**Supplementary Material 1. Fixed-effects logit analysis on health effects of unmet medical needs**

 We performed a logistic panel analysis that examines the hypothesis that unmet medical needs negatively affect health in order to ensure its adequacy before estimating the mediating effects of unmet medical needs. We estimated the health effects of unmet medical needs (Unmet medical need (M) → Poor Health (Y)) assuming that an unmet medical needs experience will be preceded by healthcare needs because the data cannot identify the medical needs. For this purpose, fixed-effects logit model estimation is applied to control the fixed properties of unmeasured individuals. The specific analysis model is as follows.

(Formula S1)

 The dependent variable is self-rated health using logit, Zi is the control variable, μi is the personal fixed effect, and εit is the residual term. In the panel analysis using unmet medical needs variables of the Korean medical panel, observations were excluded from the analysis when the dependent variable did not change during the observation period, therefore the probability effect model was mainly applied instead of the fixed-effect model because estimation efficiency was low [1,2]. However, this study suggests that there is a correlation between unmet medical needs and personal fixed-effects (μi), and for focusing on the estimation of the local average treatment effect on whether an unmet medical needs experience leads to poor health, we decided to use fixed-effects model. In the Hausman test, it was also confirmed that the systematic difference is significant in the estimation results of the two models (χ2 = 497.98, p <0.0001). STATA 15 was used for analysis and xtreg command was used for fixed-effect logit analysis.

 The results of fixed-effects logistic analysis using unbalanced panel survey dataset for 5 years showed that unmet medical needs experience had a significant effect on self-rated health (Table S1). In the analysis of adult, the unmet medical needs experience and the unmet medical needs experience due to economic reasons were all related to health, and the regression coefficient of unmet medical needs experience due to economic reasons was higher than that of total unmet medical needs. The effect of unmet medical needs was higher in males than in females. In particular, the regression coefficient of poor health due to economic reasons was the highest among the elderly over 65 years.

Table S1. Fixed-effects logit analysis on health effects of unmet medical needs, 2011-2015 Korea health panel

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **ALL** |  | **Female** |  | **Male** |
|  |  | β | se |  | β | se |  | β | se |
| **All age** |  |  |  |  |  |  |  |  |  |
| Unmet needs |  | 0.583\*\*\* | 0.045 |  | 0.527\*\*\* | 0.055 |  | 0.689\*\*\* | 0.077 |
| Unmet needs due to economic reasons  |  | 0.595\*\*\* | 0.067 |  | 0.562\*\*\* | 0.083 |  | 0.652\*\*\* | 0.116 |
| Person-year(person) |  | 18,100 (4,236) |  | 11,502 (2,668) |  | 6,578 (1,568) |
| **18~64** |  |  |  |  |  |  |  |  |  |
| Unmet needs |  | 0.532\*\*\* | 0.061 |  | 0.443\*\*\* | 0.077 |  | 0.681\*\*\* | 0.100 |
| Unmet needs due to economic reasons  |  | 0.599\*\*\* | 0.105 |  | 0.643\*\*\* | 0.133 |  | 0.503\*\*\* | 0.171 |
| Person-year(person) |  | 9,428 (2,301) |  | 5,964 (1,431) |  | 3,464 (870) |
| **Over 65** |  |  |  |  |  |  |  |  |  |
| Unmet needs |  | 0.606\*\*\* | 0.069 |  | 0.587\*\*\* | 0.082 |  | 0.643\*\*\* | 0.127 |
| Unmet needs due to economic reasons  |  | 0.572\*\*\* | 0.091 |  | 0.499\*\*\* | 0.109 |  | 0.717\*\*\* | 0.166 |
| Person-year(person) |  | 8,148 (1,925) |  | 5,211 (1,232) |  | 2,937 (693) |

\*\*\* p<0.001

Estimation of the effect of unmet medical needs by adjusting age, education level, employment, social insurance status, chronic diseases, disability, low income, observation year

References

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