

中文題目：台灣、韓國、及日本慢性腎臟病疾病負擔的性別差異：從 1990-2019 全球疾病負擔研究之發現

英文題目：Sex difference in chronic kidney disease burden in Taiwan, South Korea, and Japan: findings from the Global Burden of Disease Study 1990-2019

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Background

Growing evidence showed that females and males were differentially affected by chronic kidney disease (CKD) in incidence, prevalence, and health consequences. However, the substantial changes in demographic, social, and epidemiologic trends over the past 3 decades may have contributed to changes in epidemiology of CKD. As Taiwan, South Korea, and Japan were similar in geographical location and socio-demographic index and were countries with high incidence and prevalence of treated end-stage kidney disease, here we used the 2019 Global Burden of Disease (GBD) study data to describe and compare sex differences and changes in CKD burden in these three countries from 1990 to 2019, including incidence, prevalence, death, and disability-adjusted-life-years (DALYs).

Method

The GBD study provides a detailed epidemiologic assessment of diseases, injuries and risk factors by age and sex on a global scale. The main data sources of GBD study were published literature, vital registration systems, end-stage kidney disease registries, and household surveys. CKD burden were estimated by using a Cause of Death Ensemble model and a Bayesian meta-regression analytical tool. In the GBD study, CKD was defined as estimated glomerular filtration rate of less than 60 ml/min per 1.73 m², or albumin creatinine ratio ≥ 30 mg/g, or renal replacement therapy.

Results

In 2019, the age-standardized incidence rates of CKD in Taiwan, South Korea, and Japan were 309.2 (95% uncertainty interval 293.8 to 327.9), 238.6 (220.5 to 256.9), and 291.5 (266.7 to 317.2) per 100,000 persons, respectively, with female to male rate ratios of 1.07, 1.06, and 0.81. In addition, the age-standardized prevalence rates in Taiwan, South Korea, and Japan were 10516.9 (9876.6 to 11173.0), 6855.4 (6492.3 to 7224.9), and 8696.5 (8088.6 to 9256.8) per 100,000 persons, respectively, with female to male rate ratios of 1.26, 1.11, and 0.91, respectively.

From 1990 to 2019, the age-standardized incidence rates increased by 21.2% (14.3% to 28.6%) in Taiwan; males increased by 13.1% (6.9% to 20.2%) and females increased by 30.5% (19.0% to 41.7%). In addition, the age-standardized prevalence rates in Taiwan increased by 11.5% (8.4% to 14.6%); males increased by 8.0% (4.3% to 11.8%) and females increased by 13.1% (8.9% to 17.3%). In South Korea and Japan, the age-standardized incidence rates increased by 10.1% (1.2% to 18.4%) and 6.4% (4.6% to 8.2%) respectively, while the age-standardized prevalence rates remained stable. In South Korea, the age-standardized incidence rate increased by 13.3% (4.1% to 24.4%) in females while it remained stable in males. Conversely, the age-standardized incidence rate in Japan increased in males by 12.2% (8.8% to 15.8%) while it remained unchanged in females.

Overall, 8248 (6512 to 10329) Taiwanese, 7979 (6931 to 8864) Korean, and 45324 (35349 to 51149) Japanese people die from CKD in 2019, with age-standardized death rates of 20.5 (16.1 to 25.7), 9.6

(8.3 to 10.6), and 8.9 (7.2 to 9.8) per 100,000 persons. The female to male age-standardized death rate ratios in Taiwan, South Korea, and Japan were 0.89, 0.63, and 0.59, respectively. Additionally, CKD resulted in 223178 (186119 to 265334), 170934 (154033 to 188915), and 768793 (661723 to 856147) DALYs in 2019; the age-standardized DALY rates were 590.4 (490.6 to 701.2), 203.0 (182.8 to 224.5), and 221.9 (192.4 to 250.5) per 100,000 persons, with female to male rate ratios of 0.89, 0.68, and 0.64 in Taiwan, South Korea, and Japan, respectively.

From 1990 to 2019, the age-standardized death rates decline by 21.6% (2.5% to 36.9%), 20.9% (12.1% to 30.1%), and 31.0% (26.3% to 38.2%) in Taiwan, South Korea, and Japan, respectively. Among Taiwanese and Japanese people, the death rates declined more in females (26.7% and 36.9%, respectively) than in males (16.7% and 27.6%, respectively), while Korean males had greater decrement in death rate than females (28.0% vs. 17.9%). Additionally, the age-standardized DALY rates decline by 38.9% (33.7% to 43.8%) in South Korea and 24.7% (21.3% to 28.7%) in Japan, respectively; the decrement in DALY rates were significant in both sexes. However, there was no significant change in age-standardized DALY rates in Taiwan (-5.5%; -19.5% to 10.1%) in the past three decades, both in males and females.

In 2019, the leading causes of incident CKD were similar in all the three countries. Type 2 diabetes accounted for approximately 14% of incident CKD and hypertension accounted for 9%; less than 3% were due to glomerulonephritis and less than 0.5% were due to type 1 diabetes. Notably, nearly three-quarters of new CKD cases were due to other or unspecified causes. Similarly, the leading causes of prevalent CKD were type 2 diabetes (approximately 18%) and hypertension (approximately 5%), with glomerulonephritis and type 1 diabetes accounting for approximately 2% and 1%, respectively. More than 70% of prevalent CKD cases were due to other or unspecified causes. The pattern was similar in both sexes; however, females had slightly higher proportion of CKD due to other or unspecified causes compared with males (78% in females vs. 70% in males).

Conclusion

CKD has a significant impact on health burden, both as a direct cause of death and DALY. Our findings demonstrate considerable heterogeneity in the burden of CKD among males and females across the three high-income east Asian countries. Country-level assessments are needed to identify locally relevant policies to meet the needs of both sexes.