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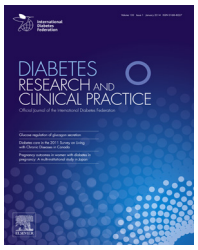

The impact of initial antidiabetic agent and use of monitoring agents on prescription costs in newly treated type 2 diabetes: A retrospective cohort analysis

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ABSTRACT

Aims: To measure the costs associated with the use of antidiabetic agents, monitoring materials and cardiovascular disease (CVD) agents in the management of newly treated type 2 diabetes, and to investigate the factors associated with these costs.

Methods: A population-based retrospective cohort study was conducted using the Irish national pharmacy claims database. Newly treated patients were identified for 2012 and followed for one year post treatment initiation. Factors associated with costs were assessed using a generalised linear model with gamma family and log-link function. Cost ratios (CR) and 95% CIs were used to determine the contributors of prescription costs. Adjusted odd ratios (OR) and 95% CIs were used to investigate factors associated with high frequency self-monitoring of blood glucose (SMBG).

Results: Mean prescription costs for the 12,941 subjects was €871, while total costs were €11 million. CVD agents accounted for 58% of total costs; 22% of costs were for SMBG; antidiabetic agents accounted for 17% of costs. SMBG resulted in costs that were 80% higher than those without, CR 1.80 (95% CI 1.76–1.84). No significant differences were observed between initiation on metformin or sulphonylureas and high frequency SMBG (OR 1.01 95% CI 0.97–1.04 vs reference). Initiation on newer antidiabetic agents was a significant positive predictors of prescription costs (CR 2.36 95% CI 2.21–2.51 vs metformin).

Conclusions: Type of initial antidiabetic agent, and SMBG were significant predictors of prescription costs. SMBG represent a major proportion of total costs; however, its use in combination with antidiabetic agents that do not cause hypoglycaemia is questionable.

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1. Introduction

The direct cost of managing type 2 diabetes and its complications has been estimated at approximately £8.8 billion in the United Kingdom [1], while in Ireland, data from 1999, estimated that the direct cost of managing type 2 diabetes was €580 million [2]. Hospitalisation as a result of the micro and macrovascular complications make up the largest component of these costs [1–3]. Prescription costs associated with the management of diabetes and associated complications account for over 25% of total costs [2,3]. In Ireland, drug utilisation patterns during 2008–2012 for the initial treatment of type 2 diabetes in Ireland were found to largely follow the recommendations of the Irish College of General Practitioners (ICGP), the National Institute of Clinical Excellence in the United Kingdom (NICE) and the American Diabetes Association and European Association for the Study of Diabetes (ADA/EASD) [4–7]. However, a substantial proportion of individuals initiated on a sulphonylurea subsequently received metformin suggesting that further optimisation of the initial antidiabetic agent may be possible and that the use of NICE and ADA/EASD recommended therapy was not as evident during treatment progression [5]. In addition, the choice of initial antidiabetic agent has been shown to have a significant impact on antidiabetic treatment continuation in newly treated type 2 diabetes patients and to affect future treatment patterns [5,8–10].

Given the increased treatment options available and frequency of dispensing of newer antidiabetic agents [11], optimisation of initial prescribing is essential if control of the condition and long-term treatment continuation are to be achieved [5,8–10]. Few studies have examined the financial impact that the choice of initial antidiabetic agent and future treatment patterns might have on prescription costs [12].

The aims of this study were to: (1) measure the direct costs associated with the use of antidiabetic agents, related monitoring materials and cardiovascular disease (CVD) agents in the management of newly treated type 2 diabetes over a one year period in the community setting, and (2) investigate the patient and drug characteristics associated with these prescription costs, including choice of initial agent, antidiabetic regimen changes, use of test strips in the self-monitoring of blood glucose (SMBG), and use of CVD agents.

2. Methods

A retrospective, observational cohort study was conducted using subjects from two community drug schemes included in the Irish Health Services Executive (HSE) Primary Care Reimbursement Services (PCRS) pharmacy claims database: the General Medical Services (GMS) scheme and the Long-Term Illness (LTI) scheme [13]. The HSE-PCRS reimburses pharmacists for dispensed medicines in the primary care setting under various schemes. The GMS scheme is means-tested and provides free primary care, including free prescription medication, for eligible participants. Since 2010 subjects on the GMS scheme have been required to pay a prescription co-payment. Persons suffering from certain chronic illnesses, including type 2 diabetes, are entitled to receive medicines to treat their condition free of charge under the LTI scheme (exempt of any prescription co-payment). The HSE-PCRS database records demographic details such as age and sex, in addition to details and dates of drugs dispensed within the scheme. A maximum of one month's supply of medication can be dispensed on the GMS and LTI scheme. No information on clinical diagnosis or outcomes is recorded. Ethical approval was not required as all analysis was carried out on anonymised data.

The study participants included all newly treated type 2 diabetes patients aged 40 years and over identified in a one year period from January 1st to December 31st 2012. Subjects receiving only one antidiabetic agent dispensing within the year were excluded from analysis. We defined newly treated subjects as those receiving monotherapy with antidiabetic agents using the World Health Organisation (WHO) Anatomical Therapeutic Chemical (ATC) classification code A10B and having received no antidiabetic medication in the preceding 12 months. Subjects initially prescribed insulin, more than one antidiabetic agent or a combination agent were excluded from the study as these subjects were less likely to be treatment naive. Subjects were followed for one year after treatment initiation or until treatment discontinuation, whichever came first.

2.1. Utilisation of antidiabetic and CVD agents

Utilisation of antidiabetic agents (WHO ATC code A10), monitoring materials used in SMBG, blood ketone, and urine analysis (V04), and needles and lancets used in these devices and for delivering insulin (V07) were examined over the study period. Initial antidiabetic agents were categorised into three groups, metformin (A10BA), sulphonylureas (A10BB) and other antidiabetic agents (A10BF, A10BG, A10BH, A10BX). The CVD agents analysed were cardiac therapy (C01), lipid lowering drugs (C10), antithrombotic agents (B01) and antihypertensives. Antihypertensives were characterised as any of the following WHO ATC agents: alpha-adrenoreceptor antagonists and other related antihypertensives (C02), diuretics (C03), beta-blockers (C07), calcium channel blockers (C08), drugs acting on the renin angiotensin system (C09), Treatment discontinuation was defined as a treatment gap of greater than 12 weeks occurring within 365 days of treatment initiation [5,14]. Subjects receiving treatment addition or switching were excluded from discontinuation analysis. For this study, treatment addition and switching are collectively referred to as a regimen change. We analysed the frequency and proportion of total prescription costs of generic medicines dispensed for the drug classes examined in this study that had within class generic medicines available. A within class generic medication was defined as any generic medication being available in a particular WHO ATC code chemical subgroup (e.g. a generic sulphonylurea A10BB).

2.2. Statistical methods

Descriptive analysis of subject characteristics, initial antidiabetic treatment and SMBG patterns, and CVD agents use are presented. Subjects were analysed in several groups: (i) those

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