The Relationships between Food, Recreation Expense, Subjective Health, and Life Satisfaction: Case of Korean People with Disability

Hyein Shim 1, Won Seok Lee 1 and Joonho Moon 2,*

1 Department of Tourism and Recreation, Kyonggi University, Suwon 443760, Republic of Korea; joyfulhyein@gmail.com (H.S.); lws79877@gmail.com (W.S.L.)
2 Department of Tourism Administration, Kangwon National University, Chuncheon 24341, Republic of Korea
* Correspondence: joonhomoon0412@gmail.com

Abstract: The influence of subjective health and life satisfaction among disabled individuals is unknown. The purpose of this study was to determine the impact of food and recreation expenditure on subjective health and life satisfaction among disabled individuals in Korea. Data from the Panel Survey of Employment for the Disabled from 2016–2018 was utilized. Econometric analyses, least squares, fixed effect, and random affect models were applied. Results showed that monthly food and recreation cost exerted an inverted U-shaped impact on both subjective health and life satisfaction. These findings have policy implications showing a relationship between social and economic variables and health outcomes. This study also sheds light on the literature by clarifying the relationship among four attributes employing the disabled.

Keywords: life satisfaction; subjective health; food expense; recreation expense; people with disabilities

1. Introduction

According to Statistics Korea [1], the population of disabled was 2,501,000 in 2013. This number increased to 2,645,000 in 2020. Korea Disabled People’s Development Institute [2] also reported that the Korean proportion of people with disability was 2.1% in 2001 and 5.1% in 2020. It can be inferred that policy design for people with disability has become more imperative over time. Hence, this research is aiming to inspect the Korean case for the characteristics of the disabled. Since the policy design for the disabled has become more imperative over time, we aim to investigate food and recreational expenditure related to quality-of-life characteristics of the disability population.

Consuming poor quality food is harmful for our health [3–5]. Because food expenditure could become an indicator to capture both the quantity and quality of food, this work adopts food expense as a main attribute. The next area of this research is recreation expenditure. Recreation is a source of mental energy. Similar to food expenditure, recreation expenditure also could represent both the quantity and quality of activities. Such a fact leads this work to select recreation expense as another main element for recreational activities. Thus, this study analyzed food expenditure and recreation expense of people with disability.

Other domains of this work included life satisfaction and subjective health. Life satisfaction has been adopted as a dependent variable by many scholars because it is an indicator of how individual life is worthy and happy subjectively [6–8]. Schwartz and Rabinovitz [9] and Moin et al. [10] documented that the level of life satisfaction for the disabled population is relatively lower than people without disabilities because their activities are constrained in daily life. Hence, it is worthwhile to figure out the life satisfaction of people with disabled to make their lives better. Moreover, this research selected subjective health as another element of this work. This is because subjective health is an individual’s subjecti...
barometer for their mental and physiological mental condition [11–14]. This could be applied to the case of the disabled. Additionally, previous research has demonstrated a significant link between subjective health and life satisfaction [13,14]. Given abundant pieces of work, this research investigated determinants of both subjective health and life satisfaction and our research also investigates the association between the subjective health and life satisfaction of people with disability. In summary, the purpose of this research is to investigate the determinants of life satisfaction using life satisfaction, food, and recreation expenditure. Additionally, another goal of this research is to explore the antecedents of subjective health using food and recreation expenditure.

Recreation and food itself and recreation and food expenses are likely to exert different effects on individual’s living. Despite the difference, extant literature has rarely explored its impact on the living of people with disability, while scholar investigated the effect of food [3,5,15] and recreation [16,17] itself on individual life. The impact of living expenses of people with disability has been sparsely inspected by the extant literature. Thus, this research sheds light on the literature by presenting a deeper understanding of the life pattern of people with disability.

2. Review of Literature and Hypotheses Development

2.1. Life Satisfaction

A vast body of literature has addressed that life satisfaction is an overall evaluation for tangible and intangible aspects of the living condition [6–8]. Hua and Coles [18] and Jang et al. [19] also stated that life satisfaction of the disabled is worthy of investigation because their constraint in daily life is likely to lead them to become less satisfied with their life condition. Because life satisfaction is regarded as a psychological well-being of an individual, many studies have used life satisfaction to understand individual behaviors [8–10]. For instance, Proctor et al. [6] have explored explanatory variables of life satisfaction using youth as study subjects. Karataş et al. [20] have inspected determinants of Turkish adults’ life satisfaction. Krause et al. [8] have also examined antecedents of life satisfaction using university students as research targets. Moreover, previous studies have eagerly investigated the life satisfaction of people with disability. For instance, Moin et al. [10] and Mollaoglu et al. [21] have adopted life satisfaction as a dependent variable to study women with disability and people with mobility disability. Schwartz and Rabinovitz [9] have explored determinants of life satisfaction of people with intellectual disability. Regarding more recent works, Ma and Gu [22] documented influential attributes on life satisfaction. Additionally, Hua and Coles [18] and Jang et al. [19] revealed the determinants of life satisfaction by investigating disabled people.

2.2. Subjective Health

Subjective health refers to subjective appraisal of an individual’s health condition. It integrates physiological and psychological aspects together [11,12,23]. Lu et al. [24] contended that subjective health of the disabled is more vulnerable and unstable because of their physical discomfort. Healthy status is the basis to make life better. Therefore, a number of studies have explored the link between subjective health and life satisfaction [13,25]. Moon et al. [14] also claimed that subjective health is a precondition of a better life because individuals are not able to do anything without healthiness. Indeed, empirical studies revealed the association between life satisfaction and subjective health. To be specific, He et al. [23] have researched Nepalese women and found that subjective health is essential to a better life satisfaction. In a similar vein, Gérain and Zech [13] have investigated caregivers and found that subjective health can positively affect life satisfaction. Thuen et al. [26] have demonstrated a positive association between subjective health and life satisfaction of parental divorced youth. Lu et al. [24] also have revealed a positive relationship between Chinese senior citizens’ subjective health and life satisfaction. Furthermore, Kim et al. [11] have disclosed a positive impact of subjective health on life satisfaction of disabled Koreans. Regarding the findings, it can be inferred that subjective
health is likely to exert positive effects on life satisfaction. Hence, this study proposes the following research hypothesis:

**H1:** *Subjective health exerts a positive impact on life satisfaction.*

### 2.3. Food

Food offers nutrition, and good food leads an individual to have a better condition by taking in more energy [3,5,27]. Coleman-Jensen [28] alluded that food insecurity leads the disabled to become more instable, both mentally and physiologically. It implies that food consumption is a very critical issue from the viewpoint of the people with disability. Delicious and nutritional food makes people feel better, which causes a better physical status by supplying more nutrition to the body [4,5,29]. Apaolaza et al. [30] and Ismael and Ploeger [5] have argued that nutritional food leads individuals to attain both improved health conditions and well-being. Schnettler et al. [15] have studied students of developing countries and found that adequate food consumption is imperative to enhance their life satisfaction. Meiselman [31] has also contended that individual life satisfaction and a better subjective health condition are crucially influenced by the consumption of high-quality food. A review of literature suggests that food consumption is closely connected with an individual’s life satisfaction and subjective health.

### 2.4. Recreation

Recreation is defined as activities to relieve fatigue and stress [32–34]. Recreation includes diverse activities, including picnic, sports, camping, jogging, and so on [35–37]. Scholars also argued that recreation activity is useful to satisfy the social needs and accomplish better healthy conditions in the case of the disabled because their lives are more isolated and less active [38,39]. Previous research has shown an effect of recreation on people’s lives empirically. To be specific, Houge Mackenzie and Hodge [40] have alluded that recreation is essential to improve subjective health. Dudek and Piegdoń [41] have also demonstrated that forest recreation can exert a positive effect on health conditions of patients. In addition, extant studies have presented a significant association between life satisfaction and recreation. In detail, Lapa [36] and Sirgy et al. [42] have revealed that park recreation can enhance life satisfaction. Yoon et al. [17] have performed a study on Korean elderly and found a positive relationship between life satisfaction and recreation activities. Similarly, Rogers et al. [43] have claimed that recreation participation can help patients improve their life satisfaction. In summary, a vast body of literature has uncovered a significant impact of recreation on both subjective health and life satisfaction.

### 2.5. Expenditure and the Law of Diminished Marginal Utility

People spend money on certain activities (e.g., food and recreation) and goods to acquire utility [43–45]. The utility of goods and service could be declined by repeated consumption because people become banal in repeated consumption [45,46]. People could also perceive wasting their time resource for repeated consumption because of its banality [44,47,48]. That is, repeated consumption can lead to a cost that exceeds the benefit, which can result in a negative utility in consumption [47,49–51]. Therefore, it could be reasonably assumed that the utility from more expenditure for food and recreation could decline per unit once it reaches a certain level. This rational is aligned with the argument of the law of diminishing marginal utility which contended that marginal utility is decreased in repeated consumption [52,53]. Moreover, scholars noted that the repeated consumption of goods and service reduces the utility, and the cost by such a repetitive consumption exceeds the benefit from the consumption [54,55]. With regard to such a characteristic of expenditure and considering the review of literature together, this research proposes the following research hypotheses:

**H2a:** *Food expense exerts inverted-U shape impact on subjective health.*
**H2b:** Food expense exerts inverted-U shape impact on life satisfaction.

**H3a:** Recreation expense exerts inverted-U shape impact on subjective health.

**H3b:** Recreation expense exerts inverted-U shape impact on life satisfaction.

Based on the hypotheses, Figure 1 depicts the research model of this study. Subjective health is positively related to life satisfaction. Food expenditure and recreation expense exert an inverted-U shape effect on subjective health. Moreover, this study hypothesizes that food expense and recreation expense present a curve-linear relationship with life satisfaction.

![Research Model](image)

**Figure 1.** Research model.

### 3. Methods

#### 3.1. Data Collection

This research collected the data using the Panel Survey of Employment for the Disabled as a source of secondary data. The panel Survey of Employment for the Disabled offers survey information for people with a disability during the period of 2016 to 2018. The numbers of observation for 2016, 2017, and 2018 were 3767, 3806, and 3816, respectively. Panel data consisted of multiple participants and multiple time points. Namely, data appeared as an unbalanced panel. It suggests that all of the participants did not participate in the survey for the entire study period. The total number of valid observations for data analysis was 11,389.

#### 3.2. Variable Description and Analytic Method

Table 1 shows measurements of variables in this work. Life satisfaction (LS) was measured with a five-point scale (1 = very dissatisfied, 5 = very satisfied). Subjective health was measured with a four-point scale (1 = very poor, 4 = very good). Food expenditure (FE) was the monthly cost for food purchasing. Recreation expenditure (RE) was the monthly expense for recreation activities. Disability level (DL) (0 = mild, 1 = severe) and gender (GN) (0 = male, 1 = female) were measured as binary variables. Age was the physical age (AG) of each survey participant. Personal asset (AS) was measured by the amount of assets possessed. The unit of money variable was 10,000 KRW.
Table 1. Variable description (N = 11,389).

<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
<th>Description (Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life satisfaction</td>
<td>LS</td>
<td>(1 = very dissatisfied, 5 = very satisfied)</td>
</tr>
<tr>
<td>Subjective health</td>
<td>HE</td>
<td>(1 = very poor, 4 = very good)</td>
</tr>
<tr>
<td>Food expense</td>
<td>FE</td>
<td>Monthly food expenditure (unit: 10,000 KRW)</td>
</tr>
<tr>
<td>Recreation expense</td>
<td>RE</td>
<td>Monthly recreation expenditure (unit: 10,000 KRW)</td>
</tr>
<tr>
<td>Personal assets</td>
<td>AS</td>
<td>Personal assets (10,000 KRW)</td>
</tr>
<tr>
<td>Disability level</td>
<td>DL</td>
<td>(0 = mild, 1 = severe)</td>
</tr>
<tr>
<td>Gender</td>
<td>GN</td>
<td>(0 = male, 1 = female)</td>
</tr>
<tr>
<td>Age</td>
<td>AG</td>
<td>Physical age of survey participants</td>
</tr>
</tbody>
</table>

Note: KRW denotes Korean won.

At the beginning, we performed descriptive statistics analysis to attain the study variables’ basic information: mean, standard deviation, minimum, and maximum. This research then adopted a correlation matrix to examine correlations between variables. For data analysis, this research used various econometric methods, including ordinary least square, fixed effect, and random effect. Ordinary least square is a regression model that can minimize residual in the estimation of coefficients [56]. The fixed effect refers to a model that can incorporate multiple time-related variables into the model to minimize omitted variable bias relevant to time in the estimation. The random effect model is a regression model that contains an unobservable effect for better estimation [57]. This study also implemented quadratic regression analysis which incorporated squared attributes into the regression to attest the curve-linear relationship between attributes [56]. Using coefficients of quadratic regression results, this research executed differentiation to reach the first order condition which enabled researchers to compute the point of explanatory variables to maximize values of explained variables [56,58]. In addition, this research computed the variation inflation factor (VIF) to detect multi-collinearity using a threshold of 10 because multi-collinearity could undermine the efficiency in the estimation. In addition, a quadratic regression model is more likely to be impaired by multi-collinearity [58].

4. Results
Descriptive Statistics and Correlation Matrix

Table 2 shows descriptive statistics of variables. The number of observations was 11,389. The mean values of LS and HE were 3.27 and 2.48, respectively. Table 2 also shows standard deviations of LS (SD = 0.69) and HE (SD = 0.66). The mean value of FE was 45.53 with a standard deviation of 26.23. The mean value of RE was 5.40 with a standard deviation of 7.90. Table 2 additionally shows information of DL (mean = 0.32, SD = 0.46), GN (mean = 0.65, SD = 0.47), AG (mean = 43.71, SD = 12.60), and AS (mean = 13,787.44, SD = 26,001.21).

Table 2. Descriptive statistics (N =11,389).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS</td>
<td>3.27</td>
<td>0.69</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>HE</td>
<td>2.48</td>
<td>0.66</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>FE</td>
<td>45.53</td>
<td>26.23</td>
<td>0</td>
<td>250</td>
</tr>
<tr>
<td>RE</td>
<td>5.4</td>
<td>7.9</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>DL</td>
<td>0.32</td>
<td>0.46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>GN</td>
<td>0.65</td>
<td>0.47</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>AG</td>
<td>43.71</td>
<td>12.6</td>
<td>15</td>
<td>66</td>
</tr>
<tr>
<td>AS</td>
<td>13,787.44</td>
<td>26,001.21</td>
<td>0</td>
<td>600,000</td>
</tr>
</tbody>
</table>


Table 3 exhibits the correlation matrix. LS positively correlated with HE (r = 0.440, p < 0.05), FE (r = 0.211, p < 0.05), RE (r = 0.241, p < 0.05), GN (r = 0.033, p < 0.05), and
AS ($r = 0.198, p < 0.05$), whereas LS negatively correlated with DL ($r = -0.166, p < 0.05$) and AG ($r = -0.118, p < 0.05$). HE also positively correlated with FE ($r = 0.194, p < 0.05$), RE ($r = 0.203, p < 0.05$), and AS ($r = 0.141, p < 0.05$). However, HE negatively correlated with DL ($r = -0.146, p < 0.05$) and AG ($r = -0.255, p < 0.05$). FE also positively correlated with RE ($r = 0.253, p < 0.05$). AS positively correlated with FE ($r = 0.229, p < 0.05$) and RE ($r = 0.290, p < 0.05$). In addition, DL negatively correlated with GN ($r = -0.041, p < 0.05$), AG ($r = -0.202, p < 0.05$), and AS ($r = -0.076, p < 0.05$).

Table 3. Correlation matrix.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.440*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FE</td>
<td>0.211*</td>
<td>0.194*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RE</td>
<td>0.241*</td>
<td>0.203*</td>
<td>0.253*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL</td>
<td>-0.166*</td>
<td>-0.116*</td>
<td>-0.092*</td>
<td>-0.089*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GN</td>
<td>0.033*</td>
<td>0.088*</td>
<td>0.039*</td>
<td>0.021*</td>
<td>-0.041*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>AG</td>
<td>-0.118*</td>
<td>-0.255*</td>
<td>-0.115*</td>
<td>-0.188*</td>
<td>-0.202*</td>
<td>-0.061*</td>
<td>1</td>
</tr>
<tr>
<td>AS</td>
<td>0.198*</td>
<td>0.141*</td>
<td>0.229*</td>
<td>0.290*</td>
<td>-0.076*</td>
<td>0.017</td>
<td>-0.037*</td>
</tr>
</tbody>
</table>


Table 4 presents results of the regression analysis for testing hypotheses. The dependent variable was HE. All three models were statistically significant ($p < 0.05$). VIFs suggest that results are less likely to be undermined by multi-collinearity. FE ($\beta = -2.92 \times 10^{-5}, p < 0.05$) and FE ($\beta = 0.006, p < 0.05$) significantly accounted for HE. RE ($\beta = -1.12 \times 10^{-4}, p < 0.05$) and RE ($\beta = 0.014, p < 0.05$) also exerted a significant effect on HE. The negative coefficients of squared attributes present the inverted-U shape effect on subjective health. Considering the first order condition of coefficient, points to maximize HE were calculated to be 102.73 for FE and 62.5 for RE. Additionally, DL ($\beta = -0.235, p < 0.05$) and AG ($\beta = -0.012, p < 0.05$) were negatively associated with HE. GN ($\beta = 0.082, p < 0.05$) and AS ($\beta = 1.60 \times 10^{-6}, p < 0.05$) positively affected HE.

Table 4. Results of hypotheses testing.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model1 (O) $\beta$ (t-stat)</th>
<th>Model2 (F) $\beta$ (t-stat)</th>
<th>Model3 (R) $\beta$ (wald)</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.782 (84.94) *</td>
<td>2.780 (84.12) *</td>
<td>2.782 (84.94) *</td>
<td></td>
</tr>
<tr>
<td>FE</td>
<td>$-2.92 \times 10^{-5}$ (-7.09) *</td>
<td>$-2.91 \times 10^{-5}$ (-7.06) *</td>
<td>$-2.92 \times 10^{-5}$ (-7.09) *</td>
<td>7.17</td>
</tr>
<tr>
<td>RE</td>
<td>$-1.12 \times 10^{-4}$ (-6.03) *</td>
<td>$-1.13 \times 10^{-4}$ (-6.06) *</td>
<td>$-1.12 \times 10^{-4}$ (-6.03) *</td>
<td>2.81</td>
</tr>
<tr>
<td>AS</td>
<td>$0.014$ (11.82) *</td>
<td>$0.015$ (11.82) *</td>
<td>$0.014$ (11.82) *</td>
<td>3.02</td>
</tr>
<tr>
<td>DL</td>
<td>$0.082$ (6.63) *</td>
<td>$0.082$ (6.64) *</td>
<td>$0.082$ (6.63) *</td>
<td>1.01</td>
</tr>
<tr>
<td>AG</td>
<td>$-0.012$ (-26.97) *</td>
<td>$-0.012$ (-26.76) *</td>
<td>$-0.012$ (-26.97) *</td>
<td>1.12</td>
</tr>
<tr>
<td>AS</td>
<td>$1.60 \times 10^{-6}$ (6.83) *</td>
<td>$1.60 \times 10^{-6}$ (6.89) *</td>
<td>$1.60 \times 10^{-5}$ (6.83) *</td>
<td>1.13</td>
</tr>
<tr>
<td>F-value</td>
<td>254.75 *</td>
<td>254.79 *</td>
<td>2037.96 *</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.1519</td>
<td>0.1519</td>
<td>0.1519</td>
<td></td>
</tr>
</tbody>
</table>

Note: dependent variable: HE, * $p < 0.05$. O is ordinary least square, F is fixed effect, R is random effect, and VIF denotes variation inflation factor. Optimal expenditure to maximize HE: $\Delta/\Delta FE = 102.73$, $\Delta/\Delta RE = 62.5$. HE: subjective health, FE: food expense, RE: recreation expense, DL: disability level, GN: gender, AG: age, and AS: personal assets.

Table 5 depicts results of hypotheses testing in case of LS. The dependent variable was HE. All three models were statistically significant regarding $p$-values ($p < 0.05$). VIFs implied that results were less likely to be biased by multi-collinearity. LS was positively impacted by HE ($\beta = 0.388, p < 0.05$). It ensured the significant effect of subjective health on life
satisfaction. \(FE^2 (\beta = -2.00 \times 10^{-5}, p < 0.05)\), \(FE (\beta = 0.005, p < 0.05)\), \(RE^2 (\beta = -9.92 \times 10^{-5}, p < 0.05)\), and \(RE (\beta = 0.012, p < 0.05)\) exerted a significant influence on LS. The results implied the curve linear effect of food and recreation expenses on life satisfaction. This research computed values (\(FE = 125\) and \(RE = 60.48\)) maximizing LS given results of differentiation. Additionally, \(DL (\beta = -0.127, p < 0.05)\) and \(AS (\beta = 2.29 \times 10^{-6}, p < 0.05)\) were significantly associated with LS. In summary, all proposed hypotheses were supported.

Table 5. Results of hypotheses testing.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model1 (O) β (t-stat)</th>
<th>Model2 (F) β (t-stat)</th>
<th>Model3 (R) β (Wald)</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.082 (50.16) *</td>
<td>2.068 (49.60) *</td>
<td>2.082 (50.16) *</td>
<td>1.18</td>
</tr>
<tr>
<td>HE</td>
<td>0.388 (41.80) *</td>
<td>0.388(41.81) *</td>
<td>0.388 (41.80) *</td>
<td>7.2</td>
</tr>
<tr>
<td>FE</td>
<td>(-2.00 \times 10^{-5} (-4.89) *)</td>
<td>(-2.09 \times 10^{-5} (-5.09) *)</td>
<td>(-2.00 \times 10^{-5} (-4.89) *)</td>
<td>2.82</td>
</tr>
<tr>
<td>RE</td>
<td>0.005 (9.21) *</td>
<td>0.005 (9.44) *</td>
<td>0.005 (9.21) *</td>
<td>3.06</td>
</tr>
<tr>
<td>RE^2</td>
<td>(-9.92 \times 10^{-5} (-5.35) *)</td>
<td>(-1.03 \times 10^{-4} (-5.56) *)</td>
<td>(-9.92 \times 10^{-5} (-5.35) *)</td>
<td>1.11</td>
</tr>
<tr>
<td>RE</td>
<td>0.012 (9.89) *</td>
<td>0.012 (10.18) *</td>
<td>0.012 (9.89) *</td>
<td>1.01</td>
</tr>
<tr>
<td>DL</td>
<td>(-0.127 (-9.94) *)</td>
<td>(-0.126 (-9.83) *)</td>
<td>(-0.127 (-9.94) *)</td>
<td>1.19</td>
</tr>
<tr>
<td>GN</td>
<td>(-0.015 (-1.29))</td>
<td>(-0.015 (-1.29))</td>
<td>(-0.015 (-1.29))</td>
<td>1.13</td>
</tr>
</tbody>
</table>
| AG       | \(-0.001 (-0.41)\) | \(-0.001 (-0.11)\) | \(-0.001 (-0.41)\) | 412.37 *
| AS       | \(2.29 \times 10^{-6} (9.82) *\) | \(2.29 \times 10^{-6} (9.81) *\) | \(2.29 \times 10^{-6} (9.82) *\) | 3711.29 * |
| F-value  | 412.37 * | 413.77 * | 2.82 |
| Wald \(\chi^2\) | 0.2459 | 0.2459 | 7.2 |
| \(R^2\) | 0.2459 | 0.2459 | 3.06 |

Note: dependent variable: LS, * \(p < 0.05\). O is ordinary least square, F is fixed effect, R is random effect, and VIF denotes variation inflation factor. Optimal expenditure to maximize LS: \(\Delta FE = 125, \Delta RE = 60.48\). LS: life satisfaction, HE: subjective health, FE: food expense, RE: recreation expense, DL: disability level, GN: gender, AG: age, and AS: personal assets.

5. Discussion and Conclusions

The purpose of this study was to examine the impact of subjective health on life satisfaction of people with disability in Korea. This research ensured that the life satisfaction of the disabled is positively affected by subjective health. Another aim of this research was to inspect the inverted-U shape effect of food and recreation expenditure on both subjective health and life satisfaction of people with disability. Based on the research hypotheses, this research conducted a quadratic regression analysis, and the results revealed the curve linear (inverted-U) impact of both food and recreation expenditure on both life satisfaction and subjective health. Results implied that subjective health was an essential element to promote the life satisfaction of people with disability. Results also uncovered that food expenditure of people with disability exerted a curvilinear impact on both subjective health and life satisfaction. In addition, this study disclosed that recreation expenditure presented an inverted-U shape impact on the life satisfaction of people with disability. Given these results, this research calculated optimal points of both food expenditure (1,027,300 KRW/month) and recreation expenditure (625,000 KRW/month) for subjective health. In addition, this study revealed the point maximizing life satisfaction of people with disability in terms of food (1,250,000 KRW/month) and recreation expense (604,800 KRW/month). The unit of currency in this work was 10,000 KRW. As compared to the mean values of food expenditure (1,250,000 KRW/month) and recreation expenditure (625,000 KRW/month), the optimal values are greater. It implied that people with disability in Korean did not possess enough of a budget for their recreation and food. Regarding gender, the results presented that subjective health is varied, whereas it had no significant difference in the case of life satisfaction. On a similar vein, the subjective health was negatively influenced by age. However, the results indicated that life satisfaction was not significantly affected by age.
5.1. Theoretical Implications and Policy Implications

This research contributes to the literature by externally validating a positive relationship between subjective health and the life satisfaction of people with disability [11,13,14,59]. That is, the findings of this research are aligned with the findings of previous studies. Moreover, we found a curve-linear effect of food and recreation expenditures on both subjective health and life satisfaction. Prior studies are limited in the ability to test the effect of overall food [5,29,30] and recreation [17,42,43] on life satisfaction and subjective health. It suggests that prior studies insufficiently examined the effect of expense on the life quality and subjective health of the disabled. Although food and recreation expenditure could be regarded as varied pieces from overall food and recreation, scholars have sparsely inspected their impacts on both life satisfaction and subjective health. By streamlining such a research gap, this study contributes to the literature by understanding behavioral characteristics of people with disability.

There are several policy implications of these results. Social and economic factors have an important impact on quality of life. Policies supporting nutrition and recreational opportunities may enhance health and quality of life for the disabled population. Moreover, it would be valuable to allot the government budget into health-related parts (e.g., medical and social welfare) to promote subjective health because it is likely to result in the better life satisfaction of people with disability. Furthermore, governments might be able to contemplate increasing subsidies for recreation and food for people with disability. It is because mean values in these attributes (e.g., recreation and food) were insufficient for maximizing both subjective health and life satisfaction. The budget could be used both ways by offering it to consumers and providing funding for the vendors of food and recreation programs. Regarding the standard deviation, the disparity of food expenditure is larger than recreation cost. It can be inferred that policy makers might need to prioritize resolving disparity in food expense because it is a necessity for living. Investing more in food and recreation for the disabled could improve the overall quality of life of people with disability. Results of this research also revealed that people with severe disability had poor subjective health and life satisfaction. Thus, policy makers might need to support them more by offering more social services and financial support. Policy makers might also be able to consider providing people with disability with the opportunity to make money. This could be accomplished by creating jobs for the disabled population. Additionally, policy makers in Korea might need to focus on the point that males show worse subjective health conditions than females with disability. It can be inferred that it might be more effective to dedicate the budget to take care of the mental and physical health of males with disability more.

5.2. Limitation

This study has some limitations. First, the study was constrained to three years. Future research may need to consider a longer time frame to detect long-range effects on health related to food and recreational expenditures as well as additional endpoints such as activity levels and overall health. Moreover, this research only focused on both food and recreation expenses. However, individuals spend their money on more various areas. Future research thus might be able to consider more diverse expenditure to figure out the behavior of people with disability. The above-mentioned efforts might be imperative to understand the behavioral characteristics of the disabled as well as allocate welfare budget more appropriately.

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