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Background

- The inverse association between educational attainment and mortality is well established,¹ however its relevance to vascular events and renal progression in a population with chronic kidney disease (CKD) is less clear.

Aims

- To determine the association between highest educational attainment and 1) risk of vascular events, 2) progression of CKD; and 3) cause-specific mortality.

Methods

- Prospective epidemiological analysis among participants randomized into the Study of Heart and Renal Protection (SHARP)
- 9270 adults with moderate-to-severe CKD (6245 not on dialysis and 3025 on dialysis) and no known history of myocardial infarction or coronary revascularisation recruited in Europe, North America, Asia, Australia and New Zealand²
- The relevance of highest educational attainment measured at study entry using seven levels that ranged from “no formal education” to “tertiary education” to predict vascular events; progression of CKD and cause-specific mortality during 4.9 years median follow-up in SHARP, was estimated using Cox PH models
- Total effects and residual effects, after adjustment for possible effect mediators, are presented³

Results

1) There was a significant trend ($p < 0.001$) towards increased vascular risk with lower levels of education. Participants with no formal education were at a 45% higher risk of vascular events (adjusted relative risk (RR) 1.45, 95%CI, 1.19-1.79) compared to tertiary educated participants.

a) Total effect b) Residual effect after adjustment for potential effect mediators

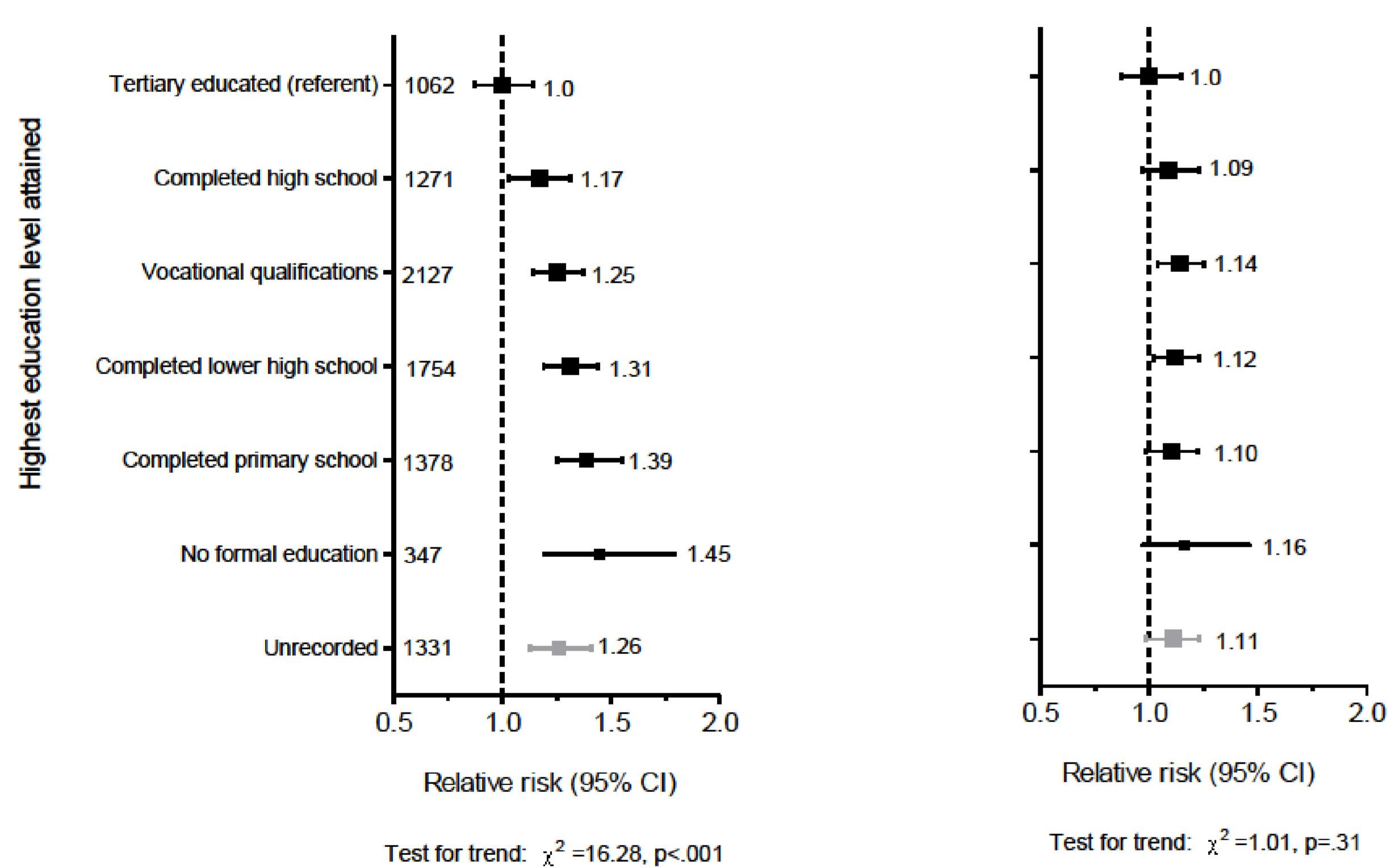


Figure 1: Relevance of highest education level attained to 2317 vascular events (atherosclerotic and non atherosclerotic)

- Total effect: Cox proportional hazards model stratified by country and adjusted for age, sex, and black ethnicity.
- Residual effect: Cox proportional hazards model stratified by country and adjusted for age, sex, black ethnicity, smoking, alcohol use, BMI, CKD stage, prior vascular disease, diabetes, renal diagnosis, systolic and diastolic blood pressure, albumin

2) Among the 6245 participants not on dialysis at baseline, education level was not significantly associated with progression to end-stage renal disease or doubling of creatinine (trend $p = 0.4$).

Results

3) There was clear trend for mortality across education levels ($p < 0.001$): all-cause mortality was twice as high among those with no formal education compared with tertiary educated participants (RR 2.05, 95%CI, 1.73-2.44), with significant increases observed for both vascular (RR 1.84, 95%CI, 1.34-2.86) and non vascular (RR 2.15, 95%CI, 1.75-2.69) causes of death.

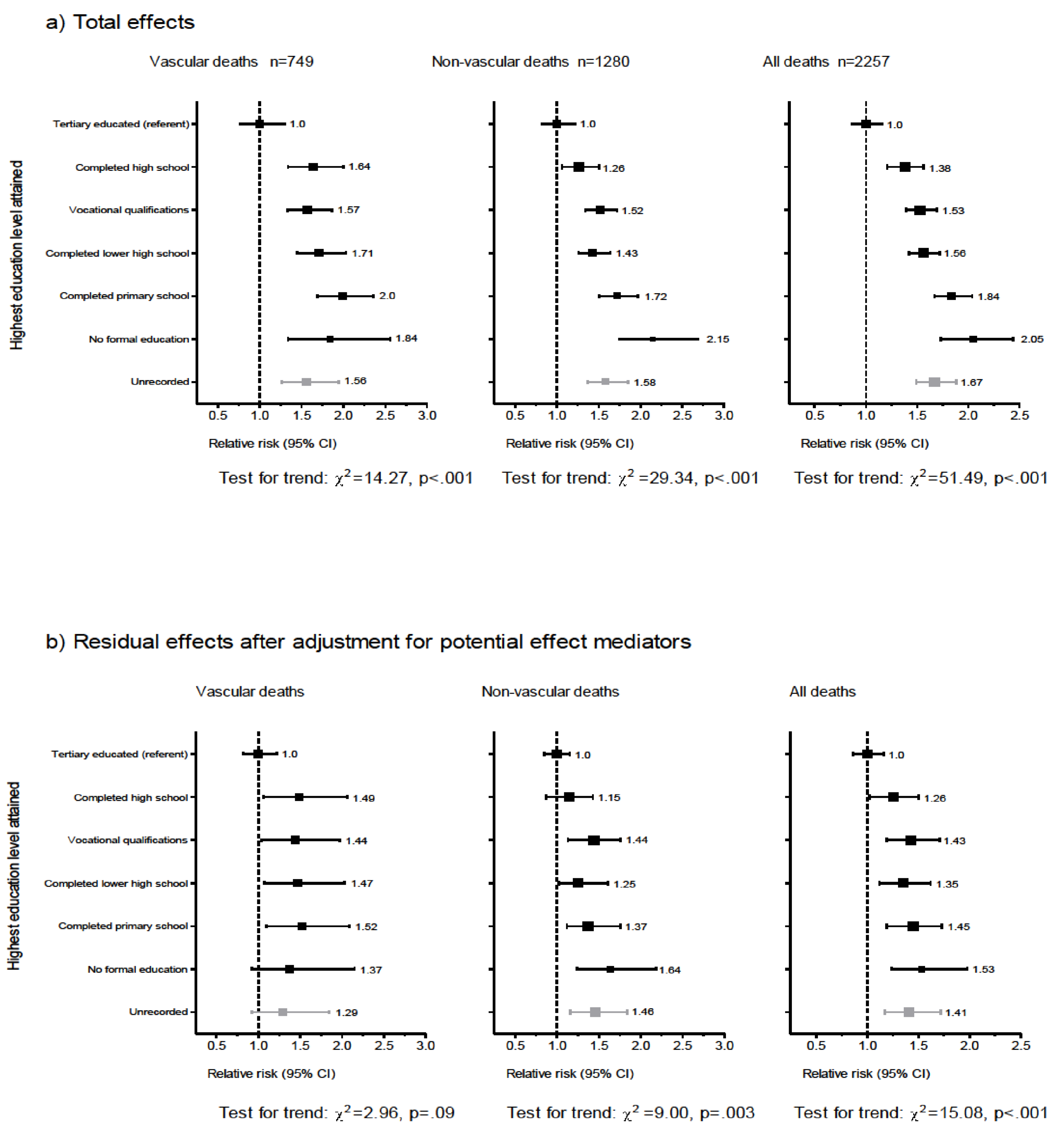


Figure 2: Relevance of highest education level attained to vascular, non-vascular and overall mortality

- Total effects: Cox PH models stratified by country and adjusted for age, sex and black ethnicity
- Residual effects: Cox PH models stratified by country and adjusted for age, sex, black ethnicity, smoking, alcohol use, BMI, CKD stage, prior vascular disease, diabetes, renal diagnosis, systolic and diastolic blood pressure, albumin, albumin:creatinine ratio, hemoglobin, phosphate, HDL cholesterol, total cholesterol

Discussion and Conclusions

- Low educational attainment is associated with increased cardiovascular risk and mortality for people with moderate-to-severe chronic kidney disease.
- Modifiable lifestyle factors (eg, cigarette smoking) and prior diseases explained much of the observed association.
- Low educational attainment was not associated with progression of CKD in this study.
- Our findings suggest educational attainment should be taken into account when considering risk of adverse health outcomes, and interventions that target the likely effect mediators are needed to address the education-mortality gradient.

References

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