



Association between unmet needs for medical services and quality of life in urban and rural area

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Introduction

- Over the past 40 years, Korea has rapidly improved in terms of social, economic and cultural aspects including medical services. As the social environment changes and medical technology advances, health disparities between members of society still exist or are becoming more polarized, although health standards have improved, such as strengthening the coverage of medical services and increasing life expectancy.
- According to a 2018 the underserved medical services areas monitoring study, there are 25 underserved medical services areas throughout Korea, defined as areas without general hospitals with more than 500 beds, and 32 cities, counties and districts without maternity and gynecology that can deliver birth.
- In order to resolve health inequality, it is necessary to understand the current state of health inequality between regions and clarify the reasons for the occurrence of health inequality between regions in society. In addition, it is necessary to review what policy efforts are needed to solve this problem.
- Therefore, in this study, we examined the quality of life (QoL) of individuals who needed medical services by dividing them into two different groups according to their unmet needs for medical services as of last year.

Materials and Methods

- Data source:** This study was carried out using data from the Korean Centers for Disease Control and Prevention (KCDC) initiated Korean Community Health Survey (KCHS) for the year 2019.

- Study population:** Participants who had missing data for the variables used in this study were excluded. This led to the final inclusion of 187,740 participants, including 100,712 individuals living in urban area and 87,028 individuals living in rural area (Figure 1).

- Dependent variable:**
Quality of Life Scores (0 to 1)

- Interesting variable:**
Unmet needs for medical services of last year

- Statistical analysis:**
The general characteristics analyzed using t-test and analysis of variance (ANOVA) to compare differences in QoL scores and standard deviations.

A multiple regression analysis was used to analyze the association between unmet needs for medical services and QoL scores.

All the analyses were carried out using the SAS software version 9.4 (SAS Institute, Cary, NC, USA).

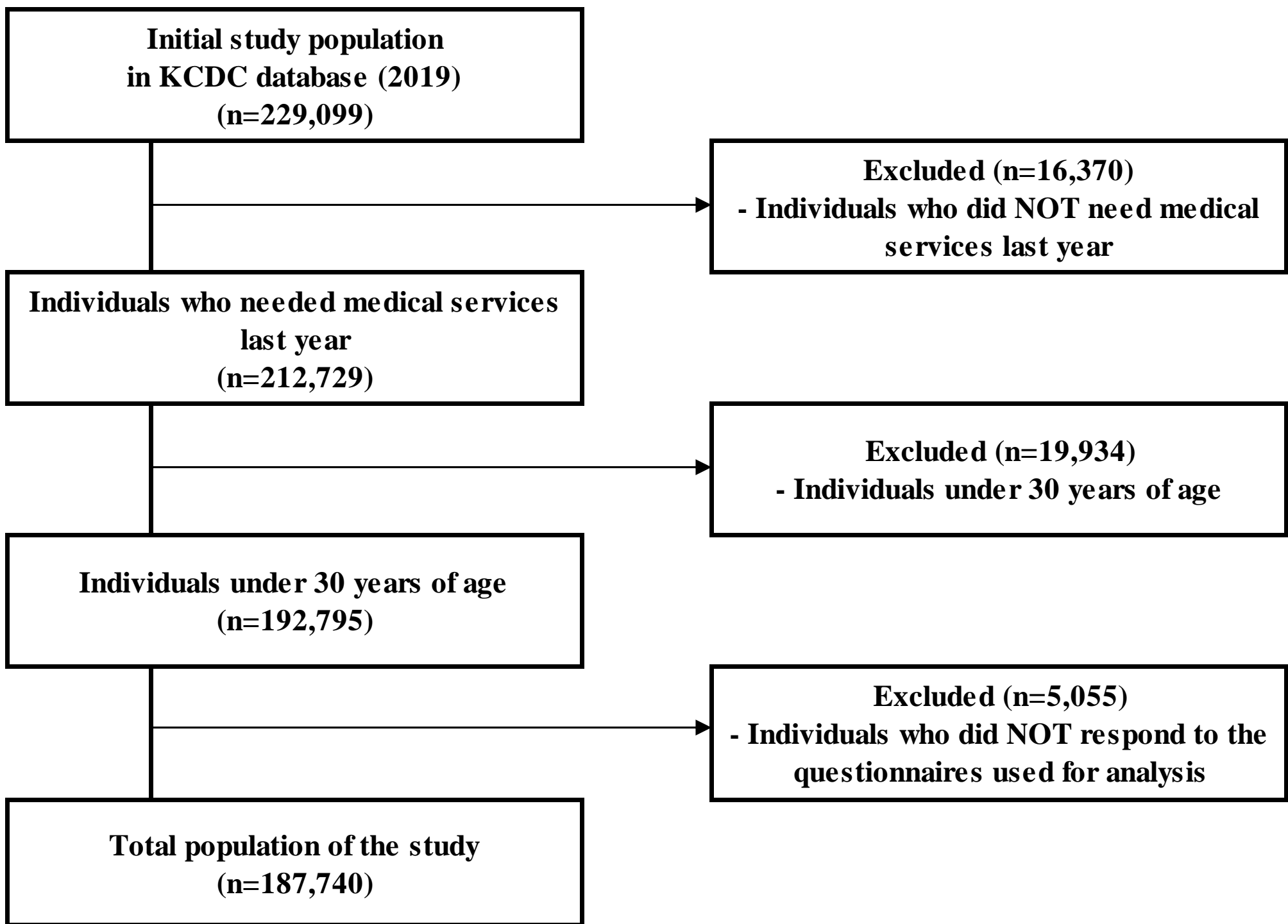


Figure 1. Flow chart of study population

Discussion

- The characteristics at the first wave of the study participants are presented in Table 1. The total of 8,130 participants were divided into 3,744 men and 4,386 women. The total mean CES-D 10 scores of men and women were 2.280±2.180 and 2.760±2.440, respectively.
- Unmet needs for medical services are possible influencing factors for their health related QoL in both urban and rural areas. The results of this study support this concept by indicating an association between unmet needs for medical services and QoL in the Korean population when adjusted for age, sex monthly household income, highest level of education, marital status, job, cohabiting generations, perceived health status, regular physical activities, social activities, hypertension, and diabetes.
- The QoL score in rural areas was generally lower compared to urban areas. Measures to reduce unmet medical care are expected to require different appropriate countermeasures depending on the characteristics of urban and rural areas. This study has the strength of examining association between QoL and unmet needs for medical services and various reasons for unmet needs were conducted by different region.
- This research had some limitations. First, in this study, the standards for urban and rural areas were classified into neighborhood(dong) and town(eup) and township(myeon). This criterion is a designated name based on the number of population relative to the area, and can indirectly evaluate the development degree and accessibility of the region. However, it may not be accurate to distinguish between "urban" and "rural" by this criterion. Next, covariates were carefully selected to minimize the risk of unexpected errors; however, other possible variables might have influenced the outcome, resulting in unintentional bias. Moreover, the study featured a cross-sectional design, the data is recorded only once for each individual, making it difficult to infer the temporal association between unmet needs for medical services and QoL scores. In other words, the results could not identify a definite causal relationship and rule out potential bidirectional effects.
- In conclusion, the results of this study indicate that there are significant associations that among those who had unmet needs for medical services, health related QoL tended to decrease in both urban and rural area. Therefore, it is important that appropriate policies and management measures are essential to reduce unmet needs for medical services in both urban and rural areas.

Results

- The characteristics of the study participants are presented in Table 1. The total of 187,740 participants were divided into 100,712 individuals living in urban area and 87,028 in rural area. The total mean QoL scores of groups of urban and rural area were 0.932±0.123 and 0.903±0.148, respectively.

Table 1. General characteristics according to quality of life in 2019

Variables	Total		Quality of Life (QoL)								P-value
	N	%	Urban				Rural				
			N	%	Mean±SD		N	%	Mean±SD		
Total	187,740	100.0	100,712	53.6	0.932	0.123	87,028	46.4	0.903	0.148	
Unmet Needs for Medical Services ^a										<.0001	
Yes	11,337	6.0	5,669	50.0	0.872	0.172	5,668	50.0	0.817	0.216	
No	176,403	94.0	95,043	53.9	0.935	0.119	81,360	46.1	0.908	0.141	

^a Groups were divided according to whether they had experience in the last year of medical treatment but had not received it.

- Table 2 describes the relationship between unmet needs for medical services and QoL according to residential area. Both in urban and rural area, those who had unmet needs for medical services had lower QoL scores (β : -0.048, P =<0.001 and β : -0.064, P =<0.001 respectively) than those who had not unmet needs for medical services.
- Table 3 and 4 shows subgroup analysis of association between reasons of unmet needs for medical services and QoL in urban and rural area respectively. The reasons of unmet needs were classified into a total of 7 different groups.

Table 2. Results of analisis of factors associated with with quality of life in urban and rural area

Variables	Quality of Life (QoL)					
	Urban			Rural		
	β	S.E	P-value	β	S.E	P-value
Unmet Needs for Medical Services ^a						
Yes	-0.048	0.0019	<.0001	-0.064	0.0023	<.0001
No	Ref.			Ref.		

^a Groups were divided according to whether they had experience in the last year of medical treatment but had not received it.

Variables were adjusted for age, sex, monthly household income, highest level of education, marital status, job, cohabiting generations, perceived health status, regular physical activities, social activities, hypertension, and diabetes.

Table 3. Subgroup analysis of Association between Reasons of Unmet Needs for Medical Services with Quality of Life in Urban Area

Variables	Urban															
	Reasons of Unmet Needs for Medical Services ^a															
	No Experiences of Unmet Needs		No Time		Mild Symptoms		Financial Problems		Traffic Inconvenience		Hospital Inconvenience		Fear of Treatment		Other Reasons	
	β		β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E
Age																
30-39	Ref.		-0.027***	0.0026	-0.023***	0.0049	-0.081***	0.0166	-0.005	0.0200	-0.065***	0.0167	-0.025	0.0159	-0.067**	0.0255
40-49	Ref.		-0.027***	0.0026	-0.016***	0.0039	0.086***	0.0168	-0.134*	0.0655	-0.044**	0.0166	-0.063**	0.0196	-0.075**	0.0353
50-59	Ref.		-0.028***	0.0030	-0.021***	0.0054	-0.105***	0.0147	-0.192**	0.0693	-0.064***	0.0157	-0.039	0.0212	-0.081***	0.0188
60-69	Ref.		-0.037***	0.0060	-0.027***	0.0074	-0.089***	0.0117	-0.197**	0.0727	-0.019	0.0156	-0.054**	0.0171	-0.161***	0.0394
≥70	Ref.		-0.038*	0.0168	-0.030**	0.0085	-0.092***	0.0108	-0.132***	0.0220	-0.075	0.0390	-0.052	0.0269	-0.237***	0.0242
Sex																
Male	Ref.		-0.024***	0.0023	-0.020***	0.0039	-0.071***	0.0095	-0.227***	0.0522	-0.061***	0.0165	-0.027	0.0225	-0.157***	0.0279
Female	Ref.		-0.028***	0.0023	-0.023***	0.0037	-0.107***	0.0082	-0.129**	0.0200	-0.048***	0.0121	-0.047***	0.0105	-0.162***	0.0166
Monthly Household Income ^b																
<200	Ref.		-0.034***	0.0064	-0.026**	0.0072	-0.095***	0.0081	-0.160***	0.0258	-0.055*	0.0263	-0.059**	0.0196	-0.211***	0.0237
200-399	Ref.		-0.030***	0.0030	-0.021***	0.0042	-0.072***	0.0105	-0.136**	0.0376	-0.075***	0.0198	-0.058***	0.0174	-0.096***	0.0226
400-599	Ref.		-0.027***	0.0026	-0.027***	0.0049	-0.064***	0.0173	-0.085**	0.0327	-0.035*	0.0152	-0.025*	0.0126	-0.115***	0.0265
≥600	Ref.		-0.021***	0.0025	-0.014**	0.0052	-0.050*	0.0230	-0.086*	0.0343	-0.046**	0.0149	0.002	0.0139	-0.111**	0.0357
Highest Level of Education																
Elementary school/lower	Ref.		-0.041***	0.0091	-0.022*	0.0085	-0.094***	0.0105	-0.128***	0.0209	-0.072*	0.0306	-0.044	0.0241	-0.197***	0.0247
Middle school	Ref.		-0.034***	0.0072	-0.036***	0.0091	-0.093***	0.0136	-0.185**	0.0664	-0.107**	0.0380	-0.064*	0.0316	-0.253***	0.0507
High school	Ref.		-0.028***	0.0028	-0.018**	0.0039	-0.089***	0.0109	-0.201***	0.0557	-0.064**	0.0190	-0.046**	0.0169	-0.118***	0.0249
College graduate/above	Ref.		-0.025***	0.0019	-0.022***	0.0040	-0.080***	0.0166	-0.092	0.0525	-0.030**	0.0093	-0.043***	0.0128	-0.120***	0.0252
Marital Status																
Single	Ref.		-0.037***	0.0058	-0.019**	0.0072	-0.097***	0.0094	-0.144***	0.0248	-0.067*	0.0317	-0.055*	0.0243	-0.225***	0.0268
Divorced/Separated/Bereaved	Ref.		-0.028***	0.0051	-0.011	0.0073	-0.081***	0.0208	-0.294*	0.1338	-0.089*	0.0389	-0.056	0.0333	-0.175**	0.0649
Married	Ref.		-0.025***	0.0018	-0.024***	0.0031	-0.086***	0.0090	-0.129***	0.0296	-0.044***	0.0085	-0.036***	0.0098	-0.115***	0.0161
Cohabiting Generations																
1	Ref.		-0.032***	0.0035	-0.024***	0.0046	-0.100***	0.0086	-0.143***	0.0236	-0.061**	0.0186	-0.067***	0.0167	-0.197***	0.0212
2	Ref.		-0.024***	0.0019	-0.021***	0.0035	-0.083***	0.0097	-0.175***	0.0386	-0.051***	0.0113	-0.029*	0.0115	-0.089***	0.0163
≥3	Ref.		-0.032***	0.0065	-0.024*	0.0100	-0.067***	0.0183	-0.062*	0.0307	-0.045	0.0338	-0.019	0.0310	-0.264***	0.0624
Perceived Health Status																
Healthy	Ref.		-0.026***	0.0026	-0.015***	0.0033	-0.035**	0.0132	-0.051	0.0283	-0.034*	0.0156	-0.021	0.0134	-0.046*	0.0191
Average	Ref.		-0.031***	0.0019	-0.028***	0.0034	-0.066***	0.0072	-0.067**	0.0257	-0.039***	0.0087	-0.060***	0.0128	-0.075***	0.0170
Unhealthy	Ref.		-0.032***	0.0057	-0.021**	0.0078	-0.107***	0.0092	-0.174***	0.0265	-0.079***	0.0238	-0.042*	0.0175	-0.206***	0.0208

* p <0.05, ** p <0.01, *** p <0.001

^a Groups were divided according to whether they had experience in the last year of medical treatment but had not received it.

^b Unit of monthly household income: 10,000 KRW

Table 4. Subgroup analysis of Association between Reasons of Unmet Needs for Medical Services with Quality of Life in Rural Area

Variables	Rural															
	Reasons of Unmet Needs for Medical Services ^a															
	No Experiences of Unmet Needs		No Time		Mild Symptoms		Financial Problems		Traffic Inconvenience		Hospital Inconvenience		Fear of Treatment		Other Reasons	
	β		β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E
Age																
30-39	Ref.		-0.030***	0.0039	-0.012*	0.0054	-0.086***	0.0237	-0.033**	0.0107	-0.024	0.0156	-0.036*	0.0140	-0.083*	0.037
40-49	Ref.		-0.027***	0.0036	-0.001	0.0047	-0.072***	0.0172	-0.074**	0.0260	-0.029	0.0196	-0.032	0.0178	-0.107*	0.0457
50-59	Ref.		-0.027***	0.0033	-0.013**	0.0058	-0.087***	0.0135	-0.120***	0.0278	-0.053**	0.0181	-0.019	0.0135	-0.092**	0.0349
60-69	Ref.		-0.029***	0.0052	-0.025***	0.0063	-0.116***	0.0159	-0.109***	0.0232	-0.017	0.0192	-0.037*	0.0174	-0.165***	0.0334
≥70	Ref.		-0.026***	0.0073	-0.038***	0.0083	-0.095***	0.0106	-0.128***	0.0083	-0.085**	0.0274	-0.067*	0.0273	-0.264***	0.0205
Sex																
Male	Ref.		-0.022***	0.0031	-0.020***	0.0052	-0.100***	0.0119	-0.175***	0.0174	-0.045*	0.0176	-0.030*	0.0150	-0.253***	0.0302
Female	Ref.		-0.028***	0.0028	-0.024***	0.0048	-0.094***	0.0090	-0.111***	0.0077	-0.058***	0.0174	-0.042**	0.0131	-0.194***	0.0172
Monthly Household Income ^b																
<200	Ref.		-0.025***	0.0044	-0.030***	0.0060	-0.096***	0.0082	-0.124***	0.0079	-0.067**	0.0213	-0.045**	0.0162	-0.238***	0.0185
200-399	Ref.		-0.025***	0.0035	-0.020**	0.0066	-0.070***	0.0127	-0.104***	0.0198	-0.026	0.0161	-0.003	0.0144	-0.189***	0.0363
400-599	Ref.		-0.032***	0.0037	-0.017**	0.0058	-0.087*	0.0412	-0.147***	0.0350	-0.070**	0.0224	-0.049**	0.0181	-0.126*	0.0502
≥600	Ref.		-0.024***	0.0043	-0.008	0.0078	-0.130*	0.0658	-0.140	0.0778	0.002	0.0231	-0.031*	0.0140	-0.030	0.0245
Highest Level of Education																
Elementary school/lower	Ref.		-0.027***	0.0048	-0.038***	0.0071	-0.095***	0.0090	-0.121***	0.0081	-0.085**	0.0261	-0.060**	0.0214	-0.230***	0.0195
Middle school	Ref.		-0.029***	0.0057	-0.014	0.0073	-0.086***	0.0216	-0.139***	0.0263	-0.025	0.0216	-0.014	0.0172	-0.248***	0.0464
High school	Ref.		-0.024***	0.0032	-0.006	0.0042	-0.099***	0.0170	-0.137***	0.0262	-0.042*	0.0193	-0.030**	0.0099	-0.198***	0.0417
College graduate/above	Ref.		-0.029***	0.0032	-0.022***	0.0054	-0.097**	0.0200	-0.086***	0.0252	-0.031*	0.0224	-0.027	0.0166	-0.073*	0.0254
Marital Status																
Single	Ref.		-0.023***	0.0057	-0.035***	0.0083	-0.089***	0.0110	-0.127***	0.0098	-0.053*	0.0211	-0.054*	0.0237	-0.210***	0.0218
Divorced/Separated/Bereaves	Ref.		-0.024***	0.0063	0.002	0.0084	-0.084***	0.0203	-0.214**	0.0670	-0.045	0.0243	0.014	0.0441	-0.186**	0.0719
Married	Ref.		-0.027***	0.0024	-0.021***	0.0040	-0.104***	0.0103	-0.116***	0.0105	-0.055**	0.0170	-0.033***	0.0092	-0.218***	0.0223
Cohabiting Generations																
1	Ref.		-0.028***	0.0032	-0.027***	0.0047	-0.099***	0.0085	-0.127***	0.0081	-0.050**	0.0187	-0.043***	0.0109	-0.225***	0.0181
2	Ref.		-0.025***	0.0029	-0.018**	0.0056	-0.101***	0.0150	-0.112***	0.0173	-0.051**	0.0158	-0.016	0.0135	-0.191***	0.0311
≥3	Ref.		-0.017**	0.0069	-0.014	0.0150	-0.034	0.0241	-0.182***	0.0353	-0.095**	0.0301	-0.074	0.0636	-0.164*	0.0710
Perceived Health Status																
Healthy	Ref.		-0.025***	0.0034	-0.020***	0.0050	-0.040**	0.0146	-0.047***	0.0136	-0.039*	0.0152	-0.041	0.0209	-0.160***	0.0418
Average	Ref.		-0.031***	0.0026	-0.018***	0.0039	-0.084***	0.0096	-0.075***	0.0103	-0.038***	0.0108	-0.030**	0.0096	-0.083***	0.0170
Unhealthy	Ref.		-0.029***	0.0052	-0.033***	0.0088	-0.097***	0.0093	-0.136***	0.0091	-0.073**	0.0262	-0.045*	0.0221	-0.244***	0.0194