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Medication administration in nursing homes

Wright D (2002) Medication administration in nursing homes. *Nursing Standard*. 16, 42, 33-38. Date of acceptance: May 20 2002.

David Wright PhD, MRPharmS, is Lecturer in Pharmacy Practice, School of Pharmacy, University of Bradford.
Email: d.wright@bradford.ac.uk

Abstract

Aim To describe the difficulties faced when administering oral medication to patients with swallowing difficulties in nursing homes, the methods that are used to overcome these difficulties and their appropriateness.
Method A self-administered questionnaire was given to all participants (n=763) at eight regional study days for nurses employed in independent nursing homes. The questionnaire included sections on respondent and nursing home demographics, extent of and methods used to overcome swallowing difficulties, experience of overcoming swallowing difficulties and nurses' opinions on the ease of changing prescriptions to liquid formulations.
Results Of 763 questionnaires, 540 (70.8 per cent) were returned completed. On average 15 per cent of all residents had difficulty swallowing tablets and capsules, 5 per cent regularly spat out their medication and 1 per cent hid it. Hiding medication in food was reported by 56.5 per cent (n=305) of respondents, 26.9 per cent (n=145) omitted the dose, 61.3 per cent (n=331) crushed or opened medication before administration and 87.6 per cent (n=473) obtained liquid alternatives. Crushing or opening of medication (unlicensed administration) took place in more than 80 per cent of all nursing homes on at least a weekly basis. The majority of nurses (n=487, 90.2 per cent) would not be reluctant to ask the prescriber for a liquid alternative, however, 58 per cent (193 out of 333) stated that the prescriber might recommend that medicines be crushed or opened, and cost was stated to be a consideration in this process by 62 per cent (n=335) of nurses.
Conclusion The crushing or opening of medication results in unlicensed administration. Liability lies solely with the nurse if the action was unauthorised and is shared with the prescriber if it had been authorised. With the availability of most oral medicines as a liquid formulation, the majority of reported crushing or opening that is taking place is unnecessary. In many instances this is because of prescriber reluctance to change the prescription. Nurses choosing to administer medication via a non-licensed method should ensure that all other avenues have been considered and appropriate advice sought. Where unlicensed administration is authorised by the prescriber, a written and signed record of this should be obtained.

RECENT RESEARCH describing the extent of covert administration of medication in care homes (Treloar *et al* 2000) and response to this from the UKCC (2001), failed to consider the separate issue of medicine crushing, which frequently occurs as part of this process. Furthermore, the number of articles describing how to administer medication to patients with swallowing difficulties (Glustein 1984, Mistry *et al* 1995), or to patients receiving oral medication via non-oral routes (Chadwick and Forbes 1996, Gilbar 1999, Thomson *et al* 2000), provide some idea of the extent of medicine crushing taking place by nurses when administering medication.

Marketing authorisations (previously known as product licences) to pharmaceutical companies are on the basis that the medicine will be administered to the patient in the form it was manufactured and via the route in which it was tested. Consequently, crushing medication before administration or delivery

The author approached Rosemont Pharmaceuticals for permission to distribute the study questionnaire at their national nurse education days. The company subsequently paid for six days' locum cover to enable the author to write the article. They have had no editorial input into the article, the questionnaire design or data analysis.

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Key words

- Drug administration
- Elderly: nursing
- Nursing homes

These key words are based on the subject headings from the British Nursing Index. This article has been subject to double-blind review.

via a feeding tube might render the medicine's administration to be unlicensed.

Guidelines for the administration of medicines provided by the UKCC clearly state that: 'If an unlicensed medicine is administered to the patient, the manufacturer has no liability for any harm that ensues' (UKCC 2000). Consequently, liability for the unauthorised administration of crushed medication or medication via a non-licensed route might lie solely with the administrating nurse.

The aim of this research is to describe the difficulties faced when administering oral medication in nursing homes, the methods that are used to overcome the difficulties and their appropriateness.

Literature review

Dysphagia can occur for many reasons, including malignancy and reflux disease with a stricture or motility disturbance (Owen 2001). As a consequence, residents in nursing homes, particularly older people, are more likely to have difficulties swallowing medication than their counterparts in the community. Furthermore, patients who require administration of food and medication via feeding tubes are regularly cared for in the nursing home environment.

The procedure for dealing with medication in patients with swallowing difficulties or requiring medication via a feeding tube is the same, whichever reference source is used (Chadwick and Forbes 1996, Thomson *et al* 2000). Firstly, the therapeutic and continuing need for the medication should be assessed. It might in some instances be more appropriate to discontinue therapy, either temporarily or long term, than to try to administer it at all. If it is imperative that the patient continues to receive the therapy, then an alternative route of administration should be considered. This might include buccal, intravenous, transdermal, rectal, intramuscular or subcutaneous routes.

Failing the choice of an alternative route, a licensed liquid formulation (including dispersible and effervescent products) should be obtained. Although the number of medicines with a liquid alternative has traditionally been limited, there has been a recent expansion in the availability of liquid formulations (Thompson 1995).

Within nearly all therapeutic groups there is now at least one medication available in a liquid formulation with a practical shelf life. Consequently, when a prescribed medication is not available in a liquid formulation, another medication within the same therapeutic group will be. Before using a liquid formulation in a feeding tube its appropriateness for administration via this route should not be assumed (Murphy 2001). Where liquid formulations are to be administered via feeding tubes, guidance from either the manufacturer or a medicine's information centre should be sought.

In the rare instance of no alternative administration route or liquid formulation being available, the crushing of medication or opening of capsules has to be considered. This last option only exists if the oral medication is not specially formulated, light-, moisture- or heat-sensitive, cytotoxic or a hormonal product (Glustein 1984, Mitchell and Pawlicki 1992).

Pharmaceutical manufacturers formulate oral medications to ensure that absorption takes place in the appropriate part of the gastrointestinal tract and at the appropriate rate. The act of crushing a medication or removing it from its capsule might significantly alter the absorption characteristics of a product, consequently affecting its therapeutic effect and side effect profile. Medicines that are sublingual, buccal, enteric coated ('EC') or extended release ('MR', 'SR', 'XL', 'CR', 'LA'), will all be affected by the act of crushing. Illicit crushing of modified release oxycodone products in the US has resulted in a large number of deaths because of the unexpected rapid release of the drug (Charatan 2001). Lists of medicines that cannot 'safely' be crushed are regularly produced and updated in the US (Mitchell and Pawlicki 1992) and Canada (Glustein 1984), but not in the UK.

The crushing of cytotoxic and hormonal medications with carcinogenic or teratogenic potential to the administrator should be avoided because of the problems caused by particle aerosolisation (Glustein 1984, Thomson *et al* 2000). It has been suggested that in this instance the employer would be legally required to complete a Control of Substances Hazardous to Health (COSSH) assessment form (Thomson *et al* 2000). Concerns about the explosive potential of crushing nitroglycerin-based pharmaceuticals (for example, nitrates for prophylaxis and treatment of angina) have also been expressed (Glustein 1984).

Although the outlined and accepted approach to dealing with swallowing difficulties seems rational and practical, it is based on the assumption that the prescriber would be willing to review and change therapy if a swallowing problem is identified, and that the prescriber and administrator are aware of the therapeutic options available to them at all stages. These assumptions have not been tested. Furthermore, there is no research describing the proportion of the nursing home population who have difficulties in receiving oral medication, or the extent and appropriateness of medication crushing that is taking place.

Against this background, nurses were surveyed to discover the difficulties they faced when administering oral medications to nursing home residents.

Research design

Rationale The financial implications of observational research to determine how swallowing difficulties in nursing homes are addressed would not justify the results. Furthermore, the effect of an

Table 1. Extent of swallowing difficulties in nursing homes

Problem	Number	Mean (sd) (per cent)	Median	Minimum	Maximum
Difficulties swallowing tablets/capsules	503	22.3 (21.6)	15	0	100
Regularly spit out medication	488	11.3 (14.8)	5	0	98
Always chew medication before swallowing	485	11.9 (16.2)	5	0	90
Hide tablets/capsules	472	4.6 (8.3)	1	0	95

observer on nurses during a medication rounds might affect their behaviour. Although a postal questionnaire to a random sample of nursing homes would reduce sample bias, concerns about response rate and obtaining responses from appropriate nurses within the home reduced the appeal of this approach.

Supervised administration of a questionnaire was chosen as the method of data collection for reasons of efficiency and to ensure an acceptable response rate. All nurses attending study days targeted at practice within nursing homes were asked to complete the questionnaires, thus ensuring that there was no bias caused by sampling.

Method The questionnaire was designed and divided into the following distinctive sections:

- Guidance on completion.
- Respondent details.
- Nursing home population demographics.
- Extent of swallowing difficulties.
- Methods used to overcome swallowing difficulties.
- Experience of overcoming swallowing difficulties.
- Opinions on the ease of changing medication.

The covering letter stated that the questionnaire was: 'designed to determine how much of a problem there is with administration of medication to patients with swallowing difficulties and what mechanisms that you presently use to cope with it'. Anonymity was assured and complete honesty was requested.

Within the questionnaire a list of commonly used medicines was provided and nurses were asked whether they needed to obtain either a liquid or dispersible alternative or crush the medication in the past 12 months.

The first draft was peer reviewed and then piloted on a small sample of nurses employed in nursing homes. After changing ambiguously worded questions and including questions to quantify frequency of crushing occurrence, it was given to all nurses on arrival at eight regional study days held in England. Only questionnaires completed and returned before the start of training were accepted. Facilitators ensured that questionnaires were completed independently and provided guidance when requested.

Limitations of the study The study population was limited to those nurses choosing to undertake study days on current pharmaceutical issues in nursing homes and consequently the sample might not be representative of all nurses working in nursing homes. The disadvantage of this limitation must be placed in the context of using unbiased sampling in postal surveys with potentially lower response rates.

Furthermore, the design relies on the honesty of the respondent, which cannot be tested within the confines of the study. Because of the nature of the research, however, responses reporting perceived inappropriate behaviour might actually be an underestimate of the actual figure.

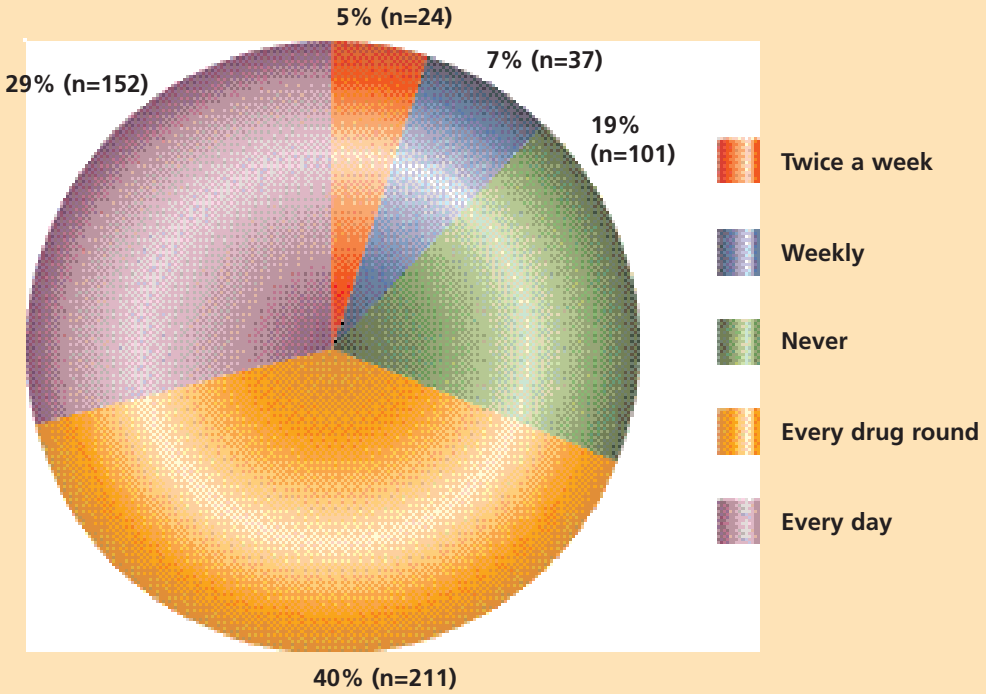
Results

Respondent demographics The number of nurses who attended the educational events was 763 and 540 (70.8 per cent) questionnaires were returned completed. Three hundred and eighty eight (71.9 per cent) nurses stated on which part of the register they were registered: 266 (68.6 per cent) were part 1, 70 (18.0 per cent) part 2, and 52 (13.4 per cent) part 3. The mean (sd) number of years practising as a nurse was 22.6 (10.6).

Nursing home demographics There were 447 (83.6 per cent) nurses employed in homes mainly caring for older people, 11 (2.1 per cent) in homes for the young and 77 (14.4 per cent) in those with young and older people (five nurses did not complete this question). The median size home in which respondents were employed was 36 beds, 17 nurses were employed in homes with greater than 100 beds and two were responsible for more than 400 beds at a number of homes. One hundred and forty nine (n=527, 28.3 per cent) nurses who answered the question cared for residents with mixed morbidity; 74 (19.6 per cent) cared solely for residents with mental illness; 87 (n=527, 16.5 per cent) for those with physical disability; 207 (n=527, 39.3 per cent) for those with infirmity; and 10 (n=527, 1.9 per cent) for those with terminal illness.

Extent of swallowing difficulties in nursing homes Table 1 summarises the extent of problems with swallowing medication encountered by respondents. It can be seen that, on average, almost a quarter of residents in nursing homes exhibit difficulties with swallowing.

Figure 1. Frequency of tablet crushing or capsule opening (n=540)



Methods used to overcome administration difficulties Methods employed by nurses to overcome swallowing difficulties included mixing with food (n=305, 56.5 per cent), omitting the dose (n=145, 26.9 per cent), crushing the medication or opening the capsule (n=331, 61.3 per cent) and obtaining liquid alternatives (n=473, 87.6 per cent). Figure 1 shows the frequency of tablet crushing or capsule opening as stated by nurses.

Three hundred and eighty nine (72 per cent) nurses had cared for a resident with a percutaneous endoscopic gastrostomy (PEG) tube in the past 12 months and 224 (n=389, 57.6 per cent) crushed medication for at least one resident. Interestingly, a further 29 (5.4 per cent) nurses who stated they had never crushed tablets or opened capsules, stated that they had actually done so to administer the medication via a PEG tube in the past 12 months. In total, 453 (83.8 per cent) nurses said they had needed to either crush tablets or open capsules to administer medication to a resident in the past 12 months.

Table 2 shows the number of nurses who had needed to either obtain a liquid alternative, crush or open medication frequently used in the past 12 months.

Experiences in changing therapy When asked about their experiences of asking doctors to change from a solid to liquid alternative, of the 511 who answered the question, 314 (61.4 per cent) stated that GPs were always happy to prescribe a liquid alternative, 190 (37.2 per cent) said GPs were sometimes happy, and only seven (1.4 per cent) stated that a GP was never happy to prescribe an alternative.

Of 333 respondents, 23 (6.9 per cent) stated that the GP would always recommend the tablet be crushed or capsule opened, 170 (51.1 per cent) stated that sometimes the GP would recommend this course of action, and 140 (42.0 per cent) stated that the GP would never recommend it.

Of 335 respondents, 45 (13.4 per cent) stated that the GP would always express concern over the cost of a liquid alternative, 159 (47.5 per cent) said they would sometimes express concern, and only 131 (39.1 per cent) said that the GP would never express concerns about cost.

Of 507 respondents, 36 (7.1 per cent) agreed that they would be reluctant to ask the GP to change the formulation of the medication, with 458 (90.3 per cent) stating that they would not be reluctant. The remainder (n=13, 2.6 per cent) were unsure.

Of the 521 who answered the question, 205 (39.3 per cent) stated that they would always seek advice before crushing tablets or opening capsules, 126 (24.2 per cent) would usually seek advice, 86 (16.5 per cent) would sometimes seek advice and 53 (10.2 per cent) would occasionally seek advice. Fifty one (9.8 per cent) stated that they never sought advice before crushing tablets or opening capsules, 93 (n=540, 17.2 per cent) stated that they would consult a nurse, 268 (n=540, 49.6 per cent) a GP and 442 (n=540, 81.9 per cent) a pharmacist if advice were needed.

Discussion

Department of Health statistics for 2001 showed that in independent nursing homes 47,720 nurses (84.9 per cent) were RGN (parts 1 and 2) and 8,520

Table 2. Common medication in nursing homes and approaches to swallowing (n=540)

Name		*No. (%) of nurses*	
Generic name	**Proprietory**	**Obtained liquid alternative**	**Crushed or opened**
Amlodipine	Istin	18 (3.3)	19 (3.5)
Bendrofluazide*	Aprinox	74 (13.7)	54 (10.0)
Co-beneldopa	Madopar	148 (27.4)	38 (7.0)
Co-careldopa	Sinemet	47 (8.7)	67 (12.4)
Co-danthrusate	Normax	169 (31.3)	9 (1.7)
Felodipine m/r	Plendil	6 (1.1)	7 (1.3)
Fluoxetine	Prozac	193 (35.7)	27 (5.0)
Frusemide**	Lasix	216 (40.0)	69 (12.8)
Lithium	Priadel/Camcolit	23 (4.3)	15 (2.8)
Lofepramine	Gamanil	46 (8.5)	32 (5.9)
Nifedipine	Adalat	27 (5.0)	30 (5.6)
Propranolol	Inderal	29 (5.4)	17 (3.1)
Senna	Senokot	317 (58.7)	52 (9.6)
Tamoxifen	Nolvadex	44 (8.1)	32 (5.9)
Temazepam		212 (39.3)	32 (5.9)
Tramadol	Zydol	49 (9.1)	32 (5.9)

* Now known as bendroflumethazide ** Now known as furosemide

(15.1 per cent) were RMN in independent nursing homes (part 3) (DoH 2001). This compares favourably with the study sample (n=388) where 86.6 per cent were RGN parts 1 and 2 (n=53, 13.4 per cent). Furthermore, in 2001 there were 176,000 registered beds in 5,220 registered independent general and mental nursing homes in England, equating to an average occupancy of 33.7 beds (DoH 2001). The large sample size obtained, high response rate and similarity to national figures increase confidence in the study results.

The stated incidence of residents having difficulties in swallowing tablets or capsules and regularly spitting out or hiding medication provides some explanation for the large number of related journal articles. It is clear that dealing with swallowing difficulties is not an insignificant part of nursing practice in nursing homes.

It is, therefore, unsurprising that a number of methods are regularly being employed to overcome these problems, with the most common course of action being changing the prescription to a liquid formulation. The ethics of hiding medication in food have recently been discussed and clarified by the regulatory body (UKCC 2001). Omitting doses is sometimes the only possible course of action, however whenever this does occur, the prescriber responsible for care should be notified as soon as possible. The scope of the survey did not enable clarification of this practice.

Tablet crushing and capsule opening in response to swallowing difficulties or administration via enteral feeding tube occurs in more than 80 per cent of all nursing homes on at least a weekly basis. Therefore, its appropriateness must be considered. Furthermore, the relatively small percentage of patients who always chew tablets or capsules before swallowing medication are in effect crushing the medication and might be causing undue harm to themselves. The need for specially formulated medication in these patients requires separate consideration.

All medicines listed within the questionnaire are available either as oral liquid formulations or dispersible tablets, and are supplied as a proprietary brand, as a licensed generic liquid or as an unlicensed product. Consequently all nurse-reported tablet crushing or capsule opening was potentially unnecessary. Furthermore, in the case of tamoxifen (hormonal product that will be aerolised), felodipine, nifedipine and lithium (all modified release formulations where bio-availability will be significantly altered by crushing), the crushing of the medication was also unequivocally inappropriate. However, it is not surprising that widespread crushing of medication is occurring when devices such as crushing syringes are advertised within the medical press (Nicholson's Health Care 1998).

Respondents were not asked to state whether crushing of medication was authorised or requested by the prescriber or advised by a third party. It would seem, however, that although a large proportion of nurses experience difficulties when asking prescribers to change therapy in the light of swallowing difficulties, this does preclude more than 90 per cent of them from doing so. When liquid alternatives are requested, some prescribers will express concerns regarding cost, and frequently the crushing of tablets and opening of capsules will be recommended.

The authorisation of crushing or opening of medication would not necessarily negate the administrating nurse's liability for the action, but increase the likelihood of it being shared. As stated by the UKCC: 'It [the administration of medicines] is not solely a mechanistic task to be performed in strict compliance

with the written prescription of a medical practitioner. It requires thought and the exercise of professional judgement' (UKCC 2000). Where crushing or opening of medication is requested by a prescriber, the nurse should take reasonable steps to ensure that this would not cause harm to the patient. Advice from the local pharmacist would be the absolute minimum action undertaken and the majority of nurses stated that they would use their pharmacist for this purpose.

The small percentage of nurses stating that they never ask for advice before crushing medication or opening capsules perhaps need to reconsider their practice. Although recent guidance to pharmacists on medicines administration in nursing homes (RPSGB 2001) does not consider the act of crushing or opening medication, the pharmacist will be able to comment on the availability of alternative routes of administration and liquid or dispersible alternatives.

Conclusion

When difficulties in swallowing medication are encountered the following should be considered:

- The need for medication continuation.
- The implications of stopping the medication either temporarily or long term.
- Whether an alternative route of administration is available.
- Whether a liquid alternative is available.

If the medication must be continued, administered orally and no liquid alternative is available then advice should be sought before tablets are crushed or capsules opened. The most convenient source of advice on all of the above is the community pharmacist. Where tablet crushing or capsule opening is being considered then it might be appropriate to obtain guidance from medicines information of the medicine manufacturer or the local medicines information centre. If tablet crushing or capsule opening is authorised by a prescriber then the prescriber's signature on either the patient's medication administration recording sheet or care plans should ideally be obtained. Protocols within every nursing home for dealing with swallowing difficulties and medicines administration via PEG tube might be appropriate

Implications for practice

- The high incidence of patients with swallowing difficulties or receiving medication via an enteral feeding tube in nursing homes leads to a variety of actions, which might not all be necessary, appropriate or safe
- Wide availability of licensed and unlicensed liquid formulations significantly reduces the need for crushing tablets or opening capsules before administration
- Nursing homes might benefit from written protocols for dealing with patients with swallowing difficulties and medication administration via enteral feeding tubes
- Nurses choosing to administer medication via a non-licensed method should first ensure that all other avenues have been considered and appropriate advice sought before taking this action
- Where unlicensed administration is authorised by the prescriber, obtaining a written and signed record of this authorisation should reduce the liability of the administrating nurse

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