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## **Nutritional status in chronic dialysis patients : associations with development of disease and survival**

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## ABSTRACT

The main objective of this thesis was to study the association between nutritional status and survival in end-stage renal disease patients who are maintained on a chronic dialysis treatment.

First, we found that in the general population obesity, smoking and physical inactivity were associated with the development of chronic kidney disease, and that men were not more susceptible than women to these risk factors.

Whereas obesity is an established risk factor for morbidity and mortality in the general population, many survival studies in hemodialysis patients have indicated reverse associations of obesity with mortality. This has been referred to as 'reverse epidemiology'. We showed, however, that the association between BMI and mortality in the hemodialysis population was similar, and not reversed compared with the general population of equal baseline age and duration of follow-up.

Compared with hemodialysis patients with a normal BMI, a low BMI was associated with a twofold increased risk of mortality. The increased mortality risk of a low BMI at baseline may in part be explained by low muscle mass and pre-existing comorbidity. Weight loss and muscle mass depletion, as assessed with the arm muscle area, were both associated with an increased mortality risk in hemodialysis patients, independent of BMI. Fat mass as assessed with the sum of four skinfolds was not associated with mortality. Serum albumin concentration appeared not a precise measure of nutritional status in chronic dialysis patients.

We observed an interaction effect between protein-energy wasting, inflammation and cardiovascular disease, resulting in excess mortality in chronic dialysis patients. Compared with a normal nutritional status, protein-energy wasting was associated with a twofold increased mortality risk in 7 years of follow-up during dialysis treatment. In time-dependent analyses, this mortality risk was even stronger (fivefold), implying that the short-term impact of nutritional status is more important than the long-term effect.

The results of this thesis emphasize the importance of maintaining a good nutritional status in chronic dialysis patients. In order to improve survival in the dialysis population more attention should be paid to patients with a declining nutritional status instead of overweight. Therefore, the nutritional status of dialysis patients should be assessed regularly, at least every 6 months. In clinical practice, the 7-point SGA can be used for this.