

# Impact of Sex and Age on Falls: Mediating Effects of Social Activities, Hypertension, Depression, and Unmet Healthcare Needs

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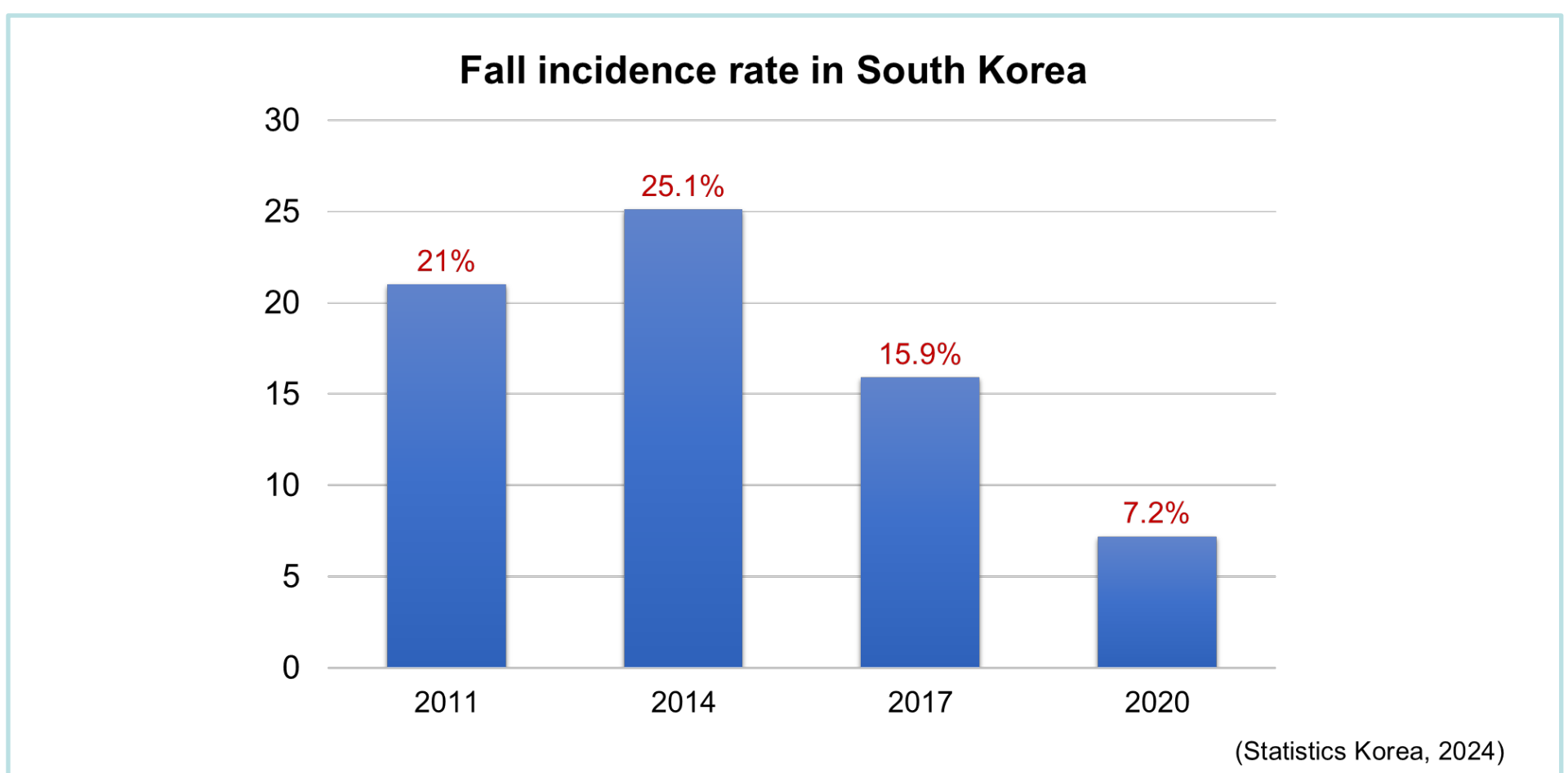
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Falls remain an important issue among older adults, not only in past generations but also in the present. In particular, falls are not limited to minor injuries such as fractures but can lead to serious secondary consequences, including traumatic brain injuries, which require considerable attention. As population aging is rapidly progressing worldwide, research on older adults' health has been actively conducted, and within this context, falls have emerged as a major global public health concern.

Although the incidence of falls has gradually declined as various studies and preventive efforts have progressed, the fall rate in South Korea remains at a relatively high level. In 2023, 5.6% of respondents (n = 10,078) reported experiencing falls, indicating a non-negligible prevalence and highlighting the need for systematic analysis of fall-related risk factors.

The causes of falls can generally be classified into biological and environmental factors. However, falls are not only closely associated with these factors but are also influenced by a wide range of personal and social factors. In particular, limited access to healthcare can increase the risk of falls. Such limited access can be explained as unmet healthcare needs, which refer to situations in which individuals require medical services but are unable to receive appropriate care due to personal or structural barriers.

Therefore, there is a need for studies that comprehensively analyze various risk factors, including unmet healthcare needs, to establish evidence for fall prevention and the improvement of healthcare accessibility among older adults.



## 1) Data and Participants

This study was conducted using data from the 2023 Community Health Survey of South Korea, which targeted adults aged 19 years and older. Among them, individuals aged 65 years and older were selected as the study population. After excluding cases with missing values, a total of 81,794 participants were included in the final analysis.

## 2) Study Variables

- Independent Variables -

- Age: 65–74 years (young-old),  
≥75 years (old-old)
- Sex: Male, Female

- Mediating Variables –

- Participation in Social Activities: Yes / No
- Unmet Healthcare Needs: Yes / No
- Hypertension: Yes / No
- Depressive Symptoms: Yes / No

- Dependent Variable –

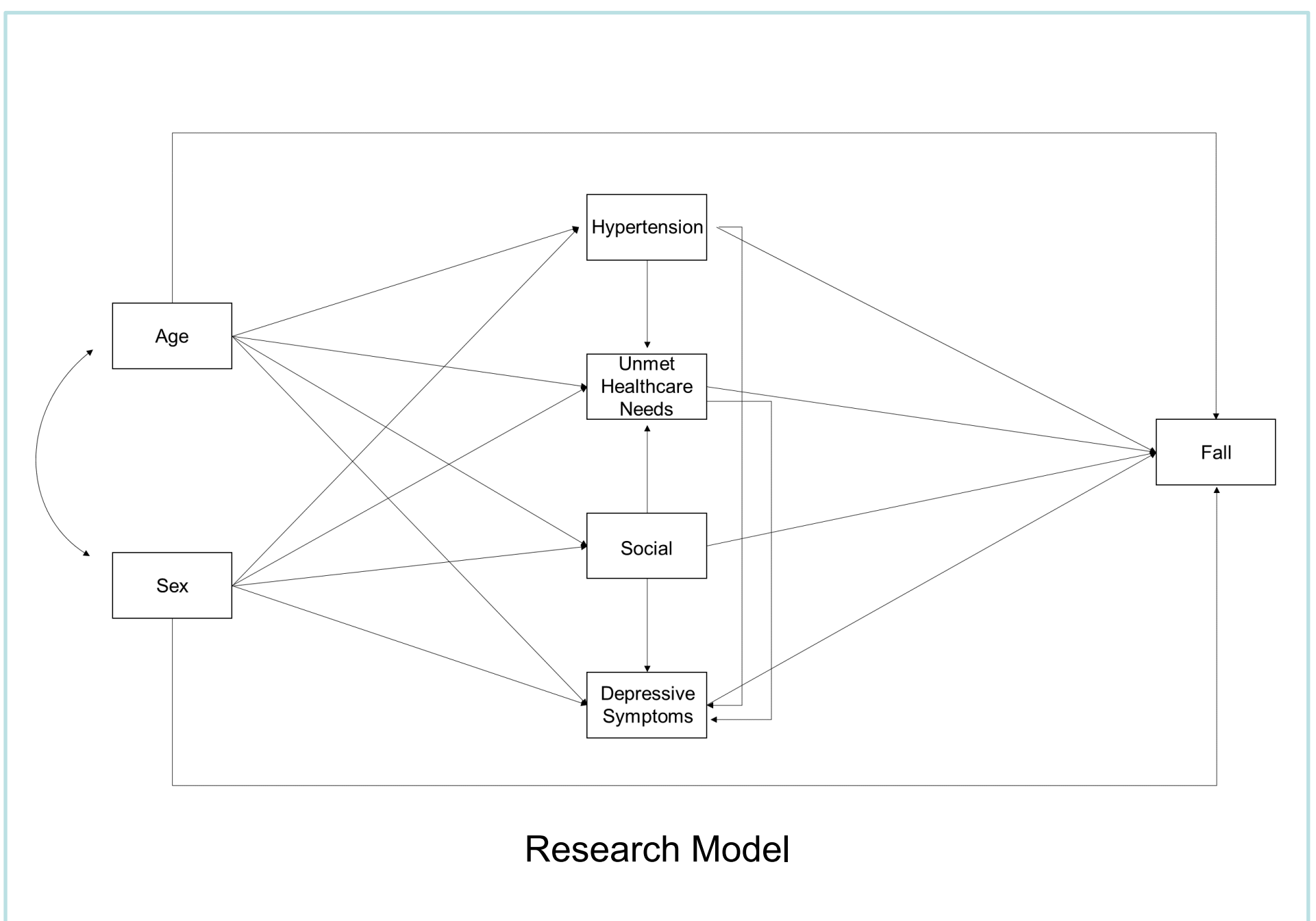
- History of Falls: Yes / No

## 3) Demographic Characteristics and Model Fit Evaluation

Demographic characteristics were analyzed using descriptive statistics, and categorical variables were summarized using frequencies and percentages through chi-square tests. In addition, path analysis was conducted to examine the mediating effects between the independent and dependent variables. Model fit was evaluated using the chi-square test, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR).

## 4) Mediation Analysis and Bootstrapping

Bootstrapping was applied to examine the mediating effects, and direct, indirect, and total effects were analyzed. In addition, data preprocessing was conducted using SAS version 9.4, and path analysis was performed using Mplus version 8.4.



## 1) General Characteristics of the Study Participants

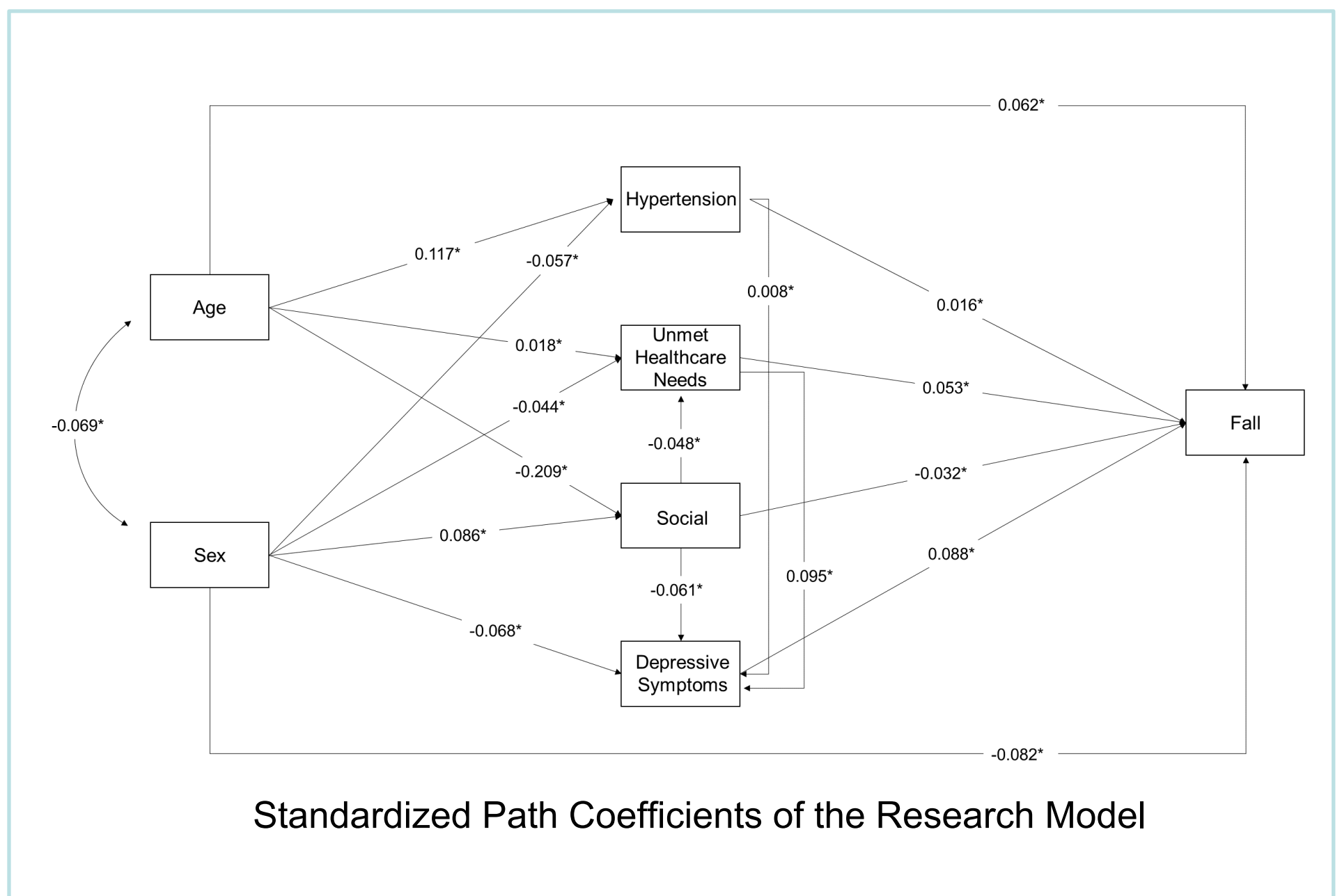
Variables	(N = 81,794) n (%)
<b>Age</b>	
65 - 74	43,957 (53.74)
≥ 75	37,837 (46.26)
<b>Sex</b>	
Male	34,882 (42.65)
Female	46,912 (57.35)
<b>Spouse cohabitation</b>	
Yes	51,250 (62.66)
No	30,544 (37.34)
<b>Employment Status</b>	
Yes	35,102 (42.92)
No	46,692 (57.08)
<b>Educational attainment</b>	
Less than elementary school	41,456 (50.68)
Middle School	15,616 (19.09)
High School	16,531 (20.21)
College degree and above	8,191 (10.01)

## 2) Model Fit Indices

The results of the model fit indices indicated that the research model showed a good fit ( $\chi^2 = 15.454$ ,  $p < .0001$ ; RMSEA = .013; CFI = .999; TLI = .972; SRMR = .002). All fit indices met the recommended criteria (RMSEA  $\leq$  .08, CFI  $\geq$  .95, TLI  $\geq$  .90, SRMR  $\leq$  .08).

## 3) Results of Mediation Analysis

In the relationship between age and falls, social activities, hypertension, and unmet healthcare needs showed significant mediating effects, whereas depression did not. Social activities exhibited the strongest mediating effect ( $\beta = .007$ ,  $p < .001$ ), and both hypertension and unmet healthcare needs also showed partial mediating effects ( $\beta = .002$ ,  $p < .001$ ;  $\beta = .001$ ,  $p < .001$ , respectively). In addition, in the relationship between sex and falls, social activities, unmet healthcare needs, depression, and hypertension all demonstrated significant mediating effects ( $\beta = -.003$ ,  $p < .001$ ;  $\beta = -.002$ ,  $p < .001$ ;  $\beta = -.006$ ,  $p < .001$ ;  $\beta = -.001$ ,  $p < .001$ , respectively). Furthermore, all mediating variables were found to be directly associated with falls ( $\beta = -.032$ ,  $p < .001$ ;  $\beta = .053$ ,  $p < .001$ ;  $\beta = .088$ ,  $p < .001$ ;  $\beta = .016$ ,  $p < .001$ , respectively).



## Reference

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