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Statin prescribing for prevention of cardiovascular disease amongst people with severe mental illness: Cohort study in UK primary care

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ABSTRACT

Background: Severe mental illness (SMI) is associated with excess cardiovascular disease (CVD) morbidity, but little is known on provision of preventative interventions. We investigated statin initiation for primary CVD prevention in individuals with and without SMI.
Methods: We used primary care data from The Health Improvement Network from 2006 to 2015 for UK patients aged 30–99 years with no pre-existing CVD conditions and selected individuals with schizophrenia ($n = 13,252$) or bipolar disorder ($n = 11,994$). In addition, we identified samples of individuals without schizophrenia ($n = 66,060$) and bipolar disorder ($n = 59,765$), but with similar age and gender distribution. Missing data on CVD covariates were estimated using multiple imputation. Statin prescribing differences between individuals with and without SMI were investigated using multivariable Poisson regression models.
Results: Initiation of statin prescribing was between 2 and 3 fold higher in people aged 30–59 years with SMI than in those without after adjusting for CVD covariates. The rates in those aged 60–74 years with SMI were similar or slightly higher relative to those without SMI. The incidence rate ratio (IRR) was 1.15 (95% CI 1.03–1.28) for bipolar disorder and 1.00 (0.91–1.11) for schizophrenia. The rate of statin prescribing was lower (IRR 0.81 (0.66–0.98)) amongst the oldest (aged 75+ years) with schizophrenia relative to those without schizophrenia.
Conclusions: Despite higher rates of new statin prescriptions to younger individuals with SMI relative to individuals without SMI, there was evidence of lower rates of statin initiation for older individuals with schizophrenia, and this group may benefit from additional measures to prevent CVD.

1. Introduction

Severe mental illness (SMI) including schizophrenia and bipolar disorder is associated with a high burden of physical comorbidity: rates of cardiovascular disease (CVD) are two to threefold higher in younger people with an SMI diagnosis than comparable individuals without SMI (Osborn et al., 2007; Laursen et al., 2011). CVD-associated mortality is three times higher amongst people with SMI than the general population and makes a sizable contribution to the 15–20 year deficit in life expectancy experienced by this group (Ringen et al., 2014). In the past, both the provision and quality of treatment for existing CVD conditions has been lower for individuals with SMI than the general population (Mitchell et al., 2012; Mitchell and Lord, 2010; Hippisley-Cox et al., 2007): however little is known about the prescribing of statins for primary prevention of CVD.

Guidelines from the National Institute of Healthcare and Clinical Excellence (NICE) identify people with SMI as a specific population for whom statin prescribing for primary prevention should be considered at the same threshold (currently >10% 10 year CVD risk) as the general population (National Institute for Health and Clinical Excellence, 2014b; National Institute for Health and Clinical Excellence, 2014c; National Institute for Health and Clinical Excellence, 2014a). Statins are cost-effective for preventing CVD events within randomised controlled trial (RCT) populations without mental illness (Taylor et al., 2013) and there is growing evidence to suggest that statins are similarly effective in people with SMI (Ojala et al., 2008; De Hert et al., 2006; Hanssens et al., 2007; Vincenzi et al., 2014, Blackburn et al., 2017). Given such evidence of effectiveness there is a need to evaluate statin prescribing in practice and to establish where policy intervention is needed to improve health outcomes for people with SMI.

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Physical health screening to estimate an individual's future risk of CVD should usually precede statin prescribing for primary CVD prevention in both people with and without SMI. Over the past decade, national guidance and financial incentives for physical health screening have been introduced for individuals with SMI (National Institute for Health and Clinical Excellance, 2006; National Institute for Health Clinical Excellence, 2009) (Fig. 1). The specification of these health checks has changed over time, with corresponding increases in CVD screening reported for the period 2000–2007 (Osborn et al., 2011) but little evaluation thereafter. Similar strategies – such as the NHS Health Check (also outlined in Fig. 1) – applied to the general population have tended to result in low levels of uptake (Artac et al., 2013; Dalton and Soljak, 2012) that is inversely correlated with need (Bender et al., 2014; Krogsboll et al., 2012a; Krogsboll et al., 2012b; Waller et al., 1990), thus generating concern that such policies may widen health inequalities (Capewell and Graham, 2010).

To date, there is limited evidence on CVD prevention in people with SMI and a paucity of research with a focus on statin prescribing for primary CVD prevention (Cooper et al., 2016; Tosh et al., 2010). This study therefore aims to evaluate patterns in new statin prescriptions to individuals with SMI, compared to people without SMI, for the period from the 1st January 2006 to 31st December 2015.

2. Experimental/materials and methods

A retrospective cohort study was developed using data extracted from The Health Improvement Network (THIN) primary care database (IMS Health, 2015). THIN captures anonymised data from electronic health records from patients registered at 587 general practice (GP) surgeries across the United Kingdom (UK); reflecting 5.7% of the total population (IMS Health, 2015). The majority of individuals with SMI routinely access primary care (Reilly et al., 2012) and the validity of these diagnoses in computer records has been established (Hardoon et al., 2013; Nazareth et al., 1993). THIN data are recorded as hierarchical medical codes (Read codes), free text comments, drug codes for prescribed medications, referrals and additional health information such as laboratory test results and biometrics (Chisholm, 1990; Stuart-Buttle et al., 1996). Townsend score for the quintile of deprivation is recorded in THIN and is assigned on the basis of deprivation at the level of the corresponding enumeration district (areas of approximately 150 households) for a patient's address (Townsend et al., 1986). All data management and analysis were undertaken with Stata v14 (StataCorp., 2015).

2.1. Study population

Data for all GP surgeries were extracted for eligible individuals for the period 1st January 2006 to 31st December 2015. Individuals with a diagnosis of schizophrenia or bipolar disorder were categorised as having SMI. The sample was stratified on age and gender and for each strata, up to 5 times as many people from the same practice who were similar in terms of age at baseline (±5 years) and gender but without an SMI diagnosis were selected for inclusion in a parallel cohort.

Entry into the study was at the latest of; i) 30th birthday, ii) date of GP registration plus 6 months and iii) 1st January 2006. In addition, data were censored for time points prior to the GP surgery meeting acceptable levels of data quality, which were assessed in terms of mortality rate and computer usage (Horsfall et al., 2012; Maguire et al., 2009). Exit from the study occurred at the earliest of i) 100th birthday ii) out of practice transfer iii) death iv) first statin prescription, v) CVD event or vi) 31st December 2015. Individuals were excluded from the study if they had a diagnosis of CVD prior to enrolment in the study or had a record of a statin prescription prior to the study start date. Thus, individuals were not eligible to enter the study until six months after the date of registration: this was in order to exclude people with prevalent diagnoses of cardiovascular disease or who were continuing statin treatment (Lewis et al., 2005). Patient data were extracted on SMI diagnoses, patient age, gender, Townsend score and physical health data (blood pressure, height, weight, total cholesterol, high density lipoprotein cholesterol (HDL-C), diabetes, smoking status and antihypertensive prescribing) and statin prescriptions. Body mass index (BMI) was estimated from weight and adult height. Measurements of blood pressure, height, weight, total cholesterol, HDL-C and smoking status recorded within the same calendar year were combined (as a mean or mode). Data on time-varying characteristics (e.g. blood pressure) were summarised for three 1 year calendar time points (2007, 2011 and 2015) and differences examined by unpaired *t*-test (or Mann–Whitney *U* test if not normally distributed) for continuous data and Chi-squared test for categorical data.

Some data were missing for smoking, height, weight, blood pressure, total cholesterol and HDL—C. Missing values were estimated using multiple imputation with the twofold Fully Conditional Specification method, which makes use of the full longitudinal health record (Nevalainen et al., 2009; Welch et al., 2014; Osborn et al., 2015). The imputation model included variables for all patient data outlined above including the outcome (statin prescribing) and associated Nelson Aalen cumulative hazard function. We created 10 imputed datasets from which combined effect estimates and associated standard errors were derived using appropriate statistical methods (Welch et al., 2014). Greater numbers of imputations were not feasible given the large size of the dataset. Height, weight, blood pressure, total cholesterol and HDL-C were included in the imputation model in log form.

2.2. Analysis of statin prescribing

Analyses were stratified into four pre-specified age groups (30–39, 40–59, 60–74, 75–99 years), which are compatible with screening

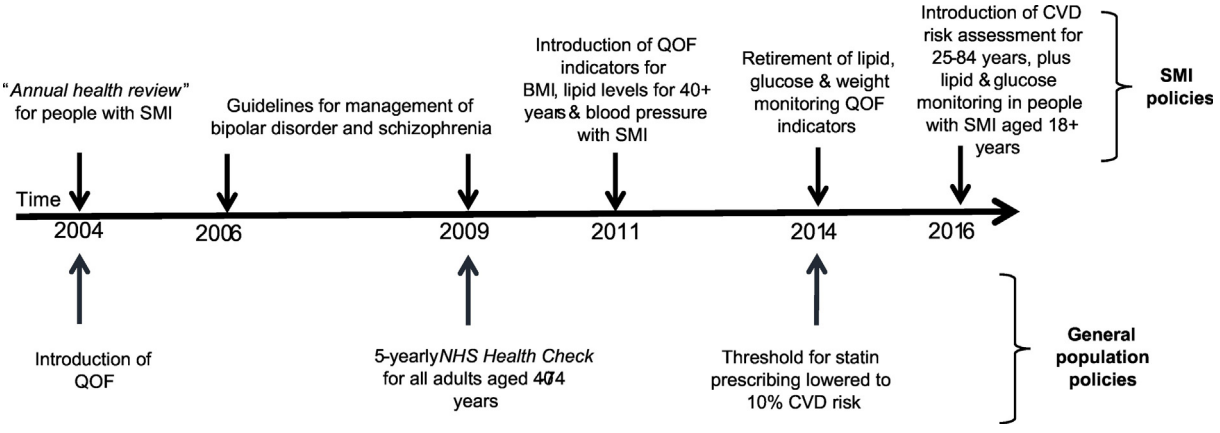

Fig. 1. Cardiovascular screening and prescribing policy developments in individuals with SMI and the UK general population.

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