People with diabetes and unmonitored renal function are at increased risk of an adverse outcome: cohort study.

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Introduction

Monitoring renal function for chronic kidney disease (CKD) in people with diabetes is recommended. Estimated glomerular filtration rate (eGFR) and proteinuria are independent predictors for adverse outcomes in people with diabetes. We explore this relationship when renal function is not monitored using a large community based cohort study.

People with CKD complicating diabetes are not always identified and are sometimes sub-optimally managed in primary care (1). Early identification of CKD and intervention with renoprotective measures, particularly the use of angiotensin converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs), has been shown to be effective in slowing progression of renal disease and in reducing cardiovascular events (2-6), and treatment that reduces proteinuria also reduces the risk of progression (7).

Study aims:

1. Investigate the association between not monitoring renal function and vascular and renal outcomes in people with diabetes.

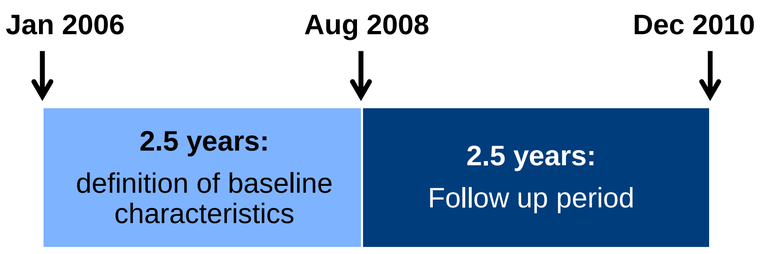
Methods

A cohort of adults with type 1 and type 2 diabetes (N=35,502), was identified from the Quality Improvement in Chronic Kidney Disease (QICKD) trial database (3). This database comprises the GP records from all patients registered at 127 GP practices across England between 2006 and 2011.

This data was divided into two periods (figure 1). The first 2.5 years was used to define the baseline characteristics of the population. The subsequent 2.5 years was used as the follow up period.

Figure 1.

Division of collected data into baseline and follow up periods.



Unmonitored renal function was determined by absence of serum creatinine measurements, to calculate eGFR, proteinuria measurement as shown in box 1, or both.

The composite outcome measure is shown in box 2.

Statistical analysis comprised three components:

- Simple descriptive analysis
- Survival analysis (Kaplan-Meier analysis)
- Multilevel logistic regression model

Box 2.

The composite measure used to identify cardio-vascular risk.

- Death (all cause mortality)
- Stroke
- Transient ischaemic attack
- Myocardial infarction
- Advanced coronary artery disease
- Heart failure
- Progression to end stage renal failure

Results

A total of 4,460 (12.6%) people had incomplete CKD screening during the 2.5 year baseline period. This comprised 1,574 (4.4%) people with no serum creatinine recorded and 3,478 (9.8%) untested for proteinuria.

People with unmonitored renal function were found to have significantly higher incidence of adverse vascular and renal outcomes than those with normal renal function. Odds ratios with no hypertension (1.33, 95% CI 1.07 to 1.66) and hypertension (1.42 , 95% CI 1.17 to 1.72), compared to normal renal function and no hypertension

Figure 2. Kaplan Meier survival curve of people with diabetes and normotension.

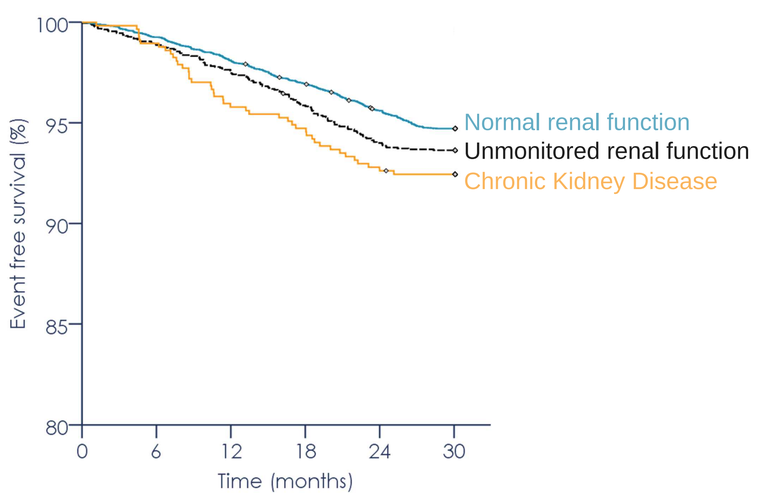
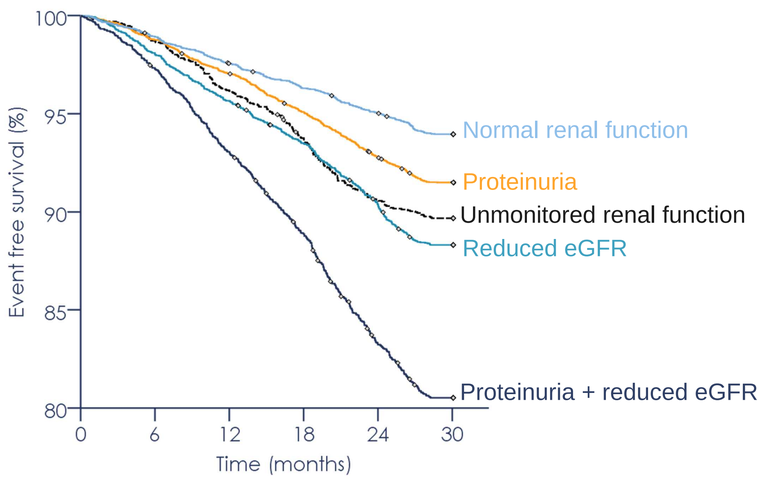
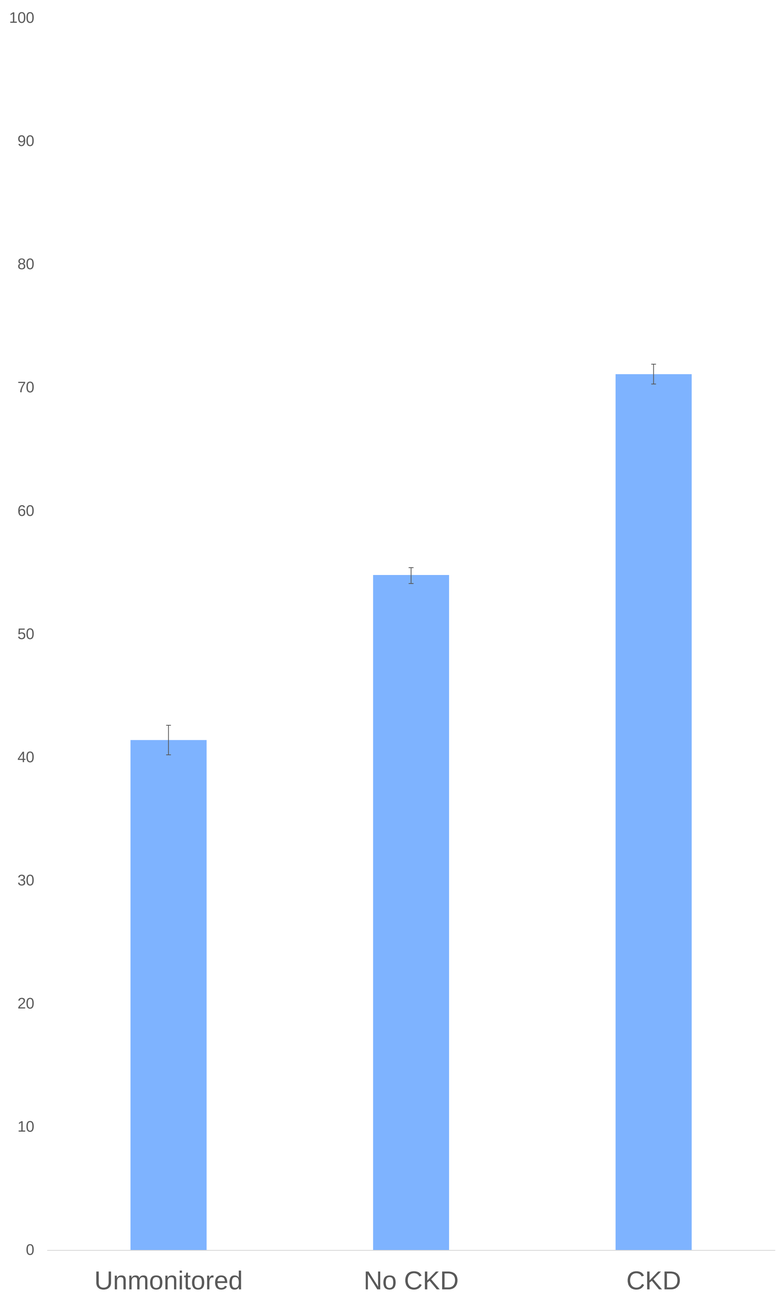


Figure 3. Kaplan Meier survival curve of people with diabetes and hypertension.



Furthermore, people with unmonitored renal function were found to have lower prescription rates of ACE inhibitors and ARBs (41.4%, 95% CI 40.2-42.6%) than people with no evidence of CKD (54.8%, 95% CI 54.1-55.4%) and people with CKD (71.1%, 95% CI 70.3-71.9%).

Figure 4. Prescription rates (%) of ACE inhibitors and ARBs in people with diabetes according to renal function.



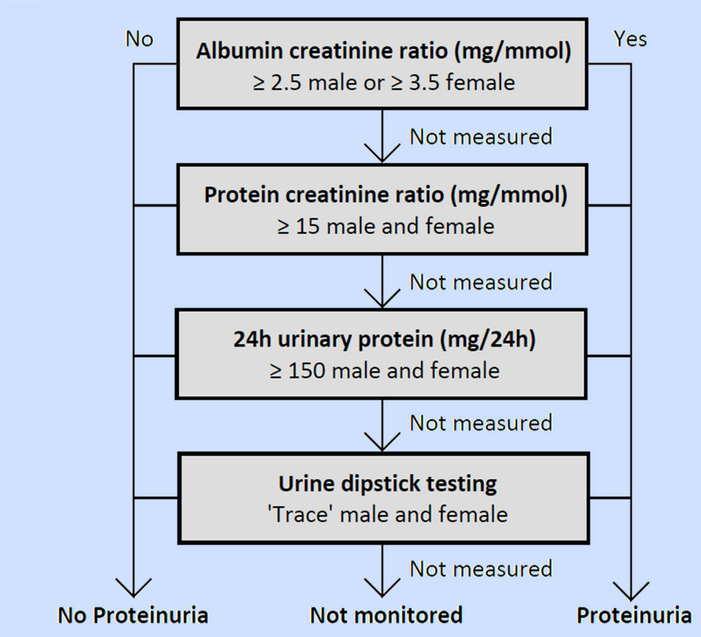
Summary

We analysed the effect on adverse outcomes of not monitoring renal function in people with diabetes. We found that people with unmonitored renal function:

- **Do worse than those who are monitored and found to have normal renal function or proteinuria**
- **Do better than those who are monitored and found to have a reduced eGFR**
- **Receive suboptimal antihypertensive therapy**

Box 1.

The hierarchy of clinical tests for monitoring proteinuria.



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