Original Article

Outreach Pharmacy Service in Old Age Homes: a Hong Kong Experience

Background. To explore drug-related problems in old age homes in Hong Kong through outreach pharmacy service.

Methods. A standard form was used by outreach pharmacists to identify drug-related problems at old age homes. Homes were selected through random sampling, voluntary participation or adverse selection. Initial observation and assessment were performed in the first and second weeks. Appropriate advice and recommendations were given upon assessment and supplemented by a written report. Educational talks were provided to staff of the homes in addition to other drug information materials. At week 7 to 9, evaluations were carried out.

Results. Eighty-five homes were assessed and identified to have problems in the drug management system. These problems could generally be classified into physical storage (8.8%), quality of storage (19.2%), drug administration system (13.3%), documentation (16.4%), and drug knowledge of staff of homes (42.2%). Quality of drug storage was the most common problem found, followed by documentation and drug knowledge (73%, 50% and 44% of points assessed with problems, respectively). Apart from lack of drug knowledge and awareness of potential risks by staff, minimal professional standards unmet may be fundamentally related to lack of professional input and inadequacy in legislation. Most homes demonstrated significant improvements upon simple interventions, from a majority of homes with more than 10 problems to a majority with less than 5 problems.

Conclusions. Diverse problems in drug management are common in old age homes, which warrant attention and professional inputs. Simple interventions and education by pharmacists are shown to be effective in improving the quality of drug management and hence care to residents. While future financing of old age home service can be viewed within the social context to provide incentives for improvement, review of regulatory policy with enforcement may be more fundamental and effective in upholding the service standard.

Key Words
elderly; Hong Kong; nursing homes; old age homes; pharmacy services

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Pop u la tion age ing is a global phenomenon in both developed and developing countries. In Hong Kong, the population size of age 65 and above in creased from 482,040 in 1991 to 747,052 in 2001 (from 8.7% to 11.1% of total population). At the same time, there were in creasing numbers of el derly moving into old age homes, which resulted in a boom of such homes in the 1990s. These became regulated thereafter, with minimal licensing requirements. Old age homes in Hong Kong can be classified into nursing homes, care and attention homes (C&A homes), homes for the aged and self-care hostels for the elderly, in descending level of care delivered. In 1994, Community Geriatric Assessment Teams (CGATs) were established in the Hospital Authority. They provide comprehensive medical, nursing and rehabilitative support through outreach service to the elderly residing mainly in C&A homes, which provide nurses, personal care and con stitute the great est num ber of places (16,426 out of 26,904 places for government run/ subvented homes, and all places (~28,000) in private homes). Com mon problems such as mul tip le medical fol low up, poor medical record keeping, poor drug keeping system and many others...
were then identified. In some countries, drugs are supplied and/or managed under designated pharmacists’ advice and various drug-related problems such as under-use and/or over use of drugs, drug-related morbidity and mortality, etc. have been reported. In Hong Kong, C&A homes are bound to staff registered nurses or health workers to be in charge of the homes (including drug management), the number of whom is determined by the number of residents. Elderly bring their drugs from multiple sources to the old age homes, and the staff is responsible for the storage and administration of drugs thereafter.

To explore drug-related problems identified under this drug management model in old age homes, a pilot study of outreach pharmacy service was carried out in collaboration with CGATs.

METHODS

The study was carried out in C&A homes between February 2001 and October 2001. Seven out of the 12 CGATs participated in the study (non-participating CGATs either already had some sort of outreach pharmacy support or were relatively small and/or newly established). All C&A homes with CGATs support were eligible, with no specific criteria. About 30% of C&A homes were selected by each corresponding CGAT through random sampling (36), voluntary participation (36) or adverse selection (13). The number of subvented and private homes recruited was in accordance with their proportions in each CGAT.

A standard assessment form was designed in the form of an all-or-none check list for data collection by on-site observation and interviewing staff who handle drug storage and administration. Points assessed represent basic requirements that help ensure safe and effective use of drugs. Under these first four areas, 4 to 7 standard statements were checked against (details of the points for each area are shown in corresponding graphs in the result section). For caregivers’ knowledge, methods and precautions of using metered-dose inhaler, nebulizer, insulin, glyceryl trinitrate (TNG) and warfarin, to gather with general knowledge in caring for diabetic residents (DM residents) were assessed against listed points.

Outreach pharmacists visited each home 3 times, at week 1, week 2 and week 7 to 9, respectively. Initial observation was carried out at week 1. At week 2, detailed assessment was performed with the use of the standard assessment form. Only points applicable to individual homes were assessed (e.g. homes with no residents using insulin would not have knowledge on insulin as assessed). Appropriate advice and recommendations were given upon assessment. Further reinforcement was made through a written report. Various forms and lists were also distributed to homes as tool aids if needed. These include drug preparation and administration records, insulin administration record, drug disposal recording forms, sample label illustration, and lists of common drug names (brand vs. generic, English vs. Chinese). In addition, an educational talk was provided to staff of the homes covered by each CGAT between weeks 2 and 7. Other drug information materials provided included patient information leaflets, pamphlets and drug management handbook for old age homes published by the Chief Pharmacist’s Office, Hospital Authority, Hong Kong. At week 7 to 9, post-intervention evaluations were carried out with the same standard as assessment form. Two satisfaction surveys were also carried out after the talks and the outreach pharmacy service, respectively (though results were not reported). Results of such ments were fore and after intervention were interpreted by descriptive statistics.

RESULTS

A total of 85 CGAT-covered homes were recruited (Table 1), 68 out of which were private homes and 17 subvented ones. These represent 13% of all C&A homes and nursing homes in Hong Kong. All visited homes

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*Health workers obtain registration after completion of a 210-hour certificate training on caring for elderly in old age home. Basic drug knowledge is part of the curriculum.*
were C&A homes except one nursing home, which provide both medical and nursing services. Fig. 1 shows the distribution of number of residents in homes visited. At least one member of staff of each visited home, who was responsible for handling drug storage and administration, was interviewed. The interviewed ones had various qualifications, and included registered nurses, health workers and personal care workers.

All recruited homes were identified to have problems in the drug management system. These problems could generally be classified into physical storage (8.8%), quality of storage (19.2%), drug administration system (13.3%), documentation (16.4%), and drug knowledge of staff of C&A homes (42.2%). The percentage of homes with problems identified before and after interventions is shown in Table 2. Table 3 shows that the quality of drug storage was the most common problem found before intervention, followed by documentation and drug knowledge (72% ± 5.8%, 50% ± 6.2% and 44% ± 4.2% of

Table 1. Details of CGAT-covered homes visited by outreach pharmacists

<table>
<thead>
<tr>
<th>CGAT</th>
<th>No. of homes visited by pharmacist</th>
<th>% of CGAT-covered homes visited</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>24%</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>33%</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>32%</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>31%</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>21%a</td>
</tr>
</tbody>
</table>

CGAT = Community Geriatric Assessment Team.

In calculating the percentage, all CGAT-covered homes were taken into account, including those covered by CGATs but not involved in this study.

Fig. 1. Distribution of number of residents in 85 recruited old age homes.

![Graph showing distribution of number of residents in homes](image)

Table 2. Percentage of homes with problems identified before and after interventions by outreach pharmacists (n = 85)

<table>
<thead>
<tr>
<th>Area</th>
<th>Before intervention</th>
<th>After intervention</th>
<th>p valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage (physical)</td>
<td>72.9%</td>
<td>29.4%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Storage (quality)</td>
<td>98.8%</td>
<td>75.3%</td>
<td>0.12</td>
</tr>
<tr>
<td>Administration</td>
<td>88.2%</td>
<td>61.2%</td>
<td>0.05</td>
</tr>
<tr>
<td>Documentation</td>
<td>84.7%</td>
<td>54.1%</td>
<td>0.02</td>
</tr>
<tr>
<td>Knowledge</td>
<td>100.0%</td>
<td>72.6%</td>
<td>0.07</td>
</tr>
</tbody>
</table>

a McNemar’s test.

b There is no prerequisite in being a personal care worker. Personal care workers usually work under a health worker in helping daily activities of elderly such as bathing and having meals.
points assessed with problems, respectively). Significant magnitude of improvement was also ranked in the same sequence (34% ± 5.9%, 18% ± 4.4% and 13% ± 2.7% of points assessed with problems post-intervention, respectively). Most homes demonstrated improvements upon simple interventions. Fig. 2 shows the prevalence of problems per home before and after intervention. It demonstrates a major shift in the distribution of number of problems per home assessed, from a majority of homes with over 10 problems before intervention to a majority with less than 5 problems after intervention.

Each standard statement on the assessment form in each area was translated into a problem identified in the corresponding graph of that particular area. For physical storage conditions, “no individualised drug container for individual resident,” “resident’s name unavailable on drug container” and “drugs stored improperly with food in fridge” constitute the most common problems (n = 85; 38%, 48% and 32% of homes with problems respectively). The percentages improve to 15%, 14% and 8%, respectively, after intervention. For quality of drug stor-
age, the most common problem was “drugs not stored according to their nature,” which involved not storing fridge/non-fridge drugs accordingly, pre-maturely dividing tablets, and pre-maturely removing drugs from strip- or blister-packing. Figs. 3 and 4 show the detailed distribution of problems in physical condition and quality of drug storage, respectively, before and after intervention.

For drug administration system, efforts were made to ensure that a proper system was in place for proper drug re-distribution and administration, and that drugs are given according to instructions on dispensing labels. Other high-risk areas include “improper drug containers for administration” and “drugs not given by trained personnel.” On the other hand, Fig. 5 shows that over 60% of homes did not give drugs according to the instructions on dispensing labels. Other high-risk areas include “improper drug containers for administration” and “drugs not given by trained personnel.” On the other hand, Fig. 6 shows that over 60% of homes lack drug administration records, record of over-the-counter (OTC) drugs and record of as needed drugs (prn drugs). On evaluation, among those lacking the mentioned records, 45% homes have taken advice and achieved complete documentation for all residents. When taken into account of those in proceedings of improvements, the improvement percentage increases to over 70%.

Regarding the drug knowledge among homes’ staffs, therapeutic areas assessed included respiratory devices (inhalers and nebulizers), insulins, caring for DM residents, TNG and warfarin. These were assessed in view of the relatively complex methods and/or precautions involved in their proper use, and the subsequent great impact on therapy success. Over 80% of homes had problems in the proper use or storage of respiratory devices, insulins and TNG despite their high level of usage age in the

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\textsuperscript{c} Drugs for individual residents are re-distributed (or pre-packed) into smaller drug containers well in advance of administration, instead of taking out drugs for direct administration at the appropriate dosing time in old age homes.

\textsuperscript{d} Trained personnel mean health workers or nurses.
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Table 4. Problems identified through observation that were excluded in the core assessment

1. Storage conditions
   • Storage condition not controlled under definite humidity and temperature
   • Residual drugs due to excessive remaining ‘as needed’ drugs, early follow-up or admission to hospitals, decease, and duplicated orders upon attending polyclinics

2. Drug administration system
   • Different practices/advice on issues of supply of non-crushable drugs to patients on Ryle’s tube feeding by healthcare professionals
   • Improper use of drugs such as using other residents’ drugs, premature termination of drug by own judgement, altering dosage without doctor’s verbal order and/or documentation, and self-initiation of high-risk drugs such as furosemide and haloperidol
   • Administration of duplicates of drugs owing to duplication upon polyclinic visits or concurrent use of old drugs

3. Drug documentation
   • Illegible and unrecognised brands of drug names on labels of drugs supplied from general practitioner, making it extremely difficult for healthcare professionals to identify interactions with or duplication of drugs from other sources

4. Other potential areas
   • Improper drug disposal
   • Polypharmacy common in elderly population, rendering adverse drug reactions and drug interactions more common problems in old age homes
   • Old age homes generally lack the concept of risk management and mechanisms to detect medication incidents

Fig. 6. Distribution of problems of insufficient drug documentation before and after intervention.

Fig. 7. Distribution of drug knowledge level in different therapeutic areas before and after intervention.
el elderly population. Fig. 7 shows the distribution of drug knowledge level in various therapeutic areas.

In addition to the standard data collection form, other problems and potential areas for improvement are identified through observer action as shown in Table 4.

DISCUSSION

With people enjoying longer life expectancy, care of the elderly, especially for those with chronic illness, has become a challenge to both the society and the healthcare professionals. Hong Kong has experienced a rapid increase in private C&A homes in the past decade. It is easily understandable that quality drug management is of paramount importance to the health of the elderly with chronic illness and/or disability residing in these old age homes. For instance, a proper physical storage system helps minimize risks of contamination, untoward access and accidental mix-up. Good quality of drug storage and a proper drug administration system help ensure safety and efficacy of drug therapy. Complete, up-to-date documentation and provision of tool aids, most homes with problems of unawareness can be effectively rectified through simple advice and education by pharmacists.

Despite significant improvement in the number of points as assessed with problems, only about 40% of homes achieve null problem in their drug administration systems. A similar phenomenon was observed in drug documentation (46%). These phenomena are due to certain substandard points observed, improvements of which are of utmost importance to the society and the healthcare professionals. Hong Kong has experienced a rapid increase in private C&A homes in the past decade. In this study, the number of homes with null problem in physical drug storage increased from 27% to 71% \((p < 0.0001)\) after intervention. The percentages of points assessed with problems in physical drug storage, quality of drug storage, drug administration system, documentation and knowledge also dropped significantly (Table 3). These reflect that such problems of unawareness can be effectively rectified through simple advice and education by pharmacists.
relatively lower adoption rate within the study period. It was suggested by homes’ staff that in the context of monetary re sources is of ten a major concern of budget holders.

The diverse drug-related problems revealed in this study was war anted at the end to the lack of pro fessional a role in in put in the drug management system and pharma ceutical issues in Hong Kong old age homes as compared to other countries.\textsuperscript{15-16} It is obvious that re sources and knowledge are two major hurdles to wards professional quality service by old age homes. How ever, the reason behind may be more of a social policy problem. Private, for-profit C&A homes emerged in the early 1980s in response to a tremendous short age of old age homes proposed by the Government and voluntary organizations.\textsuperscript{3} Many of these homes generate profit from small amounts of social security pay ments from the elderly. These became regulated in the 1990s, with only min in al licencing re quire ments supple men ted by a code of prac tice.\textsuperscript{17} Both the leg is lation and the code of prac tice con tinue to be a major problem in administration, duty and space re quire ments with hardly any sugges tions/re quire ments on drug man age ment. While quality of care is critical to the health of the elderly with chronic illness and/or disability, revenue generation or cost containment of ten usually takes precedence over service stan dard in terms of quality of facilities and man power.

In fact, most private homes only staff one or two health workers, who are qualified through a 210-hour certificate course and are eligible to be in charge of drug management as well as nursing care. Some homes largely rely on mainland China immigrants, who have some nursing skills but are not qualified as nurses/health workers in Hong Kong, for daily care of the elderly. In ability in reading English and lack of up-to-date drug knowledge hinder them in distinguishing drugs, rendering drug administration merely a process of following dosage instructions on labels. Multiple sources of drugs further deepen the risks of drug-related prob lems. With multi-pile clinics’ follow-ups, risks of polypharmacy, duplicated drugs and/or clinics, ad verse drug reactions and drug interactions inevitably increase. Without seamless in formation flow among clinics, ger general practice and contracted prac titioners of homes, de tection of the above drug-related problems is largely re lied on or facil itated by staff of homes, which is probably beyond their capabilities.

While the Government’s Bought Place Scheme/Enhanced Bought Place Scheme\textsuperscript{4} and busi ness competition have pro vided financial in creases to some private homes to raise their service stan dard to a more professional level of services. Although resources could be tight, basic service stan dard should not be sac rificed. Given the fact that more el derly with chronic ill nesses and disabilities are likely to need such services, service quality can be improved and become the main re quire ments. Con sistent with other pop ula tions, the elderly in Hong Kong old age homes as compared to other countries.

Regarding Limi tations, the data collection form used in this study does not reflect high standards used in hospitals. Null prob lem may not reflect high stan dard of service. Sec ondly, the tool only in di cates the ex ist ence of problems and does not reveal ex tent of problems. It is also not sensitive to extents of improvement like changes from generalized problems to odd cases in areas assessed. Further study may, therefore, be needed to ex amine the extent and prevalence of individual problems and after taking into account for more direct and accurate comparisons. Thirdly, lack of complete up-to-date records kept by homes ren ers sur veys of polypharmacy, poly clinics, ad verse drug reactions and drug interactions not feasible. Fur ther sur veys in these areas may be carried out upon

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\textsuperscript{4} Bought Place Scheme/Enhanced Bought Place Scheme are two schemes under which the Government buy places from existing private homes so as to shorten the waiting list by generating a supply of additional C&A home places of a higher acceptable level.
improvement in documentation. Fourthly, each home had only limited contact time with outreach pharmacists and was offered only 5 to 7 weeks for improvement, which may not be sufficient for larger homes.

In short, this study identified diverse problems in drug management in C&A homes in Hong Kong, which warrants attention and professional inputs. Simple interventions and education by pharmacists have shown to be effective in improving the quality of drug management and hence care to residents. These would help safeguard the health of resident elderly and hence minimize unnecessary burden on the healthcare system of the society.

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