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Complete List of Authors:	Bishara, Delia; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group Scott, Charlotte; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group Stewart, Robert; Institute of Psychiatry, Biomedical Research Centre at SLaM and King's College London Taylor, David; Maudsley Hospital, Pharmacy Harwood, Daniel; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group Codling, David; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group Banwell, Christine; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group Sauer, Justin; South London and Maudsley NHS Foundation Trust, MHOA and Dementia Clinical Academic Group
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Safe prescribing in cognitively vulnerable patients: the use of the Anticholinergic Effect on Cognition (AEC) tool in Older Adult Mental Health Services

Delia Bishara[1,2]•*, Charlotte Scott[1]•, Robert Stewart[1,2], David Taylor[1,2], Daniel Harwood[1], David Codling[1], Christine Banwell[1], Justin Sauer[1,2]

(1) South London & Maudsley NHS Foundation Trust, London, UK
(2) King's College London (Institute of Psychiatry, Psychology and Neuroscience), London, UK

•joint first authors
*corresponding author: delia.bishara@slam.nhs.uk

Abstract

Aims and Methods

Medication with anticholinergic action is associated with potentially serious adverse effects in older people. We present an evaluation of a novel anticholinergic burden scale introduced into routine practice in older adult services in South London and Maudsley (SLaM) NHS Foundation Trust. Our aim was to assess whether this tool improved the accurate identification of anticholinergic medication and guided safer prescribing in cognitively vulnerable older people.

Results

The introduction of the AEC tool into clinical practice led to an increase in the identification and reporting to GPs of anticholinergic medication from 11% to 85% of cases (p=0.0015).

Clinical implications

Application of the AEC tool led to improved detection of anticholinergic medication and advice to primary care on when a medication review is necessary. This is an important step towards improving the safety of prescribing in this patient group.

Introduction

Medicines with an anticholinergic effect are associated with an increased risk of cognitive decline, dementia and death in older adults[1,2,3,4]. Anticholinergic medication has also been shown to oppose the action of acetylcholinesterase inhibitors and therefore their clinical efficacy[5,6].

NICE guidance on dementia[7] emphasises the importance of assessing anticholinergic burden in cognitively vulnerable older people using an appropriate assessment tool. It recommends that when assessing people for cognitive impairment or dementia, a medication review should be conducted to identify drugs that may cause cognitive impairment. An NHS England dementia diagnosis and management resource for GPs recommends that where possible, drugs with a strong anticholinergic effect should be stopped or substituted for drugs with less anticholinergic activity[8].

A number of anticholinergic scales already exist and have been developed in order to classify drugs according to their anticholinergic risk. These were generally based on the subjective experience of assessors and usually dependent on the drug's general potency to muscarinic receptors[9,10]. A classification system was developed by Bishara et al[11] to identify the anticholinergic effect specifically on cognition (AEC) for medications commonly used in the elderly. The development of the AEC scale was evidence-based and used transparent systematic methodology to evaluate a large number of medications, whilst taking into account not only the drug's affinity for muscarinic receptors, but also its potential to cross the blood brain barrier and previous reports on its influence on cognitive impairment.

This tool is designed to be used in health care settings to support clinicians to identify and manage anticholinergic medication for patients with cognitive impairment. The AEC tool classifies medication according to a "traffic light" system, giving drugs an individual score of 0,1,2 or 3. A score of 0 means the medication has no anticholinergic effect on cognition and a score of 3 has the most effect. The individual scores of all the medications that a patient is taking are then added together to give a total AEC score. It is recommended that those with cognitive impairment who are on medication with an *individual* AEC score of 2 or more, or have a *total* AEC score of 3 or more, have a medication review so that the offending drugs can be withdrawn or switched to a safer alternative. The aim is to reduce the total AEC score to the lowest possible score.

Aim

Our aim was to determine whether the introduction of the AEC tool into routine practice in older adult services would improve the identification of medicines with a significant anticholinergic effect on cognition and lead to appropriate advice given to the patient's General Practitioner on which drugs to review. It is hoped that such an intervention would result in an overall reduction in anticholinergic burden in patients and thus improve prescribing safety. We introduced the AEC scale into three older adult services across South London and Maudsley (SLaM) NHS Foundation Trust to assess its role in the identification of anticholinergic drugs and subsequent advice given to primary care regarding medication reviews.

Method

Current practice at the time of the study: New patients referred to the Southwark and Lambeth Memory Service, are assessed by one member of the multidisciplinary team (MDT). The MDT consists of registered mental health nurses, clinical support workers, clinical psychologists, social workers, psychiatry trainees and a consultant psychiatrist. Assessments are completed using a document template which forms the basis of a report which is sent to the GP and uploaded onto the patient's electronic health records. This includes information in relation to the clinical history and examination, diagnosis, the patient's management plan and recommendations to the GP. All new assessments are discussed in the weekly MDT meeting. Prior to the introduction of the AEC tool, there was no formal template for assessing the anticholinergic burden of patients' medications.

Before introducing the intervention, retrospective baseline systematic sampling was used to identify 70 new patients assessed in the Southwark and Lambeth Memory Service over a three month period from January 2016. Data was collected by two psychiatry trainee doctors and included information retrieved from the patient's electronic patient record (EPR), including the patient's diagnosis, the patient's full medication list and the individual drug AEC scores. From this, the total AEC score was calculated. Information was also gathered on whether there was documentation that the anticholinergic medications and their potential anticholinergic burden had been identified, and whether this was communicated to the GP with appropriate advice.

The intervention: In October 2016, the AEC scale was then introduced into three separate older adult services across SLaM. SLaM is one of Europe's largest healthcare providers for mental health and dementia and serves a local population of 1.3 million people. The following teams were included in the study; Southwark and Lambeth Memory Service (SLMS), Lewisham Memory Service and Lewisham Care Home Intervention Team (CHIT). A CHIT was included as it was considered that these teams are ideally placed to review anticholinergic medication in patients with dementia. A training session was provided to educate all staff conducting new assessments for patients on how to use the AEC scale, along with guidance on how to communicate high risk drugs to the GP, whilst providing appropriate advice on which drugs to review. The assessment document template was updated to include, under the management plan, a standard communication to the GP informing them about the quality improvement project and a section to document the patients' individual drug and total AEC scores. Depending on the AEC scores, appropriate advice on whether a medication review was deemed necessary or not then followed. If the individual AEC score for a drug was 2 or more, or if the total AEC score was 3 or more the advice to the GP was "we recommend that the following drugs be reviewed so as to reduce the anticholinergic burden on cognition". If the total AEC score was under 3 and there were no individual drugs with an AEC score of 2 or more, then the advice was 'there is no need for further review'. This advice is based on similar scales such as the Anticholinergic Cognitive Burden (ACB) scale that has shown that this scoring system reflects the potential clinical implications[3].

Following the intervention, systematic sampling identified 98 patients newly assessed in the Southwark and Lambeth Memory Service from 1st September 2016 to 31st December 2016. Data were collected by a psychiatry trainee doctor, a consultant psychiatrist and a consultant pharmacist. The admission documents for the patients identified were again examined to determine whether anticholinergic medication had been correctly identified and communicated to the GP. Post-intervention data was also collected from the Lewisham Memory Service and Care Home Intervention Team (CHIT) by their designated pharmacist, so as to assess whether the intervention could easily be incorporated into the practice of other teams as well.

Results

In the Southwark and Lambeth Memory Service, pre intervention/baseline results showed that 20 patients (29%) were on anticholinergic medication. Similarly, post intervention results showed that 30 patients (30%) were on medication with an anticholinergic effect on cognition. Eleven patients from the pre intervention sample (16%) and 13 patients from the post intervention sample (13%) were on medications with an individual AEC score of 2 or more (Table 1).

Clinicians had identified 4 out of the 11 patients (36%) from the pre intervention sample i.e. those prescribed drugs with an individual AEC score of 2 or more (Table 1). The identification of an anticholinergic burden (score of 2 or more on the AEC) improved to 11 out of the 13 (85%) following the study intervention.

Table 1

Identification of medications with an individual AEC score of 2 or more (SLMS)		
	Pre intervention n=70 (%)	Post intervention n=98 (%)
Patients taking medication with an individual AEC score of 2 or more	11 (16)	13 (13)
Documentation of identification of drugs with an individual AEC score of 2 or more, n (%)	4 (36)	11 (85)

AEC, anticholinergic effect on cognition

Nine patients (13%) from the pre intervention sample and 13 patients (13%) from the post intervention sample had a total AEC score of 3 or more (Table 2). Only 1 out of the 9 patients (11%) had their total AEC score of 3 or more identified and communicated to the GP in the pre intervention sample. Identification and communication of total AEC scores of 3 or more improved with the intervention. Eleven of the 13 post intervention patients (85%) had their total AEC score of 3 or more identified and communicated to the GP. A chi-squared (Fisher's exact) test showed that this improvement was statically significant (p= 0.0015).

However, of the patients whose AEC scores were communicated to the GP, two patients (15%) had their total scores calculated incorrectly (errors in the AEC scores and calculations were also noted for patients where the total score was less than 3). Reasons for the miscalculations included medications not being correctly identified due to having multiple names (e.g. dosulepin's score was considered not known; however, it was listed on the AEC scale as having a score of 3 under the name dothiepin), medications' AEC score not being correctly identified on the scale and medications being included twice in the calculation. For the remaining 2 patients (15%) the total AEC score of 3 or more was not identified and not communicated to the GP for reasons unknown.

Table 2

| Identification of medications with total AEC score of 3 or more and communication to GP (SLMS)		
	Pre intervention n=70 (%)	Post intervention n=98 (%)
Patients with total AEC score of 3 or more	9 (13)	13 (13)
Documentation that patients with total AEC score of 3 or more were identified and score communicated to GP		
- Anticholinergic burden communicated to the GP	1 (11)	11 (85)
- Total AEC score communicated correctly		9 (69)
- Total AEC score communicated but calculated incorrectly		2 (15)
- Total AEC score (of 3 or more) not identified nor communicated	8 (89)	2 (15)

AEC, anticholinergic effect on cognition; GP, general practitioner
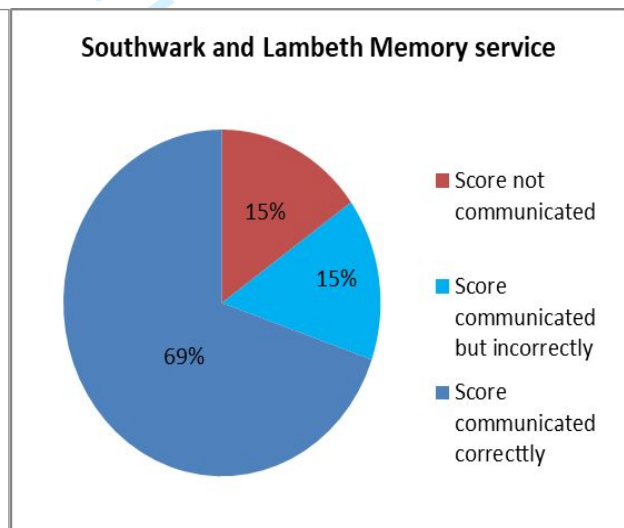
Figure 1

Pie charts showing the improvement of identification and communication to the GP of patients on medication with a total anticholinergic burden of 3 or more

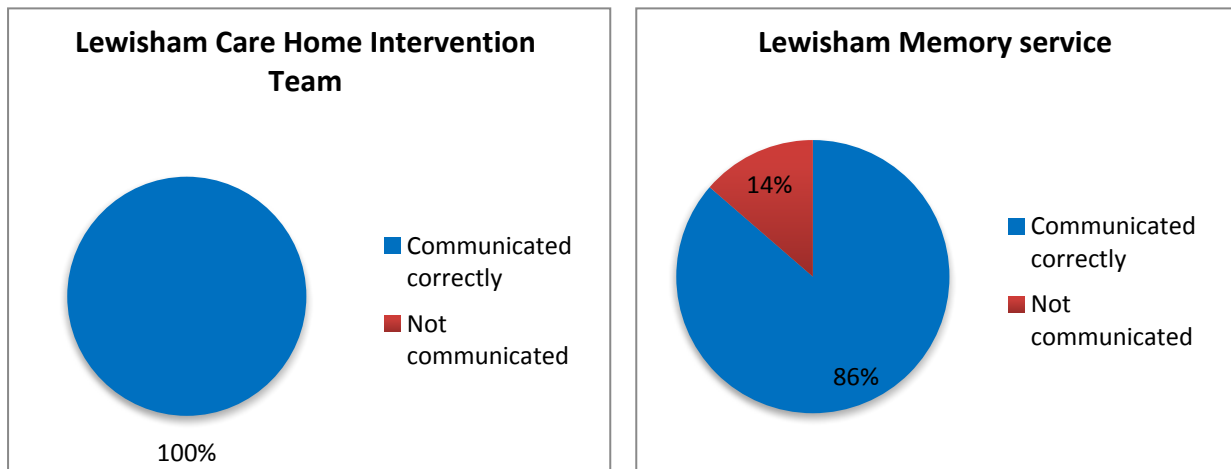**Was Total AEC score of ≥ 3 communicated to the GP?**
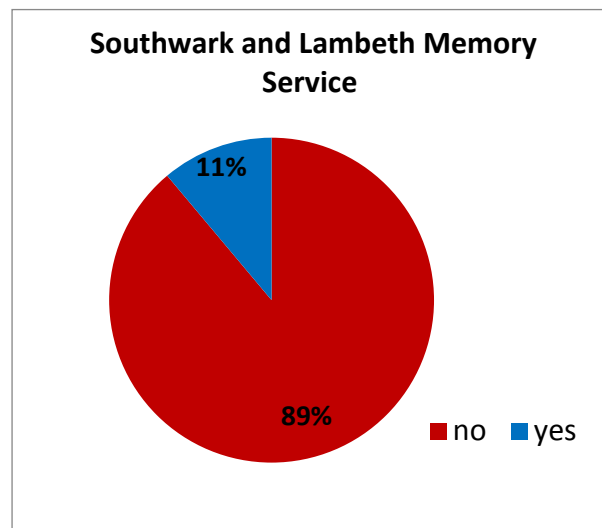
Pre intervention results   **Post intervention results**

Southwark and Lambeth Memory Service

Southwark and Lambeth Memory service

Post-Intervention results for the Lewisham teams

Lewisham Care Home Intervention Team

- Communicated correctly
- Not communicated

100%

Lewisham Memory service

14%

- Communicated correctly
- Not communicated

86%

Post intervention data collected from the Lewisham teams showed 40% of patients from the CHIT team and 29% of patients from the memory service were on anticholinergic medication. The high rate of identification of anticholinergic medication with the use of the AEC tool was also reflected in these teams using the same methods described above. Post intervention results showed that the anticholinergic burden had been communicated to the GP for 100% (7 out of 7) of patients with a total AEC score of 3 or more in the CHIT team and for 86% (19 out of 22) of patients in the memory service.

Discussion

This study provides evidence that, without a structured tool, the identification of medications with an anticholinergic effect on cognition and subsequent communication with advice to primary care was poor. With the introduction of the AEC tool and inclusion of an anticholinergic burden section in the assessment document, the identification and communication with appropriate advice to the GP regarding these drugs greatly improved. This study suggests that with a brief training session using the AEC tool, identification of medications with clinically significant high AEC scores are identified and communicated to the GP in 85-100% of cases. This is a significant improvement from pre intervention results showing that in only 11-36% of cases, identification of anticholinergic burden was noted and communicated to the GP.

Where a psychotropic medication is causing a cognitive burden, this can represent a challenge, particularly if a patient has had a stable mental state over a sustained period of time. The mental health team may be able to suggest an alternative treatment in such situations and consider the risks versus benefits of switching.

Limitations

Our intervention greatly improved the identification of and communication to GPs of anticholinergic medications. However, at times, the AEC calculations provided to the GP were incorrect. Miscalculations of the AEC score were secondary to human error (drugs being included twice in the calculation or confusion regarding drug names leading to misidentification of the AEC score). These findings alerted us to the importance of having an electronic version the AEC scale, so as to eliminate such errors arising from misidentification of drugs from the list or simple calculation errors when adding up total scores.

Developments

The results of this quality improvement programme led to the development of "Medichec"; a web-based and application version of the AEC tool. This allows practitioners to easily check their patient's medication and the cumulative anticholinergic burden score are automatically calculated. The system will identify a drug and its score by any of the names listed in the British National Formulary (BNF). It alerts the practitioner as to which drugs need to be reviewed and gives advice on how to interpret the score in order for them to be communicated to the GP. Medichec only uses generic names and prompts the user when a trade name is used. It contains over 2000 medications and is now being used across SLaM's older adult services and in other areas of the UK. The AEC tool is available online as a free resource at http://www.medichec.com. An Android application is also available, with plans for an Apple application to follow shortly. Plans are also underway to see whether Medichec can be incorporated into the GP health record systems so as to improve accessibility and safer prescribing for cognitively vulnerable patients in primary care.

Figure 2
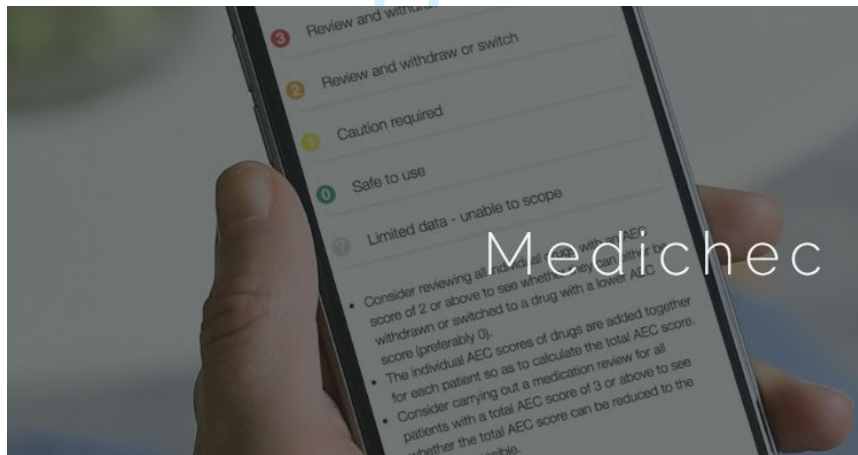
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***Delia Bishara**, Consultant Pharmacist, Mental Health of Older Adults (MHOA) and Dementia, South London and Maudsley NHS Foundation Trust (SLaM), 115 Denmark Hill, London SE5 8AZ, email: delia.bishara@slam.nhs.uk, **Charlotte Scott**, Speciality Registrar, SLaM, **Robert Stewart**, Professor of Psychiatric Epidemiology & Clinical Informatics, Biomedical Research Centre at SLaM and King's College London, **David Taylor**, Director of Pharmacy and Pathology; Head of Pharmaceutical Sciences Clinical Academic Group, King's Health Partners, SLaM, **Daniel Harwood**, Consultant Psychiatrist and Clinical Director, MHOA and Dementia Clinical Academic Group, SLaM , **David Codling,** Senior Registrar, SLaM, **Christine Banwell**, Pharmacist, SLaM, **Justin Sauer**, Consultant Psychiatrist, Clinical Lead for Memory Services, SLaM.