Genetic biomarkers in the over 40s in Northern Ireland: evidence from the Northern Ireland COhort of Longitudinal study of Ageing (NICOLA)

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INTRODUCTION

The Northern Ireland COhort of Longitudinal study of Ageing (NICOLA) is a population-based prospective cohort study, formally launched as Northern Ireland’s largest ever public health research project in 2014, and representative of the community living older population (>40 years) in Northern Ireland.

Chronic kidney disease (CKD) is an important public health problem affecting up to 10% of adults worldwide. CKD and classic polygenic traits as lipid levels and anthropomorphic traits are highly heritable, with many common associated variants identified through genome-wide association (GWA) studies.

RESULTS

Phenotype measures were obtained for 2,529 (kidney measures), 2,543 (lipid levels), and 2,488 (anthropomorphic traits) individuals after QC (Table 1). Age and sex were employed as covariates. Several markers in chromosomes 11, 16, and 19 were significantly associated with lipid levels in this population (Table 2). No association with genome-wide significance was identified for kidney disease or anthropomorphic traits.

DISCUSSION

Some of the markers identified in this study in older individuals confirm previous associations with lipid levels in other populations. Despite multiple loci being identified in association with eGFR and CKD in both European and non-European populations, those were not replicated in this study, likely as a consequence of the relatively small number of individuals investigated in NICOLA with this phenotype.

INTRODUCTION

The aim of this study is to identify biomarkers associated with CKD, lipid levels and anthropomorphic traits in older adults in Northern Ireland and to describe a genomic profile of this population.

OBJECTIVE

This is a cross-sectional study using biomolecular and clinical data from 2,807 patients from the first Wave of data collection in NICOLA. Demographic and clinical information was collected with follow-up interviews planned every two years and health assessments every four years. A range of phenotypes was investigated: CKD (estimated glomerular filtration rate (eGFR), creatinine, cystatin C, CKD stage), lipid levels (total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride (TG) levels), anthropomorphic traits (height, body mass index, waist-hip ratio).

DNA was extracted from buffy coats. Genotype data (n=551,839 markers) was generated using Illumina’s Infinium CoreExome-24 BeadChips for high-throughput screening on an iScan. Quality control (QC) was performed in PLINK and association analysis (logistic or linear regression) in PLINK and R/SPSS.

METHODOLOGY

DISCUSSION

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