QUALITY OF CARE AND WORKING CONDITIONS: UNDERSTANDING THE CARE WORKERS' PERSPECTIVE

Shirin Arslan, American University

Arnob Alam, American University

Maria Floro, American University

Seung-Eun Cha, University of Suwon

Eunhye Kang, Seoul National University

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Corresponding Author: Maria Floro, Department of Economics, American University, Washington DC, USA. mfloro@american.edu

ABSTRACT

Korea's puzzling situation of continued heavy reliance on family care for older persons and young children despite the growing supply of paid care services and workers has brought more attention to concerns about the quality of paid care. While several factors influence the performance and delivery of care provided by workers, this paper focuses on the care worker's sense of responsibility for the well-being of the care recipient and its relationship with working conditions. Care work is in large part, emotional labor and therefore has motivational dimensions that have serious consequences on the recipient's well-being. A worker's commitment to the care recipient's well-being is not static, however. It can change, depending on circumstances such as working conditions including job quality and the intensity of care work. In this sense, the latter can affect the quality of care. We conduct tobit and generalized maximum entropy (GME) analyses using the 2018 Care Work and the Economy (CWE-GAM) Korean childcare and eldercare worker survey data to assess the relationship between commitment levels of care workers and their working conditions. Our results suggest that a lack of adequate training and longer commute times, particularly for childcare workers, are associated with lower levels of commitment. Our results also suggest that having stable work schedule and ease in dealing with family members, particularly for eldercare workers, are correlated with higher levels of commitment.

Keywords: quality care services, childcare, eldercare, paid caregivers, job quality, South Korea

JEL codes: J13, J14, J81, D91, J28, J490

Quality of Care and Working Conditions: Understanding the Care Workers' Perspective[1]

1. Introduction

Korea currently faces a puzzling situation that is also emerging in other high and middle-income countries: continued heavy reliance on family care for the frail older persons and young children despite the ample supply of paid care services (Cha et al., 2022). Over the last two decades, the Korean government has increasingly invested in care services including subsidies for childcare and early childhood education (ECE), and long-term care (LTC) insurance for eldercare. While the number of paid childcare and eldercare workers in Korea has increased in the last decade or so, a significant amount of unpaid care work continues to be performed by family members (Kang et al., 2021).

Korea's adults (aged 18 and older) provide an estimated 87 million hours of unpaid care per day. This roughly translates into 11 million full-time workers (assuming 8-hour shifts) providing paid replacement for the unpaid care time (Suh, 2021).[2] Much of the burden of family care falls heavily on female members, who, on average, spend more than 50 hours a week (Cha et al., 2022).

One reason for this conundrum has to do with the affordability as well as variability in the quality of paid care services, making it difficult for families to substitute paid services for family caregiving. In the case of childcare, studies in Korea show that the lack of affordable, quality care has compelled even dual-earning households to heavily rely on informal care provided by family members (Kim and Jeong, 2006; Sung, 2017). Similar reasons are made by older person caregivers particularly daughters and daughters-in-law who cite serious concerns regarding quality of care as reasons for performing eldercare themselves (Choi and Kim, 2013; Lee, 2018; Song, 2014).

Discussions about quality care were already under way in Korea even before the COVID-19 pandemic, with serious concerns around child- and elder- abuse by care-workers and day-care teachers, *yoyangbohosa, etc.*).[3] In some childcare centers and eldercare facilities, monitoring has been put in place using surveillance cameras.[4] Policy experts have pointed out that care workers'

[1] The authors would like to thank Jooyeoun Suh, Amos Golan, and the participants of the 2021 International Association for Feminist Economics Conference for their helpful comments.
[2] On average, women in Korea performed 29.2 hours a month of unpaid care, while men performed 13.4 hours (Suh, 2021).
[3] The term *yoyangbohosa* is a newly defined job category in South Korea that refers to certified care workers in both homes and institutions.
[4] Training programs for care workers in several care facilities have put emphasis on care ethics to help reduce incidence of abuse.

abusive behavior is related to care worker's stress level (Kim, 2020), how they value their work (Kim et al., 2021; Oh and Lee, 2021) and the lack of social support (Lee and Kim, 2018).

The issue of quality care is admittedly complex and yet it is critical in understanding the care conundrum in Korea. Care provisioning is distinct from other types of services in that it requires personal attention, is usually provided on a face-to-face basis, and often for persons needing assistance in performing daily activities and bodily functions (Waerness, 1987). This distinction makes the paid care sector particularly susceptible to quality problems (Folbre, 2006). Examining countries that witnessed a rapid expansion of the paid care sector, Meagher (2007) raises a pertinent question: "How are good caring relationships sustained between strangers who are systematically thrown into intimate contact with each other?" (p. 34). While some argue that paid care workers may be unlikely to provide the same quality of care and emotional support that a loving family member or kin can offer (Moon and Cha, 2020), others have pointed out that because of the specialized training they receive and the opportunity cost of family caregiver's time, paid care workers are more effective in providing care and thus may provide higher quality of care (Banuriet al., 2019). Moreover, care work, regardless of whether they are paid or unpaid, has moral/motivational dimensions, as well as practical dimensions. Commitment or a strong sense of responsibility in the delivery of care services therefore plays a critical role in determining the quality of care.

A care worker's level of commitment to the recipient's well-being is not static; it can change depending on circumstances as well as the work environment or setting. While it is likely that a care worker's sense of responsibility for the recipient increases as more time is spent together, it can also decline because of poor stressful working conditions. For example, stressful working conditions such as difficulty in dealing with recipient's family members, long commute hours as well low job quality in terms of lack of stable/predictable work hours, irregular work contract, and inadequate training can adversely affect a worker's level of commitment. In this paper, we examine the extent to which this commitment level is associated with one's working conditions such as job security, adequacy of training, care work intensity, and nature of the relationship with recipient's family. It fills a gap in the literature by examining a critical ingredient – care worker's sense of responsibility – in the delivery of care services, which has thus far received little attention in studies assessing the quality of care.

We focus on childcare and eldercare workers in South Korea in various settings such as private and public institutions and recipients' homes. We examine the relationship between care workers' expressed level of commitment towards the recipient's well-being and working conditions using the childcare and eldercare worker survey collected in 2018 by Gallup Korea among 600 workers in Korea, as part of the Care Work and the Economy Project. Given the small sample, we conduct both Tobit and general maximum entropy (GME) tests. We create sampling weights to address any selection bias that may have occurred in the sampling process. These weights use selected demographic characteristics including the type of care arrangement and geographic region to ensure that the metrics derived from the sample data are representative of the population of child-care workers and older person care workers in Korea.

This paper proceeds as follows: Section 2 discusses the context while Section 3 provides the analytical framework. Section 4 provides a description of the data, the proxy indicators used in our analysis, and methodology. Section 5 presents the Tobit and GME estimates and discusses the results. Section 6 addresses potential selection bias and endogeneity issues. Section 7 concludes with policy implications.

2. Background and Context

Over the last decade, Korea's population of elderly aged 80 + more than doubled, from 0.86 million (in 2009) to 1.8 million (in 2019). By the year 2060, it is projected that the number of persons aged 65 or over will exceed 80% of the working-age population. Alongside Korea's rapid population aging, fertility rate has consistently declined since 1960, reaching a record low of 0.84 in 2020.[5] The continued decline in fertility rate (significantly below replacement levels) and the rapid growth of elderly have raised grave economic and social concerns with regards to future labor supply, pensions, economic growth and social reproduction. At the same time, new needs are emerging with rising standard of living such as greater expectations for quality care services. In the case of childcare for example, many parents have come to expect "enriched and educationally focused services to be offered" (Meagher 2007, p. 34). Likewise, expectations for quality and affordable eldercare have also changed. According to the 2002-2018 national social

[5] In 2020, South Korea's population declined for the first time, with the number of births down 10 percent from 2019 (Lee, 2021).

statistics survey, only 27% of Koreans agreed that the family is responsible for caring of a frail/elderly and the expectation of the government's role in care has increased dramatically in recent years (Kim, 2019).

In response, the Korean government has been expanding public investment in care provisioning by implementing a universal childcare service policy, broadening the scope of LTCI (Long-term Care Insurance) coverage to include dementia patients and those without severe functional limitations, as well as strengthening the Community Care system by local governments (See Appendix A). Consequently, the paid care workforce expanded drastically. While the population of children under 5 continued to shrink over the last decade, the childcare workforce grew from 207,000 childcare workers in 2009 to more than 331,000 in 2019 (Ministry of Health and Welfare, 2020). The eldercare workforce also doubled during this period, from 140,000 in 2009 to 287,071 in 2018.

Despite the expansion of government support and the rapid growth of the private care sector, the care burden on household members has yet to improve (Cha et al., 2021). Family caregivers continue to view caregiving as a burden and experience significant opportunity cost (Moon and Cha, 2020). As in other countries, the primary caregivers in Korea are typically women, who perform a large share of the total care work, even with the utilization of paid care services (Choi, 2009; Kim, 2010; Choi et al., 2012; Song, 2014; Choi et al., 2014; Lee et al., 2015; Song, 2016; Chung et al., 2017; Cha et al., 2022). Before the onset of the COVID-19 pandemic, about 48.3% of total childcare in South Korea were provided by family members (KICCE, 2018). More than a third of Korean women in their 30's and 40's report experiencing the double burden of care i.e., taking care of both children and frail elderly parent(s) (Song, 2014).

The unequal burden of unpaid care on women in Korea has held the country back from achieving gender equality. Women returning from career breaks from childbirth or childcare often re-enter the labor market as non-regular workers with low-paying jobs, which is a key factor behind the Korea's large gender wage gap (31.5% in 2020), compared to the OECD average of 12.5% (OECD, 2019)[6]. At the same time, Korea's overall employment rate remains below the OECD average, largely due to low female employment, with the fourth largest gender employment gap (18 percentage points) among OECD countries (OECD, 2020). Cultural practices and social norms such as a work culture involving long hours, filial piety, and socially ascribed roles for mothers,

[6] OECD, 2019, Gender wage gap (indicator). doi: 10.1787/7cee77aa-en (Accessed on 24 January 2022)

daughters, and daughters-in-law that continue to persist, as well as pro-natalist policies that largely involve financial support for families in Korea have had limited impact so far (Jones, 2019).

3. Nature of Care Work and the Quality of Care

Our study builds upon the existing work on the nature of care work and emotional labor. We also review the literature on assessments of the quality of paid care services. Care work – whether nursing, eldercare, or childcare – is essential for human life, the creation of capacities, and the continuation of social relations and economics processes. Care work is unique in that it is a form of emotional labor that encompasses human relations skills, communication skills, emotional effort, and responsibility for client well-being (England and Farkas, 1986; Steinberg, 1999). This emotional component of care work requires that 'the person doing the caring is inseparable from the care given" (Himmelweit, 1995 p. 8) and that carers need to *care about* and *care for* those they tend to as the latter's well-being depends upon this service (Folbre, 2006; Nelson, 2010; Hong and Seo, 2012). The critical role of the care worker's sense of responsibility for the well-being of the recipient in delivery quality care services can be observed in healthcare and elderly care facilities (Teng et al., 2009; Kilaberia, 2020), as well as other types of services where competition is based not only on prices but also on quality and therefore, incentives for quality provision are warranted (e.g., education services).

As feminist economists have pointed out, the performance and delivery of care by paid workers are not purely motivated by self-interest or monetary reward. Intrinsic motivation and a sense of responsibility for the well-being of the recipient play a critical role in determining the level of effort provided by care workers (Tronto, 1987; Folbre and Weisskopf, 1998; Nelson, 1999; England, 2005; Meagher, 2007; Himmelweit and Land, 2010). However, the paid care sector is also particularly susceptible to quality issues for several reasons: those receiving care often lack the ability, information and/or experience required to assess the quality of what they are receiving; both inputs and outputs of care are difficult to measure; and while the intrinsic motivation among workers helps ensure quality, workers may have little control over their work environment, thus affecting the manner in which the service is delivered (Folbre, 2006).[7]

[7] As noted by Moon and Cha (2020), care workers often have little or no control of the care situation. They often are not allowed to decide on what to do or what should be done in critical moments.

As with other essential services, quality care services also require a solid *provider – recipient* relationship, grounded in firm trust between the care recipient (or the recipient's family) and the care provider. However, in the case of child care and elder care services, establishing trust in provider – recipient relationships is difficult, especially in cases where care services are customized to the recipient rather than standardized (Folbre, 2008). The difficulty in establishing and sustaining good care relationships between "strangers who are systematically thrown into intimate contracts with each other" can be observed in countries that experienced a rapid growth of the paid care sector (Meager, 2007).

The quality of care delivered by paid care workers depends on many factors. Some are obvious and easy to observe, such as adequate training (Bruchinal et al., 2002; Burke et al., 2006; Nicol et al., 2005), organizational culture and commitment to safety (Gershon et al., 1995; Kwon and Hong, 2017), as well as working conditions and structural factors such recipient-to-worker ratio, worker's autonomy, wages and benefits, among others (Landsburgis, 1988; Felton, 1998; Yassi et al., 1991; Burchinal et al., 2002; Burchinal, 2018; Ruffini, 2021). Other are less obvious and difficult to measure, such as the relationship between care worker and recipient (Shin and Hyun, 2015), care worker's intrinsic motivation and the level of trust between recipient and provider (Banuri, 2019).

Assessing the quality of care services involves the crucial tasks of gathering information regarding the workers' qualifications as well as monitoring and supervision. To monitor and assess the quality of care services within facilities, a plethora of indices, scales and assessment instruments are available.[8] These instruments are typically based on measurable attributes and quantifiable procedures or outcomes, and they are often specific to the type of care being provided. Efforts to assess the quality of care services typically rely on such standardized metrics and assessment instruments, focusing on various aspects of care provisioning, such as the performance of care activities and interactions within facilities (Mashburn et al., 2008; Rubio-Codina et al., 2019), outcome of care services such as follow-up health assessments and treatment outcomes (Rios-Zertuche et al., 2019; Kondo, 2015), level of satisfaction by the care recipient or care recipient's guardians (Shin and Hyun, 2015), and measurable attributes of the care workers such as their education, training received and working conditions (Burchinal et al., 2002; Kwon and

[8] Examples include Family Day Care Rating Scale (FDCRS), Early Childhood Education Ratings Scale (ECERS), Caregivers Interaction Scale (CIS), to name just a few (Harding, 2002; Colwell et al., 2013; Early et al., 2018; Westerberg et al., 2018).

Hong, 2017; Burchinal, 2018). However, as Joling et al. (2018) finds through a systematic review of hundreds of quality indicators, indicators measuring care outcomes and non-clinical aspects are relatively scarce and most indicators do not meet standards of high methodological quality.

While the intrinsic motivation of the care worker is a critical ingredient in quality care provisioning, the preceding literature review shows that it has received little attention in efforts to assess the quality of care-services. The care worker's level of commitment is not only crucial in the performance of basic tasks such as dressing, feeding, bathing, giving medication, etc. It is also critical in building personal connection and meeting the emotional and developmental needs of the recipient through activities such as reading to recipient or listening to their story and providing comfort when the recipient is feeling troubled. As Susan Eaton (2005) puts it, these are activities or tasks that make all the difference if you're living in a nursing home or spending the day in a care center.

A worker's sense of responsibility for (or commitment towards) their recipient's safety and wellbeing is not static, however. It is influenced by a myriad of factors, many of which are not easily measured such as the nature of the relationship with the recipient, and certain worker's characteristics including level of empathy, patience, and conscientiousness. A worker's commitment level can also be affected by their working conditions e.g., intensity of caregiving, relationship with family members, commute hours, type of work contract, having regular breaks, receiving adequate training, etc. In this paper, we argue that working conditions and job quality are interrelated with this commitment level, and therefore the quality of care. For instance, a poor work environment can undermine a care worker's positive attitude and motivation. Stressful working conditions or low job quality in terms of lack of stable/predictable work hours, high number of care recipients at any given work period, job insecurity and the absence of benefits that facilitates a worker's healthy work-life balance can adversely affect a person's level of commitment. This may lead not only to high turnover rates but also to lower quality of care provided. Other factors that have to do with the geographical setting such as length of commute time can also affect a worker's commitment level. Heavily urbanized countries like South Korea have witnessed the lengthening of average commute times especially in metropolitan areas such as Seoul and Busan. With the removal of monthly travel allowance by some care institutions and employment agencies, many workers are forced to rely on public transport (buses and subways).

which considerably lengthens their commute time compared to a hybrid mode of travel involving short taxi rides and subways.

Additionally, there is a connection between the worker's level of commitment and intensity of care work as determined by the need of the recipient for constant attention or continual assistance to perform basic functions. In this case, the relationship is likely to be bi-directional in the on one hand, the intensity of care work can strengthen the attachment and emotional bond with the carer, which help maintain and even heighten the latter's sense of commitment. It may also be the case that care workers with strong sense of commitment are more likely to take on care jobs that are more intense such as caring for very young children or frail elderly who are immobile or with severe dementia. Nonetheless, persistent intensity of caregiving can lead to exhaustion, tiredness, or even burnt-out, which can eventually sour the worker's level of commitment.[9] Therefore, the intensity of care work may or may not be associated with lower levels of commitment.

Our study empirically examines the association between the expressed sense of responsibility of care workers and their working conditions, including job quality, relationship with (family of) recipient, commute time, and the intensity of care work. We predict that a worker's level of responsibility and commitment towards the recipient's well-being correlates with the realities of the work environment including job quality, relationship with (family of) recipient, adequacy of training received, care work intensity, and other factors. In other words, poor working conditions i.e., unpredictable work schedule, long commute, inadequate or lack of appropriate training, job insecurity, etc. can undermine the worker's morale and level of commitment to the care recipient. If, as we have argued in this section, a care worker's sense of responsibility affects the quality of care, then the latter may suffer as a worker's morale and commitment level are adversely affected by the working conditions.

4. Empirical Analysis

4. 1 Data and Methodology

Our analysis uses the 2018 Care Work and the Economy survey data collected by Gallup Korea. The purposive sample consists of 300 eldercare workers and 300 childcare workers in public and private care institutions across South Korea, including Seoul/Metropolitan Area (Seoul,

[9] A few studies have shown that work intensity in terms of difficult physical and emotional labor entailed is associated with lower quality of care (Kim et al., 2018; Kim and Yeom, 2016).

Incheon, Gyeonggi-do, Gangwon-do), Chungcheong Area (Daejeon, Sejong, Chungbuk, Chungnam), Honam Area (Gwangju, Jeonbuk, Jeonnam), Gyeongbuk Area (Daegu, Gyeongbuk), Gyeongnam Area (Busan, Ulsan, Gyeongnam). The sampling design of childcare and eldercare workers took into account the stratification by geographical region and occupational categories (institutional worker, home-based worker, or informal worker) (Jun et al., 2021).[10] Inverse sampling probability weights were obtained using data from the 2017 Day Care Centre Statistics Yearbook (National Statistics Office, 2017) and 2017 Long-Term Care Insurance Statistical Yearbook (National Health Insurance Corporation, 2017) to adjust the sample distribution and make it representative of the childcare and eldercare worker population (Suh, 2020).[11] Appendix B describes the methodology for constructing the sampling weights.

The survey question "How much responsibility do you feel for the health and safety of your care recipient(s)?" is used as our measure of expressed commitment or sense of responsibility by the care worker. An important caveat regarding the main variable of interest is that it is based on the respondent's own assessment. Moreover, the data is cross-sectional and hence we are unable to evaluate the direction of change over time. Finally, the responses are bounded between 0% (not my responsibility at all) and 100% (entirely my responsibility). Since responses are bounded, we examine the relationship between the worker's level of commitment and proxy indicators of their working conditions using Tobit regression analysis. We also conduct an entropy econometrics regression analysis to test the robustness of the results.

Table 1 describes the characteristics and working conditions of the care workers in our sample. Reflecting the dominance of women in Korea's paid care sector, most (95 percent) of the care workers in our sample are women, their weighted mean age is 52.5 with elder care workers being older on average (54.4 years) compared to childcare workers (47.3 years). Most of the care workers in our sample completed high school (72%), lived with a spouse (85%), and in dual-earning households (77%). Majority of them also work in a metropolitan area (73%) and about half (50.4 %) are regular or contract employee with a signed contract.

[10] Eldercare workers in institutional facilities work in nursing homes and daycare centers, excluding hospitals. Home-based eldercare workers work in the older person's own home and are funded by National LTCI, while informal eldercare workers are hired by families or the elderly without written or formal contracts e.g., lived-in carers. Institutional childcare workers are employed in public, private or corporate daycare centers. Homebased childcare workers are hired through agencies while informal childcare workers are hired by families without formal contracts, e.g., informal babysitters.

[11] For informal workers, regional informal worker population was estimated using informal sector share of GDP. See Appendix B for details.

Table 1 Characteristics and Working Conditions of Care Workers, by Type of Worker

	All Workers	Childcare Workers	Eldercare Workers
A. Worker Characteristics			
Average Age (years)	52.5	47.3	54.4
Care Work Experience (mean, in years)	4.7	5.62	4.4
Gender (% distribution)			
Female	94.8%	95.0%	94.8%
Education (% distribution)			
No schooling	0.1%	0.0%	0.2%
Primary	1.9%	1.5%	2.0%
Middle School	6.3%	0.5%	8.4%
High School	71.8%	56.6%	77.3%
College	19.3%	40.1%	11.8%
Graduate	0.6%	1.3%	0.4%
Number of care work licenses (% distribution)			
0	16.2%	35.4%	9.3%
1	68.0%	46.0%	76.0%
2	12.1%	14.0%	11.4%
3+	3.6%	4.6%	3.3%
Has a Spouse (% distribution)			
Yes	85.3%	87.0%	84.7%
Dual-Earner Household (% distribution)			
Yes	77.2%	83.2%	75.1%
B. Working Conditions			
Number of care recipients (mean) [1]	2.7	2.3	2.9
Work hours (mean)[2]	39.4	37.3	40.2

Average commuting time to work (mean in minutes)[3]	46.2	41.3	48
Need to watch care recipient at all times (% distribution)[4]			
Yes	49.0%	68.9%	41.7%
Extra work hours (% distribution)[5]			
Yes	26.7%	36.6%	23.2%
Metro (% distribution)[6]			
Yes	73.3%	78.3%	71.5%
Care work is physically difficult (% distribution)[7]			
Yes	65.7%	57.6%	68.7%
Has a stable work schedule (% distribution)[8]			
Yes	61.2%	61.5%	61.1%
Has regular holiday leaves (% distribution)[9]			
Yes	80.6%	83.2%	79.7%
Family is relatively easy to deal with (% distribution)[10]			
Yes	28.9%	37.5%	25.4%
Regular or contractual employee with a signed contract (% distribution)[11]			
Yes	49.6%	38.2%	53.7%
Institution-based worker (% distribution)[12]			
Yes	51.6%	32.7%	58.4%

Note: Calculated using the 2018 CWE-GAM Korean Childcare and Eldercare Workers Survey data. Statistics based on respondent's answer to the following survey questions:

1. How many care recipients have you taken care of over the past week?
2. Over the past month, how many hours per day did you do care work on average? (Sum of weekday and weekend hours)
3. How much time does it take to commute to work from your home on average?
4. I need to watch my care recipient at all times (agree/strongly agree =1, yes)
5. I work more hours than the standard number of hours (agree/strongly agree=1, yes)
6. Opening survey question completed by survey investigator on the location of care work provided.
7. In general, how much physical difficulty do you have taking care of the child or elderly person? (Slightly/very difficult=1, yes)
8. There are times when my work schedule gets cancelled without notice (strongly /somewhat disagree=1, yes)
9. I can apply for holidays when I want to (strongly/somewhat agree=1, yes)
10. It is very difficult to deal with the care recipient's family members (strongly/somewhat disagree=1, yes)
11. what type of employment do you have at your current workplace (regular employee or contract up to 2 years), and have you signed an official written labor contract related to your current care work (yes or don't know)?
12. Main workplace (Work at an institution or care center)

Table 1 also shows the educational level of the sampled care workers: about 12% of eldercare workers hold a college degree, compared to 40% of childcare workers. Most care workers hold at least one professional license; 35 percent and 9.3 percent of childcare and elder care workers respectively work without any license. The mean years of care work experience is higher for childcare workers (5.6 years) compared to elder care workers (4.4 years). Majority of elder care workers (58.4%) are institution-based workers, whereas childcare workers are more likely to work in care recipient's home.

On average, the care worker respondents in our sample cared for 2-3 recipients, worked about 40 hours a week, and spent roughly 46 minutes on commute each day. Compared to childcare workers, eldercare workers on average, tend to care for more recipients, work more hours per week, and spend longer time commuting to work. About a quarter (26%) of the sample reported that they work more hours than stated in original employment agreement. Nearly 40% reported having an unstable work schedule. More than half of the paid care workers don't have a signed labor contract or regular employment; this is the case for 62.5% and 74.7% of childcare and eldercare workers, respectively. A large majority (71%) also reported difficulty in dealing with care recipients' family members, particularly among eldercare workers (74.7%) compared to (62.5%) childcare workers.

In terms of job quality, about 61% of workers reported to have a stable work schedule, 81% have access to regular holidays, and nearly half have secure employment (defined as a regular employee or a contract employee with a signed contract). Less than one-third of respondents agreed that it is relatively easy to deal with recipient's family, which we use as a proxy for relationship with family of recipient.

In terms of care work intensity, about half (49%) of the paid care workers reported that their care work requires them to "watch recipient(s) at all times" during working hours; this is more pronounced among childcare workers (68.9%) than among eldercare workers (41.7%). More than a quarter of employees responded that they worked extra hours than the standard (more than a third for childcare workers), nearly two in three responded that care work is physically difficult (69% of eldercare workers). This indicates that care work is intense/difficult for a large segment of the care workers and there are significant differences in the dimension of difficulty between eldercare and childcare.

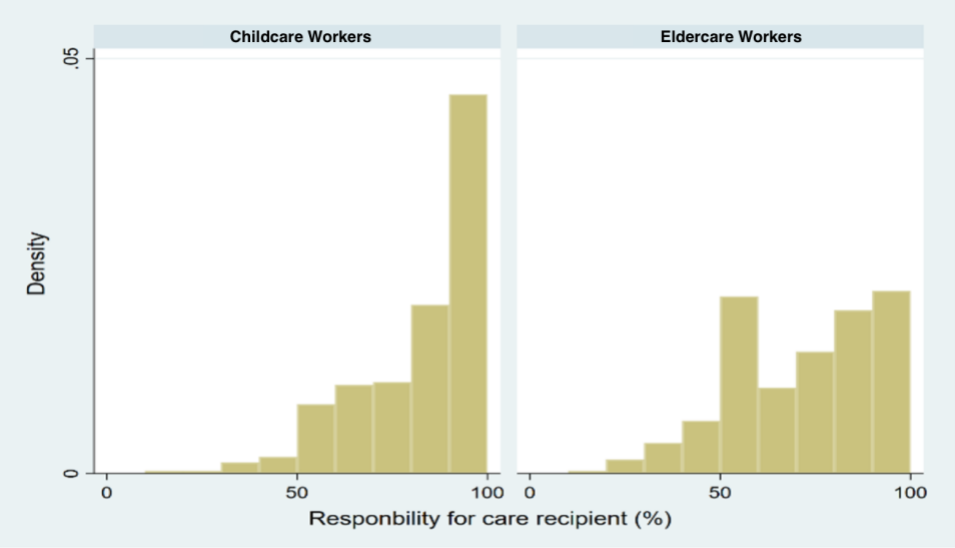
The frequency and cumulative distributions of our main variable of interest i.e., level of expressed commitment or sense of responsibility of the eldercare and childcare workers are given in Figures 1 and 2 respectively and ranges from 0% (not my responsibility at all) to 100% (entirely my responsibility). Overall, the mean percentage level of responsibility reported by the respondents is 71.6%. Childcare workers tend to report higher level of responsibility (79.5% on average), compared to elder care workers (68.7% on average) as shown in Table 2.

Table 2. Average Care Workers' Reported Level of Responsibility for Care Recipient, by Type of Worker (in percent)

Responsibility for Care Recipient	Mean	Std. Dev
All Workers	71.60%	20.60%
Childcare Workers	79.50%	17.30%
Eldercare Workers	68.70%	21.00%

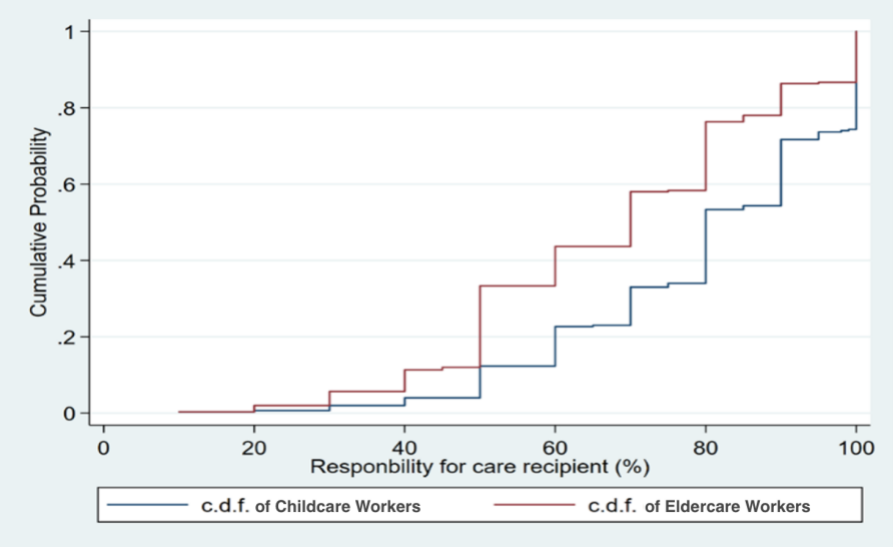
Note: Statistics are based on 2018 CWE-GAM Korean Childcare and Eldercare Worker Survey respondent's answer to the following question: *"How much responsibility do you feel for the health and safety of your care recipient(s)?"* The responses ranged between 0% (not my responsibility at all) and 100% (entirely my responsibility).

Figure 1. Frequency Distribution of Care Worker's Reported Level of Responsibility for Well-being of Recipient, by Type of Care Worker



Data Source: 2018 South Korea Paid Careworker Survey- Childcare. Care Work and the Economy Project Field Work Data, Center for Transnational Migration and Social Inclusion, Seoul National University; and 2018 South Korea Paid Careworker Survey- Eldercare. Care Work and the Economy Project Field Work Data, Center for Transnational Migration and Social Inclusion, Seoul National University

Figure 2. Cumulative Distribution of Care Workers' Reported Level of Responsibility for Well-being of Recipient, by Type of Care Worker



Data Source: 2018 South Korea Paid Careworker Survey- Childcare. Care Work and the Economy Project Field Work Data, Center for Transnational Migration and Social Inclusion, Seoul National University; and 2018 South Korea Paid Careworker Survey- Eldercare. Care Work and the Economy Project Field Work Data, Center for Transnational Migration and Social Inclusion, Seoul National University

4. 2. Methodology

An underlying argument of this paper is that quality of care services is related to the working conditions of workers, and an important dimension of this relationship has to do with the latter's effect on the workers' commitment level. In this section, we empirically examine the following hypothesis: are better working conditions in terms of job quality and care work intensity associated with higher level of expressed commitment towards the well-being of the recipient? We use the following indicators for job quality and care work intensity: a) stable work schedule, b) job security, which is proxied by a dummy variable indicating regular employment status or having either a labor contract for up to 2 years or a signed written agreement, c) if worker lacks adequate training, d) whether recipient needs to be watched at all times, e) pleasant working environment proxied by a dummy variable indicating the ease in dealing with care recipient's family, f) number of recipients currently being cared for, and g) regular occurrence of working extra hours. In addition, we consider care worker's average commute time as part of the working conditions,

based on the Korean care workers' concern regarding long commute to and from their place of work .[12]

Since the dependent variable is bounded, we use censored regression models to test our hypothesis. For the Tobit model, we assume that the observed dependent variable,

$$y^t = \begin{cases} 0 \; if \; y^{t*} < 0 \\ y^{t*} \; if \; 0 < y^{t*} \leq 1 \\ 1 \; if \; y^{t*} > 1 \end{cases}$$

That is, our observed values y^t are bounded between 0 and 1 for the underlying latent variable y^{t*}. We then estimate the model using a maximum likelihood (ML) approach.

Given the small sample size, we also conduct an entropy-based econometric analysis. This method is deemed appropriate because it does not require a restricted assumption on the distribution of the error terms, unlike conventional linear regression models. In this study, we follow the generalized maximum entropy (GME) by Golan, Judge and Perloff (1996). Golan, Judge and Perloff (1996) show that such estimators are more efficient than the ML Tobit estimators. More specifically, it draws inferences from limited or small data using the available observed information from the data to yield a non-uniform distribution with minimal assumptions that is consistent with the observed sample moments (Golan, 2008).

In the GME approach, the entropy of a probability distribution $\tilde{p}$ is given by

$$H(\tilde{p}) = -\sum(p_i \log p_i)$$

where $0 \cdot \log 0 \stackrel{\text{def}}{=} 0$. We seek to maximize this objective function subject to constraints from theory and data (including the constraint $\sum_i p_i = 1$).[13] [See Appendix C for discussion of GME model.]

In addition to the proxy variables and indicators for job quality and care work intensity as well as commute time, we also include controls for selected worker *i* characteristics such as life cycle

[12] Based on one of the authors' field interviews with and roundtable presentations by representatives from Seoul Supporting Center for Elderly Care workers, Childcare Workers Chapter of the Korean Confederation of Trade Unions, Seoul LTC Care workers Association, and Korean Domestic Workers' Association, at the International Conference on Empowerment of Care Workers: Issues and Challenges, Seoul National University, Seoul, February 25, 2019. See Moon et al. (2021) for qualitative methodology and survey instruments used in the Care Work and the Economy project's field work in South Korea.

[13] The CGE approach seeks to minimize the Kullback-Leibler divergence between $\tilde{p}$ and another distribution $\tilde{q}$ from prior knowledge. Maximizing the GME objective function is equivalent to minimizing the CGE objective function with uniform priors for $\tilde{q}$. Since we do not have knowledge of a prior distribution, we assume uniform priors, the most conservative assumption.

(age, and age-squared), experience proxied by the number of years since the start of care service employment, years of education, whether the worker resides in a metro area, and if the worker has a spouse. We also control for other job characteristics such as whether performing eldercare or childcare. The basic model is expressed as:

$$Y_i = \beta_0 + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Educ_i + \beta_4 Experience_i + \beta_5 Spouse_i + \beta_6 Metro_i + \beta_8 Eldercare_i + \beta_9 ExtraHours_i + \beta_{10} NumRecipients_i + \beta_{11} NeedsConstantWatch_i + \beta_{12} CommueTime_i + \beta_{13} StableSched_i + \beta_{14} FamilyRelation_i + \beta_{15} SecureJob_i + \beta_{16} InadequateTraining_i + \epsilon_i$$

where Age_i is the care worker's age, $Educ_i$ is the worker's years of education, $Experience_i$ is the worker's years of experience in providing care work (calculated from the survey question "years since care work first started"), $Spouse_i$ is an indicator variable for whether the care worker has a spouse, $Metro_i$ is an indicator variable for whether care work is performed in a metro area, $Eldercare_i$ is an indicator variable for whether the worker is providing eldercare (as opposed to childcare), $ExtraHours_i$ is an indicator variable for whether the care worker regularly works extra hours than was originally agreed to (self-reported), $NumRecipients_i$ refers to the number of care recipients being cared for, $NeedsConstantWatch_i$ is an indicator variable for whether the recipient needs to be watched at all times (care worker reports they agree or strongly agree), *CommuteTime* refers to weekly average commute time, $StableSched_i$ is an indicator variable for whether the care worker has a stable work schedule (self-reported), $FamilyRelation_i$ is an indicator variable on whether the care worker reports that it is easy to deal with recipient's family members, *InadequateTraining* dummy indicates if the worker lacks adequate training. $SecureJob_i$ is an indicator variable on whether the worker is a regular (full time) employee, a contract worker with up to 2-year labor contract or a dispatched employee with a signed written agreement and ϵ_i is the random error term.

5. Results and Discussion

The results of both Tobit and GME models using the entire sample (both eldercare and childcare workers) are reported in Table 3. The standard errors of the estimates of the latter are smaller since the GME estimators are more efficient. Our results generally hold for both regression analyses, however we focus our discussion on the GME results.

Table 3: Tobit and Generalized Maximum Entropy (GME) Regression Estimates: Association between Care Worker's Level of Responsibility for Recipient's Well-being and Working Conditions, by Type of Worker

	All Care Workers	
VARIABLES	**Tobit**	**GME**
Age	-1.823*	-0.091
	(1.097)	(0.889)
Age-squared	0.0174	0.000
	(0.0112)	(0.009)
Years of education	1.325**	1.417***
	(0.634)	(0.504)
Years since first started care work	0.558	0.085
	(0.349)	(0.245)
Has a spouse)	5.762	1.291
	(3.752)	(2.944)
Metro area worker	-9.574***	-5.777***
	(2.685)	(2.207)
Institution-based worker	-0.957	-2.712
	(2.665)	(2.345)
Eldercare worker	-5.024**	-5.093**
	(2.489)	(2.326)
Worked extra hours	6.464**	5.424**
	(2.651)	(2.147)
Number of recipients under one's care	-1.376	-0.926
	(0.881)	(0.790)
Need to watch care recipient at all times (agree and strongly agree)	5.185**	3.455*
	(2.278)	(1.975)

Daily average commute time (minutes): to and from work	-0.0918**	-0.08**
	(0.0415)	(0.036)
Stable work schedule	10.29***	7.946***
	(2.192)	(2.018)
Easy to deal with recipient's family members	5.465**	4.117**
	(2.339)	(2.065)
Job security proxy[1]	5.329**	3.982
	(2.544)	(2.434)
Received enough training (somewhat or strongly disagree)	-3.520*	-4.242**
	(2.814)	(2.356)
Constant	98.68***	59.848
	(26.75)	(22.594)
Observations	600	600

[1] Dummy variable for worker who is a regular employee, with a signed contract up to 2 years or a dispatched employee with a signed labor contract.

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Several of the job quality variables are found to be statistically significant. Having a stable work schedule is associated with a 7.9 percentage-point increase at 1 percent level in the reported level of commitment towards the safety and well-being of care recipient, while a lack of adequate training leads to 4.24 percentage-point decline at 5 percent level. The ease in dealing with the recipients' family is associated with a 4.1 percentage-point increase at 5 percent level. This indicates the importance of maintaining a stable work routine that helps avoid sudden and unanticipated changes in the care worker's schedule. Adequate training is also paramount in terms of reducing accidents and building the worker's confidence in dealing with emergencies. It also implies that relationships with the recipient's guardians (parents or children) can affect the care worker's level of commitment. Table 3 results also show that longer commute times are associated with lower reported levels of commitment; that is, an increase in commute time is associated with

an 0.08 percentage-point decrease in respondent's sense of responsibility. These results give support to the Korean care workers' associations' concern about the lack of travel allowance that compel workers to use the cheapest, albeit longer, means of travel to their place of work and about their need for more adequate training.

Interestingly, working extra hours is associated with a 5.4 percentage-point increase in the worker's sense of responsibility, while the need to watch the care recipient at all times is associated with a 3.4 percentage-point increase. We acknowledge that the relationship between the worker's sense of responsibility (the dependent variable) and these care work intensity indicators is bi-directional: on one hand, as workers attempt to meet the intense caregiving needed by the recipient, their sense of commitment also increases. At the same time, workers who care a lot about the recipient may self-select into or stay in positions where the recipient requires being watched at all times.

Table 3 results also indicate that respondent's education has a positive effect i.e., an additional year of schooling is associated with a 1.4 percentage-point increase in the worker's sense of responsibility at 1 percent level. On the other hand, living in a metro area is associated with a 5.8 percentage points decrease at 1 percent level. We hypothesize that this is due to the market density effect in that while there is a larger supply of care workers in the metropolitan areas, there are also more job opportunities in these areas. Hence, it is easier for workers to find other jobs. In smaller cities, towns and the rural areas on the other hand, there are likely to be fewer job opportunities given the lower supply of care centers and care-related institutions, making it harder for care workers to find other employment. Job search outside larger cities is also likely to be based on kinship and community networks. Since communities and neighborhoods in non-metropolitan areas are likely to have more frequent social interactions compared to those in large cities, a care worker could suffer reputational risk if the carer is not dedicated to the recipient's well-being. Performing eldercare is associated with lower sense of responsibility towards the safety and well-being of the recipient compared to childcare. This may be due to the complexity and challenges of caring for older persons.

We next consider the possibility that the relationship between worker's sense of responsibility and working conditions may be different for eldercare workers and childcare workers. We conduct separate Tobit and GME regressions for the childcare and eldercare subsamples and the results are given in Table 4. Note that the standard errors in the subsamples' estimates are larger compared to

those for the whole sample in Table 3 due to the smaller sample sizes. We note that working extra hours is positively associated with higher reported level of commitment for both childcare and eldercare workers by 5.1 and 6. 6 percentage points respectively. This also suggests that care workers with strong sense of commitment are willing to work extra hours as needed or requested.

Table 4: Tobit and Generalized Maximum Entropy (GME) Regression Estimates: Association between Worker's Level of Responsibility for Recipient's Well-being and Working Conditions, by Type of Care Worker

	Childcare Workers		**Eldercare Workers**	
VARIABLES	**Tobit**	**GME**	**Tobit**	**GME**
Age	-1.399	0.356	-2.095	1.256
	(1.327)	(1.183)	(2.108)	(2.214)
Age-squared	0.0153	-0.004	0.0187	-0.013
	(0.0141)	(0.013)	(0.0203)	(0.021)
Years of education	1.112	**1.647****	**1.432***	1.034
	(0.866)	**(0.698)**	**(0.818)**	(0.752)
Years since first started care work	0.394	-0.067	0.813	0.656
	(0.386)	(0.311)	(0.503)	(0.435)
Has a spouse	**-6.661***	-7.307	**8.683****	**7.635****
	(3.665)	(4.586)	**(4.369)**	**(3.803)**
Metro area worker	**-7.192***	-3.198	**-9.583*****	**-7.513****
	(4.105)	(3.284)	**(3.168)**	**(2.962)**
Institution-based worker	1.336	-3.141	-1.083	-0.745
	(3.430)	(3.194)	(3.621)	(3.544)
Worked extra hours	**5.111***	**5.106***	**7.159****	**6.583****

	(2.881)	**(2.792)**	**(3.622)**	**(3.317)**
Number of recipients under one's care	**-2.697****	-1.403	-0.884	-1.161
	(1.146)	(1.218)	(1.108)	(1.094)
Need to watch care recipient at all times (agree and strongly agree)	**9.908*****	3.597	3.523	3.656
	(2.972)	(2.907)	(2.813)	(2.68)
Daily average commute time (minutes): to and from work	-0.0666	**-0.083***	**-0.120****	-0.094
	(0.0465)	**(0.047)**	**(0.0579)**	(0.059)
Stable work schedule	1.984	3.542	**13.12*****	**11.803*****
	(2.860)	(2.934)	**(2.669)**	**(2.795)**
Easy to deal with recipient's family member	1.668	1.776	**7.730****	**8.113*****
	(2.617)	(2.756)	**(3.079)**	**(3.11)**
Secure job proxy[1]	**8.158****	3.454	3.673	3.547
	(3.495)	(3.695)	(3.041)	(3.211)
Received enough training (somewhat or strongly disagree)	**-6.034***	**-6.78***	-2.694	-2.702
	(3.179)	**(3.532)**	(3.389)	(3.143)
Constant	100.0***	56.398**	98.59*	16.47
	(34.76)	(27.948)	(53.53)	(58.56)
Observations	300	300	300	300

[1] Dummy variable for worker who is a regular employee, with a signed contract up to 2 years, or a dispatched employee with a signed labor contract.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The effect of commute time is negatively associated with childcare worker's level of commitment at 10 percent level, but not for eldercare workers. This may be because the majority of childcare workers in Korea work in daycare centers rather than in the homes of recipients, which

can be far from their residence. This makes the commute time a concern for these workers. Half of eldercare workers on the other hand, visit or even live with their clients in the latter's homes. They can select arrangements such that the recipient's house is not too far from the worker's residence or that the cluster of clients live within the same community, which reduces travel time when they move from one client to another on a given day. Lack of adequate training is also associated with a 6.8 percentage-point decline in the childcare worker's level of commitment at 10% level, but not for eldercare workers.

Table 4 results also show that having stable work schedule and ease in dealing with recipient's family member(s) are associated with an increase in 11.8 percentage points and 8.1 percentage points respectively in the eldercare worker's commitment level, but they don't have any statistically significant effect on that of the childcare worker. This may be due to more complicated and heterogeneous nature of eldercare as compared to childcare. Workers caring for older persons are therefore likely to experience difficulties or dilemmas not only in dealing with the recipient's family members but also directly with the elderly. Moreover, the elderly's mental, emotional and physical conditions can change without warning. Since majority of eldercare workers visit or live with their clients at home, maintaining a stable work schedule can be challenging, especially when there are unexpected accidents.[14] Such challenges can lead eventually to greater stress or exhaustion on the part of the care workers, which can affect their level of commitment.

6. Endogeneity Issue

We note in our previous discussion that some of our variables can suffer from endogeneity. In particular, the variables indicating that the worker "usually work extra hours than discussed" and "need to watch care recipients at all times" may suffer from self-selection bias. That is, care workers who are more committed or dedicated might self-select into jobs where they need to always watch the recipient or to work extra hours. Indeed, we find that in the entire sample, care workers who must always watch the care recipient and who work longer hours have a higher sense of responsibility for the recipient on average. This is in contrast to the general expectation that more intense working conditions is associated with lower quality of care (as proxied by the worker's level of commitment variable).

[14] For example, lack of bladder control or a fall.

We attempt to correct for this problem by looking at the subsample of care workers who may be randomly assigned by their recipients. We look at a subsample of care workers who are matched to their care recipient by their workplace (this includes both workers who provide care work at a facility and workers who provide home care but work through an institution) to eliminate the self-selection bias.[15] About 22% of home care workers and 55% of institutional care workers are assigned to their recipient by their workplace/care institution.[16]

Another potential source of endogeneity bias is that less dedicated workers might leave if the job is too demanding, leaving the more dedicated workers to work with recipients who need more time or need to be always watched. We correct for this by adding a variable for years of experience in our regression.

We then conduct Tobit and GME regression analyses using this subsample and the results are given in Table 5. We note that "working longer hours than discussed" is no longer associated with a higher sense of responsibility to the recipient. However, the "need to watch care recipient at all times" remains statistically significant, suggesting that having to watch the care recipient at all times increases the sense of responsibility the care worker feels towards the recipient.[17]

[15] We note that these variables can suffer from other forms of endogeneity. For example, care workers who feel less committed to might attrite from care work at higher rates when working conditions are intense, leaving only the more committed workers in our sample (survivor bias). In addition, workplaces might try to match more dedicated workers with more difficult cases, in which case, our assumption that "workplace assignment" would serve as a randomizing mechanism no longer holds.

[16] See Appendix D Table D1.

[17] For the subsample of institutionally assigned workers, we also examine the group mean of the reported level of responsibility for the bottom 20% of workers by experience (those with 0-2 years of experience) and the top 20% of workers by experience (those with 8-30 years of experience). The mean level of responsibility for those with 0-2 years of experience is 72.9% and for those with 8-20 years of experience is 72.2%. The differences in means are not statistically significant. Note that the cases whereby spending more time or watching the care recipient causes the care worker to feel more responsible for the recipient is not endogenous. We believe that this is the causal effect of spending more time with the recipient.

Table 5 Tobit and GME Regression Estimates for institutionally assigned subsample

	Childcare Workers		Eldercare Workers	
VARIABLES	**Tobit**	**GME**	**Tobit**	**GME**
Age	-2.630	2.116	**-11.37*** **	2.425
	(1.659)	(4.626)	(2.675)	(5.015)
Age-squared	**0.0347***	-0.031	**0.108*** **	-0.027
	(0.0196)	(0.054)	(0.0270)	(0.048)
Years of education	**3.904*** **	-1.263	-0.849	2.777
	(1.279)	(2.651)	(1.264)	(2.037)
Years since first started care work	-0.248	0.318	0.612	0.587
	(0.483)	(1.02)	(0.648)	(0.977)
Has a spouse	-5.027	-0.633	**25.78*** **	-1.306
	(5.839)	(13.537)	(5.717)	(9.191)
Metro area worker	**-13.51** **	-10.12	-3.497	-7.909
	(5.952)	(13.1)	(5.089)	(7.239)
Worked 40 hours or more	0.444	-2.494	8.762	-9.501
	(8.109)	(20.005)	(6.842)	(10.636)
				-6.248
Worked extra hours	**3.097***	2.525	-0.415	(8.91)
	(4.313)	(10.288)	(5.769)	-4.04
Number of recipients under one's care	-1.226	-1.979	**-3.433*** **	(2.904)
	(2.184)	(4.705)	(1.709)	3.048
Need to watch care recipient at all times (agree and strongly agree)	**14.81*** **	0.847	**13.20*** **	(7.063)
	(5.662)	(12.265)	(4.983)	0.162
Daily average commute time (minutes): to and from work	-0.0651	0.075	-0.0630	(0.134)

	(0.0825)	(0.176)	(0.0662)	-40.84
Stable work schedule	2.719	4.993	**16.84*** **	(6.908)
	(4.395)	(11.435)	(3.968)	-4.818
Easy to deal with recipient's family member	7.098	-2.755	**9.345*** **	(7173)
	(4.606)	(10.466)	(4.437)	-9.485
Secure job proxy[1]	1.779**	-7.603	-0.136	(8.223)
	(4.731)	(14.089)	(5.477)	-11.051
Received enough training (somewhat or strongly disagree)	**-17.46*** **	7.643	-5.506	(7.272)
	(5.495)	(14.785)	(5.319)	-0.368
Constant	**72.92***	13.58	**345.8*** **	(139.753)
	(39.21)	(93.294)	(68.50)	-9.501
Observations	200	200	250	250

[1] Dummy variable for worker who is a regular employee, with a signed contract up to 2 years, or a dispatched employee with a signed labor contract.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We note a third potentially endogenous variable in our analysis: ease in dealing with the care recipient's family members. Care workers with higher level of commitment could be better treated by family members, compared to those with lower level of commitment. Thus, the quality of care provided by the care worker might be causing the difficulty or easiness of dealing with family members, rather than the other way around. On the other hand, family members might try to take advantage of more dedicated care workers, saddling them with more of the care responsibility, and souring the relationship between care worker and family members. Thus, we do not know the direction of bias in this study, given data limitations. Future research can explore this relationship and can help shed light on this aspect of care work.

7. Conclusion

Korea's puzzling situation of continued heavy reliance on family care for the frail older persons and young children, despite the ample supply of paid care services and workers has brought attention to the quality of care services. This issue is complex and yet critical in our understanding of the conundrum faced by Korea and other countries and in developing an integrated policy agenda aimed at the provision of affordable, quality childcare and eldercare. While a range of factors influence the performance and delivery of care provided by workers - from the nature of care infrastructure, level of employee training, to access to complementary resources, this paper focuses on a crucial factor i.e., the care worker's sense of responsibility for the well-being of the recipient. In other words, carers should care about those they care for as the latter's well-being depends upon their emotional support and effort that they provide.

Research on care have pointed out that care work, whether paid or unpaid, has motivational dimensions, in addition to practical dimensions. A worker's commitment to their care recipient's well-being is not static however, it can change and can vary over time depending on circumstances. We argue in this paper that working conditions e.g., job quality, work intensity, and relationship with recipient's family are related with a worker's level of commitment. In this sense, working conditions can affect the quality of care.

Using the 2018 Care Work Economy (CWE-GAM) survey of 600 childcare and eldercare workers in South Korea, we assess the relationship between commitment levels among these workers using tobit and GME tests. Our results suggest that longer commute time, a lack of adequate training, particularly for childcare workers, are associated with lower levels of commitment. Our results also suggest that having stable work schedule and ease in dealing with family members, particularly for eldercare workers, are correlated with higher levels of commitment. That said, our findings are only tentative since our analysis admittedly has omitted variable bias due to data limitations.[18]

Our results show that the expressed level of commitment is not impervious to the working conditions that the care worker faces. Policies that promote decent working conditions such as the provision of stable work schedule and adequate training, travel allowance for care workers to

[18] For example, paid care worker's emotional and relational skills, which are difficult to measure, are not taken into account. We are also unable to take hourly wage into consideration as this was not collected in the survey.

reduce commute time, as well as guidelines that promote a healthy relationship between recipient-family and hired-care worker are critical in improving the quality of care services. Our study findings also show that many childcare and eldercare workers in Korea work extra hours and, in some cases, intensely as their recipient needs to be watched at all times. The issues of quality care services and the working condition of care workers are intricately connected. Our results are consistent with findings from the experimental investigation of care provisioning by Banuri et al. (2019), which show that increasing the effectiveness of care workers may significantly impact the quality of work provided. Improving the working conditions of care workers, in addition to providing care workers with adequate training will likely yield higher quality of care services. With the growing need for care and families' concern for quality care, it is time for policymakers to seriously consider the nature of care workers' employment conditions and need for adequate training in efforts to promote quality care.

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APPENDICES

Appendix A. Current Major Eldercare and Eldercare Programs in Korea

A1: List of Major Eldercare Programs in Korea

Long-Term Care (LTC) Insurance Program	This program was established in 2008 in response to the rising costs of eldercare and the growing burden of families providing care to older persons. Persons aged 65 years and older or those who suffer from geriatric illness are eligible. The program provides facility-based care such as nursing home, elderly daycare center, short-term respite care, as well as home-based care such as home-visit care, home-visit bathing, home-visit nursing, short-term housework service, and welfare equipment services. The National Health Insurance Corporation (NHIC) administers and supervises the LTC program, supervised by the Ministry of Health and Welfare.
Customized Elderly Community Care System	The customized elderly community care system was implemented in 2020 in Korea by the Ministry of Health and Welfare. It consolidates previous elder care programs including basic elder care service, the comprehensive elder care service, programs supporting older persons living alone, short-term housework service, and community care. The local governments consign the program to social care centers or non-profit organizations in providing the service. The customized elderly community care system is operated separately from the LTC program. LTC beneficiaries are not eligible for receiving this service.
Social Service One Program	Social Service One is a public foundation established in 2019 in Korea in response to strengthening social care. Care provided by small private businesses raised concerns in Korea due to their low quality of care and mismanagement. Social Service One aims to providing quality care and quality jobs in the care economy through direct employment of care workers and direct operations of elder care services. A consigned management of daycare centers for children is also part of their program. SSO services are currently available in four areas of Korea: Seoul, Gyeonggi-do, Daegu, and Gyeongsangnam-do and will be expanded to 17 additional areas. So far, older persons, children, and the disabled are the main beneficiaries. SSO plans to include individuals with different needs in its service provisioning.

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3) Seoul Public Agency for Social Service. 2020. Project Manual on Social Service One. https://seoul.pass.or.kr/sub0604/file_down/id/591

A2: List of Current Major Childcare Programs in Korea

Universal Childcare and Kindergarten Tuition Subsidy Program	In 2013, the Korean government expanded its financial support to all children aged 0-5 who are registered in daycare centers or in kindergarten through tuition subsidy. This has led to high enrollment rates of children in daycare centers or kindergarten.
Public Babysitting Service (*Ai-dolbomi*) Program	The *Ai-dolbomi* service program is a public, home-visit babysitting service implemented in 2007 that provides short-term, temporary care to children aged from 3 months to 12 years old. It was a response to the increase in dual-earner households that led to a growing demand for such services, which is not covered by existing care service programs in Korea. Over 70,000 households who used the service in 2019.
Community Child Care Center Program (*Jiyeok-adong Center Program*)	This program provides care to children from low-income families and from dual-earning parent households. With the building and operation of community care centers after the amendment of the Child Welfare Act in 2004, the program provides more than 8 hours of care that include various activities for children as well as meals and snacks. The center is open during school vacations and is freely available to children from low-income families in need of social protection, and to other children for a fee, if there is vacancy.
Cooperative Childcare Program (*Gongdong-yooka-nanumteo*)	This program was established in 2018 in response to the growing need for care sharing among parents. It is rooted in *Poom-asi*, a traditional way of taking care of children in neighborhoods in Korean society. This community-sharing childcare is done at neighborhood centers where parents take turns in providing care. The program offers various activities to children and provides opportunities to meet neighbors as well as share care knowledge.

Sources:

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Appendix B: Construction of Survey Weights

The eldercare and childcare worker survey data collection in Korea for the Care Work and the Economy (CWE-GAM) Project was performed in 2018 using a purposive sampling design (Jun et al., 2021). The 600 samples were evenly split between eldercare and childcare workers. For eldercare workers, of the 300 workers surveyed, 150 samples were allocated to institutional workers, 100 to in-home care workers and 50 to informal workers. These samples were further stratified by region namely, Seoul Metro, Chungcheong, Honam, Gyungbuk, and Gyungnam. For childcare workers 100 samples were allocated to institutional workers (50 to public daycare centers, 50 to private daycare centers), 100 samples were allocated to in-home care workers and 100 samples were allocated to informal workers. These samples were again further stratified by region.

Table B1. Sample Allocation

	Eldercare workers			Childcare workers			
	Institution	In-home	Informal	Institution		In-home	Informal
				Public	Private		
Seoul Metro	80	42	10	25	27	20	20
Chungcheong	20	11	10	6	6	20	20
Honam	18	23	10	8	5	20	20
Guyngbuk	16	10	10	5	4	20	20
Guyngnam	16	14	10	6	8	20	20
Total	150	100	50	50	50	100	100

We weighted the purposive sample used in the paper to make it representative of the eldercare and childcare worker population in Korea by calculating the inverse sampling probability weight for each observation. For institutional eldercare workers, the relevant subpopulation was the number of institutional workers in each region published in the 2017 Eldercare Facility Statistics (Ministry of Health and Welfare, 2017a). For in-home eldercare workers, the relevant subpopulation was the number of in-

home care workers in each region as published in the 2017 Long-Term Care Insurance Statistical Yearbook. For childcare workers, the relevant subpopulation was the number of care workers (excluding administrative staff and instructors) for each type of institution (private facility, private in-home or public) in the region, as published in the 2017 Day Care Centre Statistics (National Statistics Office, 2017).

The number and distribution of informal care workers across Korea is unknown, so we use the estimates on the number of informal childcare and eldercare workers using the method in Suh (2020) paid care sector in Korea study. We assumed that the distribution of informal care workers among childcare and eldercare worker subpopulation follows the same pattern as that of formal care workers. That is, about a third were employed in childcare while the rest were employed in eldercare. We next assumed that the regional distribution of workers follows the regional GDP share. The relevant subpopulation for informal care workers is the estimated number of informal workers in each region for each type of care work (childcare or eldercare).[19]

The sampling probability p_i for an observation in subpopulation i is simply the number of samples allocated to the subpopulation n_i divided by the size of the subpopulation N_i.

$$p_i = \frac{n_i}{N_i} \qquad \text{(c1-1)}$$

The inverse sampling probability weight is $1/p_i$.

[19] For example, to obtain the survey weight for informal childcare workers in Chungcheong Area: we use the total number of informal childcare workers: 27,500; and Chungcheong's share of Korean GDP: 13.45%; to get estimated number of informal childcare workers: 3,700 = 27,500*13.45%. We then divide this by the number of informal childcare workers surveyed in Chungcheong (20) to obtain the survey weight 2700/20 = 185.

Table B2. Survey Weights for Eldercare Workers

	Institutional Workers			In-Home Workers			Informal Workers		
Region	Total Workers N_i	Workers Surveyed n_i	Weight p_i	Total Workers	Workers Surveyed	Weight	Total Workers	Workers surveyed	Weight
Seoul/Metro	47,688	80	596.10	10,955	42	260.83	19,372	27	717.49
Chungcheong Area	11,969	20	598.45	2,736	11	248.73	5,010	6	834.97
Honam Area	11,206	18	622.56	6,005	23	261.09	3,383	5	676.62
Gyungbuk Area	9,707	16	606.69	2,409	10	240.90	3,376	4	843.93
Gyungnam Area	9,373	16	585.81	3,739	14	267.07	5,918	8	739.71
Total	89,943	150		25,844	100		37,055	50	

Table B3. Survey weights for childcare institutional care workers

	Institutional						
	Public	Non-Profit	Workers Surveyed	Weights	Private	Workers Surveyed	Weights
Seoul/Metropolitan	2,179	218	25	95.88	6,988	27	258.81
Chungcheong Area	195	277	6	78.67	1,614	6	269.00
Honam Area	191	426	8	77.13	1,326	5	265.20
Gyungbuk Area	212	203	5	83.00	1,532	4	383.00
Gyungnam Area	351	193	6	90.67	2,352	8	294.00
Total	3,128	1317	50		13,812	50	

Table B4. Survey wights for childcare in-home and informal care workers

	In-Home			Informal		
	In-Home	Workers Surveyed	Weights	Informal	Workers Surveyed	Weights
Seoul/Metropolitan	10,998	20	549.90	9,382	20	469.08
Chungcheong Area	2,591	20	129.55	2,426	20	121.31
Honam Area	1,767	20	88.35	1,638	20	81.92
Gyungbuk Area	1,424	20	71.20	1,635	20	81.74
Gyungnam Area	2,741	20	137.05	2,866	20	143.29
Total	19,521	100		17,945	100	

Appendix C. Discussion of the Generalized Maximum Entropy (GME) Model

In the case of the GME model, we assume that the $\boldsymbol{\beta}$ are discrete random variables drawn from a support space $\mathcal{L} \subset \mathcal{R}^k$ where k is the number of parameters in the problem. Then β maybe expressed as

$$\beta = \begin{bmatrix} z_1 & 0 & . & 0 \\ . & z_2 & . & 0 \\ . & . & . & . \\ 0 & 0 & . & z_k \end{bmatrix} \begin{bmatrix} p_1 \\ p_2 \\ . \\ p_k \end{bmatrix}$$

Similarly, we assume that the errors from the model are being drawn from some discrete bounded distribution. Thus, the error distribution maybe written as

$$e = Vw = \begin{bmatrix} v_1 & 0 & . & 0 \\ . & v_2 & . & 0 \\ . & . & . & . \\ 0 & 0 & . & v_k \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ . \\ w_k \end{bmatrix}$$

Where w are the probability weights associated with each outcome. Then our objective function becomes (bold-faced variables indicate vectors or matrices)

$$\max_{p, w_1, w_2, w_3} -\boldsymbol{p^T} \log \boldsymbol{p} - \boldsymbol{w_1^T} \log \boldsymbol{w_1} - \boldsymbol{w_2^T} \log \boldsymbol{w_2^T} - \boldsymbol{w_3^T} \log \boldsymbol{w_3}$$

Subject to the constraints

$$\begin{aligned} \boldsymbol{y_1} &= \boldsymbol{X_1 Z_p} + \boldsymbol{V_1 w_1} \\ \boldsymbol{0} = \boldsymbol{\mu_1} &\leq \boldsymbol{X_2 Z_p} + \boldsymbol{V_2 w_2} \\ \boldsymbol{1} = \boldsymbol{\mu_2} &\geq \boldsymbol{X_3 Z_p} + \boldsymbol{V_3 w_3} \end{aligned}$$

and the adding up constraints described in Golan, Judge, Perloff (1996) eq. 4.6 - 4.8. Note that our responses are bound on both sides, so we have an additional data constraint and adding up constraint.

The estimation procedure requires the researcher to make several choices. For the support space $\boldsymbol{Z}$, we choose

$$\boldsymbol{Z} = \begin{bmatrix} -100 & -50 & 0 & 50 & 100 \\ -100 & -50 & 0 & 50 & 100 \\ . & . & . & . & . \\ -100 & -50 & 0 & 50 & 100 \end{bmatrix}$$

Where $\boldsymbol{Z}$ is of dimension 20×5. Golan, Judge and Perloff (1996) show that as long as $Z_{1k} \leq \beta_k \leq Z_{Hk}$, the estimates are not very sensitive to the specification of the support space. (In our case, $H =$

5 and we assume the β_k are bound between $[100, 100]$ For the error supports, we use the 3-sigma rule for v_1 and choose uniform errors between $[10, 10]$ for v_2 and v_3. That is:

$$V_2 = V_3 \begin{bmatrix} -10 \\ 0 \\ 10 \end{bmatrix}$$

We test with alternative specifications of V_2 and V_3 and note they do not significantly change the result.