Selected Summaries

Renal failure deaths in India: Crying for attention

Dare AJ, Fu SH, Patra J, Rodriguez PS, Thakur JS, Jha P; Million Death Study Collaborators. (Centre for Global Health Research, St Michael's Hospital and Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada; and School of Public Health, Post Graduate Institute of Medical Education and Research, Chandigarh, India.) Renal failure deaths and their risk factors in India 2001–13: Nationally representative estimates from the Million Death Study. *Lancet Glob Health* 2017;**5:** E89–E95.

SUMMARY

Few studies have determined the prevalence of chronic kidney disease (CKD) and death due to CKD in India.[1] This large, prospective, population-based study—Million Death Study—documented cause-specific mortality in India. This study is conducted by the Registrar General of India (RGI)'s Sample Registration System (SRS) in association with Center for Global Health Research at the University of Toronto, Indian Council of Medical Research and a number of national and overseas academic institutions.

The office of the RGI conducts a national census every 10 years. RGI's SRS, initiated in 1971, partitions India into 1 million small areas after each census. From these areas, single-stage stratified simple random sample is drawn for continuous monitoring of household births and deaths.[2] By this approach, 6671 small areas from the 2001 census and 7597 small areas from the 2011 census are randomly selected for continuous monitoring. In these selected areas, a full-time RGI non-medical surveyor visits each house every 6 months to verify information collected by local part-time non-medical enumerator. The present study trained 800 RGI surveyors to complete a two-page validated form for 'verbal autopsy' after interviewing family members or associates of every deceased person. These records were converted into electronic records and set to two of 400 specially trained physicians. These physicians coded cause of death using the International Classification of Diseases and Related Health Problems, tenth version (ICD-10). Differences between the two were reconciled anonymously by the two or adjudicated by a third physician. Renal failure deaths were identified using ICD-10 codes for renal failure (N00-N19). This 'verbal autopsy' is used to classify the cause of death.

The present study focused on death due to renal failure in adults between 15 and 69 years of age. Age-specific and age-standardized rates were calculated in two periods—between 2001 and 2003 and between 2010 and 2013. People who died from injuries served as the control group. Prevalence of comorbidities such as diabetes, hypertension, cardiovascular disease and tuberculosis and also smoking and drinking among men was compared between the two groups.

The study showed that of all deaths among 15–69-year olds, renal failure accounted for 2.1% of deaths in 2001–03. This proportion increased in 2010–13 to 2.9%. Age-standardized death rate for renal failure was 5/100 000 population in both the periods for the age group of 15–45 years, but in the age group of 45–69 years, it increased from 30/100 000 in 2001–03 to 40/100 000 in 2010–13. Age-standardized death rates due to kidney failure were higher in urban areas compared to rural areas though a total number of renal deaths were more in a rural area due to higher proportion of population being rural. Men constituted nearly 65% of renal deaths in both the periods. Using the estimated cause-specific death rate of 2.9% in 2010–13, the study estimates that renal failure leads to 136 000 (range 108 000–150 000 based on the two physicians immediately agreeing to the cause of death or not) deaths in 2015. The study also highlights regional disparity—the southern and eastern states had higher rates of deaths due to renal failure that further increased in the later period whereas western and northern states had lower rates that remained relatively stable in both the periods. The presence of diabetes was significantly more common (34% *v.* 23% in 2010–13) in renal failure deaths compared to that in the control group. Hypertension (23% *v.* 16% in 2010–13) and cardiovascular disease (8% *v.* 6% in 2010–13) also were modestly associated with renal failure deaths in both the periods.

COMMENT

Generating complete and accurate health-related data at the national level is a challenge. This largest nationwide study provides an estimate of number and rate of kidney failure deaths in India. The study has many strengths; its sampling frame and strategy are robust. This makes the sample truly representative of the entire nation. The study also provides state-wise and regional estimates. Elaborate procedure was followed to assign the cause of death using an enhanced verbal autopsy tool and lower bound of the estimate was provided based on whether the two physicians immediately agreed regarding the cause of death.

Due to lack of systematic recording of deaths, worldwide, less than a third of the deaths are assigned a cause.[3] Therefore, verbal autopsy is an invaluable tool to try and understand cause-specific mortality although it has limitations.[4] Numerous factors affect validity of verbal autopsy that may change from one population to another and also over time.

The study also did not differentiate between acute kidney injury and CKD. Regional differences in rates of renal failure deaths and also differences in change over time remain unexplained and should be researched. Regional differences could be a result of real differences in the prevalence of risk factors in different regions or simply be a reporting bias. This study estimates the number of persons dying from kidney failure, but not of those suffering from renal failure who are living with renal replacement therapy or those who die due to comorbid conditions with coexistent renal failure.

Despite these limitations, this study is an invaluable tool both for policy-makers and clinicians. It provides estimates of current as well as future demand of renal replacement therapy. According to one estimate,[5] in 2009, around 20 000 patients were receiving dialysis in the whole of India. Clearly, there is a large gap between the actual demand and supply of dialysis in India since this study estimates that renal failure deaths as high as nearly 150 000 in the year 2015. Thus, facilities to provide renal replacement therapy should be urgently expanded. In addition, increased coverage by insurance companies or government agencies is necessary to improve access to dialysis. This study establishes that diabetes is the strongest risk factor for renal disease as was reported by the national CKD registry.[6] Diabetes was prevalent in 34% of patients with renal failure deaths in 2010–13. Thus, focusing of diabetes

along with hypertension and cardiovascular disease is necessary but not sufficient for preventing renal failure in India.

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