care work can generate other costs to the care provider, including time poverty (lack of time for personal care or leisure), particularly for women. Global evidence indicates that women and girls worldwide perform 76.2 percent of the total amount of unpaid care work and spend on average 3.2 times more time than men in unpaid care work, these figures reach 80 percent and 4.1 times in Asia and the Pacific region (Addati et al. 2018). The unequal sharing of unpaid care work reinforces unequal social, economic, and political opportunities for women and furthers the patriarchal status quo. The adverse impacts on caregivers, in turn, can have consequences over the long term, for human well-being intergenerationally and for economic development (Beneria, Berik, and Floro 2016).

In this study, we develop a conceptual framework based on the capability approach (CA) to examine the consequences of unpaid care work at multiple levels. The empirical analysis focuses on the contemporaneous effects of unpaid direct care work, which comprises care for elderly/sick/disabled in the household, on care providers in Nepal, a South-Asian low-income, subsistence agricultural economy where unpaid care work is the sole responsibility of households and predominantly women in them (Central Bureau of Statistics (CBS), Nepal 2019). The study uses a unique time-use dataset for Nepal, generated as part of the Nepal Living Standards Survey (NLSS)-III-2010/11. As per our knowledge, so far, only two other least developed-country studies examine the relationship between unpaid care work and paid work by using time-use survey (TUS) data (Ford 2017; Ward 2017), and this is the first study to do so for Nepal.

First, we examine how unpaid direct care work, can affect care providers' well-being over their lifetime, have spillover effects intergenerationally, and affect macroeconomic outcomes, by presenting three conceptual frameworks motivated by the CA (Sen 1999, 2004; Nussbaum 2003; Strenio 2020): (1) Vicious Cycle; (2) Lifecycle and Intergenerational; and (3) Caregiving and Well-being. Second, we use data from NLSS-III (2010/11) and perform a 2 Stage Least-Squares (2SLS) instrumental variables (IV) analysis to examine the effects of unpaid care work on care providers' ability to undertake employment to earn a living (i.e., on the contemporaneous segments of the frameworks). We look at two outcome variables—(1) likelihood of employment (a dummy variable that takes a value of 1 if an individual is employed for greater than zero hours in a week and 0 otherwise), and (2) number of weekly hours employed (at work) outside the home (continuous variable), each disaggregated by gender. We use presence of household members less than six years of age and/or greater than 69 years as an instrument for caregiving.

We find a significant trade-off between unpaid care work and the likelihood of employment for women/girls in Nepal, whereas men/boys and women/girls (henceforth men and women) both reduce their weekly employment hours by similar margins as a result of caregiving. While we cannot empirically examine the compounding long-term and macroeconomic consequences of these negative employment effects due to the cross-sectional nature of the data, we show in the conceptual frameworks that these effects can be transmitted intergenerationally, contributing to persistent gender inequality and adverse macroeconomic consequences. The conceptual frameworks that demonstrate the potential adverse societal well-being outcomes could help in formulating more effective development policies to ensure that caregivers are not deprived of opportunities to seek education, take paid work, and be healthy.

The study makes two contributions to the existing literature. To our knowledge, it is the first attempt: (1) to apply the CA to highlight consequences of unpaid care work for care providers' deprivation of capabilities and functionings and to conceptualize linkages between unpaid care labor and overall macroeconomic development; and (2) to evaluate the gender-differentiated impact of unpaid care work on care provider's employment outcomes in Nepal using time-use data from NLSS.

Background: Nepal

Nepal is one of the eight least-developed countries that has collected time-use data (Ferrant and Thim 2019). It is pre-dominantly a subsistence-based agrarian economy, employing 64 percent of its labor force in agriculture, 15 percent in industry, and 21 percent in services (International Labour Organization (ILO), 2019). Sixty-two percent of the country's labor force is in the informal sector (CBS, 2019).

As of 2020, 65 percent of the total population of 29 million in Nepal are in the working age group of 15-64 years (UN Department of Economic and Social Affairs (DESA), 2019). However, as the population ages 65 years and above is expected to more than double (from 5.8 percent to 12.8 percent) by 2050 at a rate higher than the average growth for least-developed countries (UN DESA 2019), Nepal's need for care is expected to expand (King et al. 2021). Moreover, in low-income countries, like Nepal, unpaid care work, is more time-consuming because limited resources in these countries make substitutes for unpaid care work, whether through the market or public provision, scarce. Therefore, given the current limited care infrastructure and anticipated demographic change, both care and employment needs could peak at the same time.

Nepal is a patriarchal society where family structure is dependent upon social norms and unpaid care work burden is disproportionately borne by women. A field survey conducted in Nepal as part of the research project—'Balancing Unpaid Care Work and Paid Work' during 2016-17 shows that 56 percent of women respondents in nuclear families and 64 percent in extended families reported being solely

responsible for unpaid care work (Chopra and Zambelli 2017). According to the Nepal Labour Force Survey (NLFS) 2017/18, 71.4 percent of those aged 15 years and above report doing at least some unpaid care work, and this proportion is higher for women (90.7 percent) compared to men (47.2 percent).

Literature Review

Scholarship on unpaid caregiving mostly provides evidence on the economic and health costs of unpaid care work, and its consequences for gender inequality (Lilly et al. 2007, 2010). Studies indicate an inverse relationship of caregiving with labor force participation (LFP) and earnings based on cross-sectional data, mostly limited to developed countries (Carmichael and Charles 2003; Houtven, Harold, Coe, and Skira 2013; Müller and Wrohlich (2020)). There is evidence for existence of multiple caregiving thresholds, beyond which increase in caregiving hours have a larger negative effect on LFP than below this threshold (Carmichael and Charles 2003; Heitmueller 2007). Since unpaid care work is disproportionately done by women, this inverse relationship is more profound for women, affecting their ability to participate in the paid economy. In 2018, globally 606 million women of working age (15–59 years) reported to be outside the labor force due to unpaid care work, compared to 41 million men (ILO 2018). Studies have identified a range of social, demographic and economic factors that influence gender gap in the distribution of unpaid domestic work (Sinha and Sahai 2021).

Moreover, using longitudinal data, Brimblecombe et al. (2020) find that in England people aged 16 to 25 who provided care at baseline (2014/16) were less likely to be employed, had lower earnings, and had poorer health at follow-up (2015/17) compared to people of the same age who were not providing care at baseline. A few other studies have used longitudinal datasets and pointed to a negative effect of caregiving on labor supply, with some evidence of stronger labor market trade-offs for women than men (Heitmueller 2007; Houtven et al. 2013; Fahle and McGarry 2018; Carmichael, Darko, Kanji & Vasilakos 2022; Miller and Sedai 2022). In Britain, Carmichael and Charles (2003) found that women providing care for at least 10 hours a week experienced larger adverse effect on their labor market participation compared to men. Yet other studies have found labor market effects to be similar across genders (Nguyen and Connelly 2014; Stanfors et al. 2019). In recent years, evidence on the impact of unpaid work has been growing even in developing countries. For example, for China, Chai et al. (2021) show that LFP was significantly and inversely associated with caregiving conditional on discontinuities or kinks. Further, Li and Chen (2023) using an instrumental variable show that elderly care reduces propensity to work by 5% for men and women combined. In the context of a low-income country, Meurs and Slavchevska (2013) find negative impact of caregiving on time spent in employment in Tajikistan. Other studies in Latin America indirectly substantiate this relationship, by showing that there is a positive relationship between public provisioning of child and elderly care and women's LFP through the mechanisms of reducing women's care work burden

(Kozhaya and Martínez Flores 2022; Padilla-Romo and Cabrera-Hernández 2019, 2021; Contreras and Sepúlveda 2017). More recently, Sinha et al. 2024 provide evidence on the multi-dimensional consequences of unpaid care work for India using primary time-use survey data. They find that an additional hour of caregiving reduces women's probability of labor market participation by 20 pp and their employment hours by over one hour per day as well as reduce their self-care and socializing time; and probability of life satisfaction and happiness; with either no significant or smaller negative effects for men.

Women's reconciliation of care responsibilities with paid employment can lead to "occupational downgrading", where women choose employment below their skills level and accept poor job quality (Hegewisch and Gornick 2013). Low- and middle-income families are unable to rely on market provisioning of care thereby combine their employment and unpaid care work which has negative repercussions in terms of time poverty and labor market performance. Among working parents in Vietnam, caregiving responsibilities resulted in lost income, promotions, or difficulties in retaining jobs of 63 percent of one or both parents surveyed (Vo, Penrose, and Heymann 2007). Finally, unpaid care work can have indirect macroeconomic effects as it is a cost to the society in terms lower utilization of potential labor force, and lower economic growth (Elborgh-Woytek et al. 2013). Growing research seeks to incorporate care activities into macroeconomic models to assess their economic growth outcomes and evaluate policies (Seguino 2020; Braunstein et al. 2020).

Lack of time-use data due to the high cost of implementing TUSs in low-income countries has constrained research on the consequences of unpaid care activities (Charmes 2019). In Nepal, apart from NLSS-III 2010-11, two small-scale surveys collected time-use data: (i) a time-diary survey of 106 women conducted by ActionAid in 2011-12; and (ii) an activity list-based TUS of 200 women conducted as part of the 'Balancing Unpaid Care Work and Paid Work' project in 2016-17. Reports based on these surveys indicate that women bear a disproportionate burden of unpaid household work and highlight the need for public investment in care infrastructure (Budlender and Moussié, 2013; Ghosh, Singh, and Chigateri 2017). There are a handful of Nepal-specific studies that have examined the linkages between unpaid care work, paid work, education, and women's status, by relying on small-scale survey data. For instance, using a subsample of 100 women from the 2016-17 survey data, Ghosh and Chopra (2019) show that improving the quality of paid work and a reallocation of time between paid work and unpaid work are necessary for women's empowerment, which is defined as a change in power relations for women as a collective entity. Using 2011-12 time-diary survey data, Marphatia and Moussiéb (2013) argue that women's education plays a role in recognizing the importance of their care work, which can lead to its redistribution in the household. They suggest that a more equitable sharing of care work is needed to improve women's status; and that gender norms about women's role in society must be transformed so that unpaid care work does not prevent girls' education in Nepal.

Our study contributes to this line of literature by providing empirical evidence on the nexus of unpaid care work and employment opportunities in Nepal, addressing a critical gap in research concerning the consequences of unpaid care work burden in low-income countries.

Conceptual Framework: Capability Approach and Unpaid Care

In this study, we use the CA to conceptualize the consequences of caregiving for the care provider, society, and macroeconomy. The CA, first conceptualized by Amartya K. Sen in 1980 (Sen 1980) is a departure from the mainstream economics understanding of well-being in terms utility maximization and income. While CA recognizes the importance of access to income and other non-market resources as requisite for people's well-being, it emphasizes people's capabilities and functionings as the measure of their well-being. *Capabilities* are available opportunities that an individual has the ability to do and to be in his/her life. *Functionings* are the actual outcomes that an individual chooses from the available set of capabilities, the one that they assign the highest value. As a normative approach, the CA emphasizes expansion of people's freedom to experience different capabilities and to achieve their most valued functionings as the goal of economic and social policy. This approach is used widely to track progress in human development, as implemented in the suite of Human Development indices of the United Nations Development Programme (UNDP).

Our study builds on Strenio (2020) who developed the CA conceptual framework to examine the contemporaneous and long-term consequences of Intimate Partner Violence (IPV) by presenting two frameworks that incorporate resources, capabilities, and functionings.: (i) Vicious Cycle; and (ii) Lifecycle. We show how unpaid care work interferes with individuals' access to resources (both time and money resources), their capabilities set, and desired functioning in the *Vicious Cycle Framework*. In addition, we augment the lifecycle model by adding intergenerational spill-over effects of unpaid caregiving (*Life Cycle and Intergenerational Framework*) and develop a third framework—*Caregiving and Well-being*—to trace potential macroeconomic and overall well-being effects. In this framework, we consider the different mechanisms through which caregiving feeds into overall well-being- (i) caregiving is a capability in itself that is being able to care and affiliate with other human beings in satisfying relationships has been identified as a capability (Nussbaum 2003); (ii) care provisioning positively affects care recipients' well-being; (iii) caregiving can negatively impact care provider by limiting their time in other activities and by impacting their capabilities (ability to earn a living, education, health).

Feminist economists acknowledge the ambiguous nature of care work in expanding well-being (Robeyns 2003; Tontoh 2021). Within the framework of CA, first, the ability to care is a capability of the care provider, and second, care activities are unambiguously important for the care recipient's well-being (Robeyns 2003). The latter has an important public good dimension as care work improves productive human capabilities and the benefits spillover to the community as a whole (Folbre 2006). However, excessive care burden can have negative repercussions for the caregiver, undermining their capabilities like employment, education, health, and time autonomy. The time constraint of 24 hours in a day leads people to make trade-offs

between paid work, unpaid work, leisure, and rest (Heitmueller 2007). In the absence of policy supports or community arrangements the time trade-off could undermine caregivers' ability to develop their own capabilities and that of their children. Thus, this third aspect of caregiving has a potential negative contribution to human well-being, while the first two dimensions of care are unambiguously positive for human well-being.

The focus of this study is on the potentially negative effects of care work for the care provider. In conceptualizing these consequences of caregiving, we highlight three capabilities: to earn a living which we capture through employment[1]; to attain education; and to be healthy. Due to data limitations, however, the empirical analysis focuses only on employment capabilities.

Employment as capability: To be able to 'earn a decent standard of living' has been identified as a capability and used in UNDP's human development and gender indices. The most common proxies at the macro level for this capability are income measures, such as income per capita or the LFP rate. Nussbaum's (2003) list of capabilities identifies 'control over one's environment' as a capability that refers to both the ability to make political choices that affect one's life and the ability to secure one's livelihood through employment and asset ownership, while Robeyns (2003) identified 'paid work and projects' as a capability of individuals. This study uses employment as a proxy for earning a decent standard of living, and an indicator of individual well-being. It encompasses work outside home including farm activities, animal husbandry, businesses, and wage and salaried work. The burden of unpaid care work within household could interfere with people's ability to work outside home.

Education as a capability: Education or knowledge has been identified as a key capability in UNDP's human development and gender indices. Being able to be educated is a capability on lists of central capabilities of both Nussbaum (2003) and Robeyns (2003). Unpaid care work can impede caregivers' ability to pursue their schooling, whether through gender norms that restrict young women's schooling or through time intensive unpaid caring responsibilities that leave less time available for attaining education.

Health as a capability: To "live a long healthy life" has been identified as a key capability in UNDP's human development and gender indices. Life expectancy at birth is commonly used as the indicator to measure a long and healthy life as a component of Human Development Index (HDI). Nussbaum (2003) includes bodily health as one of the capabilities on her list. This capability refers to being able to have good health, including reproductive health; to be adequately nourished and to have adequate shelter. Further, Robeyns's (2003) list of capabilities includes 'life' (being able to be born) and 'physical health' (once born, being able to live a life of normal length in good health). In our study, we consider health to be a capability that has both an intrinsic value and an instrumental role. We indicate how excessive

[1] We use employment as a proxy to reflect ability to earn a living. Earnings/income at the individual level could also serve as effective proxy as it directly affects the power dynamics within households changing the sharing of paid and unpaid work between men and women, however due to data limitation we could not use this variable.

unpaid care burden can deprive caregivers from having a healthy life and the double burden of paid and unpaid work leaves less time available for rest and personal care, especially women (Gammage 2010), that could further affect individuals' health.

Conceptualizing wide-ranging effects:

1. Vicious Cycle Framework: Figure 1 represents a vicious cycle, set in motion by unpaid caregiving, which involves linkages between resources, capabilities, and functionings of a caregiver's lifetime. Caregiving is a non-monetary resource for household livelihoods, which can deprive caregivers of time[2] and money resources. The lower employment hours or low-quality of employment due to unpaid care burden could reduce individual's income resources. These limited resources in turn constrain caregiver's capabilities set (Link A). As a result, the caregiver is deprived of capabilities to earn a living, attain education, and acquire adequate nourishment and avoid ill health. These deprivations further prevent them from achieving their most-valued functioning (Link B). The inability to achieve a specific functioning further impacts the attainment of resources, and thus the vicious cycle continues (Link C). An individual deprived of capabilities ends up having poor quality functionings and consequently poor quality or lower resources. Each of these links are shaped by "conversion factors", such as gender, ethnicity, class, that differentiate outcomes. In Fig. 1, we illustrate gender as the conversion factor.

Let's say $\alpha and \gamma$ represent the conversion factors for Link A and Link C, respectively, and β represents the choice factor for Link B. The gender differences in terms of deprivations can be understood in terms of lower conversion and choice factors for women compared to men.

Below we list some examples to show how the conversion and choice factors differ between men and women.

(i) Link A: $\alpha_{\text{women}} < \alpha_{\text{men}}$

Gender norms define women as homemakers and men as breadwinners, especially in lower-and middle-income countries (LMICs). This leaves the task of unpaid caregiving mainly to women, who end up having lesser time to undertake other activities like education, employment or personal care as compared to men. In addition, lower monetary resources within the household, lead to a trade-off between resource allocation to boys vs. girls, typically favoring boys over girls. The result is a smaller capability set for girls.

(ii) Link B: $\beta_{\text{women}} < \beta_{\text{men}}$

At this stage men and women have different capabilities sets, which condition their choices to join the labor market. The choice factor is lower for women than men, because of the disproportionate sharing of unpaid care work. In other words, care burden restricts women's ability to convert their education into a good quality

[2] Care provisioning can constrain individuals' time resources not just in terms of employment time but also time available for self-care and leisure which could be detrimental for care providers' well-being.

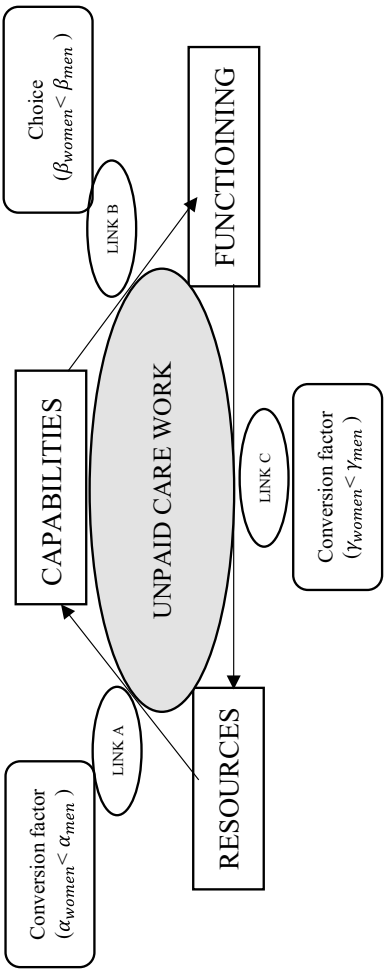

Fig. 1 Vicious Cycle Framework

(full-time, high-paying, formal sector) job/occupation. As a result, women divert to part-time, low-paying or informal sector jobs that offer flexibility in work schedules, allowing them to combine caregiving with employment. This constraint is reflected in gender-based occupational segregation.

(iii) Link C $\gamma_{\text{women}} < \gamma_{\text{men}}$

2. Now that women end up with inferior functioning, their ability to achieve desired resources also gets affected. Gender occupational segregation and gender pay discrimination contribute to gender earnings gap and women's income poverty[3]. Lower resources in turn, affect their capabilities and functioning in a vicious cycle. *Lifecycle and Intergenerational Framework*: Figure 2 present the life course of a woman (or man) who bears the disproportionate burden of unpaid care work within the household at every stage of life from adolescence to adulthood. It is important to understand how unpaid care work interferes with individual's ability to attain specific capabilities, choose a specific functioning, and acquire resources that affect their overall well-being contemporaneously and over the life span. We add an intergenerational component to the life-cycle model and argue that these deprivations could be passed on to the next generation through spill-over effects on children's well-being.

Through Framework 2, we show that at the adolescence and young adulthood stages care responsibilities can deprive individuals from capabilities and functioning by using the example of attaining education. According to this framework, unpaid care work can potentially interfere with the ability to attain education because more time devoted to unpaid care work can leave less time to attend school and do homework. In the following stage of adulthood, lack of quality education further affects individual's well-being, by restricting their occupation choice set. This, in turn, interferes with the ability to earn a decent standard of living. For example, women with only high school education will have very different occupation choices compared to a college graduate. Even when they are able to attain tertiary education, women tend to take up more flexible jobs due to accommodate their care responsibilities. Choice of occupation further conditions access to economic resources. Moreover, parents' occupation, earnings, standard of living, and gender norms constrain the choices of their children. Therefore, unpaid care work can adversely affect women's capabilities and functioning contemporaneously, which gets compounded over the life span and, spills over to the next generation. For instance, unpaid care work through its negative employment consequences for women can lower their bargaining position within households, adversely affecting spending on children's well-being, and therefore transmit capability deprivations intergenerationally. Research supports these linkages (Thomas 1990; Doss, 2013; FAO 2011; Anderson and Eswaran 2009).

[3] It is crucial to note that while women's opportunities to earn an income may be hampered due to caregiving responsibilities, it may not translate directly to income poverty as there could be income pooling within households. However, lack of own earning restricts women's bargaining position within household and influence their expenditures.

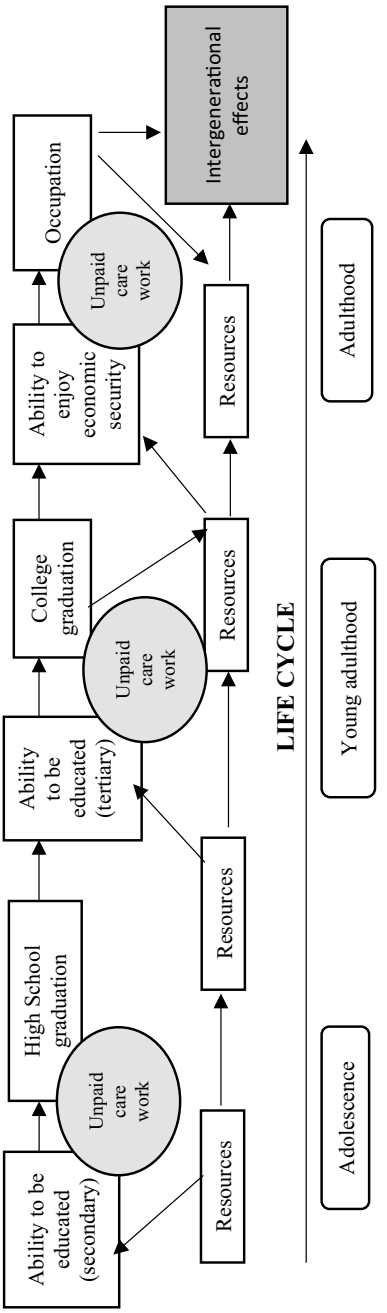

Fig. 2 Lifecycle and Intergenerational Framework (C and F in the figure refer to capabilities and functioning respectively.)

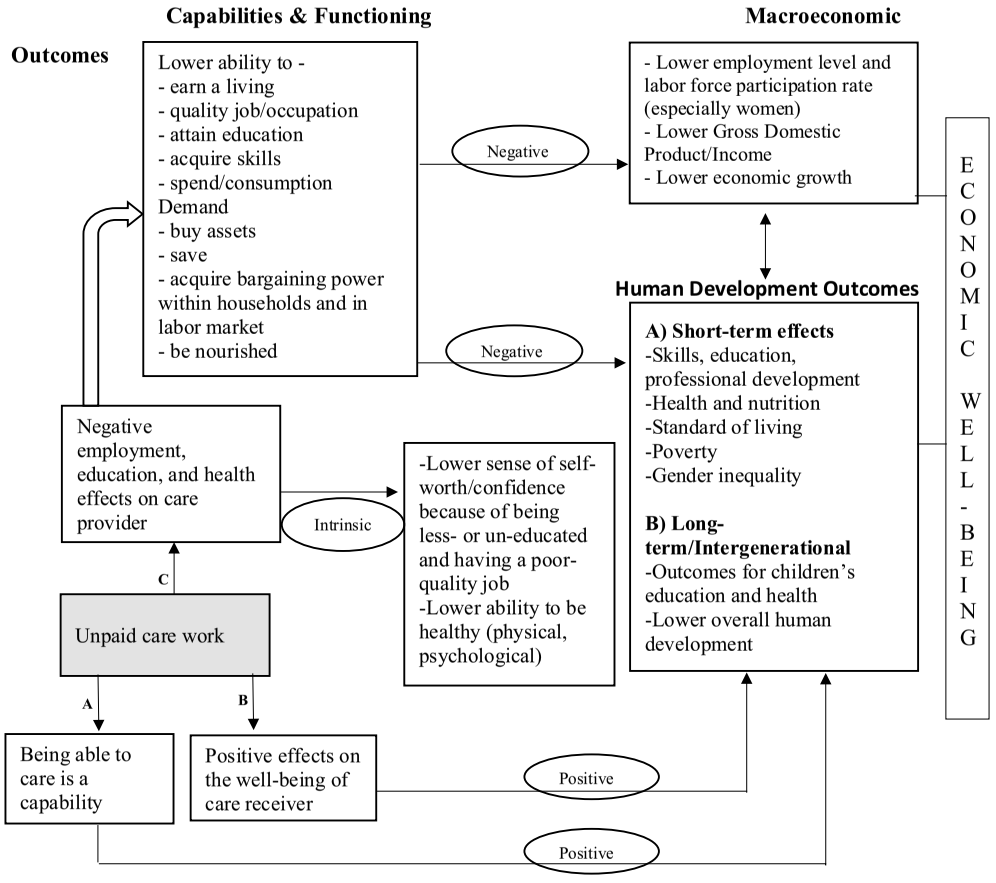

Fig. 3 Caregiving and Well-Being Framework

There is evidence of negative employment and education effects of unpaid work in Nepal: over one million working-aged women were willing to work in a paid job, but they were not looking or were unavailable for jobs because of family responsibilities (CBS, 2019). In addition, in the NLSS 2010-11, one quarter of people reported the reason for never attending school as 'Help needed at home' and the proportion was higher for women compared to men (29.6 percent versus13.5 percent). Social norms surrounding gender division of labor, forces women to be restricted to household work or self-employment, that are associated with lower educational attainment as compared to the desirable occupations for men. The deprivations in terms of education and employment can then pass intergenerationally affecting overall development in Nepal, however due to lack of data we are unable to gather evidence on intergenerational effects.

3. Caregiving and Well-being: Figure 3 presents the third framework that incorporates the multiple linkages through which unpaid care work contributes to societal well-being: (i) as a capability of care provider (positive); (ii) positive effects on the well-being of care recipients; and (iii) negative effects for the care providers in terms of deprivations of other capabilities. We expand on the third pathway, to show that deprivation of capabilities and functioning of the care providers can lead to underutilization of the workforce and indirectly and adversely affect aggregate outcomes: country's economic growth and human development, through lower human capacities. Both outcomes combined are important for the overall well-being of an economy and have two-way linkages between each other (Ranis and Stewart 2007). In this regard, we highlight the importance of reducing unpaid work time and redistribute its burden from households, mainly women to men, public sector and market.

Our hypothesis is that unpaid care work can adversely affect three main capabilities of care providers: the ability to earn a living through employment; ability to attain tertiary education; and ability to be healthy. All three are intrinsically important and have an instrumental role in further affecting other capabilities and functioning, which in turn affect societal well-being.

While we highlight three capabilities in the conceptual frameworks and predict contemporaneous, long-term, and inter-generational micro and macro effects of caregiving due to data limitations, we are only able to test the segments in the three frameworks that capture the impact of caregiving on *contemporaneous micro-level employment capabilities* of men and women.

Data and Methodology

Data

We use national-level time-use data from the NLSS-III, 2010-11 that sampled 4926 individuals, of which 2308 were men and 2618 were women (CBS, 2011)[4]. Nepal's CBS carried out three rounds of NLSS as part of the World Bank's household survey program, Living Standard Measurement Study (LSMS), and collected data on household welfare using a multi-topic questionnaire. The first round of NLSS in 1993 collected data with the objective of measuring people's living standards and extent of poverty in Nepal. In its third round in 2010-11 the NLSS-III included a module featuring an activity list to capture time allocation of all household members aged 5 years or over in economic activities, extended economic (home based) activities and non-work activities (household work including care for elderly/sick/disabled and domestic chores), using an interview methodology with a recall period of one week (seven days a week)[5]. This approach is common in low-income countries where resource constraints and illiteracy prevent conducting regular TUSs, particularly those based on time-diary approach (Esquivel et al. 2008). Typically, countries add a time-use module to an existing survey, such as a labor force or household survey, and use an activity-list approach to generate time-allocation data, albeit this information is less detailed than the time-use diary approach (Esquivel et al. 2008; Charmes 2019). In addition, as in many low-income countries, the Nepal time-use module was a one-time addition in the 2010-11 NLSS, which does not allow generation of information for assessing changes over time. While Nepal plans to implement a new LSS in 2022, for the time being the 2010-2011 NLSS remains the only source of national scale time-use data. The data limitation thus shapes methodological choices in this study, namely, to rely on cross-section analysis to make inferences, and to use an instrumental variables estimation in addition to district-fixed effects regression model for robustness.

Our outcome variables of interest are—(i) likelihood of employment which is a dummy variable that we construct such that it takes a value of 1 if an individual is employed and 0 otherwise, and (ii) weekly employment hours which is a continuous variable in the dataset. NLSS 2010/11 considers an individual to be employed if they spend greater than zero hour in a week in paid work outside the home, including in farm activities, animal husbandry, businesses, wage, and salaried work. The primary explanatory variable in our analysis is unpaid direct care work– care for elderly/sick/disabled. We use both dummy and continuous care variables. First, we construct a dummy care variable such that it takes a value of 1 if an individual provides care for greater than zero hours in a week and 0 otherwise comparing outcomes for care providers versus those providing no care. Second, we use the continuous care variable

[4] NLSS-III survey data have a larger sample size compared to data used by previous studies in Nepal.

[5] The recall period is greater than the usual 24-hour recall in time-diary approach which provides more accurate responses for time-use. It is important to note that the longer recall period may result in recall bias which needs to be kept in mind while interpreting the findings, in addition to issues encompassing social desirability bias, particularly regarding men's reporting of time spent on unpaid household work.

Table 1 Description of variables, and the hypothesized directions of the relationship between outcome variables and unpaid care work

			Explanatory variables (Unpaid care work)	
			Dummy care Takes a value of 1 if an individual provides care for greater than zero hours in a week and 0 otherwise	Care hours per week Sum of time spent on child and elderly/sick/disabled care in a week and captures the extent of caregiving
Outcome variables (Employment)	Likelihood of employment	Binary employment variable takes the value of 1 if an individual is employed for more than zero hours in a week, and 0 otherwise.	↓	↓
	Employment hours per week	Captures the extent of work by measuring the number of hours in a week spent on employment activity.	↓	↓

in the dataset to capture effect of marginal caregiving in a week above the average value on outcome variables.

In Table 1, we describe the details of the variables used in our analysis.

Generally in Nepal individuals start engaging in employment, mainly agricultural activities, small businesses, and informal sector at an early age (ILO, CBS 2012), as also observed in the NLSS data. Accordingly, in the empirical models we restrict the sample to individuals aged 11 years and above that brings down the sample size to 3761 individuals (1711 men and 2050 women. We lose some observations for employment hours per week, education status, and household income due to missing values.

Empirical Methodology

This section examines the effect of unpaid care work on individuals' capabilities in terms of employment outcomes in Nepal. We first estimate the following district-fixed effects regression model (Model 1) to examine the *association* between unpaid care work variables and employment outcome variables:

$$E_i = \gamma_o + \gamma_1(Care_i) + \lambda X_i' + District_j + \varepsilon_i \quad (1)$$

where E_i represents the outcome of interest—employment for individual i, $Care_i$ represents the caregiving explanatory variable for individual i; X_i' is a vector of control variables which includes age, age squared, marital status, education, health status, caste, household size, and household income in the baseline model; $District_j$ captures district fixed effects to control for time-invariant district-level heterogeneity; and ε_i is a random error term.

We run four separate regressions. First, we examine the impact of the dummy care variable on the likelihood of employment (dummy variable). Second, we examine the impact of the weekly care hours (continuous variable) on the likelihood of employment. Third, we examine the impact of the dummy care variable on weekly employment hours (continuous). Fourth, we examine the impact of weekly care hours on weekly employment hours. We calculate these estimates for three groups—the combined sample, men, and women. In separate regressions, we add time spent on domestic chores to the set of controls. To estimate the effect of only the direct caregiving component of unpaid work, we control for time spent on domestic chores, which is considered indirect care but overlaps with direct caregiving. We examine if controlling for domestic chores mediates the effect of caregiving on employment outcomes. This is crucial from a policy perspective: targeting an increase in public investment in care infrastructure (water, cooking fuel, electricity, transportation etc.) to reduce the time spent on domestic chores, can in turn reduce the negative effects of caregiving on employment.

It is widely argued that cross-sectional estimates measuring the impact of unpaid care work on employment are confounded by endogeneity issues (Heitmueller 2007; Kalenkoski 2017). The estimates obtained from Model 1 are most likely upward biased because reverse causation can exist between employment and unpaid care

since it is hard to be certain about whether individuals quit their job to provide care, or they provide care because they are not employed. The negative effect of care work on employment variables and vice versa bias the correlation coefficients, reducing the magnitude of the negative effect, thereby underestimating the true negative effect (Heitmueller 2007; Bolin et al. 2008). There could also be selection of care receivers in households with employed women further enhancing the bias. Further an individual's unobserved characteristics, such as their innate nature and ability, may influence both their willingness to be employed and to provide care, affecting the relative cost of providing unpaid care compared to buying market care services.

To overcome endogeneity and provide causal estimates, several studies have used panel data to control for time-invariant and -variant unobserved heterogeneity (Heitmueller 2007; Brimblecombe et al. 2020; Miller and Sedai 2022). However, the panel-data approach is not feasible due to the lack of regular TUSs in most countries. This confines most of the research in this field to estimating cross-sectional correlations between unpaid care, and employment, health, and leisure (Henz 2004; Bauer and Sousa-Poza 2015; Stanfors et al. 2019).

In this study, to address potential endogeneity issues, we estimate a 2SLS IV regression model (Model 2) to examine the impact of unpaid care work on employment outcomes. We use an established IV—the presence of household members less than six years of age and/or greater than 69 years (hereafter IVcare) as an instrument for caregiving.[6] This is a variation of an instrument used by Chai, Fu and Coyte (2021).[7] Our IV is a binary variable that takes a value of 1 if there is presence of a household member in the above age group and 0 otherwise. A growing literature uses similar instruments for unpaid care to predict employment such as number of siblings, number of grandchildren aged below 16 years, parental characteristics (such as widowed father, recent death of parent, parental education), household member health status (Wolf & Soldo 1994; Ettner 1995; Johnson & Lo Sasso 2006; Heitmueller 2007; Bolin et al. 2008; Nguyen and Connelly 2014; Chai, Fu and Coyte 2021). The choice of all these instruments is based on the underlying idea that the presence or absence of household members who are potential care recipients directly affects care needs within households without being related to employment outcomes other than through caregiving.

We estimate the following 2 SLS-IV model (Model 2):

$$Care_i = \alpha_o + \alpha_1\left(IVcare_i\right) + \theta X_i\prime + \varepsilon_i \tag{2}$$

$$E_i = \beta_o + \beta_1\widehat{(Care_i)} + \eta X_i\prime + \varepsilon_i \tag{3}$$

[6] We constructed and tested individually and in combination(s) other possible instruments available in the dataset, such as number of household members suffering from any health problems or chronic illness, health status of household members, and the status of health facility in the municipality. However, these variables either did not meet the first-stage requirements or there were missing values leading to a decline in sample size.

[7] They use number of grandchildren aged below 16 years as an instrument for caregiving.

where, E_i represents the outcome of interest—employment for individual *i*; $Care_i$ represents the caregiving explanatory variable for individual *i*; $IVcare_i$ is the instrumental variable for caregiving, X_i' is a vector of control variables which includes age, age squared, marital status, household size, household income, education, and health status in the baseline model; and ε_i is a random error term. We again run four separate regressions as described above for Model 1 and calculate these estimates for three groups—the combined sample, men, and women. In separate regressions, we add time spent on domestic chores to the set of controls.

We successfully tested the relevance and strength of our instrument using tests of under-identification (Kleibergen-Paap rk LM statistic) and weak identification (F-statistic of the instrumental variables in the first stage equation and Cragg-Donald Wald F test). We find that there is positive and statistically significant (at the 1 percent level) impact of IVcare on caregiving variables. The first stage F-test statistic is greater than 10, as required by the rule of thumb for it to be a relevant instrument (Staiger and Stock 1997). Appendix Table 7 presents the first stage results, which show that our instrumental variable– IVcare is positively and significantly associated with caregiving variables. In other words, the presence of household members less than six years of age and/or greater than 69 years is associated with 21pp higher likelihood of providing any care by women and 2.2 hours greater time spent on caregiving per week by women, compared to households where there are no individuals in the above age group. The coefficients are similar and significant even for men and the combined sample. These first-stage results along with the F-statistics confirm the relevance and strength of our instrumental variable. Subsequently, in the second stage, we estimate the effect of caregiving on employment.

The choice of our instrument is based on the idea that household members in this age group are the primary care recipients, and their presence in the household will increase care demand for other members. In Nepal, primary education begins at the age six, when children generally start attending school. Since children start spending more time in school from this age, their care needs within the household are expected to be lower than the care needs of children less than this age. Further, older people, especially those over 69 years, are more likely to suffer from health issues and are less able to take care of themselves, thus relying on their children and grandchildren for care needs. Therefore, the presence of a household member in the proposed age group is positively correlated with caregiving by other household members. Moreover, in Nepal, households are predominantly engaged in self-employment in agricultural activities and rely on informal care provisioning due to social obligations and lack of public care infrastructure and services. In such a social, cultural, and agricultural context, we expect a low likelihood of reverse causality and endogeneity concerns. The decision to live with and take care of elderly, and fertility decisions depend on cultural factors and social norms (Kohler 2001; Wasti et al. 2017) and, to a large extent, are unrelated to employment decisions. Prior research based in developing countries has identified education attainment and external factors such as urban location as key determinants of LFP (Naudé, Serumaga-Zake 2001; Contreras, Mello, Puentes 2011). To test if reverse causality exists

Table 2 Descriptive Statistics by gender, NLSS 2010-11

Variables	Men (M)			Women (W)		Difference (M-W)	
	Obs.	Mean	SD	Obs.	Mean	SD	*p*-value
Likelihood of employment	1711	0.73	0.45	2050	0.74	0.44	−0.01
Work hours per week	1561	25.74	26.70	1867	25.61	26.40	−0.13
Self-employment (share)	1215	0.74	0.01	1413	0.77	0.01	−0.03**
Any care (dummy)	1711	0.15	0.36	2050	0.17	0.38	−0.02
Care hours per week (all)	1711	1.73	5.72	2050	1.99	6.31	−0.26
Care hours per week (care providers)	257	11.52	10.28	347	11.77	10.97	−0.25
Domestic chores (weekly hours)[a]	1711	15.44	18.15	2050	16.31	17.94	−0.87
Total hh work (care and domestic chores) (weekly hours	1711	17.17	19.91	2050	18.20	20.21	−1.13*
Total work (care, domestic and employment) (weekly hours)	1561	42.63	34.12	1867	43.89	3353	−1.26
Age	1711	36.73	19.73	2050	35.26	18.48	1.47**
Education status[d]	1634	1.92	0.83	1956	1.94	0.85	0.00
Marital status[e]	1711	0.59	0.49	2050	0.61	0.49	−0.20
				Aggregate			
	Obs.	Mean	SD	Min	Max		
Household income (NPR[f])	3077	1412	7581	0	120,000		
Household size	3761	6.56	2.89	1	23		

[a] Descriptive statistics are for the sample of individual aged 11 years and above. *P*-value column shows the *p*-value for *ttest* of significance of difference of means.

[b] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance at the 1% level ($p<0.01$).

[c] Self-employment is further segregated into agricultural and non-agricultural activities, with majority of men and women involved in agriculture (73% and 75%, respectively). Domestic chores include cooking, cleaning, shopping, house repair, food processing, knitting, animal care, firewood collection, fodder collection.

[d] Education status includes 3 categories- never attended school/college (1), attended school/college in the past (2), currently attending school/college (3).

[e] Marital status is a dummy variable (1=married, 0=never married/widow/widower/divorced/separated)

[f] US$ 1 = Nepalese Rupee (NPR) 74.53 (2011)

in our sample, we estimated the effect of employment variables on IV care and found very small and statistically insignificant results.

While we do not claim complete causality, we expect that our 2SLS-IV model, incorporating a comprehensive set of covariates, presents robust estimates. The main identifying assumption of the IV is that conditional on a set of covariates such as age, marital status, household size, household income, education, and health status, the presence of household members less than six years and above 69 years impacts employment outcome variables only through their impact on unpaid caregiving. Controlling for these variables is crucial to satisfy the exclusion restriction of the

instrumental variable strategy because these variables could affect the outcome variable independently and indirectly via the IV. For instance, the presence of household members needing care might require higher household income to sustain the needs of the dependent population, thereby affecting the employment decisions of other household members; hence we control for household income in our model.

In light of the above arguments, we expect the 2SLS IV model serve as a valuable robustness check to Model 1 estimates.

Results

Descriptive Statistics

Table 2 presents descriptive statistics for the sample aged 11 years and above disaggregated by gender and the *t-test* results to show the significance in the difference of means between men and women. We do not find statistically significant gender difference for most variables in the sample, except age and total household work hours. The average age of men and women is 37 and 35 years, respectively. We observe that men and women spend nearly equal time on employment activities per week, whereas women spend slightly more time on domestic chores and care work combined (18.20 versus 17.17 hours per week). Moreover, 74 % men and 77% women are self-employed, majorly in agricultural or farm activities. Finally, around 60 percent of the sample is married, and the average household size is large, comprising on an average seven members indicating potential care demand within the household.

Regression Results

Model 1 results substantiate a negative *association* between unpaid care work and employment outcomes in Nepal, which are more pronounced for women than men. The results are similar to Model 2 estimates in terms of the direction of relation between care work and employment, except that the estimates are smaller in magnitude compared to Model 2. Not accommodating for endogeneity in Model 1 significantly underestimates the impact of unpaid care on employment as reflected in the smaller magnitudes in Model 1 compared to when we control for selection bias of care needers into households where women are employed in Model 2. The findings align with the expected bias of Model 1 estimates and are consistent with previous studies that also indicate an underestimation of the impact of caregiving on employment in OLS and Probit models compared to IV model (Heitmueller 2007; Bolin et al. 2008; Nguyen, and Connelly 2014; Li and Chen 2023).

Table 3 Effect of unpaid care on likelihood of employment, District Fixed Effects Model

Variables	(1) Employment (All)	(2) Employment (Men)	(3) Employment (Women)	(4) Employment (All)	(5) Employment (Men)	(6) Employment (Women)
Any care (dummy)	−0.08***	−0.03	−0.12***	−0.09***	−0.04	−0.13***
	(0.02)	(0.04)	(0.03)	(0.02)	(0.04)	(0.03)
Care hours	−0.004 ***	−0.001	−0.01***	−0.01***	−0.002	−0.01***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Domestic chores	N	N	N	Y	Y	Y
Observations	2912	1297	1615	2912	1297	1615

[a] Control variables include age, age squared, marital status, education status, health status, caste, household size, household income, and district-fixed effects are absorbed. Time spent on domestic chores is added to the set of controls in Columns 4, 5 and 6.

[b] Robust standard errors in parentheses.

[c] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance

[d] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance

Table 4 Effect of unpaid care on weekly employment/work hours, District Fixed Effects Model

Variables	(1) Weekly work hours (All)	(2) Weekly work hours (Men)	(3) Weekly work hours (Women)	(4) Weekly work hours (All)	(5) Weekly work hours (Men)	(6) Weekly work hours (Women)
Any care (dummy)	−3.27**	−2.03	−4.34**	−2.80*	−1.23	−4.14*
	(1.53)	(2.24)	(2.20)	(1.57)	(2.33)	(2.23)
Care hours	−0.13	0.04	−0.40**	−0.10	0.08	−0.39***
	(0.10)	(0.14)	(0.17)	(0.11)	(0.15)	(0.17)
Domestic chores	N	N	N	Y	Y	Y
Observations	2011	902	1109	2011	902	1109

Refer to Table 3 notes

District Fixed Effects Estimates (Model 1):

Columns 1, 2 and 3 in Tables 3 and 4 present the baseline regression results of Model 1 for the combined sample, men, and women respectively with age, age squared, marital status, caste, household size, household income, education, health status as controls, along with district fixed effects whereas columns 4, 5 and 6 present these estimates for the three groups when time spent on domestic chores is added to the set of controls. Model 1 results are statistically significant for women and insignificant for men.

Table 3 shows that the probability of employment is 12 percentage points (pp) lower for women who provide any care compared to women who provide no care. Further, in response to a one-hour increase in weekly care above the average value, the probability of employment declines by 1 pp for women. Moreover, these results are similar when time spent on domestic chores is added to the set of controls.

Table 4 shows that the association between care variables and the weekly employment hours conditional on individuals being employed (i.e when weekly employment hours>0). We find that women who provide any amount of care are employed on average 4.34 hours less per week compared to women who provide no care. Further, in response to a one-hour increase in weekly care above the average value, women reduce their weekly employment hours reduce by 0.40 hours. Moreover, these results are similar when time spent on domestic chores is added to the set of controls.

Model 1 results suggest that there is gender-differentiated negative effects of unpaid care work such that it significantly reduces only women's likelihood of employment and employment hours. However, as discussed above Model 1 estimates are potentially biased because of potential reverse causality and omitted variable bias. Consequently, we present results from IV estimates next.

Table 5 2SLS-IV, Effect of unpaid care on likelihood of employment

Variables	(1) Work hr per week (All)	(2) Work hr per week (Men)	(3) Work hr per week (Women)	(4) Work hr per week (All)	(5) Work hr per week (Men)	(6) Work hr per week (Women)
2SLS-IV						
Panel A						
Any Care (dummy)	−17.80***	−20.58*	−15.37*	−15.94***	−18.14**	−13.78*
	(6.40)	(10.62)	(7.97)	(5.70)	(9.23)	(7.19)
F-test first stage	144	52	92	176	66	111
(Cragg-Donald Wald F statistic)	157	57	100	211	80	131
(Kleibergen-Paap rk LM statistic)	133	50	84	158	61	97
Panel B	−2.04***	−2.16*	−1.89*	−1.80***	−1.91**	−1.65*
Care hours	(0.77)	(1.19)	(1.02)	(0.68)	(1.03)	(0.89)
F-test first stage	48	20	29	60	25	36
(Cragg-Donald Wald F statistic)	60	24	36	80	32	48
(Kleibergen-Paap rk LM statistic)	47	19	28	58	24	34
Domestic chores	N	N	N	Y	Y	Y
Observations	2011	902	1109	2011	902	1109

Table 6 2SLS-IV, Effect of unpaid care on weekly employment/work hours

Variables	(1) Employment (All)	(2) Employment (Men)	(3) Employment (Women)	(4) Employment (All)	(5) Employment (Men)	(6) Employment (Women)
2SLS-IV						
Panel A						
Any care (dummy)	−0.11	0.03	−0.20*	−0.05	0.10	−0.16
	(0.08)	(0.15)	(0.11)	(0.08)	(0.13)	(0.10)
F-test first stage	198	64	137	243	83	163
(Cragg-Donald Wald F statistic)	184	63	122	250	90	160
(Kleibergen-Paap rk LM statistic)	185	62	125	224	78	147
Panel B						
Care hours	−0.01	0.003	−0.02*	−0.01	0.01	−0.014
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
F-test first stage	88	28	62	111	37	75
(Cragg-Donald Wald F statistic)	81	29	52	114	41	72
(Kleibergen-Paap rk LM statistic)	85	27	60	107	36	72
Domestic chores	N	N	N	Y	Y	Y
Observations	2912	1297	1615	2912	1297	1615

[a] Control variables include age, age squared, marital status dummy, education status dummy, health status, household size, and household income. Time spent on domestic chores is added to the set of controls in Columns 4, 5 and 6.

[b] Robust standard errors in parentheses

[c] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance at the 1% level ($p<0.01$)

IV Estimates (Model 2):

Model 2 results substantiate a negative *effect* of unpaid care work on employment outcomes in Nepal. Columns 1, 2 and 3 in Tables 5 and 6 present the baseline IV regression estimates for the combined sample, men, and women, respectively, with age, age squared, marital status, education, health status, household size, and household income, whereas columns 4, 5 and 6 present these estimates when time spent on domestic chores is added to the set of controls. As a result, the estimates of the negative effect on weekly employment hours declines in magnitude but remains statistically significant and becomes insignificant for the likelihood of employment. This is an anticipated result, since greater time spent on domestic chores is also expected to have a negative effect on employment variables, and not controlling for it in the model could overestimate the negative effects of caregiving. Moreover, we find that controlling for domestic chores reduces the negative effect of caregiving on employment, indicating it is crucial to target time spent on domestic chores through greater public investment in care infrastructure including water, electricity, cooking fuel, and public transportation.

Panel A in Table 5 shows the effects of dummy care variable on the likelihood of employment. We find statistically significant results only for women such that the probability of employment is 20 pp lower for women providing any care than no care.

Panel B in Table 5 shows that in response to a one-hour increase in weekly care above the average value, the probability of employment declines by 2 pp for women, whereas the results are statistically insignificant for men and the combined sample.

We find limited statistically significant impact of care work on likelihood of employment for women, and the results are insignificant for men.

Panel A in Table 6 shows how the dummy care variable affects weekly employment hours conditional on individuals being employed. We find that provisioning of care lowers employment hours in a week by 17.80 hours overall. Men who provide any amount of care are employed on average 20.58 hours less per week compared to men who provide no care and women who provide any care are employed on average 15.37 hours less per week than women who do not provide any care. The magnitudes decline to 15.94, 18.14, and 13.78 for the combined sample, men, and women, respectively, when we additionally control for time spent on domestic chores. Findings indicate that men care providers reduce their employment hours by a greater margin than women care providers when compared to their respective counterparts who provide no care. This difference indicates that men might be less likely compared to women to take the double burden of work (paid and unpaid work); hence end up reducing their employment hours when they have no choice but to meet care responsibilities within households. Interpreting the lower employment hours among caregivers compared to non-caregivers is crucial, particularly in the backdrop of negligible potential of outsourcing care services to the market sector in the context of Nepal. Cultural factors and lack of market substitutes (presence of childcare and elderly care centers) combined with lower affordability limits outsourcing of care services, thereby potentially exacerbating negative employment effects. Additionally, Nepal's dominant self-employment

landscape may allow caregivers more flexibility in reducing their work hours compared to wage employment. In high-income societies where households can outsource these services, individuals may be able to more effectively engage in employment. In fact, richer households may have women outsourcing care services and also less likely to be employed due to income effect outweighing substitution effects of engaging in labor market.

Panel B in Table 6 shows that, conditional on being employed, in response to a one-hour increase in weekly care above the average value, weekly employment work hours reduce by 2.04 hours overall, by 2.16 hours for men, and by 1.89 hours for women. The magnitudes decline to 1.80 for the combined sample, men, and women, respectively, when we additionally control for time spent on domestic chores. We do not observe an economically significant gender difference in the reduction of employment hours. One potential reason could be that both men and women are engaged majorly in self-employment activities (74% and 77% respectively) which may allow for combining some of their unpaid care work, particularly childcare, with employment. This has been found to be true in similar rural settings in other developing countries including India. Gautham (2022) finds that there is greater temporal and spatial flexibility in the kind of work women are engaged in rural areas compared to urban areas and wage employment. This makes it easier for mothers to accommodate childcare responsibilities in rural setting (mostly farm work). Moreover, for China, Jia and Dong (2013) note that most married women in rural villages work primarily on family farms and it is easier for mothers to combine work with childcare under self-employment than under wage employment. Further, to examine how unpaid care work could affect employment hours of women and men in self-employment versus wage employment, we present additional analysis in Appendix Table 8. We find that due to an additional hour of caregiving, the decline in work hours in the self-employment category is higher for women compared to men, moreover no such significant declining trends were observed for wage employment (Panel B, Appendix Table 8). Potential reasons include that wage employment offers less flexibility in choosing hours of work and also the opportunity cost of wage employment may be higher.

The adverse labor market effects are consistent with prior evidence that finds a decline in the likelihood of LFP due to caregiving in Europe, ranging from 18 to 32% for women (Carmichael and Charles, 1998; 2003) and around 6% for the aggregate sample (Heitmeueller 2007). However, our results indicate important differences by gender. One of the primary reasons could be stricter gender unequal norms prevailing in low-income patriarchal setting of Nepal, that strengthens the gendered breadwinner-homemaker model, making it more likely for women to drop out or not enter the labor force due to care work compared to men. The situation gets aggravated especially because in LMICs there is lack of public provisioning of care services and affordable market substitutes, making women the primary caregivers. This is an important finding and calls for region-specific policy making around reducing and redistributing care work.

Our findings for a decline in the magnitude of employment hours (2.16 and 1.89 hours per week for men and women, respectively) are comparable with the evidence in the USA which ranges from 2.4 to 3 hours decline per week (Miller and Sedai

2022; Van Houtven et al. 2013). Even though care providers in Nepal on average spend greater time on caregiving, nearly 1.7 hours per day compared to 1 hour in the USA, the decline in employment hours is greater in the USA. This could potentially mean that individuals in LMICs such as Nepal end up becoming more time poor or experience double burden of work (domestic and workplace) to maintain their daily livelihoods. Particularly in LMICs income poverty combined with the nature of employment, mostly farm activities, could make it difficult to allow trade-offs with care work time–i.e., women are often found simultaneously taking care of children while doing farm and related activities. This result is in line with other studies in LMICs that show women's increased time in employment is not compensated by reductions in unpaid reproductive work making women time poor (Zacharias et al. 2019; Meurs and Slavchevska 2013; Zacharias, Antonopoulos, and Masterson 2012; Floro and Komatsu 2011; Bardasi and Wodon 2010; Gammage 2010).

Overall, our results are also comparable to studies in China in terms of the negative impact on likelihood of employment [Li and Chen 2023; Liu et al. 2010], albeit our results are greater in magnitude and provide gendered analysis. Studies in Latin American, Africa and Asia also indirectly indicate a negative relationship between care work time and women's labor supply by showing that an increase in access to publicly provided care services, which reduces women's caregiving time, increases their labor force participation and employment (Kozhaya and Martínez Flores 2022; Contreras and Sepúlveda 2017; Diaz and Rodriguez-Chamussy 2013; Halim et al. 2018). Moreover, there is growing evidence in India, which has similar patriarchal norms like Nepal, indicating that a major determinant of low and declining women's LFP is unpaid care work responsibilities (Afridi et al. 2018; Eswaran et al. 2013; Rangarajan et al. 2011). Similar to our results for Nepal, there is evidence for gender unequal negative employment effects for India (Sinha et al. 2024).

Our results hold importance in understanding the tradeoff between unpaid care work and labor market outcomes through a gendered lens, particularly by adding empirical evidence in a patriarchal low-income setting.

In sum, we conclude that unpaid care work affects care providers' employment capability and other related capabilities and functionings in Nepal. Both men and women reduce their weekly employment hours by similar margins. However, since care work significantly affects only women's likelihood of employment, there will likely be stronger adverse effects on women's well-being. This is in line with gender norms that define women's primary role as homemakers and men as breadwinners; therefore, care needs within the household are more likely to affect women's chances of being employed to fit the gendered division of work in the stereotypical gender roles. Further, the difference in the opportunity cost of care work which is expected to be higher for men compared to women due to gender inequality in earnings make it comparatively more advantageous for women to give up employment to meet care needs within the household. Moreover, findings indicate, that conditional on being employed, women are more likely to take up greater double burden of work compared to men which further affects women's capabilities more adversely.

Next, we check the robustness of our results and find that our conclusions are robust to a number of additional checks. In addition to examining the impact of care hours and binary of care variables on employment hours and likelihood of employment,

we examine the impact of unpaid work by type of employment in Appendix Table 8. Second, we conduct subgroup analyses stratified by: (i) age (below the age of 36 years vs. equal to or above 36 years), and (ii) education attainment (less than 12th grade or equal to and above 12th grade including tertiary education (bachelor and master degrees). We present the results in Appendix Tables 9 and 10, respectively. We use weekly caregiving hours for each subgroup to verify the robustness of our primary findings. The estimates point toward the same direction, however, we find that the decline in work hours per week for women is greater than men by a larger margin compared to the sample without segregations. For age group analysis, women younger than 36 years reduce their work hours for an additional hour of caregiving, by a greater margin compared to men in the same age category. This is expected, because in this age group, women are more likely to bear children and experience motherhood penalty. Moreover, women equal to or older than 35 years reduce their work hours by a lower margin compared to younger women. For the education level sub-groups, women with less than 12th grade education reduce their work time by 6 hours in a week for an additional hour of caregiving, whereas no significant decline in men's hours of work. Moreover, women with higher than 12th grade education reduces their work hour by a lower margin compared to women with less than 12th grade education. This could be due to the type of employment that higher educated women are engaged in that it may not allow flexibility in choosing work hours and the opportunity cost of reducing hours may be higher. However, strangely men with higher education reduce their work hours by a greater margin. It is important to note that subsample analysis increases sampling variance; hence, estimates are less likely to be significant at conventional levels.

Overall, we expect the negative employment outcomes within households to have potential adverse effects on macroeconomic growth and LFP because these channels affect the ˙development consequences for the care providers and their children, albeit we cannot examine intergenerational and growth effects empirically due todata limitations. Further, these pathways could exaggerate labor market gender inequalities, such as LFP gap, gender earnings gap, and occupational segregation (NLFS 2017/18).

While in this study we focus on the impact of unpaid care work on employment outcomes, due to data limitation we could not examine its effect on women's earnings, which is crucial and serves as an effective tool to alter power dynamics within households. It is vital to incorporate how women's economic empowerment in terms of income gets affected due to unpaid care work, which in turn affects their bargaining power within households, gender division of work, and women's decision making around securing different types of employment. This study opens door for future research to examine the impact of caregiving on women's earnings in the context of Nepal.

Conclusion

In this study, we provide Capability Approach frameworks to examine how unpaid care work within households can negatively affect care providers' well-being outcomes and how these could have adverse consequences for the macroeconomy and human development outcomes.

The empirical results using NLSS-III 2010/11 substantiate that unpaid care work can negatively affect individuals', mostly women's, employment outcomes in Nepal. The results of this study underscore the importance of integrating unpaid care work in development-related policymaking as called for by Sustainable Development Goal (SDG) 5 (UN, DESA 2016). SDG Target 5.4 have recognized the need to address women's disproportionate unpaid care work burden globally and to develop public care infrastructure and services to reduce and redistribute it. If caregiving responsibilities continue to be borne by households, mainly women, without adequate publicly provided support, the long-term consequences would hinder not only achieving the goals of gender and class equality (Razavi 2011), but also likely contribute to sluggish economic growth and impede improvements of living standards (Rai et al. 2019).

Motivated by Elson's (2017) 3R (Recognize, Reduce, Redistribute) strategy, we draw three broad policy recommendations in the context of Nepal based on our results. First, it is crucial for Nepal to *recognize* unpaid care work by conducting regular TUSs to examine individuals' time-allocation patterns, including simultaneous activities. Such statistics will allow more insightful research in this field. It is also crucial to spread awareness among households about the definition of "work," especially unpaid work. Second, there is a need to reduce the burden of unpaid care work on households through public investment in care infrastructure. Third, it is essential to redistribute unpaid care work among households, the state, and the market. In other words, public investment in child and elderly care services can provide alternatives to unpaid care provisioning at home, allowing caregivers within households to allocate their time to develop their own capabilities and achieve the most-valued functioning.

However, we recognize that in the context of low-income countries like Nepal the 3R strategy is difficult to implement due to two main reasons- (i) low fiscal capacity poses limitations for conducting regular TUSs and for social spending on care infrastructure and, (ii) poverty prevents outsourcing to the market or affording market substitutes of unpaid work. Hence, we recommend additional community-based measures that would allow sharing of the care burden among households. For instance, household members in a neighborhood can come together to develop a crèche system where community members can voluntarily take turns to provide child and elderly care or provide these services at affordable rates. The state's role could be to support such efforts and make them sustainable by, for example, setting up a common community center and using it for various community activities, including care. This would be more cost-effective than developing stand-alone care infrastructure like day care centers. However, we do not recommend this as an

alternative to public investment in care, but more like an immediate solution until public policies develop to prioritize budget allocation toward care.

Overall, the study draws important implications for Nepal, a subsistence agrarian economy with strong patriarchal norms. Unpaid care work is affecting the employment potential of women and men. The life-cycle-intergenerational framework alongside the caregiving and well-being framework introduced in this paper suggest that capabilities deprivation of individuals in Nepal will prevent it from experiencing a high development trajectory. Hence, development-related policymaking must recognize the well-being costs of unpaid care work that people in Nepal experience every day.

Appendix

See Tables 7, 8, 9 and 10.

Table 7 First stage results: Instrumental variable and caregiving

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Variables	Any care (dummy) (All)	Any care (dummy) (Men)	Any care (dummy) (Women)	Any care (dummy) (All)	Any care (dummy) (Men)	Any care (dummy) (Women)
IVcare	0.18***	0.16***	0.21***	0.21***	0.18***	0.23***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
F-test first stage	198	64	137	243	83	163
Domestic chores	N	N	N	Y	Y	Y
Observations	2912	1297	1615	2912	1297	1615
Panel B						
	Care hours per week (All)	Care hours per week (Men)	Care hours per week (Women)	Care hours per week (All)	Care hours per week (Men)	Care hours per week (Women)
IVcare	1.98***	1.69***	2.22***	2.34***	2.03***	2.58***
	(0.21)	(0.32)	(0.28)	(0.22)	(0.33)	(0.30)
F-test first stage	87.6	27.47	62.17	111	37	74.81
Domestic chores	N	N	N	Y	Y	Y
Observations	2912	1297	1615	2912	1297	1615

[a] Control variables include age, age squared, marital status dummy, education status dummy, health status, household size, and household income. Time spent on domestic chores is added to the set of controls in Columns 4, 5 and 6.

[b] Robust standard errors in parentheses.

[c] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance at the 1% level ($p<0.01$)

Table 8 Impact of unpaid work on work hour per week, by type of employment

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Self-employment			Wage-employment		
	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)
2SLS-IV						
Unpaid care hour	−3.7* (0.9)	−2.6** (1.4)	−4.2*** (1.1)	−0.68 (1.1)	−2.7 (1.9)	0.91 (1.4)
F-test first stage	64	21	44	32	10	26
(Cragg-Donald Wald F statistic)	61	23	39	38	11	29
(Kleibergen-Paap rk LM statistic)	61	21	41	30	9	23
Domestic chores						
Observations	1512	670	842	407	206	201

[a] Control variables include age, age squared, marital status dummy, education status dummy, health status, household size, and household income.

[b] Robust standard errors in parentheses.

[c] * denotes significance at the 10% level ($p<0.1$), **denotes significance at the 5% level ($p<0.05$), and ***denotes significance at the 1% level ($p<0.01$)

Table 9 Impact of unpaid care on hours of employment, by age

	(1)	(2)	(3)	(4)	(5)	(6)
	Age less than or equal to 35 years			Age greater than or equal to 35 yeras		
	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)
2SLS-IV						
Unpaid care hour	−1.9** (0.8)	−0.48 (1.4)	−2.8** (1.1)	−2.7*** (0.9)	−3.56** (1.6)	−2.06* (1.1)
F-stat first stage	42	15	28	39	15	23
Cragg-Donald Wald F statistic	37	17	21	41	15	24
Kleibergen-Paap rk LM statistic	41	15	26	38	15	23
Observations	1431	614	817	1231	577	654

Refer to Table 8 notes

Table 10 Impact of unpaid care on hours of employment, by education

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Less than secondary (12th)			Secondary (12th) and above		
	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)	Work hr per week (All)	Work hr per week (Men)	Work hr per week (Women)
2SLS-IV						
Unpaid care hour	−5.2** (2.3)	−4.5 (3.3)	−6.09* (3.5)	−2.9* (1.1)	−4.4** (1.9)	−2.3* (1.26)
F-test first stage	8	4	4	8	5	4
(Cragg-Donald Wald F statistic)	9	4	5	7	5	3.8
(Kleibergen-Paap rk LM statistic)	8	4	5	8	6	5
Observations	596	268	328	57	24	33

Refer to Table 8 notes

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Declarations

Conflict of interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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