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Korean Longitudinal Survey of Women & Families: The 2021 Annual Report

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Korean Women's Development Institute

**Korean Longitudinal Survey of Women
& Families: the 2021 Annual Report**

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I . Introduction

1. Necessity and Purpose of the Research

Korean society is currently facing social changes, including changes in demographic and family structures. These changes will have a great impact on the overall lives of its members. However, it is believed that they will have a greater impact on women's lives than men's because issues in women's lives are closely interrelated with each other in various areas. For example, issues in women's economic activity are not simply related to the labor market, but they are also closely related to changes in family type, family dynamics, and so forth.

Various surveys have been conducted so far to analyze issues in

women's lives, yet, mostly through cross-sectional surveys. However, cross-section surveys cannot track changes in women's lives and evaluate policy effects. Therefore, to track changes in women's individual lives and to identify policy effects, a longitudinal survey is more appropriate than a cross-sectional survey.

Although longitudinal analysis is also possible through existing panel surveys, such as the Korean Labor and Income Panel Survey (KLIPS), these panel surveys fail to consider gender characteristics in their designs and lack number of women respondents. Therefore, they are limited in conducting an in-depth analysis to observe unique experiences pertaining to women. Moreover, as these surveys were not equipped with question structures diverse enough to analyze women's lives, it is impossible to analyze women's lives from multiple perspectives.

As such, the Korean Women's Development Institute found it necessary to overcome such limitations and in 2006 performed a research to establish a longitudinal database. In 2007, a nation wide, the Korean Longitudinal Survey of Women and Families (KLoWF) panel survey was launched.

Beginning with its first wave in 2007, the survey sampled 9,997 women between the ages of 19 and 64 years in 9,068 households across the nation. The KLoWF conducted its second wave in 2008, and third wave in 2010. Changing the survey cycle to biennial in 2010, the KLoWF completed its eighth wave in 2021.

The purposes of the KLoWF are i) to identify characteristics of women's economic activity and the actual conditions of work and family reconciliation, ii) to empirically examine women's lives and to predict the future of families in Korean society, and iii) to track changes in

important social issues in Korea, including low fertility, aging, work-family reconciliation, and family-friendly social environment.

2. Content and Use of the Research

1) The 2021 Research Content

The major research contents of the 2021 KLoWF included the following: First, we completed the main (second) survey of the eighth wave KLoWF. The subjects of the eighth wave survey included i) 12,710 eligible female household members in 9,906 households that were established in the seventh wave survey and ii) 2,660 eligible female household members in 2,096 households that were newly added in the eighth wave survey. Additional COVID-19 questions were included in the eighth wave survey.

Second, we released the first to eighth wave data and held a symposium for experts, providing the data limitedly for presenters at the 2021 KLoWF Symposium. The purpose of the symposium was to check the quality of the data prior to the release to the general public in the following year (in 2022).

Third, we hosted the “Workshop on Data Methodology Education.” To disseminate the KLoWF data use, we introduced at the workshop the survey overview and precautions upon using the data. Also, we conducted education on the methodology of analysis using the KLoWF data.

Fourth, we conducted descriptive analyses and in-depth analyses using the eighth wave survey data. The in-depth study topics include women’s lives, economic activity, and presented implications.

Fifth, we conducted research related to data quality management, such

as checking weights for the eighth wave survey results and operating an integrated panel consisting of existing and new panels.

Sixth, we published a working paper that contained analyses of latest issues and studies on policy effects using the KLoWF data. We published the paper two~three times a year, and in 2021, the paper was published three times.

2) Achievements of the KLoWF Data Use

First, since its beginning in 2006, the KLoWF data have been utilized in various researches. A total of 616 research cases had been reported from 2008 until September 2021. Beginning with 32 cases in 2008, the number of cases slightly increased to 66 cases in 2020.

Second, in 2020, 66 researches were examined using the KLoWF, of which domestic journal papers accounted for the largest proportion of 40.9% (27 cases), followed by the KLoWF academic conference 30.3% (20 cases), and theses and dissertations 18.2% (12 cases).

Third, when examined by the theme of the achievements, the data used for studies on economic activity made up for the largest portion of 144 cases, followed by childbirth and care 126 cases, and family 125 cases. This shows that the survey data were used in a wide range of women-related areas rather than concentrated on a particular area.

Of the studies on economic activity, the highest proportion of the themes was on determinants of changes in economic activity according to women's life cycle. The theme focused mostly on determinants of women's career break, including family and institutional support (accessibility, etc.) and the respondents' human resources and values. Studies on childbirth and care examined respondents' conditions for

work-family reconciliation in relation with the family dynamics (i.e. level of support), determinants of childbirth and changes in care according to institutional accessibility. The theme mostly addressed in 2019 and 2020 was family. Studies on the family (125 cases) included changes in women's lives by life cycle, marital relations, and family relations. As such, the studies encompassed changes in dynamics between women, couples, and families.

Fourth, the KLoWF data used for policy research reports that presumably had a direct impact on policy improvement totaled 33 cases. Of the 33 cases, 20 cases were about improving policies on women and families by the central and local governments. Specifically, the policy research was conducted in designing major policies implemented by the Ministry of Gender Equality and Family (5 cases), the Ministry of Health and Welfare (4 cases), Statistics Korea (2 cases), the Ministry Employment and Labor (1 case), and the Ministry of Education (1 case). On top of this, the data were used by the Presidential Committee on Ageing Society and Population Policy (1 case), the Economic, Social and Labor Council (1 case), the National Research Council for Economics, Humanities and Social Sciences (1 case), Job Planning Center at the Presidential Committee on Jobs (1 case), the Office for Government Policy Coordination, Prime Minister's Secretariat, (1 case), the Provincial Government of Chungcheongnam-do (1 case), and the Provincial Government of Jeollabuk-do (1 case).

II . Overview of the Eighth Wave KLoWF

1. Subjects of the Survey

The subjects of the eighth wave KLoWF included the original households surveyed in 2007 and eligible household members of the split-off households after 2007, plus the households of the panel newly added in 2017 and eligible household members of the households after 2017. The subjects are shown in the table below.

(Table 1) Subjects of the eighth wave survey

| Survey subjects | Existing panel | Added panel |
|----------------------------|---|---|
| Households | A total of 9,906 households, including 9,068 original households in the 1 st wave and 838 split-off households (100 households in the 2 nd wave, 161 households in the 3 rd wave, 148 households in the 4 th wave, 129 households in the 5 th wave, 105 households in the 6 th wave, 76 households in the 7 th wave, and 119 households in the 8 th wave) | A total of 2,096 households, including 2,049 original households in 2017 and 66 split-off households (47 households in the 7 th wave and 19 households in the 8 th) |
| Eligible household members | A total of 12,710 household members, including 10,446 female household members ages 19 and 64 who live in the household successfully surveyed in the 1 st wave, 2,231 additional eligible household members, excluding original eligible household members from existing household members, and 33 newly eligible household members who entered the households in the 8 th wave | A total of 2,660 household members, including 2,531 female household members ages 19 and 64 who live in the household successfully surveyed in 2017, 119 additional eligible household members, excluding original eligible household members from existing household members, and 10 newly eligible household members who entered the households in the 8 th wave |

2. Sampling and Survey Methods

The population of the KLoWF was based on approximately 260,000 enumeration districts (ED) in the 2005 Population and Housing Census with the following sampling methods:

For the primary sampling units (PSU), a total of 1,700 EDs were

selected from the 2005 Population and Housing Census by applying the probability proportional to size (PPS) sampling. This sampling method was to select EDs in proportion to the size of households in the EDs from the stratified EDs by city and by province at the urbanization level, the proportion of workers by industry, the proportion of households by housing type, the distribution of households by household members, the age of the head of households, and the gender of the head of households as variables. In distributing the number of sampled EDs by city and by province, this survey employed the method of distribution in proportion to the square root of the household number by region rather than simple proportional distribution methods.

For the secondary sampling units (SSU), households were selected by systematic sampling from those who lived in the 1,700 EDs selected for the primary sampling units (Su-mi Park, et al. 2007). Although five households were selected from one sampled ED through systematic sampling to survey female household members as the final targets, four to seven households were selected from each ED in this survey.

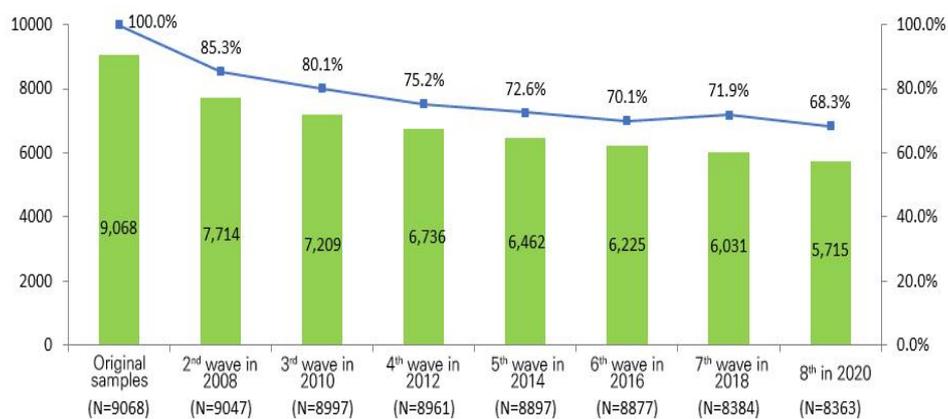
3. Principles for Tracking and Succeeding to the Original Households

The KLoWF is an individual panel survey to track eligible household members of the original sample households from the first wave survey and the household members who live with the eligible household members of the original sample households from the first wave among the newly eligible household members that had entered the households since the first wave survey. The first one to succeed to the original household is the head of a household or the spouse of the household

head among the original eligible household members. The second one to succeed to the original household is the eldest woman in the household.

4. Retention Rate of Original Samples

The retention rate of original samples of the KLoWF is calculated based on valid samples. Valid samples refer to samples that are excluded from the (9,068) original sample households for reasons of death and missing, study abroad, long-term business trip, emigration, illness and accidents, or their request to drop out of the panel. As such, the valid retention rate of original samples in the eighth wave was 68.3%. The retention rate sharply dropped to 85.3% in the second wave survey, to 80.1% in the third wave, and to 75.2% in the fourth wave, approximately 5 percentage points down every year. After that, the retention rate gradually entered a stable phase, standing at 70.1% in the sixth wave and 71.9% in the seventh wave. But the retention rate slightly went down in the eighth wave as the dropout rate of the panel was relatively high due to the outbreak of the COVID-19 pandemic.



[Figure 1] Retention rates of the 2007 original household samples by wave

5. Composition of the Questionnaire for the Eighth Wave Survey

The KLoWF is composed of questionnaires for households, individual women (existing & new), and jobs (existing & new). The eighth wave survey was conducted with the same composition, but with an additional survey to identify changes in women’s lives due to COVID-19. The composition of the questionnaire is presented in the table below.

〈Table 2〉 Composition of eighth wave KLoWF questionnaire

| Questionnaire | | Area |
|-----------------------|--------------|--|
| For households | | ① Household members and family, ② Housing status, ③ Household income, ④ Household spending, ⑤ Assets and debts ⑥ <u>Changes in family lives due to COVID-19 (additional survey)</u> |
| For Individuals women | | ① School life, ② Confirmation of marriage experience, ③ Unmarried women, ④ Marriage and marital life, ⑤ Housework, ⑥ Husband’s job, ⑦ Couple living temporarily apart, ⑧ Separated, ⑨ Divorced, ⑩ Widowed, ⑪ Pregnancy and childbirth experience, and family planning, ⑫ Children’s education [preschool children], ⑬ Children’s education [primary and secondary school ages], ⑭ Relationship with unmarried adult children, ⑮ Relationship with married adult children, ⑯ Relationship with my parents, ⑰ Relationship with husband’s parents, ⑱ My siblings, ⑲ Husband’s siblings, ⑳ Family-related values, ㉑ Health, leisure, life satisfaction, ㉒ <u>Changes in women’s lives due to COVID-19 (additional survey)</u> |
| For Jobs | Jobs (basic) | ① Jobs I had during the last survey ② Jobs I still have since the last survey : wage workers, non-wage workers, special-type workers ③ Jobs I have quit now since the last survey : wage workers, non-wage workers, special-type workers ④ New jobs I have had since the last survey ⑤ New jobs I still have now since the last survey : wage workers, non-wage workers, special-type workers ⑥ New jobs I have quit now since the last survey : wage workers, non-wage workers, special-type workers ⑦ Current economic activity |

| Questionnaire | | Area |
|---------------|-----------------|--|
| | Jobs (other) | ⑧ Job-search experience ⑨ Job satisfaction ⑩ Education and training ⑪ Social insurance ⑫ Work and family life ⑬ Discrimination ⑭ Maternity protection system |

III. Descriptive Analysis of the Eighth Wave KLoWF(Summary)

1. General Characteristics of the Survey Respondents

According to the distribution of household members of the households surveyed in the eighth wave KLoWF, one-person households accounted for the highest proportion of 30.3%, followed by two-person households 28.0%. The average number of household members was 2.38 persons. The average monthly income of the households was approximately 3.28 million won. Monthly income less than 1.5 million won made up the largest proportion of 29.2% and the income 5 million won or above 23.2%, hence, the distribution of the respondents' income was distinctly concentrated in low and high income. Regarding the average monthly living costs of the households, the highest proportion of the respondents said that they spent less than 1.5 million won, accounting for 36.0%. This was followed by 1.5 million won to less than 2.5 million won making up 28.7%, 2.5 million won to less than 3.5 million won 17.3%, 3.5 million won to less than 5 million won 12.7%, and 5 million won and above 5.4% in that order. The amount of the average monthly living costs was approximately 2.27 million won. Regarding housing occupation

types, the largest proportion of the respondents owned their house, accounting for 63.9%. This seems to have resulted from the characteristic of the panel survey because house owners are less likely to move their dwelling places and thus more likely to respond to the survey. The second largest proportion was a lease with a large-sum deposit called *jeonse* making up 13.9%, followed by monthly rent with a deposit 16.1%, monthly rent (including the rent paid fully upon the contract) 1.2%, and free housing and other 4.9% in that order.

2. Women's Lives and Values

1) Family Formation

Regarding family formation, we asked unmarried respondents whether they had intentions to marry in the future. Of them, 26.6% answered that they 'had intention to marry,' 26.1% 'did not have,' and 47.3% 'had never thought of marriage.' Excluding those who had never thought of marriage, we examined their intentions to marry by age and current employment status. By age, a relatively higher proportion of the respondents had intention to marry in their 30s or below than that of those who did not have. That is, the respondents in their 20s or below made up 53.4% and those in their 30s 62.1%. By the current employment status, a relatively high proportion (58.6%) of those who 'currently have a job' had intentions to marry compared to their counterparts. Regarding reasons for having no intention to marry, the highest proportion of them responded 'I like single life' (26.0%), followed by 'I have no suitable one to marry' (23.8%) and 'I am not at a proper age to marry' (19.2%).

We examined changes in values on marriage. When asked about conservative tendencies that perceive marriage and childbirth as a

must-to-do and selection of a spouse as union of families, respondents in their 60s and above agreed to the statements ‘It is good to marry young’ and ‘Should marry someone with similar family backgrounds’ with the lowest proportion of 53.3% agreeing to the first statement and the highest proportion of 78.0% to the second statement. On the other hand, respondents in their 20s or below agreed to the statements ‘It is good to marry young’ and ‘Should marry someone with similar family backgrounds’ with the lowest proportion of 12.1% agreeing to the first statement and the highest proportion of 53.5% to the second statement.

2) Marital Life of Women with Spouse

When asked about their marital satisfaction, respondents with a spouse gave an average of 6.80 points (10 points for the highest satisfaction). This shows that they were happy with their marital life. By age, women in their 30s had the highest satisfaction of 7.21 points. By household income, those with high income had high satisfaction. By health conditions, those in good health conditions had high satisfaction.

We asked respondents questions about who is mostly in charge of family decisions and whether the couple coordinated their opinions with each other when making decisions. Except for living expense managements, the highest proportion of them answered that the couple made a decision together on children’s education, investment and property management, and leisure activity in the family. On the other hand, a high proportion of women in all age groups reported they themselves mostly made decisions on living expense management. A relatively high proportion of the respondents in their 40s and above responded that their husbands mostly made decisions on investment and

property management, exceeding 10%. Spending related to financial activity in the family was predominantly decided by women, on the other hand, investment and property management was relatively decided by men. In particular, the proportion of owning a house in their name was still high with the male heads of a household, accounting for 81.6%, compared to that in women's name 15.5%.

3) Relations with Children

We examined the topics of female respondents' usual conversation with their children. The frequent topics of conversation with elementary and secondary school children were about children's school life and daily habits; those with unmarried adult children were about occupation and marriage; and those with married adult children were about current issues, grandchildren, and health. We also examined the respondents who had almost no conversation with their children. The proportion of those having almost no conversation with elementary and secondary school children accounted for 0.4%; with unmarried adult children 0.4%; and with married adult children 2.5%.

When we examined the level of agreement to the value 'Child/ren should live with parents when parents get old,' 26.1% of all respondents agreed, but 73.9% disagreed. By age group, respondents in their 20s or below had the highest proportion of agreement, making up 31.4%. When we examined the topics of the respondents' usual conversation with their parents and parents-in-law, the most frequent topic was parents' health, followed by worldly affairs, and childcare. The proportion of those having almost no conversation with their parents made up 2.9% and with their parents-in-law 6.3%.

3. Changes in Women's Lives Due to COVID-19

1) Changes in Household Life

We examined household income and spending changes due to COVID-19. First, with regard to household income, 67.9% of all households answered that their household income remained at the same level even after the outbreak of the pandemic, but approximately 30% said their income dropped. Of the household income, 22.1% responded that their earned and business income decreased. Smaller than this figure, 14.4% said their spouses' earned and business income dropped. Second, with regard to household spending, 76.7% said that their spending remained the same, but 13.0% responded that the size of their spending reduced, and 10.3% answered that their spending increased. In other words, there were households whose income decreased due to COVID-19, but the size of their spending remained the same.

The government provided COVID-19 disaster relief funds to alleviate financial hardship to households. Each household received 835,000 won on average from the relief funds during the survey period (March 2020 to June 2020). The biggest item for using the relief funds was food expenses, including meals and side dishes, accounting for 71.4%. The second biggest item was expenses for eating out, making up for 7.4%. That is, households spent most of the relief funds on food and eating out, with the two items totaling 78.8%. The third and fourth items were expenses for health and medicare (4.7%) and clothes and footwear (3.1%). The households generally used the largest amount of the relief funds for health-related items such as food and medical expenses.

2) Changes in Individual Life

When we examined changes in individual life due to the pandemic, approximately 17% of the female respondents experienced changes in their jobs. Specifically, 8.5% of them answered that their pay or income (sales) from their jobs sharply dropped, 8% quit their jobs, and 3.5% said their work hours sharply shortened. On the other hand, the highest proportion, or 41.4%, of the women remained unemployed, and 39.6% continued to work without changes in work hours or income.

4. Women's Economic Activity

1) Gender-Based Discrimination in the Workplace

We surveyed wage workers on a five-point scale to ask whether there was gender-based discrimination in their workplace in six areas, including recruitment, promotion, pay, allocation of job duties, education and training opportunities, and restructuring. The highest proportion of positive responses (including “strongly agree” and “moderately agree”) to the question was that there was discrimination upon allocation of job duties (16.9%), followed by discrimination upon promotion (14.1%), discrimination in pay (13.8%), discrimination upon restructuring (13.7%), discrimination in education and training opportunities (12.4%), and discrimination upon recruitment (12.2%) in that order. Though the proportion of discrimination upon recruitment is a relatively small figure, discrimination in working conditions acts as a factor expelling women from the labor market. Therefore, it is necessary to continually monitor gender-based discrimination in working conditions.

When asked if they experienced discrimination, a majority of the respondents answered that they were not in a discriminatory situation or

experienced no discrimination. Discrimination upon allocation of job duties was a type of discrimination with the lowest proportion of answering 'not applicable,' but it was the most perceived type of discrimination in the workplace. Of the respondents, 0.7% answered that they experienced discrimination in the workplace. The most experienced type of discrimination was discrimination in pay, making up 1.6%.

When asked whether the respondents had ever experienced sexual harassment or violence in the workplace since the last survey, 0.8% of respondents answered they had. By age, those in their 30s or below accounted for 1.2%, and those in their 60s or above 0.9%. As such, we found that sexual harassment or violence was no less serious an issue to the old as to the young.

2) Job-Seeking Activity and Education & Training

We surveyed unemployed respondents who were seeking jobs about their desired type of work. According to the results, 98.9% of the respondents hoped to get a job. The proportion of respondents who wanted to start a business made up 2.1% for those in their 30s or below by age group, 1.6% for two-year college or above school graduates by education level, and 1.6% for unmarried women by marital status. Starting a business exhibits entrepreneurship and further leads to the status of business owner who can make a decision independently. Therefore, it has an important impact on enhancing women's status.

We surveyed women respondents who wanted to get a job in order to identify the type of work time they hoped for. According to the results, 81.6% of them preferred full-time work, but 18.4% part-time work. The higher their age and the lower their education level, the more they

preferred full-time work. While a majority of unmarried women preferred full-time work, slightly more than half of married women preferred full time. According to the results, the reasons for hoping to work part-time, the highest proportion, or 38.9%, of them responded ‘due to health issues,’ followed by 27.5% ‘due to housework.’ A high proportion of the respondents in their 40s and in the groups of two-year college or above school graduates and married women answered ‘due to childcare.’ The reason ‘due to housework’ was evenly distributed through all the groups. On the other hand, a high proportion of the respondents in their 40s answered ‘because they were unlikely to find full-time work.’ This shows the supply-and-demand mismatch in the labor market.

We surveyed the unemployed to analyze the two main reasons for having difficulties getting a job. According to the results of the analysis, the highest proportion of the reasons was ‘because there is no or lack of job’ (48.2%). This was followed by ‘lack of information on getting a job or starting a business, or don’t know where to get the information’ (13.4%), ‘insufficient career experience’(10.3%), ‘too old’ (8.3%), and ‘unsuitable working environment or work hours’ (7.9%) in that order.

According to the survey of education and training experience, a mere 2.9% of the respondents said they received education and training in the last year. By age, the proportion of those in their 50s or below stood at 3-percent level. By education level, the proportion was high with two-year college or above school graduates standing at 4.4%. By marital status, the proportion of married women standing at 3.0% was higher than that of unmarried women by 0.3 percentage point.

We examined the economic activity status of women who responded they received education and training in the last year. The highest proportion of them were the employed (73.7%), followed by the

economically inactive population (23.8%) and the unemployed (2.5%). Compared to the economic activity status of all the respondents, the employed were more likely to experience education and training. Therefore, it is necessary to inform the economically inactive population and the unemployed of the need for education and training and to implement high quality education so that they too can have education and training opportunities. We surveyed those women who received education and training in the last year to identify three education and training institutions they used. The highest proportion of the institutions was private training institutions, including their company training centers, accounting for 37.0%. This was followed by public training institutions (vocational schools run by the Human Resources Development Service of Korea (HRDK) or local governments, technical colleges, and the Human Resources Development Division of the Korea Chamber of Commerce and Industry) (20.7%), private institutes (17.7%), and welfare and culture facilities (welfare centers, cultural centers and institutes, and libraries) (10.9%). The main goals of their receiving education and training were ‘to improve job competency related to occupation or workplace,’ (66.7%), ‘for re/employment’ (19.2%), ‘for hobby’ (10.4%), and ‘to obtain a certificate’ (4.5%) in that order.

IV. In-Depth Analysis and Implications

1. Married Female Workers’ Work–Family Balance Burden and Depression

1) Research Purpose

Preceding studies found that women’s depression aggravated when

they experienced or perceived high gender-based discrimination in their workplaces. As such, it can be predicted that gender-based discrimination in the workplace have a negative impact on female workers' mental wellbeing. Workplaces with high level of discrimination are places with high gender segregation and gender differences in rewards and opportunities. Such a workplace, in general, may not provide a family-friendly system, or lack in resources or means to satisfy demands for work-family reconciliation. Therefore, if female workers are exposed to a gender discriminative environment in a workplace with high level of work-family burdens, they are more likely to experience higher depression. In this context, we examined the relations between married female workers' work-family balance burden and depression. We also analyzed the moderating effects of workplace gender discrimination on these two relations.

2) Research Method

For the analysis data, we used five-year time series data from the fourth to eighth wave surveys that included depression-related scale questions from the KLoWF data of the Korean Women's Development Institute. The subjects of the analysis included 7,776 observations of 3,122 married female workers. The analysis was limited to wage workers who were deemed suitable for measuring the impact of workplace gender discrimination or culture. For the analysis method, we employed the fixed effect model and the random effect model using the panel regression. For the estimation, we used robust standard errors.

For the analysis, variables were composed of dependent, independent, moderator, and control variables. First, the dependent variable was the

average of the sum of 10 CES-D scales related to depression. Second, the independent variable consisted of three questions related to the level of work-family balance burdens perceived by married female workers: i) negative impact of excessive burdens of duties in the workplace on family life (work→burdens on family), ii) negative impact of excessive burdens of duties in family life on work life (family→burdens on work), and iii) satisfaction with sharing housework with spouses (satisfaction with sharing housework). Third, the moderator variable was the average of the sum of six questions to measure the respondents' perceptions of gender discriminative organizational culture in the workplace. Lastly, for the control variable, we used the characteristics of jobs, family life, individuals and households, and periods. Job-related variables of the respondents included their earned income (converted to log value), regular workers or not, and job satisfaction levels.

3) Results

According to the results, married female workers' depression increased in the following cases: first, where excessive duties in the workplace increasingly impinged on family life; second, where excessive duties in the home put more strain on work life; third, where sharing housework with spouse was more unsatisfactory; and fourth, where women perceived the level of gender discrimination in the workplace as being high. In other words, their work-family stress increased in these cases, and thus aggravated their depressive syndromes. On the other hand, those who perceived gender-discrimination in the workplace as being low showed almost no change or were statistically insignificant even when work-family burden increased. Therefore, it is believed that though the dual burdens of work and family have an increasing impact on women's

depression, what determined the degree of their depression was believed to be the level of gender discrimination in the workplace.

This conclusion presents the following policy implication: creating a gender equal environment in the workplace is important to resolve women's burdens of work-family reconciliation. The critical factor aggravating married female workers' depression may be gender-discriminatory workplace rather than work-family stress per se. Though various support policies for work-family balance are currently provided, the existence of such support policies can be another mechanism for gender segregation that causes discrimination against and exclusion of women workers unless gender equal culture is created in the workplace. Therefore, it is necessary not only to expand the gender equal use of the work-family reconciliation system, but also to establish policies on the promotion of gender equal organizational culture in the workplace so that the demand or use of the work-family reconciliation system may not act as the ground for discrimination or prejudice in the workplace.

For an additional analysis, we examined how changes in perception after COVID-19 affected the relations between married female workers' work-family stress and their depression using the data of the eighth wave KLoWF in 2020. According to the results, women who were more likely to perceive the pandemic as a serious threat reported to be more depressed than those who were not. A careful interpretation is needed to explain the reasons of this finding, but we presumed the reasons as follows: women who perceived the COVID-19 threat as being serious might have i) had lower connections with their workplace due to their using flexible work arrangements, including working from home, or worsened job situations, or ii) perceived their burdens of work-family

reconciliation as a ‘taken-for-granted role’ of a better wife or mother, or been asked for bearing the burdens in the gender norm. Therefore, in the follow-up study, it is necessary to examine how changes in the labor market due to the pandemic have impacted female workers’ perceptions of gender role and gender norms.

4) Summary and Policy Implications

This study aimed to examine the determinants of married female workers’ depression from the aspect of dual burdens working women face both in the workplace and family life, focusing on their perceptions of work-family reconciliation and gender discrimination in the workplace. According to the results, women who reported low gender discrimination in the workplace, did not experience big changes in depression level when work-family stress increased. On the other hand, those who reported high gender discrimination in the workplace, showed increased depression when work-family conflict increased.

These results imply that the critical determinant of married female workers’ depression may be workplace environment that impedes the resolution of work-family reconciliation. Unless a gender equal environment is fundamentally created in the workplace, those who can work for long hours or who are exempt from the family duties are more likely to be perceived as competent workers. Therefore, it is necessary not only to expand a gender equal use of the work-family reconciliation system but also to establish a policy to facilitate a gender equal organizational culture so that the demand for work-family reconciliation or the use of the reconciliation system may not become the basis for discrimination or prejudice in the workplace.

2. Study on Prediction Models for Women's Employment Retention under the Pandemic

1) Research Purpose

This study analyzed the impacts of characteristics of decent jobs on women's employment retention using the scikit-learn logistic regression package and classification model performance evaluation package for the sixth to eighth wave KLoWF data. To compare the effectiveness of prediction models, we divided women into two groups: those who experienced care gaps during the pandemic situation and those who did not.

2) Literature Review

According to scholars and research institutes, there are very diverse definitions of decent jobs. However, characteristics of a decent job commonly include job security, safe work environment, and just wage system. A decent job can be defined as a job that does not include elements related to underemployment. In other words, the fewer a job includes elements of underemployment, the better the job corresponds to the definition of a decent job. Therefore, this study defined a decent job as one that does not include elements related to underemployment. The elements related to underemployment comprise time-related underemployment, dissatisfaction with job duties, low wage, marginal labor, and non-regular work.

3) Research Method

For the data analysis, we used the sixth to eighth wave KLoWF data. We applied the scikit-learn package of Python to establish the prediction

model for employment retention and to evaluate the performance of the model. As one of classification algorithms combined with Sigmoid function, the logistic regression algorithm of scikit-learn can be used in estimating the coefficients of individual variables, like logistic regression that is generally used in statistical studies. However, instead of estimating the coefficients of individual variables, this study paid attention to the results of applying a classification model to the data collected from the pandemic situation. The classification model is learned with the latest data related to decent jobs prior to the pandemic.

For the independent variable, we used variables closely related to a decent job, including high physical-proximity job or not, difficulties of childcare due to COVID-19, age, education levels, monthly average wage, work hours and satisfaction. The dependent variable was whether the respondents retained their employment.

4) Research Results

The average employment retention rate calculated from the sixth to eighth wave KLoWF data prior to the pandemic was 77.5%. In comparison, the employment retention rate calculated from the eighth wave KLoWF data under the pandemic was 76.5%, slightly down from the pre-pandemic. The number of women who retained their employment was 4,092 persons.

To assess the performance of the employment retention prediction model, we compared the group who experienced care gaps and the group who did not. According to the results, the prediction model showed a higher performance regarding the group with care gap experience, and overall, showed a good prediction accuracy under the pandemic.

5) Summary and Policy Implications

In this analysis, we examined the effects of decent jobs. The results imply that the reason for losing their jobs under the unavoidable situation like the pandemic was not because women had the jobs but because the jobs themselves were not decent jobs from the beginning. Women who had decent jobs were highly likely to successfully retain their employment during the pandemic, but in reality a majority of women had difficulties getting decent jobs. This is to say, a majority of women became vulnerable to the pandemic because they could not get decent jobs. The impact of the pandemic was not exercised particularly on women only.

V. Data Quality and Weighting of the KLoWF

1. Analysis of the KLoWF Panel Dropout

In this study, we conducted a non-response analysis of the fifth to eighth wave panel established in 2007 and the added panel for the sixth wave survey. We analyzed characteristics of non-responses, employing household factor, demographic factor, and economic factor as the independent variable. Using the decision tree model, we also tracked factors of high influence.

According to the results, the main factors influencing the non-responses of the sixth to eighth wave panel of 2007 included marital status, age, current financial conditions, economic activity status, housing type, and the number of household members. Of these, marital status was the most influential factor for the non-responses of the sixth to seventh panel. On

the other hand, age was the most influential factor for the non-responses of the eighth panel surveyed during the pandemic. The added panel had basically similar characteristics of non-responses to the 2007 panel. The results using a decision tree model also yielded similar findings. However, the added panel had a high proportion of non-responses, overall, from unmarried women in their 30s or below compared to the 2007 panel.

The dropout rate of the KLoWF slightly went up again under the pandemic. For the panel management, we have so far established a panel management protocol considering responses or non-responses from the panel by wave only, rather than taking characteristics of respondents into account. This way of panel management is predicted to have limitations given the recent survey environment. Therefore, to improve the panel management and to raise response rates in the future, it is necessary to review the following ways of panel management: First, the method of panel management should be changed from inspection on the spot to daily management. Second, it is necessary to establish a new way of panel management which takes into account of the respondents' characteristics. That is, the current method of panel management that classifies panel dropouts and retentions should be fully revised to a method of management based on respondents' characteristics. Also, since the reasons for drop out was measured based on households, we could not analyze reasons for non-responses from individual women. To retain the panel, it is very important to revise meta data. Therefore, all the panel collection processes need to be established as a database in the future.

2. Weight Adjustments of the Eighth Wave KLoWF

We conducted weight adjustments of the eighth wave survey in the following four steps: The first step was to adjust weights for individual women and households focusing on the existing panel of the first to eighth survey participants. The second step was to adjust weights for individual women and households of the panel newly added after the sixth wave, then to adjust weights for individual women and households that remained in the panel from the sixth wave to eighth wave survey. The third step was to adjust weights for individual women who newly entered the eighth wave and individual women who newly entered the added panel. Lastly, the fourth step was to adjust integrated cross-sectional weights between the new panel added in the sixth wave and the existing panel.

