HEALTH PSYCHOLOGY | RESEARCH ARTICLE

Participation restriction of stroke survivors: Verification of the moderating effects of demographic characteristics

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Abstract: This study aimed to verify the interaction of demographic characteristics on the participation restriction of stroke survivors. This study was a secondary analysis using data from a completed cross-sectional study including stroke survivors. Data from 156 stroke survivors were analyzed. Participation restriction was measured using the Impact on Participation and Autonomy. The main and moderating effects of demographic characteristics were verified through a general linear model. The validated Korean version of the Mini-Mental State Examination was employed to assess cognitive ability. There were three significant moderating factors on participation restriction, namely, gender × presence of a spouse, gender × economic status, and education level × presence of a spouse. Intervention considering simple demographic factors might not affect activities that promote participation. Conclusion: The results of this study suggested that a strategy must be developed to reduce participation restriction among less educated and female stroke survivors without a spouse.

Subjects: Disability; Chronic Diseases; Quality of Life

Keywords: demographic; moderating effect; participation; spouse; stroke

1. Introduction

Participation is defined as involvement in areas related to communication, family life, and community life. Participation can be affected by individual impairment, activity limitations, contextual factors, and both environment and individual (Colver & Dickinson, 2010). The International

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PUBLIC INTEREST STATEMENT

The participation restriction of stroke survivors is influenced by demographic characteristics. The degree of participation is low in women living without a spouse, those with low economic status, and highly educated stroke survivors living with a spouse. Promoting participation of stroke survivors needs to provide support by comprehensive consideration of demographic characteristics.
Classification Functioning, Disability and Health (ICF) is a framework for introducing a new concept of disability that combines personal and environmental factors from the perspective of the past, which was merely a medical or biologic aspect of disability, and a framework for distinguishing a wide range of health-related information. Most importantly, the classification of body function and structure of the ICF is designed to be used with activities and participation items (World Health Organization [WHO], 2001). The activities and participation offered by the ICF differ conceptually: while activities reflect the ability to perform tasks, participation is a more complex aspect of life that can be achieved using the dynamic diversity of the task (Jette, Haley, & Kooyoomjian, 2003; McConachie, Calver, Forsyth, Jarvis, & Parkinson, 2006).

Participation includes the personal life environment. Participation is therefore influenced by complex interactions between external factors related to the personal life environment and individual’s health status, body function, and activity (functional status). Reduced disability and increased participation among stroke survivors are the ultimate goals of rehabilitation and are becoming a health policy direction (White et al., 2007). It has been observed that after 5 years of stroke, personal functioning was maintained, but health-related quality of life (QOL) decreased. In addition, several studies have pointed the importance of limiting activity and social participation rather than health status (Jenkinson, Mant, Carter, Wade, & Winner, 2000; Van Brakel et al., 2006). This means that the goal of intervention should be on individual social role and participation as well as functional enhancement.

Studies have reported several factors that affect participation of stroke survivors. Cognitive impairment (Beaudoin et al., 2013; Viscogliosi et al., 2011), emotional problems (Andrenelli et al., 2015; D’alisa, Baudo, Mauro, & Miscio, 2005), psychological factors (Choi et al., 2015), functional status (Yang & Kong, 2013), and general characteristics are factors known to influence participation (Chau, Thompson, Twinn, Chang, & Woo, 2009; Desrosiers et al., 2006; Poulin & Desrosiers, 2008). Other studies have shown that age, comorbidity, exercise coordination, and upper-limb use are internal factors influencing participation (Desrosiers et al., 2006). In addition, environmental factors include family support and physical and social environment (Rochette & Luc Noreau, 2001; Tsouna-Hadjis, Vemmos, Zakopoulos, & Stamatelopoulos, 2000).

The basic variables are demographic characteristics, which is one of the factors that affected participation of stroke survivors. However, there is insufficient information about the effect of demographic characteristics on participation. Moreover, there are some inconsistent results on the relationship between demographic factors and participation. Although older age was a contributing factor to participation restriction (Andrenelli et al., 2015), younger age was reported as an independent predictor of favorable participation after 1 year in stroke survivors aged over 70 years, but not in stroke survivors below age 70 years (de Graaf et al., 2018). Female gender was associated with higher levels of participation restriction (Chau et al., 2009; Di Carlo et al., 2003); however, it was an unfavorable factor in stroke survivors underage 70 years (de Graaf et al., 2018). These results suggest that the influence of demographic variables on participation may be due to the interactions among variables.

The effects of demographic variables, such as income, presence of a spouse, and education level, on participation have not been verified. Income level was often associated with health status and social connectedness (Altman & Taylor, 2001). Although education level and income do not directly result to participation restrictions, there is a significant difference in the duration of education between participants in the rehabilitation program and those who did not (Harlan, Sandler, Lee, Lam, & Mark, 1995). Marital status and income were significantly associated with overall QOL score. Marital status was positively related to the overall QOL (r = 0.29, p < 0.05), as was income (r = 0.30, p < 0.05) (Kim, Warren, Madill, & Hadley, 1999).

The interaction dynamics of demographic characteristics including gender role, family role, caregiver, and socio-economic status including the shared environment and its effect on factors related to QOL such as depression have been reported (Hays et al., 1997; Siegel, Bradley, Gallo,
Promoting participation is a major goal of rehabilitation, but it lacks specific information to devise effective intervention and rehabilitation programs. Especially, there was insufficient information about the interaction effect of demographic characteristics on participation of stroke survivors. The aim of our study was to verify the interaction among demographic characteristics such as gender, age, education level, presence of a spouse, and economic status on the degree of participation restriction of stroke survivors.

2. Materials and methods

2.1. Participants
This study was a secondary analysis using data from a completed cross-sectional study including stroke survivors. The sample was a convenience sample derived from a study to present a model for participation restriction of chronic stroke survivors (Choi et al., 2015). Six inclusion criteria were applied for this study: (1) participants with confirmed diagnosis of stroke based on hospital records, (2) participants who experienced their first stroke as determined on hospital records, (3) stroke onset of at least 12 months earlier, (4) communication and cognition ability to answer questions, (5) participants who lived in a community, and (6) cognitive function. The validated Korean version of the Mini-Mental State Examination (MMSE-K) was employed to assess cognitive ability. In this study, participants whose MMSE-K scores were 18 and below were excluded.

All participants provided informed consent. The Ethic Review Board of Y University in Korea reviewed and approved this study.

2.2. Measures
Participation restriction was measured using the Impact on Participation and Autonomy (IPA) (Cardol, de Haan, van Den Bos, de Jong, & de Groot, 1999). The five domains of IPA consisted of 32 self-report questions. These five domains were autonomy indoors, family role, autonomy outdoors, social life and relationships, and work/education. Questions were answered based on a 5-point Likert scale. Since the IPA scale measured participation restriction, lower scores indicated greater participation and autonomy. This study used the Korean translation of the IPA (Beaton, Bombardier, Guillemin, & Ferraz, 2000). Cronbach’s alpha was .95.

Demographic factors including gender, age, presence of a spouse, education level, and economic status were investigated and recorded as categorical data. Age was divided into two categories of below or above 60 years. Education level was divided into two categories of below or above high school. Marital status was classified into the presence of a spouse and absence of a spouse. Unmarried, divorced, deceased spouse, and separated were classified under absence of a spouse.

Economic status was divided into two categories of general or low income. The subjective thought on economic status was measured through questions about economic status. A 5-point scale which consists of very sufficient, sufficient, average, somewhat insufficient, or very insufficient was used. The above average income was classified under general income, and somewhat insufficient and very insufficient income were classified under low income.

2.3. Statistical analyses
The differences in participation restriction according to demographic characteristics were analyzed using $x^2$ tests. The moderating effect of demographic characteristics was verified using the general linear model (GLM). Since the GLM could analyze the differences of dependent variables with more than one independent variable, the moderating effect could be derived. The analysis option of full factorial design and type III sums of squares were selected. The post hoc analysis was not completed because there were only two categories in each variable. We evaluated significant main effects of gender, education level, age, economic status, and presence of a spouse on the degree of participation restriction and examined the interaction between gender, education level, age, economic status, and presence of a spouse. We measured the influence of gender × education level, gender × age, gender × economic
status, education level × age, education level × presence of a spouse, education level × presence of a spouse, and education level × economic status, age × presence of a spouse, age × economic status, and presence of a spouse × economic status on the degree of participation restriction. Statistical analysis was performed using SPSS 23.0. Values of p < 0.05 indicate the level of significance.

3. Results

3.1. Participant characteristics
A total of 156 stroke survivors (57 women and 99 men) were analyzed. Among the participants, 115 patients were below age 60 and 41 were above age 60 years. Moreover, 64.7% of participants answered that they had a spouse, while the remaining 55 (35.3%) did not have a spouse. With regard to education level, 114 participants had high school education or above, and others were below high school level. For the household income, 114 participants belonged to the general-income category and 40 participants belonged to the low-income category. The general characteristics of the participants and group differences of the degree of participation restriction are presented in Table 1. The degree of participant restriction according to gender, age, education level, and economic status was significantly different (p < .05) (Table 1), but there was no significant difference according to the presence or absence of a spouse.

3.1.1. Moderating effects of demographic characteristics on depression
Three significant moderating effects on participation restriction were gender × presence of a spouse, gender× income status, and education level × presence of a spouse (p < .05) (Table 2).

The participation restriction of male participants was lower than those of female participants, and gender had a significant interaction with the presence of a spouse (p < .05). The participation restriction of female participants living with a spouse was lower than that of female participants without a spouse. The difference in participation restriction according to the presence of a spouse was higher in female participants than in male participants as shown in Figure 1.

The participation restriction in those with general income was lower than those with low-income status, and economic status had a significant interaction with gender (p < .05). The effect of economic status in female participants was larger than that in male participants (Figure 2).

| Table 1. Demographic characteristics of the participants |
| Category | n  | M   | SD  | t     | p       |
|-----------|----|-----|-----|-------|---------|
| Gender    |    |     |     |       |         |
| Male      | 99 | 58.11| 29.13| -2.32 | .021    |
| Female    | 57 | 69.28| 29.95|       |         |
| Age       |    |     |     |       |         |
| < 60      | 115| 58.31| 28.61| -2.58 | .011    |
| ≥ 60      | 41 | 71.43| 31.08|       |         |
| the presence of spouse | |     |     |       |         |
| yes       | 101| 60.95| 27.21| -5.8  | .560    |
| no        | 55 | 63.79| 34.30|       |         |
| Education |    |     |     |       |         |
| Below high school | 42 | 70.38| 31.51| 2.32  | .021    |
| Above high school | 114| 58.61| 28.56|       |         |
| Economic status |     |     |     |       |         |
| General income | 114| 57.37| 30.11| -3.291| .001    |
| Low income | 40 | 73.89| 25.66|       |         |
The degree of participation restriction according to education level was significantly different as presented in Table 1. However, the effect of education level appears to be different with respect to the presence of a spouse (p < .05). Interaction among variables and the presence of a spouse is shown in Figure 3. The participation restriction of those below high school who lived with a spouse was lower than those who lived without a spouse. However, in those above high school, the participation restriction was higher among stroke survivors who lived with a spouse than those who lived without a spouse.

4. Discussion
This study focused on the interaction effects between demographic characteristics including gender, age, education level, economic status, and presence of a spouse that affect participation restriction of stroke survivors.
Many researchers have studied the factors affecting social participation and return to society after stroke (Ezekiel et al., 2019; Rotter, 2002; Verberne et al., 2018). A previous study found that the return to work rate was higher for men, those with higher income, and those with higher education level than for those who did not (Trygged, Ahacic, & Kareholt, 2011). In a previous study regarding participation, objective participation was determined by physical and cognitive independence, age, and education, whereas subjective participation was determined by physical and cognitive independence, fatigue, and mood (van der Zee, Visser-Meily, Lindeman, Jaap Kappelle, & Post, 2013). These mean that participation restriction is not only affected by physical and psychological functions but also by personal demographic factors. Previous studies have shown that the major factors leading to participation restrictions are older age, female gender, lower education level, and lower income. Recently, Verberne et al. (2018) reported that older stroke survivors with lower education levels showed higher participation restrictions than younger stroke survivors with high education level. In this study, the main effect results showed that female gender, older age, low income, and lower education were associated with increased participation restrictions of stroke survivors, and these results are in concordance with those of previous reports.
In general, the presence of a spouse is considered to influence the participation of stroke survivors because the spouse provides psychological and physical support as primary caregivers of patients needing help (Sreedharan et al., 2013); however, in this study, living with a spouse does not significantly affect participation restriction (Table 1). Interestingly, the presence of a spouse interacted with education level and gender. The effect of spousal presence on the restriction of stroke participation showed different aspects that depend on gender and education level.

According to a previous study, stroke outcomes including activities of daily living independence and QOL differed by gender (Saini & Shuaib, 2008). Similarly, in this study, male stroke survivors had fewer participation restrictions than female stroke survivors, but male stroke survivors had a certain level of participation regardless of the presence of a spouse. In women, participation was more restricted in those without a spouse than those with a spouse. This means that female stroke survivors need more support from the spouse or family. This results showed that social support is an important factor which could decrease gender discrepancies in the QOL of stroke survivors (Norris et al., 2008). Based on the moderating effect of gender and the presence of a spouse, female stroke survivors living without a spouse are considered to need intensive social support.

Basically, highly educated stroke survivors have less participation restriction than less educated stroke survivors. However, according to the results of this study, there was an interaction between the presence of a spouse and education level. The participation restriction was the lowest among highly educated stroke survivors without spouse. In contrast, those with low education and living without a spouse have highly restricted participation. Participation restriction is not significantly affected by education level if living with a spouse, but in the absence of a spouse, the participation restriction after stroke appears to be strongly influenced by education level. Interestingly, in highly educated stroke survivors, the absence of a spouse is less restrictive than the presence of a spouse. Verberne et al. (2018) reported that highly educated stroke survivors are more involved and spent more time in vocational activities. Considering this, stroke survivors with higher education who do not have spouse are believed to be more likely to have independent activity opportunities, and an increase in their occupational activities results in decreased participation restriction. However, further studies on education and spousal presence are required for deeper understanding of their interaction.

Gender and economic status were independent variables influencing participation restriction of stroke survivors and showed significant interaction with each other. The participation restriction of female stroke survivors with low income was the most severe. In women, restrictions of participation tended to increase sharply when the income was low, and it is thought that economic and social support is especially needed for female stroke survivors.

This study has a few limitations. First, it was difficult to generalize the results of the study because of the small sample size and the distribution of variables such as gender, age, and education level tended to be biased toward one side. The effect of demographic variables should be verified through adequate sample size in each group. Second, we did not collect data on the degree of support from the spouse but simply collected data on the presence or absence of a spouse. In addition, we could not analyze the effect of demographic factors on the subdomains of participation restriction. The effect of demographic factors on participation restriction might be different across subdomains. Further study will be completed to gather specific information on participation restriction among stroke survivors to develop an effective support program for them.

The findings of this study showed that demographic factors influenced the level of participation restriction of stroke survivors. Particularly, there was an interaction effect between demographic factors, which ultimately affected the level of participation restriction.

In addition, our results suggest that a simple comparison of demographic variables is meaningful, but the interaction effects between the variables are more meaningful. This study also confirmed the importance of the moderating effects of demographic variables. This implies that a simple dichotomy
based on demographic characteristics of stroke survivors such as male or female, and low or high education level, cannot lead to effective participation promotion. In conclusion, the results of this study suggest that a strategy to increase the level of participation of less educated stroke survivors without spouse and female stroke survivors without spouse might be more necessary.

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Competing interests
The authors report no conflicts of interest.

Implications for Rehabilitation
• Demographic characteristics have moderating effects on participation restriction of stroke survivors.
• The most vulnerable groups for participation are women living without a spouse, those with low economic status, and highly educated stroke survivors living with a spouse.
• Comprehensive consideration of demographic characteristics is needed to promote participation of stroke survivors.

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