

The impact of age and body mass index on biomedical measures in a community population with diabetes and chronic kidney disease (CKD)

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Background

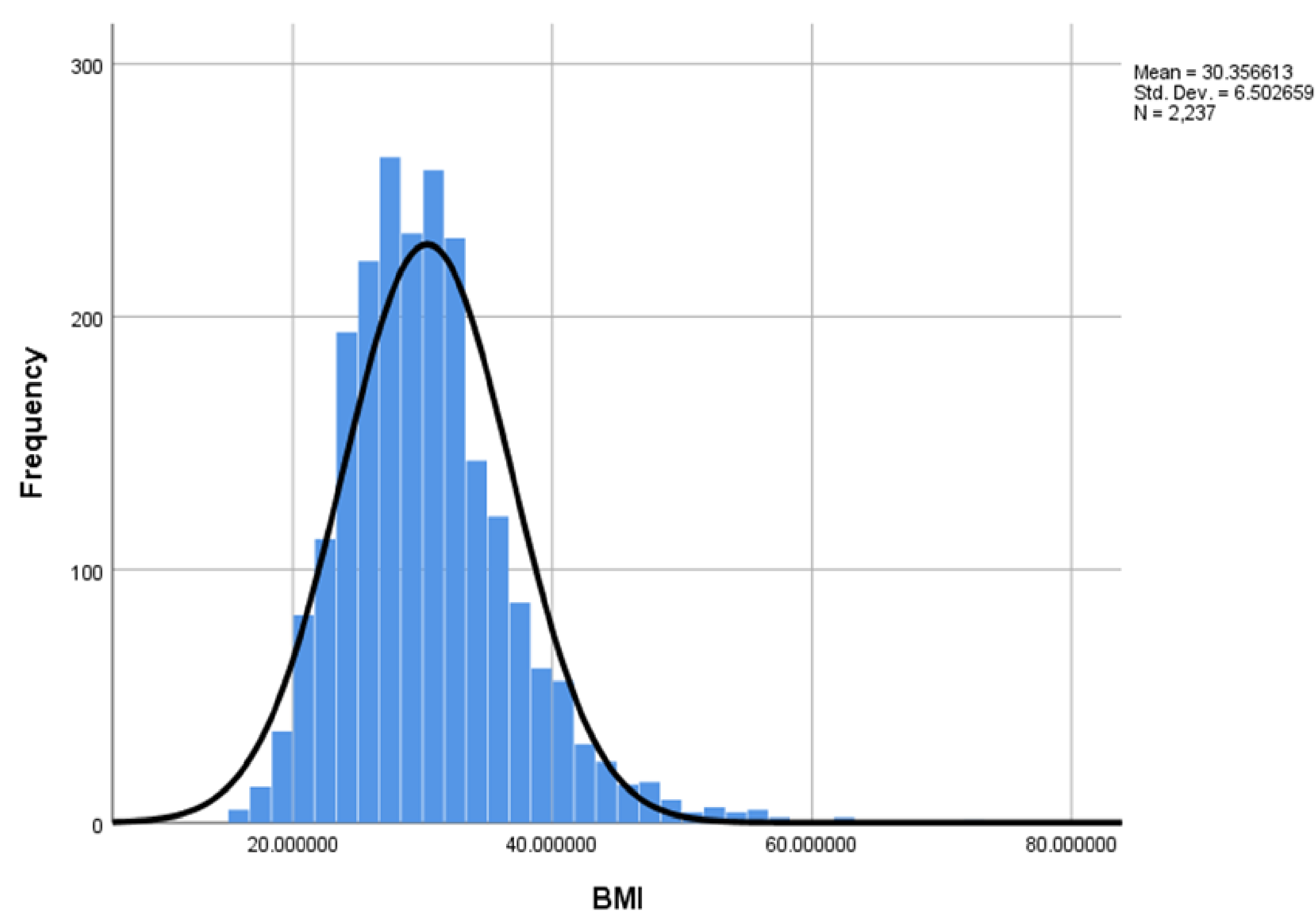
Both ageing and obesity are contributing to an increased incidence of both type 2 diabetes (DM) and chronic kidney disease (CKD). By contrast there is published evidence that obesity in the elderly may be paradoxically associated with better health outcomes.

The ENHIDE diabetes renal telehealth project evaluated the feasibility of supporting primary care in the management of people with type 2 diabetes (DM) and CKD through accessing comprehensive data sets linked to diabetes primary care registers.

This current evaluation set out to examine the relationship between age, BMI and renal function and cardiometabolic risk factors in those with DM and CKD. For this evaluation, we identified 2356 individuals with DM and CKD (eGFR < 60 and/or urine albumin creatinine ratio > 10) from 16 participating practices, representing 23% of those on the practice diabetes registers. 1349 (57%) had eGFR < 60 and normal albumin creatinine ratios (ACR) or no recent ACR information, 493 (21%) had eGFR < 60 and raised ACR (> 10), and 514 (22%) had eGFR > 60 and ACR > 10. We examined those aged < >= 75 and those with BMI < >= 30.

Results

The age of the cohort was 77 (19-103) (Median (Range)), eGFR 52 (3-171) and BMI 30 (15-73). The graph below shows the BMI ranges for 2237 out of 2356 patients whose BMI was recorded. Obesity (BMI ≥ 30) prevalence was 48%.



We examined the impact of age (< or >75 years) and body mass index (< or > 30) on cardiometabolic measures. Those aged > 75 years regardless of BMI had significantly lower eGFR (48 v 56 ml/min) and Haemoglobin (Hb) (124-125 v 132 g/dl), ACR (33-38 v 46-65), DBP (73-74 v 75-76 mm Hg), HbA1c (53-55 v 62-63 mmol/mol), Cholesterol (4.2-4.3 v 4.5-4.6 mmol/l) (all p < 0.0005).

By contrast obese patients (BMI > 30) had somewhat higher levels of SBP (135-137 v 134-135 mmHg), regardless of age (p = 0.027). Non HDL cholesterol measures were available in 1546, of which 495 (32%) had values ≤ 2.5, as a surrogate marker of dyslipidaemia-insulin resistance. Although more individuals aged > v ≤ 75 had reduced non HDL cholesterol (37% v 28%), the proportion with low non HDL cholesterol was actually less in those with BMI ≥ 30 v those with BMI < 30 (27% v 36%). The distribution of eGFR was broadly comparable between those with BMI ≥ v < 30, with no suggestion that those eGFR was lower in those with obesity.

Discussion

This cross sectional analysis of a community cohort with DM and CKD suggest that age may predominate over BMI in determining adverse renal function, but is linked with lower values of HbA1c and cholesterol. In this predominantly older cohort, the only adverse cardiometabolic measure in those with obesity based on BMI was a modest increase in systolic blood pressure. It has been suggested that BMI is a less reliable marker of metabolic syndrome in DM CKD than specific measure of central obesity. The most relevant measure of metabolic syndrome in our study was non HDL cholesterol, but again age was a stronger marker of reduced non HDL cholesterol than obesity with if anything less obese patients with reduced non HDLC. The counter intuitive findings may reflect the demographics or use of statins in the cohort. Although it has been reported that eGFR will be lower than true GFR in obesity, there was no such distinction in this cohort. These data suggest that older obese DM with CKD in the community do not have less adverse cardiometabolic risk than younger obese or non-obese patients regardless of age. It is possible that obesity in the elderly with CKD may represent a survivor effect as has been previously suggested. The issue of frailty in elderly DM with CKD may or may not be compounded or mitigated through obesity but would require evaluation in future research. Contemporary evaluation of the health status of this cohort has documented a high mortality rate of 16% + in the 2 years since the earliest baseline data was captured. We have yet to evaluate whether there were differences in these biomedical measures and especially BMI in this subgroup. Obesity management strategies in younger people with DM CKD has been found to benefit biomedical measures and renal function. It is not clear if similar benefits are either achievable or beneficial in those older people aged > 75

Conclusion

The majority of DM CKD patients are older, with obesity in over 50%. The somewhat counter-intuitive pattern of adverse CVD risk measures suggests that this might be a potential survivor effect where standard cardiovascular risk management strategies may be less appropriate.