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Underweight and the risk of end-stage renal disease in the general population: a nationwide cohort study

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Objectives:

Few studies have investigated the association between being underweight and the risk of end-stage renal disease (ESRD) in the general population. We examined the effect of BMI on the risk of ESRD according to detailed underweight status using a nationwide cohort.

Methods: We included 10,133,738 individuals aged 20 years or over, who underwent a health examination that was conducted as part of the Korean National Health Insurance Service in 2009. Based on body mass index, underweight status was categorized into normal (18.50–22.99), mild (17.00–18.49), moderate (16.00–16.99), and severe underweight (<16.00) groups. Cox proportional hazards analyses were performed to calculate the hazard ratio for ESRD according to the severity of underweight in reference to the normal weight.

Results:

The mean estimated glomerular filtration rate (eGFR) of the eligible subjects in this study cohort was 87 ml/min per 1.73 m². During a median follow up period of 8.32 year, 22,469 incident ESRD occurred. Underweight was associated with a higher risk of ESRD in all participants after adjustment for all covariates including eGFR. The incidence of ESRD increased proportionally with the severity of underweight in the multivariate model. The hazard ratios (95% confidence intervals) for mild, moderate, and severe underweight were 1.60 (1.44–1.78), 1.79 (1.52–2.10), and 1.91 (1.52–2.39) for ESRD. When we performed stratified analysis according to age, gender and presence of diabetes and hypertension, this relationship was more prominent in participants without diabetes and hypertension.

Conclusions:

Patients who were underweight had a significantly higher prospective risk of incident ESRD, even after adjusting for confounding factors.