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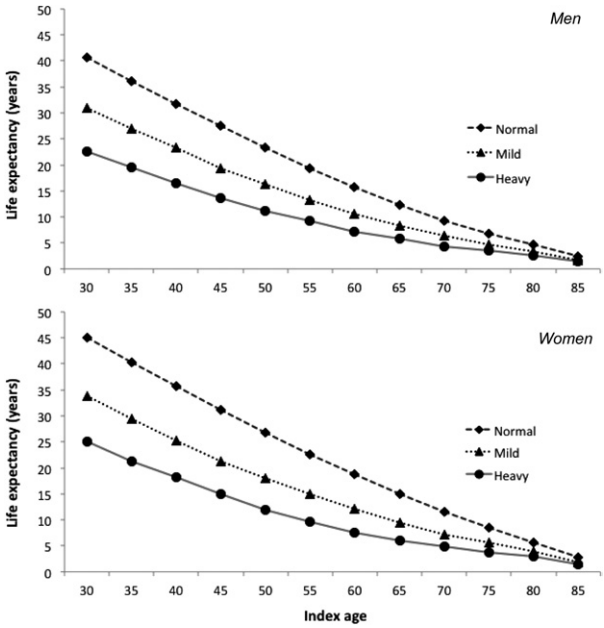

Figure 1. Life expectancy for men and women with different levels of proteinuria at different index ages.

Proteinuria and Life Expectancy

To the Editor:

Proteinuria, a marker of kidney disease, is associated strongly with risk of adverse outcomes, including all-cause mortality.[1-3] Life expectancy, a measure to estimate health status and disease burden at a population level, has not been reported for patients with different levels of proteinuria. This information could help policy makers recognize the health burden caused by proteinuria and prioritize health care programs or funding. We used a large population-based registry to estimate life expectancies of middle-aged men and women with varying levels of proteinuria.

The study population included adults without end-stage renal disease in Alberta, Canada, who had at least one outpatient measurement of proteinuria between May 1, 2002, and December 31, 2006. A cohort of 812,386 patients (375,325 men, 437,061 women) was followed up until March 31, 2009, to identify all-cause mortality. Baseline proteinuria was estimated by urine albumin-creatinine ratio (ACR) or urine dipstick based on outpatient random spot urine measurements and categorized based on ACR (normal, <30 mg/g; mild, 30-300 mg/g; and heavy, >300 mg/g) or urine dipstick (normal, negative; mild, trace or 1+; and heavy, 2+).[4,5] Age-specific mortality rates were calculated with the person-year method,[6] where age was considered in time scale. The abridged life table was used to calculate life expectancies.[7,8] (Details of the study methods have been published elsewhere[9] and are provided in Item S1).

Among men, 9.55% had mild proteinuria and 2.03% had heavy proteinuria. Corresponding proportions among women were 7.48% and 1.22%, respectively. Figure 1 shows mean life expectancy for participants by sex and level of proteinuria in 5-year age bands (from 30 to ≥85 years). Within each age stratum, life expectancy was substantially shorter for people with higher levels of proteinuria (Table S1). Life expectancy for men aged 40 years was 31.8 years for those without proteinuria, 23.2 years for those with mild proteinuria, and 16.6 years for those with heavy proteinuria. Life expectancies for women aged 40 years with normal, mild, and heavy proteinuria were 35.7, 25.2, and 18.2 years, respectively. Life expectancies of 40-year-old men and women with no proteinuria were 15.2 and 17.4 years longer, respectively, than for those with heavy proteinuria (Table 1). Life expectancy was shorter in the presence of mild and heavy proteinuria (compared with those with no proteinuria) across all age strata for both sexes. Life expectancy for men was consistently shorter than for women for all proteinuria categories, especially in the middle age strata (Table S2).

These results mirror our recent report of the life expectancy of patients across different levels of estimated glomerular filtration rate, in which we observed that lower levels of kidney function were associated with a decrease in life expectancy for both men and women.[9]

Our study is strengthened by its population-based sample and large size, but also has limitations. First, life expectancy for the middle-aged population with no proteinuria in our study was approximately 7-8 years shorter than the overall life expectancy during the same period in Alberta.[10] This difference may be due to the selective nature of our cohort, including that it comprised individuals who had outpatient proteinuria measurements as part of routine care and excluded presumably healthier individuals who did not access medical services and receive proteinuria testing. This might have selected patients with comorbid conditions associated with kidney disease and increased the overall risk of mortality for the cohort. Second, proteinuria categorization was based on a single measurement at baseline. Thus, misclassification due to transient proteinuria could not be ruled out. Third, our study provides information for only the crude association between proteinuria and life expectancy. These estimates of life expectancy were not adjusted for coexistent comorbid conditions, and in particular, for level of kidney function, and therefore the projected decreases in life expectancy associated with proteinuria may be due partly to conditions such as hypertension and diabetes or more severely decreased kidney function. Also, the age effects on life expectancy should not be interpreted as in a longitudinal study. Finally, it is important to note that current methods for the estimation of life expectancy cannot account for changes in risk factor status over time due to aging, changes in lifestyle, or medication. Regardless, our estimates accurately reflect life expectancy for people with proteinuria in a developed country and are useful to decision makers.

Table 1. Differences in Mean Life Expectancy

Age Group (y)	Normal vs Mild Proteinuria	Normal vs Heavy Proteinuria	Mild vs Heavy Proteinuria
		Men	
30	9.7 (9.0 to 10.5)	18.0 (16.3 to 19.7)	8.3 (6.4 to 10.2)
35	9.2 (8.5 to 9.8)	16.6 (15.2 to 17.9)	7.4 (5.9 to 8.9)
40	8.5 (8.0 to 9.0)	15.2 (14.1 to 16.3)	6.7 (5.5 to 7.9)
45	8.1 (7.6 to 8.5)	13.9 (13.0 to 14.8)	5.8 (4.9 to 6.8)
50	7.1 (6.7 to 7.5)	12.1 (11.4 to 12.8)	5.0 (4.2 to 5.8)
55	6.1 (5.8 to 6.5)	10.2 (9.7 to 10.8)	4.1 (3.5 to 4.7)
60	5.1 (4.8 to 5.5)	8.7 (8.2 to 9.1)	3.5 (3.0 to 4.0)
65	4.1 (3.9 to 4.4)	6.6 (6.3 to 7.0)	2.5 (2.1 to 2.9)
70	3.0 (2.7 to 3.2)	5.0 (4.7 to 5.2)	2.0 (1.7 to 2.3)
75	2.2 (2.0 to 2.3)	3.3 (3.1 to 3.5)	1.1 (0.9 to 1.3)
80	1.3 (1.2 to 1.5)	2.0 (1.9 to 2.1)	0.7 (0.6 to 0.8)
85	0.8 (0.5 to 1.0)	1.0 (0.6 to 1.4)	0.2 (−0.2 to 0.6)
		Women	
30	11.1 (10.4 to 11.8)	19.9 (18.3 to 21.6)	8.8 (7.0 to 10.6)
35	10.8 (10.2 to 11.5)	19.0 (17.4 to 20.5)	8.1 (6.5 to 9.7)
40	10.4 (9.8 to 11.0)	17.4 (16.2 to 18.7)	7.0 (5.7 to 8.4)
45	9.8 (9.3 to 10.4)	16.2 (15.1 to 17.3)	6.4 (5.2 to 7.6)
50	8.9 (8.3 to 9.4)	14.8 (13.9 to 15.8)	6.0 (4.9 to 7.0)
55	7.7 (7.2 to 8.1)	13.0 (12.2 to 13.8)	5.3 (4.4 to 6.2)
60	6.6 (6.1 to 7.0)	11.1 (10.5 to 11.8)	4.6 (3.8 to 5.3)
65	5.5 (5.1 to 5.8)	9.0 (8.4 to 9.5)	3.5 (2.9 to 4.1)
70	4.4 (4.1 to 4.7)	6.7 (6.3 to 7.1)	2.3 (1.8 to 2.7)
75	2.7 (2.5 to 3.0)	4.6 (4.3 to 4.9)	1.9 (1.6 to 2.2)
80	1.7 (1.5 to 1.8)	2.7 (2.5 to 2.8)	1.0 (0.8 to 1.2)
85	1.0 (0.8 to 1.2)	1.4 (1.0 to 1.7)	0.4 (0.0 to 0.8)

Note: Difference in life expectancy is reported in years (95% confidence interval).

In conclusion, we found a substantial and progressive decrease in life expectancy for men and women with the presence and severity of proteinuria.

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Supplementary Material

Table S1: Life expectancy by age, sex, and level of proteinuria.

Table S2: Difference in life expectancy among women and men by proteinuria levels.

Item S1: Detailed methods.

Note: The supplementary material accompanying this article (http://dx.doi.org/10.1053/j.ajkd.2012.11.030) is available at www.ajkd.org.

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