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Self-reported medication use validated through record linkage to national prescribing data

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Abstract

Objectives: Researchers need to be confident about the reliability of epidemiologic studies that quantify medication use through self-report. Some evidence suggests that psychiatric medications are systemically under-reported. Modern record linkage enables validation of self-report with national prescribing data as gold standard. Here, we investigated the validity of medication self-report for multiple medication types.

Study Design and Setting: Participants in the Generation Scotland population-based cohort (N = 10,244) recruited 2009−2011 self-reported regular usage of several commonly prescribed medication classes. This was matched against Scottish NHS prescriptions data using 3- and 6-month fixed time windows. Potential predictors of discordant self-report, including general intelligence and psychological distress, were studied via multivariable logistic regression.

Results: Antidepressants self-report showed very good agreement (κ = 0.85, [95% confidence interval (CI) 0.84−0.87]), comparable to antihypertensives (κ = 0.90 [CI 0.89−0.91]). Self-report of mood stabilizers showed moderate-poor agreement (κ = 0.42 [CI 0.33−0.50]). Relevant past medical history was the strongest predictor of self-report sensitivity, whereas general intelligence was not predictive.

Conclusion: In this large population-based study, we found self-report validity varied among medication classes, with no simple relationship between psychiatric medication and under-reporting. History of indicated illness predicted more accurate self-report, for both psychiatric and nonpsychiatric medications. Although other patient-level factors influenced self-report for some medications, none predicted greater accuracy across all medications studied.

Keywords: Agreement; Pharmacoepidemiology; Self-report; Medicines; Indication; Linkage

1. Introduction

Cohort studies, and other epidemiologic studies using self-reported data, depend on the accuracy of the self-report to make accurate and reliable conclusions. This includes pharmacoepidemiologic and large-scale biobanking studies which are based on self-reported medication use. Self-reported medication use can be determined by questionnaire [1,2]; by telephone or internet survey [3]; or by face-to-face interview [4−7]. However, self-report is subject to recall errors and biases [8,9] and patients may be less willing to disclose details of certain medications than others.

The accuracy of self-report can be verified by comparison to a trusted measure or ‘‘gold standard.’’ For medication utilization, the choice of gold standard depends to an extent on the purpose of the study (i.e., estimating patient adherence or monitoring prescribing behavior of clinicians), and there is therefore no universally applicable and accepted gold standard [10,11]. One option is for a

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What is new?

Key findings

- Self-reported medication use shows high validity in the general population, although there is variation between medication classes. A simple relationship between psychiatric medications and under-reporting was not found. Antidepressant reporting agreement is comparable to other long-term nonpsychiatric medications.

What this adds to what was known?

- Medical history of an indicated health condition is the strongest predictor of accurate report. General intelligence was not associated with the accuracy of reporting.

What is the implication and what should change now?

- Medication-related factors such as range of indications, prescribing cycles, and phrasing of self-report question may also influence accuracy of self-report. Longer fixed time windows produce higher levels of agreement and positive predictive values, at the expense of some loss of sensitivity.

third party to perform a home inventory [12] or record individual medications produced by the patient [13], but these assessments are difficult to perform on a large scale. An alternative is to compare self-report data with prescriptions, healthcare insurance claims, or general practice medical records [4,5,11,14]. Prescribing databases have been shown to be highly accurate in recording medication utilization [15], at least for those medications that require prescriptions.

Among published studies comparing medication self-report to prescribing data, the majority have been relatively small in size [4,6,7,10−13,16−18]. Many studies are restricted to certain medications or medication types, such as antihypertensives [11]; cardiovascular drugs [6]; antidepressants [17], or hormone replacement therapy (HRT) [1]; or to special populations, such as the elderly [6,12,15]; postmenopausal women [2,5]; or psychiatric illnesses [16]. Few studies use large population-based samples [4,13,14,19] or multiple disparate medication types [13,19−21]. Such comparisons are important, however, for they enable study of systematic over- and under-reporting of medication utilization between drug classes.

Self-report can be compromised by a number of factors, including not understanding the question, poor recall, and intended nondisclosure [4]. There is no consensus on patient-level factors predisposing to discordance between medication self-report and gold standard measures, but previous reports have implicated advancing age [9,19], being unmarried [19,21], number of medications regularly dispensed [18,22], suffering poor health [19], and lower educational attainment [21]. Within medication classes, there is some evidence that psychiatric medications are less likely to be accurately self-reported [19,22]. Potential explanations for this include confusion regarding medication indication but also nondisclosure because of social desirability bias [9] or self-stigmatization [2,4,10,23]. Factors that have not to date been found to influence reporting include gender [19,21] and cognitive health [21].

Prescribing data can be sourced from local health providers or insurers [10], pharmacy records [6,11,13,14,17,21], social insurance databases [16,19] or national health service databases [1,2,4]. The recording of the dispensing and collection of medication, as well as its prescribing, is important for studies that seek to measure patient utilization (although even collection of a medication is not a hard indicator of usage). The country of origin of the study and respective prescription legislation, dispensing, and reimbursement practices are also relevant to interpreting self-report against prescribing data (e.g., over-the-counter medications may not appear in these data) and to make comparisons between national studies.

In this study, we sought to ascertain agreement between medication self-report, derived from a large UK cohort study, compared with record-linked national prescribing data as gold standard, across a range of commonly used psychiatric and nonpsychiatric medications. We hypothesized that agreement would be lower for psychiatric medication types because of systemic under-reporting. To our knowledge, this is one of the largest population-based studies of medication self-report, also incorporating a covariate analysis method across a range of medications.

2. Methods

2.1. Study population

Our study used the Generation Scotland: Scottish Family Health Study (GS:SFHS) family-based and population-based cohort of Scottish adult volunteers (n = 21,474), recruited February 2006 to March 2011, which has been described elsewhere [24,25]. The cohort has a higher proportion of females (59%) and older median age (47 males: 48 females) than the Scottish population at the 2001 census (37 and 39, respectively) [25,26]. Written informed consent was obtained for 98% of GS:SFHS for data linkage to routinely collected healthcare records.

2.2. Medication self-report data

All participants in GS:SFHS were asked to complete a pre-clinic questionnaire before their enrollment in the study. The first phase of the study used a text-based questionnaire which is not part of this analysis. Those