

Importance of Subjective Health Condition and Women's Social Environment¹

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Abstract

Studies based on social environments and their impact on the health conditions of women have been less frequently conducted compared to studies on the correlation between biological settings and women's health condition. Therefore, this research has two goals. The first is to examine the relationship between subjective and objective health conditions to ascertain how important subjective health condition may be for women's health. The second is to examine the relationship between social environment and subjective health condition among women by means of longitudinal data. This research made use of the Korean Longitudinal Survey of Women and Family (KLoWF), and Kaplan-Meier analysis and Cox regression analysis were employed for data examination. This study confirmed the fact that subjective health condition and objective health conditions treated by a medical doctor are highly correlated. Those with unfavorable social environments are likely to experience their health condition shifting from being good to being bad at an earlier age than are their counterparts in their life course. The findings in this study could have critical policy implications in terms of improved prevention strategies against diseases for women with unfavorable social environments.

Key words: Women's health condition, women's social environment, diseases, policies for improving women's health with unfavorable social environment

Introduction

Both domestically and internationally, a great number of studies have been conducted regarding women's health. Many significant research findings on women's health have been produced drawing upon a range of academic perspectives. However, studies based on social environments and their impact on the health conditions of women have been less frequently conducted compared to studies on the correlation between biological settings and women's health condition. The primary reason for this could stem from a lack of acknowledgement

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of the differences in health status that result from the social environmental divergences between or within the male and female populations. Consequently, South Korea's national planning of public health policies has yet to include a gender perspective. One recent study emphasized the fact that a gender perspective approach spanning all life stages of women is needed to better develop women's health conditions (Kim Young-taek, et al., 2007).

Subjective health condition is one of the best indicators for illuminating the relationship between socio-economic status and subjective health condition (Kawachi, et al., 1999; Lantz, et al., 2001). Past studies have reported that women's subjective health conditions were found to be lower than those of men (Kawachi et al., 1999; Kim Young-taek, et al., 2009). Another recent study also found that women's subjective health conditions turned out to be lower than men's subjective health status. Moreover, by applying subjective health condition, the study found differing health status within the population of women. Educational and income groups within the female population turned out to influence their health status. For example, women aged 40 and over with only a middle or primary school education are more likely to report "bad" and "worst" subjective health condition compared to a reference group with a university or higher education (odds ratio=6.184, $p<.000$). Women with the lowest incomes are more likely to report "bad" and "worst" subjective health condition than the reference group with the highest income (odds ratio=2.157, $p<.001$), (Kim Young-taek et al., 2008).

The questionnaire on subjective health condition used here is simply constructed with five response categories such as "excellent", "good", "average", "bad", and "worst". Subjective health condition could represent people's well-being as well as their physical condition, rather than representing only the presence of physical diseases (Ross & Bird 1994). Objective health condition could directly influence how people feel about their health conditions, but their attitudes and subjective beliefs regarding their health conditions could in the end be what determines their judgement of their health conditions (Jang, 2007). This implies the importance of analyzing subjective health conditions in order to account for people's health condition in a comprehensive manner.

However, a number of scholars have pointed out the limitations involved in the measurement of subjective health conditions. One limitation could be that women not suffering from diseases are more likely to report their health condition as being "bad" or "worst" compared to men. Still, subjective health condition has been well known to predict death rate, occurrence of disease, and physical disability. Survey respondents reporting their health status as "bad" and "worst" are more likely to show higher mortality than those reporting "very good" or "excellent" health subjective status (Idler and Benyamini, 1997). Also, a recent study on why the rate of women reporting their subjective health condition as being "bad" or "worst" is higher than that for men found that the chronic illness distributional effect between men and women turned out to be higher than the simple reporting effect of describing their health conditions as being "bad" or "worst" in the absence of physical sickness (Kim Seung-gon, 2009).

Turning to past studies on the relationship between subjective health condition and social environment, due to the poor availability of longitudinal data, little research has been conducted using a panel survey. One of the most recent research efforts in South Korea

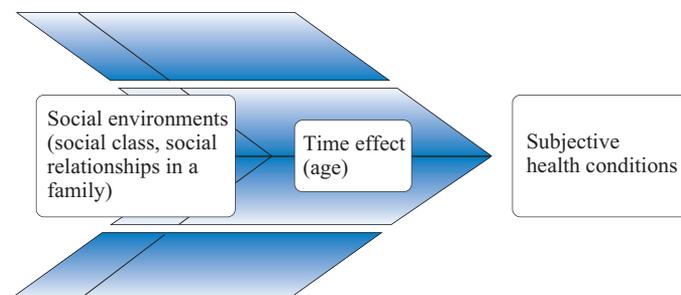
using a cross-sectional survey found that people with higher socioeconomic status turned out to experience better subjective health condition than their counterparts because they tend to pursue more healthy behaviors and to be in a favorable social position to gain access to better health resources (Kim Min-gyeong et al., 2010). This finding confirmed the analytical results of multiple past studies.

Another finding from panel survey research could be the presence of a time effect between subjective health condition and social environment. Women with poor social environments could be more likely to report their subjective health condition as being “bad” or “worst” earlier than their counterparts in terms of life course. Considering the difficulty of transitioning from “bad” or “worst” to “excellent” or “good” as people age, as well as the fact that women’s subjective health conditions were found to be lower than men’s, such an impact by the social environment on their subjective health condition over their life course could have significant meaning and implications for women’s health policy.

Based on the discussion to this point, this research has two goals. The first is to examine the relationship between subjective and objective health conditions to ascertain how important subjective health condition may be for women’s health. The second is to examine the relationship between social environment and subjective health condition among women by means of longitudinal data.

Theoretical Review and Research Model

Since social environments have been more unfavorable to women than men, women tend to be more likely to experience health inequalities in social settings than are men. Moss (2002) and Davidson (2006) have pointed out that the law, politics, economic development, education, profession, workplace status, and health education, among other elements, have all negatively influenced women’s health to a greater degree than they have that of men. Both scholars considered the sources of women’s poor health in terms of macroscopic variables such as national history, geographical environment, policy, legal rights, discrimination against women at home in the workplace, and more. Moreover, they emphasized the causes of poor health among women by applying microscopic and socio-demographic variables such as income, education, and employment. Moss even suggested that the interaction effect between macroscopic and microscopic variables could be one



of the best ways to account for women's health.

Most past studies have used education, income, and employment variables to ascertain how social class is associated with health condition. Highly educated people were found to be more likely to have access to health-related information and resources than were the less educated (Ross and Wu, 1995). People with high incomes were identified as being more likely to lead lifestyles featuring health-promoting food, housing, and culture than those with low incomes (Backlund and Johnson, 1999). Also, employment could positively affect health conditions compared to unemployment (Ross and Mirosky, 1995). Kinds of jobs with different social reputations and qualifications were found to be associated with health condition as well (Gregorio et al., 1997). The reasons could be associated with whether or not the workplace includes a job-stress management program, health screening test, and better job environments for health conditions.

Moreover, their parents' social class was found to be persistently linked to children's social status, even after they become adults (Hauser and Warren, 1999). This social phenomenon could differently affect their health conditions, given the relationship between social class and health condition.

Lastly, women tend to care for their children while men work outside the home. Such a division of labor could tend to cause women's health conditions to be affected by family structures and relationships with family members to a greater degree than is the case with men (Feldberg and Glenn, 1979). Currently, many women tend to work both in the home and in a workplace since a large proportion of women have entered into the job market. As a result of this expanded role of women, they also tend to experience conflict with family members such as their children, parents, and in-laws.

In this study, social environment includes the economic conditions of a subject's family at age 15 and their education, income, job, and social relationships with family members. Taking into account the discussion to this point, this study presents a research model as follows.

Research Method

Data

This research made use of the Korean Longitudinal Survey of Women and Family (KLoWF). The first survey was conducted in 2007, the second in 2008, the third in 2010, and the fourth in 2012. A total of 9,997 persons aged between 19-64 from 9,068 households were selected in the first wave. The sampling method was to sample households based on the manner of the "Population and Housing Census" conducted in South Korea. In addition, this survey applied a probability proportional stratified sampling method by considering the number in a household and the age and sex of the head of the household. This survey is mainly characterized by a longitudinal survey fit for supporting longitudinal research for women. The survey questionnaire included economic activity, education, jobs, and family environment, among other items. Furthermore, the first wave of the survey has limited variables on health: only depression (3rd. wave) and subjective health conditions (1st.-4th. waves). For the fourth wave, the survey added questions on health conditions. The

appended health-related questions covered objective health condition, mental health condition, medical utilization, smoking and drinking, exercise, etc. Therefore, the Korean Longitudinal Survey of Women and Family (KLoWF) is considered among the best surveys for researching the goals of the study as described earlier.

Variables used in the study

Firstly, this study made use of variables related to subjective and objective health condition in order to determine the relationship between these two variables. As discussed earlier in the data section, the fourth wave of the Korean Longitudinal Survey of Women and Family (KLoWF) surveyed the respondents through health-related questions that included objective health condition, mental health condition, medical utilization, smoking and drinking, exercise, etc.

Secondly, this study used social environmental variables. These included the economic condition of their family at the 15 years old as self-rated by respondents, age, education, total household income, profession, and social relationship with parents, spouse, mother-in-law/father-in-law, and non-adult/ married/non-married adult children.

Longitudinal data can be classified into time-invariant and time-variant variables. The time-invariant variable in the survey is the self-rated economic condition of respondents' families at 15 years old. Respondents were asked to rate the economic condition of their family at that time based on their parents' jobs and income level. Responses were then categorized into three groups: very or relatively affluent; average; and relatively or very poor.

Time-variant variables included age, education, income, and profession during the first to fourth surveys. Age was considered as a continuous variable during the first to fourth surveys. For the variable of educational attainment, it was categorized into "middle school educated or less", "high school educated", and "college educated or higher" during the first to fourth surveys. The study used total household income, which was categorized into four groups of 25 percentile rankings during the first to fourth surveys.

The profession variable applied two variables: whether respondents are employed or not employed and what kinds of jobs respondents have. Next, this study added the category of "not employed group" into the categories of the variable of what kinds of jobs respondents have. The profession variable was categorized into managers/professionals/office workers, service and sales workers, workers in agriculture/forestry/fishery, mechanics and manual laborers, and those with no job.

In terms of the relationships variable, this study emphasized social relationships within a family and used variables of respondents with parents, spouses, mother-in-law/father-in-law, and non-adult/married/non-married adult children. It should be noted that this study included all social relationships to the greatest degree possible without excluding respondents' particular relationships with their counterparts. In the case that the respondents had not yet married, they might be expected to have relationships with only their parents. It is assumed that they do not have any problems related to subjective health condition in this study.

For speaking about the variables related to relationships with parents and mother-in-law/father-in-law, this study used the variable of the response to the question, "How often did you have an argument or serious conflict over the following issues with your father or mother

for the past month?” For speaking about the variables on relationships with elementary, middle and high school children, as well as with non-married adult children, this study used the variable, “How much are you worried about the following issues concerning your elementary, middle and high school children and married/non-married adult children?” For speaking on the variables regarding the relationship with adult children, this study used the variable, “Do you frequently talk over issues?” and selected one item of the questionnaire, “seldom talk.” Next, the variable was dichotomized into two groups such as “no talk” and “talk.” To examine the variables on relationship with their spouse, “Did you experience any of the following cases when you had an argument with your husband over the past month?” was applied. We coded 1 if they responded “yes” to any items on conflicts or worrying issues or “seldom talk.” The rest were coded 0. After calculating comprehensive scores for each item, three groups were created based on 33% percentiles of the distribution.

Thirdly, this research tracked changes in self-rated health based on responses to 5-point scale questions featured in the first, second, third, fourth KLoWFs. While the survey divided the responses into five categories of very good, good, average, bad, and very bad, this research dichotomized them between good (very good, good, average) and bad (bad, very bad). The event of bad condition was coded 1 and the remainder were coded 0.

Analysis methods

In the survival analysis performed in this research, an event was defined if self-rated health changed from very good, good, or average to bad or very bad. The person-level data sets from the 2007, 2008, 2010, 2012 surveys were converted into person-period data sets listing a respondent’s experiential growth or changes in a longitudinal direction. This conversion of data structure facilitates the measurement of changes of events in panel data (Singer and Willett, 2003).

Kaplan-Meier analysis and Cox regression analysis were used. Kaplan-Meier analysis, which is considered a technical analysis for investigating panel data, is useful for demonstrating a univariate variable’s probability of an event. It is similar to a life table featuring the concept of conditional probability. The basis of Kaplan-Meier analysis is defined by the number of events, the time j in which an event begins, and the number of subjects at risk. It can be represented as in the following equation (Singer and Willett, 2003).

$$p(t_j) = \frac{n \text{ events}_j}{n \text{ at risk}_j}$$

The survival function is the survival probability that passes through the j th period, and is defined by multiplying the sequential survival probability of each period from the first to the j th period. This can be represented in the following equation.

$$S(t_j) = (1 - p(t_1))(1 - p(t_2)) \cdots (1 - p(t_j))$$

Unlike Kaplan-Meier analysis, Cox regression analysis enables a multivariate analysis with predictors controlling for other variables. In this research, a Cox regression analysis was used to examine the probability ratios of predictors changing good health (very good, good, average) to bad health. The Cox regression analysis assumes that the influences of

predictors remain constant throughout the period from 2007 to 2012 and risk probabilities within predictor groups are similar (Singer and Willett, 2003). These assumptions were verified in the survival probability histogram of the Kaplan-Meier analysis. The Cox regression analysis complying with these assumptions is called a proportional hazard model. This can be expressed as the following equation (Singer and Willett, 2003).

$$h_i(t) = [h_0(t)]e^{b_0 + b_1\xi_1 + \dots + b_px_{ip}}$$

hi (t): the hazard rate that occurs at the ith time along the time t

h0 (t): the first hazard rate along the time t

p: the number of covariates

bj: the value of the jth regression coefficient

xij: the value of the ith case of jth covariates

Table 1. Correlations between subjective health condition and type of objective health conditions (Bivariate correlation)

	SHC	HD	CD	MD	RD	DD	ND	IC	Other	ES	GS	US	(SD)	(ED)
Subjective health condition (SHC)	1													
Heart disease (HD)	.138**	1												
Cerebrovascular disease (CD)	.150**	-.030*	1											
musculoskeletal disease (MD)	.406**	-.079**	-.054**	1										
Respiratory disease (RD)	.065**	-.022	-.015	-.040**	1									
Digestive disease (DD)	-.476**	-.420**	-.286**	-.763**	-.212**	1								
Neuropsychotic disease (ND)	.159**	-.023	-.016	-.042**	-.012	.055**	1							
Injury by accident (IC)	.073**	-.014	-.009	-.025*	-.007	.032**	-.007	1						
Other	.049**	-.009	-.006	-.016	-.004	0.021	-.005	-.003	1					
Endocrine system (ES)	.091**	-.026*	-.017	-.047**	-.013	.061**	-.014	-.008	-.005	1				
Gynecological system (GS)	.087**	-.016	-.011	-.029*	-.008	.038**	-.008	-.005	-.003	-.009	1			
Urinary system (US)	.083**	-.008	-.006	-.015	-.004	0.02	-.004	-.003	-.002	-.005	-.003	1		
Skin disease (SD)	.033**	-.006	-.004	-.01	-.003	0.014	-.003	-.002	-.001	-.003	-.002	-.001	1	
Eye disease (ED)	.023	-.005	-.003	-.009	-.003	0.012	-.003	-.002	-.001	-.003	-.002	-.001	-.001	1

Note) **p < .01, *p < .05

Results

Firstly, respondents reporting subjective health condition as “bad” or “worst” turned out to be highly correlated to objective health conditions requiring treatment by a medical doctor. Pearson coefficient R turned out to be .58, very close to .60. When examining Table 1 above, musculoskeletal disease positively showed the highest correlation with subjective health condition ($r=.406$). On the other hand, digestive disease negatively showed the highest correlation with subjective health condition ($r=-.476$).

Secondly, a survival analysis was performed in order to determine the probability ratios of a change from good health (very good, good, average) to bad health (bad and very bad) by predictor groups selected for the period of 2007-2012 through Kaplan-Meier analysis. It should be noted that we separately analyzed three age cohort groups of 18-39, 40-54, and 55 and higher age groups in order to control for heterogeneity within age cohort groups.

This study analyzed the 18-39 age group. The cumulative survival rate ranged from 0 to 1. One means that all cases survived at a particular time period without their changing subjective health conditions from good to bad. A censoring case in a survival analysis means that it has to censor the cases in a survival function because of respondents who never experience the event. In the 18-39 age group, the serious problem of having a large number of censoring cases is likely to occur because many respondents in such a young cohort group will never face such an event during the course this study. However, this study put more emphasis on controlling heterogeneity within the age groups rather than on minimizing censoring cases. Still, this study does have cases experiencing the event due to the well-designed sampling method and the passage of five years (2007-2012) in the KLoWF data used.

<Figure 1> shows that gaps in the survival rate within the predictor group increase as age approaches 39 years old. This means that those with poor economic condition at age 15 were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 39 years old.

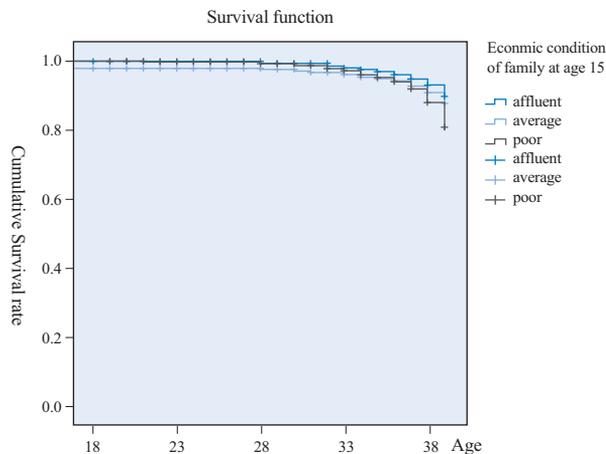


Figure 1. Survival function by economic condition of family at 15 years of age, 18-39 age cohort

<Figure 2> shows that the gaps in the survival rate within the predictor group increase as age approaches 39 years old. This means that those with the lowest completed education were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 39 years old.

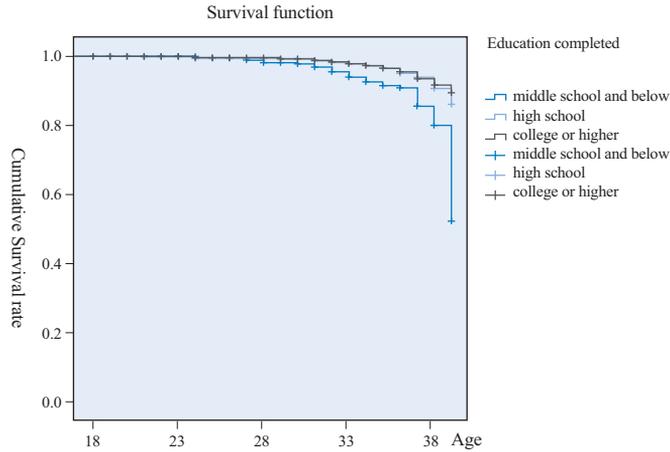


Figure 2. Survival function by educational attainment, 18-39 age cohort

<Figure 3> shows that the gaps in the survival rate within the predictor group increase as age approaches 39 years old. This means that those with the lowest income (1st 25th percentile group) were found to have a lower cumulative survival rate than their counterpart Survival function groups as they grow closer to 39 years old.

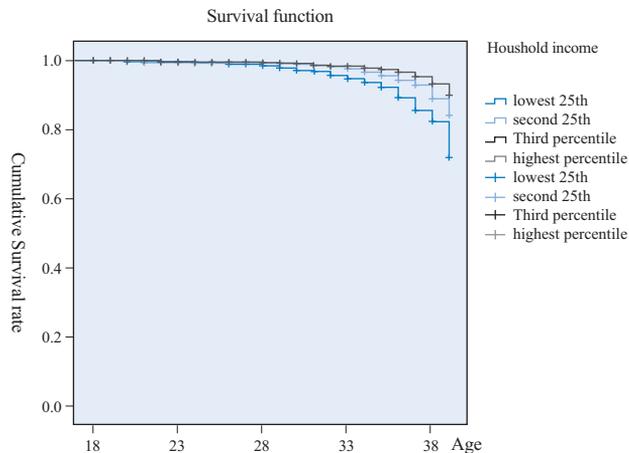


Figure 3. Survival function by total household income, 18-39 age cohort

<Figure 4> shows that the gaps in the survival rate within the predictor group somewhat increase as age approaches 39 years old. This means that those in the group of “no job” were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 39 years old.

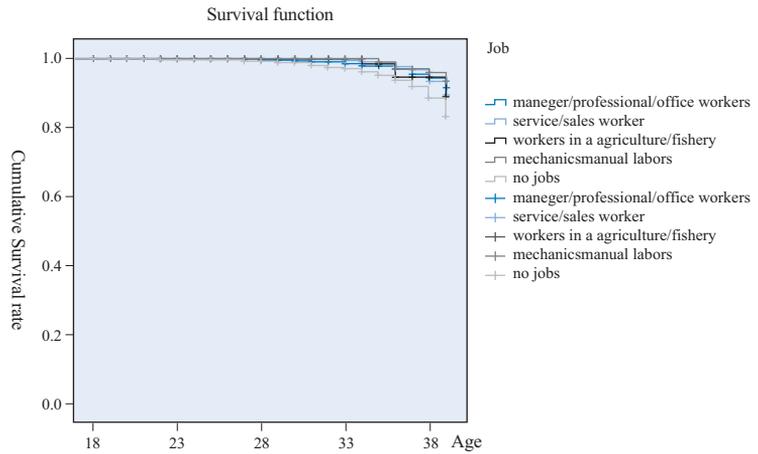


Figure 4. Survival function by respondent’s job, 18-39 age cohort

<Figure 5> shows that the gaps in the survival rate within the predictor group increase as age approaches 39 years old. This means that those with the fewest problems in relationships with family members were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 39 years old.

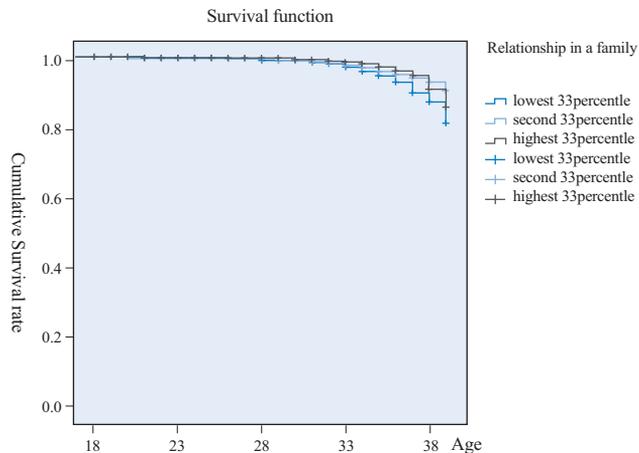


Figure 5. Survival function by respondent’s relationships within the family, 18-39 age cohort

Next, the 40-54 age cohort group was analyzed. <Figure 6> shows that the gaps in the survival rate within the predictor group increase as age approaches 54 years old. This means that those with poor economic condition at the age of 15 were found to have a lower cumulative survival rate than their counterpart groups when they grow closer to 54 years old.

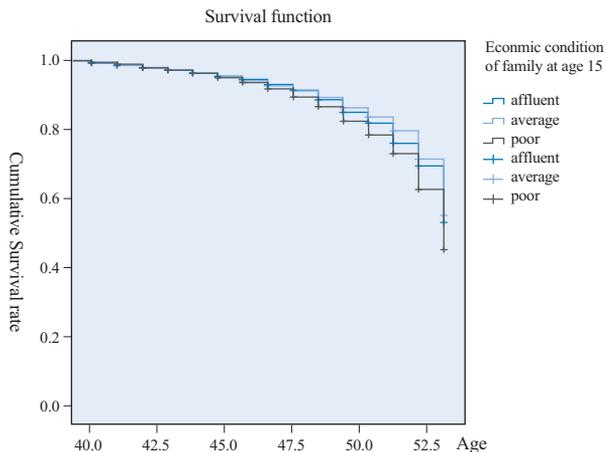


Figure 6. Survival function by economic condition of family at 15 years of age, 40-54 age cohort

<Figure 7> shows that the gaps in the survival rate within the predictor group increase as age approaches 54 years old. This means that those with the lowest completed education are found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 54 years old.

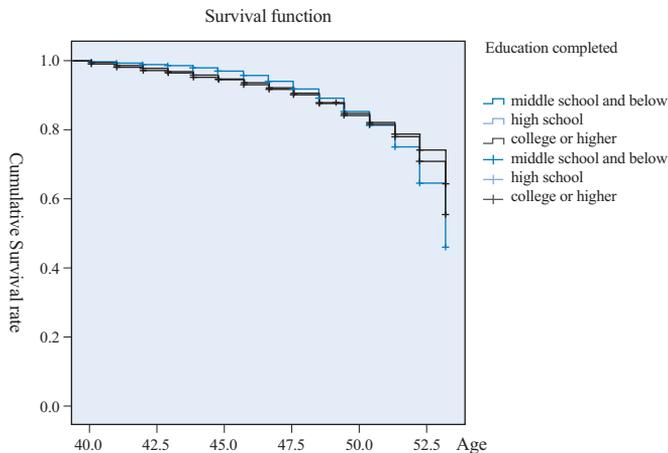


Figure 7. Survival function by educational attainment, 40-54 age cohort

<Figure 8> shows that the gaps in the survival rate within the predictor group increase as age approaches 54 years old. This means that those with the lowest income (1st 25th percentile group) were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 54 years old.

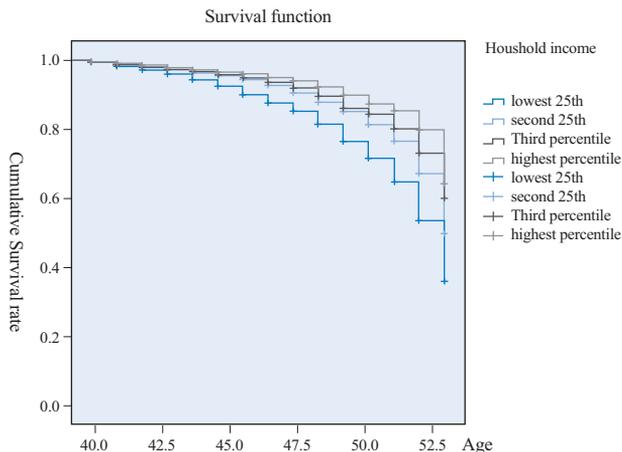


Figure 8. Survival function by total household income, 40-54 age cohort

<Figure 9> shows that the gaps in the survival rate within the predictor group increase as age approaches 54 years old. This means that those in the group of “no job” were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 54 years old.

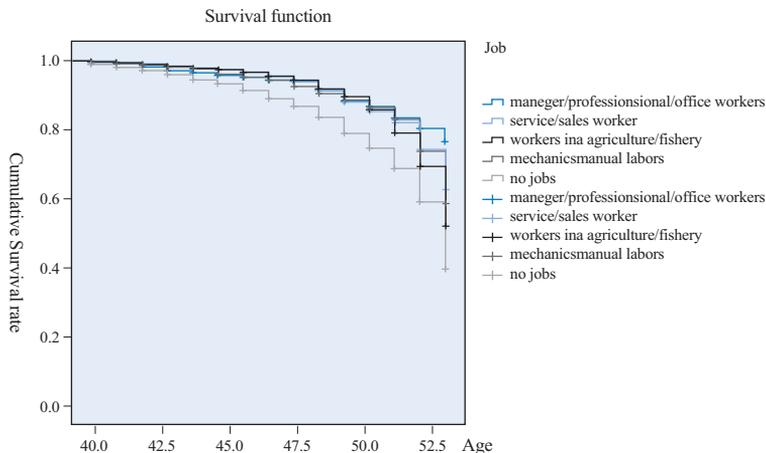


Figure 9. Survival function by respondent’s job, 40-54 age cohort

<Figure 10> shows that the gaps in the survival rate within the predictor group increase as age approaches 54 years old. This means that those with greater social relationship problems with family members were found to have a lower cumulative survival rate than their counterpart groups when they grow closer to 54 years old.

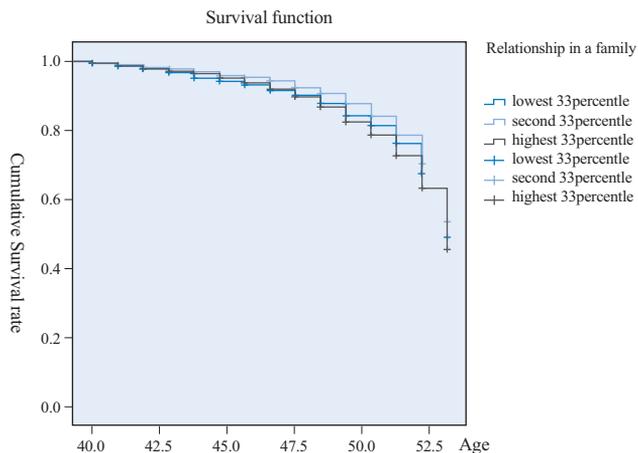


Figure 10. Survival function by relationships within the family, 40-54 age cohort

Lastly, this study analyzed the 55 and higher age cohort group. <Figure 11> shows that the gaps in the survival rate within the predictor group increase as age approaches 69 years old. This means that those with poor economic condition at age 15 were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 69 years old.

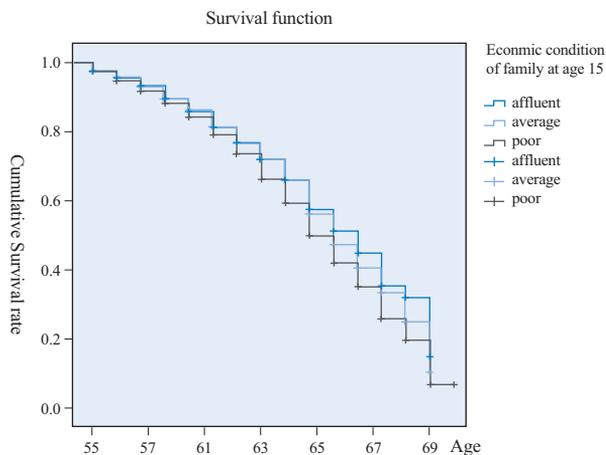


Figure 11. Survival function by economic condition of family at 15 years of age, 55 and higher age cohort

<Figure 12> shows that the gaps in the survival rate within the predictor group increase as age approaches 69 years old. This means that those with the lowest education completed are found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 69 years old.

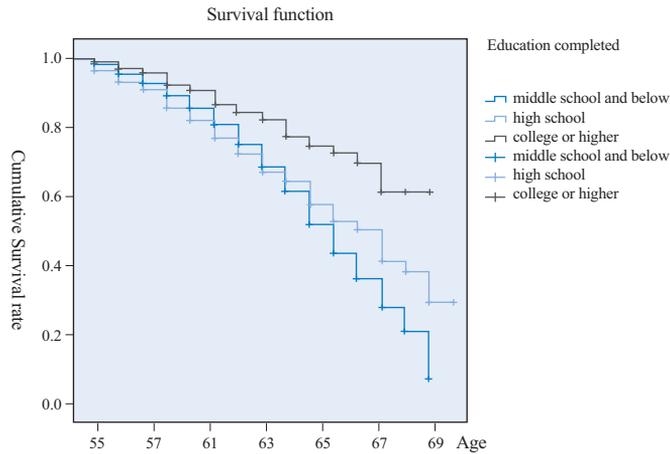


Figure 12. Survival function by educational attainment, 55 and higher age cohort

<Figure 13> shows that the gaps in the survival rate within the predictor groups increase as age approaches 69 years old. This means that those with the highest income (4th 25th percentile group) were found to have a higher cumulative survival rate than their counterpart groups as they grow closer to 69 years old.

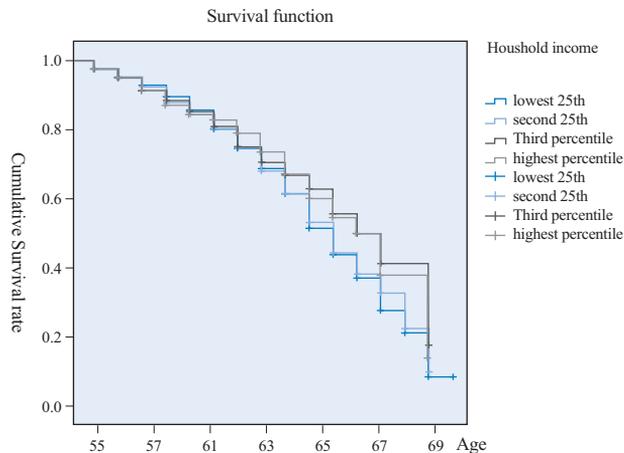


Figure 13. Survival function by total household income, 55 and higher age cohort

<Figure 14> shows that the gaps in the survival rate within the predictor group increase as age approaches 69 years old. This means that those with the group of manager/professional/office workers were found to have a higher cumulative survival rate than their counterpart groups as they grow closer to 69 years old.

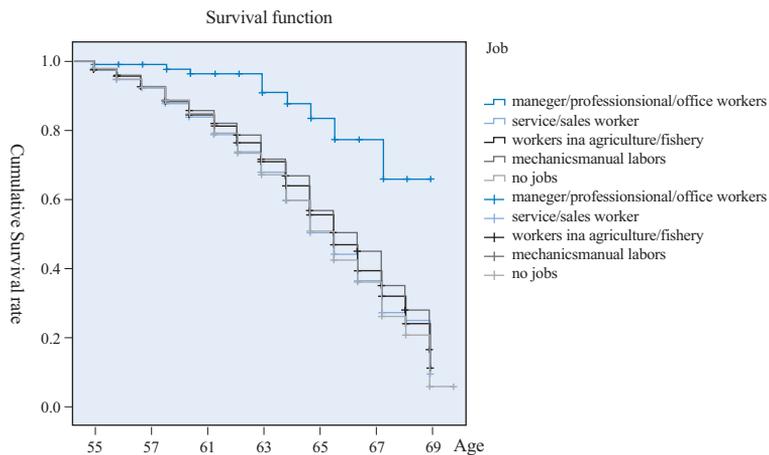


Figure 14. Survival function by respondent’s job, 55 and higher age cohort

<Figure 15> shows that the gaps in the survival rate within the predictor group increase as age approaches 69 years old. This means that those with the greatest problems with social relationships with family members were found to have a lower cumulative survival rate than their counterpart groups as they grow closer to 69 years old.

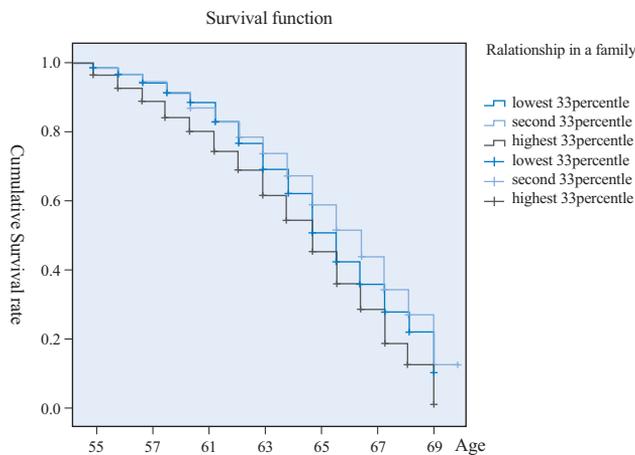


Figure 15. Survival function by respondent’s social relationship in a family, 55 and higher age cohort

A multivariate analysis was conducted through a Cox regression analysis. Firstly, this study analyzed the 18-39 age cohort group. Those with middle school completed education and lower were found to have a statistically significant relationship with health condition turning from good to bad based on the reference group of those with college completed and higher (Exp(B)=1.966, p<.001). Compared to the highest household income group, both the lowest household income group and the second lowest showed a statistically significant relationship with health condition turning from good to bad (Exp(B)=2.765, p<.000; Exp(B)=1.392, p<.05). As to the respondent’s profession, the odds ratio of health condition turning from good to bad for those with no job was found to be 1.646, based on the reference group, managers/professionals/office workers (p<.001). Those with problems in their social relationships with family members were found to have a statistically significant relationship with health condition turning from good to bad. The odds ratios of those in the second 33rd percentile and third 33rd percentile groups were found to be .634 (p<.001) and .621 (p<.000) based on the reference group, those with least problems in relationships with family members, the first 33rd percentile group.

Table 2. Results of a Cox regression on social environment and subjective health condition for the 18-39 age cohort group

Variable	Model	
	Exp(B)	B(SD)
Family economic condition at 15 years old		
Average	0.767	-.266 (.146)
Poor (Affluent)	1.148	0.251 (.047)
Respondent’s education		
Middle school completed or lower	1.966**	.676 (.231)
High school completed (College completed or higher)	0.995	-.005 (.115)
Respondent’s total household income		
Lowest income, 1st 25 th percentile	2.765***	1.017 (.163)
2nd 25 th percentile	1.392*	.331 (.154)
3rd 25 th percentile (Highest income, 4th 25 th percentile)	0.997	-.003 (.156)
Respondent’s profession		
Service/sales	0.959	-.042 (.230)
Agriculture/forestry/fishery	1.006	.006 (.528)
Mechanics/manual labor	0.569	-.564 (.342)
No job (Managers/professionals/office workers)	1.646**	.498 (.160)
Social relationships with family members		
Middle, second 33rd percentile	.634**	-.456 (.141)
Highest problems, third percentile (Lowest problems, first 33rd percentile)	.621***	-.476 (.121)
Chi-Square	188.499	
-2LL	5963.979	

Note: P < .05*, p < .01**, p < .000***; () reference group

Secondly, this study analyzed the 40-54 age cohort group. Those with a family in poor economic condition at 15 years old were found to have a statistically significant relationship with health condition turning from good to bad based on the reference group of affluent economic condition at 15 years of age (Exp(B)=1.322, $p<.001$). Compared to the highest household income group, the lowest 25th percentile household income group, second 25th percentile household income group, and third 25th percentile household income group showed a statistically significant relationship with health condition turning from good to bad (Exp(B)=2.347, $p<.000$; Exp(B)=1.623, $p<.000$; Exp(B)=1.367, $p<.001$). As to respondent's profession, the odds ratio of health condition turning from good to bad for those in the no job group was found to be 1.650, based on the reference group of managers/professionals/office workers ($p<.001$). Those with problems with social relationships with family members were found to have a statistically significant relationship with health condition turning from good to bad. The odds ratio of those within the highest-problem 33rd percentile group was found to be 1.263 ($p<.000$) based on the reference group, those with the least problems with relationships with family members, the first 33rd percentile group.

Table 3. Results of a Cox regression on social environment and subjective health condition for the 40-54 age cohort group

Variable	Model	
	Exp(B)	B(SD)
Family economic condition at 15 years old		
Average	1.024	.024 (.085)
Poor (Affluent)	1.322**	.279 (.083)
Respondent's education		
Middle school completed or lower	0.857	-.155 (.110)
High school completed (College completed or higher)	0.902	-.103 (.102)
Respondent's total household income		
Lowest income, 1st 25 th percentile	2.347***	.853 (.087)
2nd 25 th percentile	1.623***	.484 (.092)
3rd 25 th percentile (Highest income, 4th 25 th percentile)	1.367**	.313 (.096)
Respondent's profession		
Service/sales	0.824	-.194 (.165)
Agriculture/forestry/fishery	0.924	.079 (.172)
Mechanics/manual labor	0.794	-.230 (.175)
No job (Managers/professionals/office workers)	1.650**	.501 (.151)
Social relationships with family members		
Middle, second 33rd percentile	0.946	-.056 (.090)
Highest problems, third percentile (Lowest problems, first 33rd percentile)	1.263***	-.234 (.081)
Chi-Square	296.179	
-2LL	20299.302	

Note: $P < .05^*$, $p < .01^{**}$, $p < .000^{***}$; () reference group

Thirdly, this study analyzed the 55 and higher age cohort group. Those with families in poor economic condition at 15 years of age were found to have a statistically significant relationship with health condition turning from good to bad based on the reference group, affluent economic condition at 15 years old (Exp(B)=1.189, $p < .001$). Those with education of middle school completed and lower, as well as the high school completed group, were found have a statistically significant relationship with health condition turning from being good to bad based on the reference group, those with college completed and higher (Exp(B)=1.855, $p < .000$; Exp(B)=1.813, $p < .010$). Those in the groups of service/sales, agricultural/forestry/fishery, and mechanics/manual labor, and no job were found to have a statistically significant relationship with health condition turning from good to bad based on the reference group, managers/professionals/office workers (Exp(B)=3.151, $p < .001$; Exp(B)=2.750, $p < .05$; Exp(B)=2.560, $p < .05$; Exp(B)=3.258, $p < .001$). The odds ratios of those with the greatest problems with relationships with family members, the third 33rd percentile group, were found to be 1.336 ($p < .000$) based on the reference group, those with the least problems with relationship with family members, the first 33rd percentile group.

Table 4. Results of a Cox regression on social environment and subjective health condition for the 55 and higher age cohort group

Variable	Model	
	Exp(B)	B(SD)
Family economic condition at 15 years old		
Average	1.021	.021 (.065)
Poor (Affluent)	1.189**	.173 (.057)
Respondent's education		
Middle school completed or lower	1.855***	.618 (.169)
High school completed (College completed or higher)	1.813**	.595 (.175)
Respondent's total household income		
Lowest income, 1st 25 th percentile	1.036	.036 (.096)
2nd 25 th percentile	1.050	.049(.103)
3rd 25 th percentile (Highest income, 4th 25 th percentile)	0.910	-.094 (.118)
Respondent's profession		
Service/sales	3.151**	1.148 (.393)
Agriculture/forestry/fishery	2.750*	1.004 (.389)
Mechanics/manual labor	2.560*	.940 (.392)
No job (Managers/professionals/office workers)	3.258**	1.181 (.387)
Social relationships with family members		
Middle, second 33rd percentile	0.886	-.121 (.050)
Highest problems, third percentile (Lowest problems, first 33rd percentile)	1.336***	-.290 (.050)
Chi-Square	146.999	
-2LL	38584.831	

Note: $P < .05^*$, $p < .01^{**}$, $p < .000^{***}$; () reference group

Conclusion

The purpose of this study was to examine the relationship between subjective health condition and social environment using longitudinal data, after examining the fact that the subjective health condition and objective health conditions are highly correlated with each other.

First of all, this study confirmed the fact that subjective health condition and objective health conditions treated by a medical doctor are highly correlated ($r=-.58$, $p<.001$). Still, the correlation can be even higher when women consider depression to be a disease that should be in by a medical setting. In general, women are twice more likely to experience depression than are men, but are not likely to visit a hospital because they do not believe the depression to be serious enough to require treatment in a medical setting. Moreover, they are not precisely aware of their current emotional condition because the national health screening system in Korea does not have a well-designed system for checking mental health (Kim Young-taek, 2010). Thus, women are not likely to report their health condition as being bad even when they are mentally suffering. A bivariate correlation between nero-psychiatric disease and subjective heath condition in this study turned out to be too low ($r=.159$, $p<.001$), even though the two variables are positively correlated with each other.

Past studies have reported that a different chronic disease distributional effect between women and men could contribute to the reason why more women than men report their subjective health condition as bad. Among the chronic diseases which showed the greatest differences in distributional effect between women and men, musculoskeletal disease was found to be outstanding (Kim Seung-gon, 2009). This study also determined that the bivariate correlation between subjective health condition and musculoskeletal disease treated by a medical doctor was be higher than the bivariate correlations between subjective health condition and any other diseases treated by a medical doctor ($r=406$, $p<.001$). Lastly, it was unusual to find a negative relationship between digestive diseases and subjective health condition as in this study. The simple reason might be that women do not consider digestive diseases to be serious enough to report their subjective health conditions as bad.

Nextly, this study used the first (2007), second (2008), third (2010), and fourth waves (2012) of the KLoWF data to observe the changes and duration of independent and dependent variables. For an analytic method, it used Kaplan-Meier analysis as a bivariate analysis and Cox-regression analysis as a multivariate analysis to examine the relationships between selected social environments and subjective health condition. Moreover, this study analyzed these relationships within separate age cohort groups, including the young cohort (18-39 year old group), middle aged cohort (40-54 year old group), and old aged cohort (55 or higher year old group), in order to control for heterogeneities within such age cohort groups.

The results of Kaplan-Meier analysis demonstrated in a graphical manner that unfavorable social environments could indeed negatively affect health condition. The gaps in the

survival rate within predictor groups increased as age approached the end of each age cohort. Those with poor family economic conditions at the age of 15, low education, low income, no or a low-prestige job, and greater social problems with family members showed a lower cumulative survival rate of subjective health condition turning from good to bad than their counterparts. The only exception was found between social problems with family members and subjective health condition in the 18-39 age cohort group. Those with less social problems with family members were found to show a lower cumulative survival rate of turning from good to bad than did their counterparts. The reason might be a characteristic of the young age cohort group of handling tension arising from family members well, even when they actually have more problems with family members.

In addition, the Cox-regression analysis results confirmed the results produced by Kaplan-Meier analysis, even in the multivariate setting. Those in the middle school completed group and lower, both the lowest household income group and the second lowest income group, and no job proved more likely to report subjective health condition as being bad than did their counterparts within the young cohort (18-39 years old). Those from families in poor economic condition at 15 years old, the lowest 25th percentile household income group, second 25th percentile household income group, and third 25th percentile household income, no job, and greater problems with of relationships with family members are more likely to report a subjective health condition of bad than are their counterparts within the middle aged cohort (40-54 years old). Those from families in poor economic condition at 15 years old, both the middle school and lower completed and the high school completed group, service/sales, agricultural/forestry/fishery, and mechanics/manual labor, and no job, and greater problems with relationships with family members are all more likely to report subjective health condition as bad than are their counterparts within the old aged cohort (55 years old).

Finally, this study generally found that those with unfavorable social environments are likely to experience their health condition shifting from being good to being bad at an earlier age than are their counterparts in their life course. Women are far less likely to return to being in a good health condition once their condition has shifted from good to bad. It is reported that less than 10% of KLoWF respondents managed to succeed in returning to a good health condition during the 2007-2010 period (Kim Young-taek, 2012). The findings in this study could have critical policy implications in terms of improved prevention strategies against diseases for women with unfavorable social environments.

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