

# A survey of hospital readmission in elderly patients

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This survey was designed to study the problem of hospital readmission in a geriatric centre in Hong Kong. A retrospective survey of 565 unplanned admissions to a geriatric department showed that the rate of unplanned readmission was 25.3%. Only 56.7% of the selected hospital records could be retrieved for further analysis. Of the unplanned readmissions, 19% were potentially avoidable. The reasons for readmission included medication problems (2.5%), inadequate medical management (16.5%), natural clinical course (32.9%), and new clinical problem (48.1%). A statistical difference was found in the readmission rates for those patients with or without multiple admissions in the previous year ( $P = 0.001$ ). Those patients who presented with cardiovascular problems were also more likely to be readmitted, although this difference was not statistically significant.

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*Key words: Patient readmission; Aged; Geriatrics*

## Introduction

Readmission is a common problem among geriatric patients in the acute hospital setting. The centre of study is a geriatric department within a public hospital in Hong Kong, which admits elderly patients with medical problems directly through its Accident and Emergency department according to age criteria. The readmission rate within 28 days of discharge was 14% in 1994.<sup>1</sup> This is comparable to the 6% to 36% reported in other centres.<sup>2,3</sup> Some of these readmissions were regarded as potentially avoidable; estimates vary widely (9%-59%) among the different centres.<sup>2,4-6</sup>

To minimise readmissions, we need to estimate the local readmission rate to establish a baseline for future comparison. Review of admission records in the centre studied showed that readmissions were mainly caused by unplanned admissions (unpublished data), which is similar to overseas studies.<sup>2,7</sup> Hence, only readmissions following unplanned admissions were studied in this survey and those following planned admissions were excluded.

It is important to know the percentage of potentially avoidable readmissions since it helps to set a realistic target in the audit programme for prevention of readmission. It is also important to understand the reasons and risk factors for readmission as these can help in the design of an effective intervention programme through the identification of high risk patients. The aim of this survey was to study the readmission rate among unplanned admissions, the preventability of readmission, and the reasons and risk factors for readmission in a major geriatric centre in Hong Kong.

## Subjects and methods

This was a retrospective case comparison study of hospital records. All unplanned admissions to the male and female geriatric wards of Princess Margaret Hospital in Hong Kong, for the months of September, October, and November 1994 were identified. The hospital records of those patients who had an unplanned readmission within 28 days of hospital discharge were retrieved and analysed. A similar number of hospital records of patients admitted during the same period were selected randomly as the control group. All of these records were reviewed by the researchers. Basic information such as age, sex,<sup>8-10</sup> and the interval between discharge and readmission<sup>6</sup> were collected. From the literature, possible unplanned readmission risk factors were identified. These included the number of unplanned admissions one year prior to the index admission,<sup>2,8</sup> the availability of functional

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assessment by a rehabilitation therapist during the index admission, the presence of impaired mobility or functional limitation during the index admission,<sup>8,11</sup> duration of hospital stay,<sup>2,12</sup> the primary problem at index admission,<sup>9-11</sup> the number of medications being taken on discharge,<sup>2</sup> follow up arrangement,<sup>2</sup> and discharge destination.<sup>8</sup> This data was also collected.

The major presenting problems at the index admission and readmission were recorded. The causes and preventability of all readmission cases were discussed and judged clinically by a panel of three trainees in internal medicine—the researchers. Hospital records of readmission cases were first reviewed by one of the researchers and each case was then brought to the panel and discussed thoroughly, focusing on the cause and preventability of each readmission. With reference to the findings of Williams et al,<sup>2</sup> we particularly looked for several factors that may cause readmission, these being—relapse of original condition, development of a new problem, carer problems, complications of the initial illness, need for terminal care, problems with medication, and problems with services.

Clinically, a consensus of opinion among the panel members was required for a readmission to be classified as potentially preventable.<sup>6</sup> Those cases for which no consensus could be arrived at were not classified as such. The same applied to the identification of the cause of readmission. Chi-square test was used to analyse nominal and ordinal data whereas continuous data were analysed by the Student's *t*-test.

## Results

The total number of unplanned admissions into geriatric wards for the study period was 565. One hundred and forty-three of the 565 patients were subsequently readmitted within 28 days of discharge, the readmission rate being 25.3%. Among the 143 readmissions, hospital records were successfully retrieved in only 79 (55.2%). One hundred and five control patients were randomly selected and in only 61 (58.1%) cases could the researchers trace the hospital records. The overall success rate for hospital record retrieval was 56.7%.

Fifteen (19%) of the 79 readmissions were considered potentially avoidable by the three researchers. Among the 15 avoidable readmissions, 13 were due to inadequate medical management, and two were due to medication problems. The reasons for readmission are shown in Table 1.

**Table 1. Reasons for readmission to the Department of Geriatrics, Princes Margaret Hospital, Hong Kong**

Reason	Frequency	Percentage
<b>Potentially avoidable</b>		
Medication problems*	2	2.5
Inadequate medical management <sup>†</sup>	13	16.5
<b>Unavoidable</b>		
Natural clinical course	26	32.9
New clinical problem	38	48.1
<b>Total</b>	<b>79</b>	<b>100</b>

\* One due to inadequate information about the side-effects of the medication, the other due to poor compliance due to inadequate instruction on how to take the medication.

† Four due to inadequately controlled heart failure, two due to uncorrected electrolyte disturbance, two due to the medication being inappropriately stopped, one due to inadequate work-up of the medical problem, and four due to suboptimal medical treatment.

The mean interval between discharge and readmission was 11.5 days (SD, 7.6) and 64.6% of the readmissions occurred within the first two weeks of discharge. There were significantly more unplanned admissions one year prior to the index admission for the readmission group ( $P = 0.001$ , 95% CI, 0.856, 3.059). No significant differences were found between the readmission and control groups with regard to age, sex, availability of functional assessment, functional limitation, mobility, duration of stay, number of medications, follow up arrangements, and discharge destination. A summary of this data is given in Tables 2a and 2b. As regards the presenting problems on admission, no significant difference in disease categories were found between the readmission and control groups but a trend of increased readmission in cases presenting with cardiovascular disease was observed (Table 3).

## Discussion

The readmission rate for unplanned admissions was high, up to 25.3%, in a major geriatric centre in

**Table 2a. Comparison of risk factors between the readmission and control groups**

<b>Risk factor</b>	<b>Control group n = 61(%)</b>	<b>Readmission group n = 79(%)</b>	<b>Statistical significance</b>
Sex	M: 32 (52.5) F: 29 (47.5)	M: 33 (41.8) F: 46 (58.2)	ns
Functional assessment during index admission	Yes: 24 (39.3) No: 37 (60.7)	Yes: 33 (41.8) No: 46 (58.2)	ns
Functional limitation	Yes: 21 (34.4) No: 31 (50.8) na: 9 (14.8)	Yes: 29 (36.7) No: 38 (48.1) na: 12 (15.2)	ns
Mobility	bedchair: 7 (11.5) ass: 5 (8.2) indep: 36 (59.0) na: 13 (21.3)	bedchair: 12 (15.2) ass: 9 (11.4) indep: 46 (58.2) na: 12 (15.2)	ns
Follow up arrangement	GOPD: 5 (8.2) Geri OPD: 40 (65.5) GDH: 4 (6.6) Other OPD: 2 (3.3) No FU: 10 (16.4) na: 0	GOPD: 7 (8.9) Geri OPD: 56 (70.9) GDH: 5 (6.3) Other OPD: 5 (6.3) No FU: 5 (6.3) na: 1 (1.3)	ns
Discharge destination	alone: 2 (3.3) home: 30 (49.2) PAH: 13 (21.3) SAH: 5 (8.2) Hosp: 7 (11.5) na: 4 (6.5)	alone: 1 (1.3) home: 49 (62.0) PAH: 8 (10.1) SAH: 14 (17.7) Hosp: 4 (5.1) na: 3 (3.8)	ns

Please refer to Table 2b for explanation of abbreviations

Hong Kong. However, this does not necessarily imply poor quality of patient care since most (81%) of the readmissions were unavoidable (Table 1). Thus, the use of readmission rate as an outcome indicator may not be reliable in the local situation.

The estimated overall avoidable readmission rate was 4.8% (19% of 25.3%). A reduction in this figure may result in a quite significant reduction in hospital expenditure and would also reduce a patient's risk of acquiring nosocomial infection. Any intervention to reduce readmission should be targeted at high-risk cases for readmission—identified in this study as those with repeated admission one year prior to the index admission. It was also observed that those who presented with cardiovascu-

lar disease had a higher readmission rate, although this difference was not statistically significant. Therefore, patients presenting with cardiovascular diseases should also be considered as target group for intervention.

As most of the avoidable readmissions were due to inadequate medical management, the use of an educational programme and clinical guidelines may be considered when an intervention programme is planned. Readmissions due to medication problems were mainly due to poor communication of medication information to the patient, thus the establishment of a discharge planning programme may also be considered as an intervention. However, the effectiveness of these interventional methods is still in doubt and further study is required to find out the best way to tackle this problem.



could not identify any carer or social service arrangement problem as a cause of readmission. This may mean that either the patients in this study were satisfied with their social situation, or that the psychosocial assessment and documentation were inadequate. These problems arose because this study was retrospective in design and did not allow the authors to study in depth certain factors, particularly the psychosocial aspect. A prospective design may avoid these problems. Finally, since readmission carries resource implications, the authors suggest that a larger scale prospective survey be conducted to assess the local situation and to identify risk factors with the aim of reducing the readmission rate in the elderly.

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## Correction

Please note the following correction to the article "*Immune response to hepatitis B vaccine in health care workers in Hong Kong*" (*HKMJ* 1996;2:138-140). In the section subtitled "Materials and methods", line 10 in the first paragraph should have read: "...HBV vaccine 10 µg intramuscularly in the deltoid area..." and not "HBV vaccine 10 mg...".