Medication management – the missing link in dementia interventions

Running head – Medication management in dementia

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Dementia has an estimated global prevalence of 35 million individuals (Alzheimer's Disease International, 2009). In the UK 570,000 people live with dementia - a figure which will double over the next 30 years, reflecting global predictions (Alzheimer's Disease International, 2009; DoH, 2009a). People with dementia are commonly prescribed complex medication regimens, containing both physical and psychotropic medication (Schubert et al, 2006).

Medication related adverse events due to poor medication management are associated with significant morbidity and admission to secondary care (Pirmohamed et al, 2004). Medication management is the entire way in which medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that they make to producing informed and desired outcomes of patient care (Audit Commission, 2001). The importance of safe and effective medication management for people with dementia is recognised nationally in the UK, by both the National Dementia Strategy (DoH, 2010) and NICE guidance (National Collaborating Centre for Mental Health, 2007), and internationally (Ministry of Health Services, 2007; Agency for Healthcare Research and Quality, 2009; see table 1 for a summary of the key factors). However, medication management care pathways in dementia are often complex. In addition, there is an inherent tension between ensuring that the symptoms of dementia are treated effectively and limiting iatrogenic disease associated with medication.

Please insert table 1 here.

There has been relatively little research on the impact of dementia on the prevalence of adverse drug events, in terms of adverse drug reactions (ADRs) and/or medication errors (Maidment et al, 2008; Gomez-Pavon et al, 2010). Dementia has, however, been identified as the main disease state which increases the likelihood that other risk factors for ADRs, including inappropriate prescribing, old age, adherence issues, drug interactions, comorbidity and polypharmacy, are present (Gomez-Pavon et al, 2010).

Medication errors (any incident where there has been an error in the process of prescribing, dispensing, preparing, administering, monitoring or providing medicines advice, regardless of whether any harm occurred; NPSA, 2009) may also be more common in people with dementia due to the involvement of multiple health and social care professionals (Maidment et al, 2008). The direct impact of cognitive impairment is of course also important (Nirodi et al, 2002). Within the general population, patients identify and thereby avoid nearly a quarter of errors, but both dementia and medication impair cognition and decision-making facilities (Boustani et al, 2003; Warner et al, 2005; Schubert et al, 2006; Maidment et al, 2008). Patients with dementia may be less likely to question a prescription or a change in medicine, be less aware of potential adverse events, and of whether monitoring is required, and therefore more likely to fail to identify a potential error (Maidment et al, 2006; Barber et al, 2009).

Both adverse drug reactions and medication errors may lead to admission to resource-intensive care facilities. One of the largest studies of its type estimated that adverse drug events caused 6.5% of all admissions to secondary care facilities (Pirmohamed et al, 2004). The same study found that such events might account for as many as 6,000 deaths each year in England. In a study of 13,000 unplanned admissions, of which 714 (5.6%) were related to medication, impaired cognition was identified as the main predictor of preventable medication-related admission to hospital (Odds ratio, 11.9; 95% confidence interval, 3.9 to 36.3; Leendertse et al, 2008).

The impact of adverse drug events on admission to residential care facilities is less well studied. However, it is clear that people with dementia are frequently prescribed medicines with both anti-cholinergic and sedative activity, both of which impair cognition (Boustani et al, 2003; Mulsant et al, 2003). It has been estimated that 20 to 50% of people with dementia take at least one medication with anticholinergic activity (Boustani et al, 2003; Schubert et al, 2006). Admission to residential care facilities is linked with impaired cognition and central ADRs could be associated with admission to residential care facilities via their impact on cognition.

Informal carers of older people, such as family members, may conduct as many as 10 activities in relation to medication management, such as noticing and managing side-effects, deciding when to administer the medication and supplying appropriate information (Smith et al, 2003; Francis et al, 2002). They have a key role in ensuring safe medication management (Smith et al, 2003; Francis et al, 2002). People with dementia often rely upon informal carers to manage their medication particularly as the dementia progresses

(Cotrell et al, 2006; Arlt et al, 2008). This role places significant strain on such carers (Francis et al, 2002). The greater the number of medication management related activities, the worse the social functioning and the mental health of the carer (Francis et al, 2002). People with dementia may over-estimate their ability to manage their own medication safely and there is a lack of research on both the causes, and the impact, of switching from self-administration to carer-led administration (Cotrell et al, 2006; Arlt et al, 2008). One study, however, found that cognitive impairment was only associated with a difficulty in self-medicating safely in people prescribed complex medication regimens (Maddigan et al, 2003).

Adherence to, and concordance with, prescribed medication may be particularly problematic for people with dementia (Mackin et al, 2007). An inability to manage complex medication regimens is a predictor for admission to residential care facilities (Lieto et al, 2005). A successful self-medication programme that includes adequate support, teaching the older person about the medication and other measures to improve compliance, can reduce the risk of medication errors and help maintain independence (Maddigan et al, 2003). However, simply improving adherence may be counter-productive and an over-emphasis on adherence may increase the incidence of medication related iatrogenic disease (Holland et al, 2005; Holmes et al, 2006). In the HOMER trial - an intervention designed to improve medication management - a pharmacist-led, home-based medication review actually *increased* readmission rates in the intervention group compared to treatment as usual (234 vs. 178; OR 1.30, 95% confidence interval 1.07 to 1.58; P = 0.009) - possibly by over-encouraging improved adherence and thereby precipitating iatrogenic disease (Holland et al, 2005). Other trials of pharmacist-led medication review have produced variable results; though some studies have reduced the number of medicines prescribed, improving real life outcomes has been problematic (Zermansky et al, 2001; MEDMAN Team, 2007; Patterson et al, 2010; RESPECT Trial Team, 2010).

Research to date in this area has tended to focus on the use of anti-psychotics to treat behaviour that challenges. Such behaviour is amongst the main drivers for admission to residential care facilities (Holmes et al, 1998; Souetre et al, 1999; Gaugler et al, 2009; Ballard et al, 2010). Concern about the use of anti-psychotics in dementia has been highlighted for a long time (DoH, 2001). Recently the National Dementia Strategy targeted a two-thirds reduction in the use of anti-psychotics to treat behaviour that challenges (DoH, 2009b & 2010). While a significant proportion of anti-psychotic prescribing (in particular for long-term use) is inappropriate, this is an ambitious target and may prove unrealistic. The US 1987 Omnibus Budget Reconciliation Act (OBRA) restricted the use of anti-psychotics to certain approved indications, but only achieved a reduction in antipsychotic use of between 28 and 36% (Furniss, 2002; National Long Term Care Ombudsman Resource Center, 2011). Pharmacological methods will still be needed to treat acute behaviour that challenges; such a rigid and ambitious target may have adverse consequences such as the use of alternative unlicensed therapies for example, benzodiazepines, which are themselves are associated with serious side-effects (Ancill et al, 1991; Guthrie et al, 2010). Indeed, one large study

involving 4850 nursing home residents, which examined the impact of the OBRA guidelines, noted a 48.6% increase in regular and a 27.5% increase in 'as required' prescriptions for anxiolytics such as benzodiazepines and buspirone (Borson et al, 1997).

We conclude that medication management in dementia is a broad concept that should encompass a complete review of medication including assessment of indication, dosage, interactions and continued need. Optimising the management of all medication in dementia offers significant potential to improve dementia care in several ways:

(a) improving the quality of care for people with dementia and their carers;
(b) improving key outcomes, in dementia by reducing iatrogenic disease;
(c) enhancing the healthcare professional/patient relationship, by for example empowering people with dementia and their carers;
(d) reducing inappropriate medication and the need for resource intensive interventions consequent to mismanagement;
(e) enhancing non-medication management pathways for people with dementia.

Research is urgently needed to identify the most effective ways of delivering effective medication management in dementia.

Conflict of Interest
No conflicts of interest were identified.

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Table 1 – Key Factors in Medication Management in Dementia

Ensuring effective evidence-based treatments are utilised.
Limiting adverse events associated with medication, such as adverse reactions and medication errors.
Ensuring appropriate adherence to medication.
Supporting the role of carers in safe and effective medication management.
Ensuring that medication can facilitate independent living.