Care management for hospital-discharged older persons: an 18-month randomised controlled trial

ORIGINAL ARTICLE

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ABSTRACT

Background. A group of 83 elderly subjects and their informal carers were randomly selected to receive an 18-month care management programme starting in July 2000. Another group of 83 subjects with similar characteristics were recruited as controls to compare the effect of care management on the health care utilisation pattern over that period.

Methods. The health conditions of the subjects were assessed using Minimum Data Set-Home Care. Health care utilisation patterns were evaluated by means of the total number of (1) attendances at the accident and emergency (A&E) department, (2) bed-days in acute and rehabilitation hospitals, (3) community nursing service (CNS) visits, and (4) geriatric day hospital (GDH) use per patient per month.

Results. The health conditions of the subjects deteriorated over time, the proportion of deterioration being greater in the intervention group than in the controls. The total number of bed-days occupied in acute hospitals over time for the intervention group decreased by 38% ($p<0.001$) but among controls by 5% only ($p<0.001$). The reduction of bed-days in acute hospitals per patient per month in the intervention group was significantly greater than that in the controls ($p<0.05$). The total number of bed-days spent in rehabilitation hospitals over time by those in the intervention group decreased by 56% ($p<0.001$), whereas in the controls the number decreased by 47% ($p<0.001$). The corresponding reduction of bed-days in rehabilitation hospitals in the intervention group was also greater than that in the controls. There were no statistical differences in the change over time for usage of A&E services, the CNS and the GDH between the two groups.

Conclusion. Care management intervention could reduce elderly persons' dependence on health care services because of an appropriate use of a comprehensive assessment tool, effective interfacing among disciplines, and adequate support for and training of informal carers.

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INTRODUCTION

Ageing is a global issue and Hong Kong is facing the challenge of a rapidly ageing population in the coming decades. It is estimated that those aged 65 years and over among Hong Kong residents will grow to 26% in the next 30 years.[1] Increasing life expectancy results in a growing number of older persons encountering a series of major transitions in work, health, wealth, and living arrangement during the later periods of life. Although ageing does not necessarily confer disability, it is reported that 12.4% of Hong Kong citizens aged 65 years and over are cognitively and physically impaired.[2] For those aged 75 years and over, the proportion is as high as 25.9%. Currently about 27 600 persons aged 65 years and over in Hong Kong have dementia, and the trend will increase to 60% (i.e. 43 600 persons) by 2016.[3]

In Hong Kong, 62.9% of persons aged 65 years and over had consulted physicians during the 3 months before the census enumeration.[4] Their hospitalisation rate was also significantly higher than that in other age groups (99 vs 17 to 58 per 1000 persons per year).[5] The mean length of stay in hospitals for all ages was 13.73 days in 2005, but was 16.24 to 21.44 days for those aged 64 years and over.[6] Older patients had a higher propensity for hospital re-admission, ranging from 8% to 37%,[6] and heavy dependence on health care services.

It is observed that when people require medical intervention from a health care system, they may need to tackle the system and become stressed, if no one helps them to navigate through the process. For this reason, medical social workers are appointed to promote better coordination of care for frail patients. In addition to providing psychosocial care, medical social workers are also responsible for formulating discharge plans and coordinating post-discharge services for patients and their families. It is hypothesised that a well-designed hospital discharge plan reduces the length of stay in hospitals and minimises re-admission, and results in health care cost reductions. Moreover, well-coordinated community-based care may facilitate frail elderly patients to enjoy 'ageing in place', i.e. receive care in their familiar living environment, without being transferred to hospitals or long-term care institutions. However, these hypotheses have not been tested by means of randomised controlled trials, especially in Chinese societies.

In Hong Kong, patients not planned for any medical follow-up within 3 months of discharge from hospitals are classified as 'medically inactive' by medical social services departments of the Hong Kong SAR Government.[7] The responsible medical social worker will then terminate interventions in relation to the discharged person 3 months after leaving the hospital. Consequently, as in the United Kingdom,[8] chronically ill patients receive fragmented long-term care because of the poor interface between health and social care as well as formal and informal care.

Care management, which emphasises integrated discharge planning and continuity of care, becomes one of the popular service delivery models in gerontology. Care management is a collaborative, multidisciplinary approach targeted to handle complex health and social needs through networking with appropriate care.[8] It is claimed that management with well-interfaced formal and informal care can be an effective intervention enabling physically and/or cognitively frail persons to achieve the highest level of independence.[9,10] It is therefore recommended as a promising model to care for chronically frail older persons not only during their stay in hospital but also after discharge from health care settings. This type of intervention may ensure continuity and enhance the well being of patients and their informal carers. Nevertheless, the effect of care management, especially on Chinese elders, has not been examined by means of randomised controlled trials.

To determine whether care management is an effective intervention for frail Chinese elders, the Haven of Hope Hospital implemented an 18-month randomised controlled trial starting in July 2000. Its aims were to compare the change of health care utilisation by these patients over time in an intervention group and in controls, and to identify the possible factors contributing to any changes.

METHODS

Because of the restricted catchment area of the hospital, the project only recruited older patients residing in the East Kowloon district discharged from the hospital between December 1999 and June 2000. After obtaining their informed consent, a total of 166 patients were recruited for the 18-month trial starting from July 2000. Having examined their health status by means of clinical assessment by their physicians and the Minimum Data Set-Home Care (MDS-HC) Hong Kong version,[10] they were randomly assigned to the intervention or control group. On average, these elderly persons had two chronic diseases, such as chronic obstructive pulmonary disease, stroke, diabetes and/or heart disease. Details of the sampling procedure used has been reported.[11-13]

As per the normal practice for any hospital-discharged patient, those in the control group were referred to their required health and social services (geriatric day hospital service, community nursing service, home-help service) by their responsible discharge planners (nurses or medical social workers). For intervention group patients, in addition to conventional care, during and after their hospital

stay, each of them also received 'care management intervention', rendered by a social-work trained care manager, supported by a multidisciplinary consultancy group of the hospital.

Like the practice of care management in the UK,[14] the service rendered by our care manager was directly and indirectly related to these elderly patients and their informal carers. The interventions were:

(1) Tailor-made care plans[13] and service matching[15,16] using the MDS-HC Hong Kong version,[10]
(2) Regular (usually bi-weekly) home visits, face-to-face counselling during hospitalisation or telephone contact/counselling to care recipients and their informal carers,
(3) Routine case conferences with the care recipients' health and/or social care providers,
(4) Psycho-educational programmes such as training and mutual-aid support groups to care recipients and informal carers,
(5) Making referrals to health and/or social care providers, and
(6) Making special arrangements for hospital-based care for patients in urgent medical need.

To test the hypothesis that care management interventions could reduce usage of health care services by the subjects, our care manager did not comply with the recommendations concerning the length of intervention[7] and his/her role,[17] as suggested by the Hong Kong Social Welfare Department and the British Department of Health. On the contrary, our care manager assumed an active role in offering direct services to those in the intervention group. When the patient was re-admitted to hospital, the care manager took up the role of medical social worker, liaising about the patient's needs with various health care professionals of the hospital, and assisting informal carers to formulate long-term care plans.

Measurements

The health of all participants was assessed at 6-monthly intervals using the MDS-HC. The total number of hospital- and community-based services used was retrieved from the Integrated Patient Administration System of the Hospital Authority. In the statistical analysis of normally distributed data, paired *t*-tests were used to compare the mean difference in scores over 18 months within each group, and independent *t*-tests to compare mean differences between the two groups. Mann-Whitney *U* tests were applied for non-normally distributed data. Differences were considered statistically significant when the p value was <0.05. All analyses were performed using the SPSS 15.0 statistical package.

RESULTS

Demographic data

The mean age of these elderly care recipients (n=83 in each group) was 75 (standard deviation [SD], 8; range, 61-95) years. 55% were male and 56% were married. The mean age of the informal carers (n=83 in each group) was 56 (SD, 16; range, 31-86) years; of whom only 34 were male. As for their relationships to the patients, 33% were wives, 23% were daughters, and 16% were sons. The mean care-giving hours provided by these informal carers on weekdays was 11 (SD, 13) and on weekends was 5 (SD, 5). These carer characteristics are similar to those documented in the literature; most informal carers were middle-aged females who were usually from the middle generation of each family.

Table 1 shows that the mortality rate of elderly care recipients in the control group was 22%, which was almost threefold higher than in the intervention group. Concerning the admission rate to elderly homes, it was 11% in the controls and 7% in the intervention group. Four participants in the two groups withdrew from the project because they moved out of the service area of the hospital.

There were no statistically significant differences between the groups at baseline, with respect to health status (measured by the MDS-HC) and health care utilisation (**Table 2**). The health of these elderly deteriorated over time, and the extent of deterioration in the intervention group was greater than that in the controls.

Changes in health care utilisation during the 18 months

With regard to the utilisation of the accident and emergency service by these elderly per patient per month, there was an increase in the total number

Table 1
Characteristics of care recipients*

Characteristics	Intervention group (n=83)	Controls (n=83)
Age (mean±SD) [years]	74±7	75±7
Percentage of male	56.9%	52.3%
No. of chronic illness at baseline (mean±SD)	2.7±1.4	2.9±1.5
No. of deaths in 18 months		
1st 6 months	3	8
2nd 6 months	3	5
3rd 6 months	1	5
No. of admissions to elderly home in 18 months		
1st 6 months	2	2
2nd 6 months	2	2
3rd 6 months	2	5
No. of drop-out	3	1

* All differences were not statistically significant

of attendances over time. In the intervention group they increased from 87 to 97 episodes, and in the controls from 62 to 86 episodes, but this difference was not statistically significant (**Table 2**). Concerning the total number of bed-days occupied in acute hospitals, in the intervention group they decreased by 38% (from 1520 to 943 days, $p<0.001$), while in the controls they decreased by only 5% (from 1214 to 1154 days, $p<0.001$) over time. The reduction of bed-days in acute hospitals per patient per month in the intervention group was significantly higher than that in the controls ($p<0.05$). As for the total number of bed-days utilised in rehabilitation hospitals, in the intervention group they decreased by 56% (from 1865 to 816, $p<0.001$) whereas in the controls they decreased by 47% (from 1629 to 860, $p<0.001$). The reduction of bed-days in rehabilitation hospitals per patient per month in the intervention group was greater than that in the controls.

As for the community nursing service use per patient per month, though there were changes in the total number of visits over time (decreased from 236 to 232 visits in the intervention group, and from 231 to 400 in the controls), this difference was not statistically significant. Furthermore, elderly patients in both groups used less geriatric day hospital service over time (decreasing from 253 to 149 days in the intervention group, and from 172 to 112 days in the controls). The mean decrease per patient per month among controls was greater than that in the intervention group.

Interventions provided by the care manager during the 18 months

Table 3 shows the services provided by the care manager to the participants in the intervention group. These entailed 7 face-to-face counselling sessions per patient (via home visits or in hospital) over the 18-month period. The patients also received a mean of 18 additional telephone counselling sessions from the care manager over that period. Sixteen psycho-educational sessions were also organised for these care-recipients and their informal carers, involving 160 enrolments. To discuss hospital discharge plans and long-term care for care recipients over that period, the care manager conducted 1731 case conferences with hospital staff, community-based health and/or social care providers as well as stakeholders. In other words, each participant's situation was monitored by the care management team on a weekly basis over the 18-month period. A total of 285 referrals were made to health and/or social service organisations for bridging of the care recipients with community-based care, and 99 special arrangements were made for admitting those with urgent medical problems to hospital-based care.

DISCUSSION

Although no care management intervention was provided to the frail elderly patients in the control group, before discharge from hospital they were nevertheless referred for conventional care, such as

Table 2
Health status and health care utilisation per patient/month before and after the trial

Parameters	Intervention group (n=83)	Controls (n=83)	P value*
Level of impairment (mean rank of MDS-HC scores†)			
No. of health problems			
Baseline	78	89	(1) NS, (2) p<0.001, (3) p<0.05, (4) p<0.001
After trial	98	99	
No. of psychological symptoms			
Baseline	77	90	(1) NS, (2) NS, (3) p<0.001, (4) p<0.001
After trial	83	84	
No. of behavioural symptoms			
Baseline	85	82	(1) NS, (2) NS, (3) NS, (4) NS
After trial	85	82	
Cognitive functioning			
Baseline	81	86	(1) NS, (2) p<0.001, (3) p<0.01, (4) p<0.05
After trial	95	72	
Functioning in activities of daily living			
Baseline	85	82	(1) NS, (2) p<0.001, (3) NS, (4) NS
After trial	88	79	
Utilisation of hospital care (mean±SD)			
Accident & emergency department			
Before trial	0.05±0.3	0.04±0.2	(1) NS, (2) NS, (3) NS, (4) NS
After trial	0.06±0.3	0.05±0.3	
Acute hospital			
Before trial	1.0±3.6	0.8±2.9	(1) NS, (2) p<0.05, (3) p<0.001, (4) p<0.001
After trial	0.6±2.5	0.8±2.8	
Rehabilitation hospital			
Before trial	1.3±4.6	1.1±4.2	(1) NS, (2) NS, (3) p<0.001, (4) p<0.001
After trial	0.6±2.9	0.6±2.7	
Utilisation of community-based health care (mean±SD)			
Community nursing service			
Before trial	0.2±1.4	0.2±1.1	(1) NS, (2) NS, (3) NS, (4) p<0.05
After trial	0.2±1.2	0.3±1.8	
Geriatric day hospital			
Before trial	0.2±1.2	0.1±1.1	(1) NS, (2) NS, (3) NS, (4) NS
After trial	0.1±1.0	0.1±0.8	

* P values for (1) difference between groups before trial, (2) difference between groups after trial, (3) change after trial within intervention group, and (4) change after trial within control group. NS denotes not significant
† Higher mean rank represents greater impairment

community nursing and the geriatric day hospital service, if deemed necessary by the responsible medical and nursing staff. This may explain why these elderly patients in the control group attained a certain level of improvement in their health, particularly in reference to cognitive functioning and use of hospital care. Nevertheless, the proportional reduction in health care utilisation in the intervention group was significantly greater than that in the controls. Drawing from the experience gained from our project, we can identify three important factors that may contribute to these differences, including (1) appropriate use of a comprehensive assessment tool, (2) more effective interfacing among disciplines, and (3) adequate support for and training of informal carers. Details of the care management interventions

Table 3
Interventions provided by the care manager over 18 months

Interventions	Total no. of services provided	Services provided per week	Service provided per participant
Home visit and face-to-face counselling during hospitalisation	571	7.3	6.9
Telephone contact/counselling	1495	19.2	18.0
Case conference	1731	22.2	20.9
Psycho-educational group sessions (No. of enrolment)	16 (160)	-	0.9
Making referrals	285	3.7	3.4
Making special arrangement for hospital-based care	99	1.3	1.2

are as follows:

Appropriate use of a comprehensive assessment tool

The literature indicates that comprehensive geriatric assessment can prevent deterioration of health in frail older adults and delay their permanent residence in nursing homes.[18] In our project, we therefore made use of the MDS-HC, which is now widely adopted by the Social Welfare Department for the service matching for elderly people. The use of the associated software assists assessment of individual health needs and formulation of care plans. The care plans were fully discussed within our multidisciplinary consultancy team, and shared with our elderly patients and their informal carers. After deciding the most suitable/appropriate care for each individual, the care manager monitored the provision of such care and maintained regular contact with the patient to ensure that needs were met satisfactorily.

Effective interfacing among disciplines

Arguably, fragmentation of care for those in need and role blurring among health care professionals is due to inadequate training of carers in interdisciplinary teamwork with their elderly patients.[19] Thus, upon embarking on this project, a multidisciplinary consultancy group was formed in Haven of Hope Hospital to provide support for the care manager through networking with health and social care professionals in different service units. The group consisted of senior hospital administrators, geriatricians, geriatric nurses, social workers, a clinical psychologist, a senior physiotherapist and a senior occupational therapist. The group became a standby backup for the care manager when encountering difficulties in the process of caring for a patient. No matter how strong the support from the consultancy group, direct care was rendered solely by the care manager.

There is evidence that timely multidisciplinary bio-psychosocial intervention is effective in improving patient functions.[20] In our project, the care manager acted as a care coordinator liaising with different service units within and outside the hospital, discussing the care-recipient's health condition and long-term care plan through regular case conferences. According to our experience, close collaboration and trust among health and social care providers could enhance quality and patient-centred care of our elderly and of their informal carers, and correspondingly this appears to reduce health care utilisation over time.[11,12]

Adequate support and training of informal carers

In Hong Kong, having a number of close relatives and frequent contact with friends have been documented as important indicators for successful ageing.[21] Although there have been changes in social and family dynamics after the reunification with mainland China, Hong Kong people are still family-oriented and filial piety is practised flexibly.[22] Thus, service providers should make use of this unpaid informal support from families, close relatives, friends or neighbours to facilitate positive health outcomes among older people. In order to provide support to informal carers in the intervention group of our project, the care manager invited each carer to participate in the process of care plan formulation and implementation. Furthermore, a series of health education programmes, such as parallel groups, were organised for care recipients and their carers to improve self-care and care-giving skills, respectively.

The participants learned how to prevent relapse, and acquired skills for self-care or care-giving. They also gained opportunities to share the burden of disease and care-giving, which helps to establish mutual trust and support between care recipients, their informal carers, and the care manager. These ideas are in line with some western studies,[23,24] which concluded that good communication between the care manager, care recipients, and early involvement of family members could reduce dependence on health care services. Elaborated discussion and description of how the care manager intervenes with the care-recipients have been documented.[11]

Yet, informal carers may suffer various types of stress when their care recipients' health deteriorates during the process of ageing. The long-term effect of care-giving may generate burnout, which results in diminishing family care. An Australian study found that a lower level of social support is a predictor of care recipients' poorer health outcomes.[25] This observation was consistent with our findings that inadequate informal care was an attributive factor for the high utilisation rate of formal services by elderly persons.[26-28] Therefore, care for informal carers should be rendered by government and non-governmental organisations so as to establish a strong interface between formal and informal care for elderly dependents.[28]

CONCLUSION

A care manager should humanise the rehabilitation process and safeguard care-recipients as well as informal carers' quality of life.[29,30] Our experience has demonstrated that the care manager should not only be a 'broker' between care-recipients and care-providers, but also assume an active role in offering direct services to care-recipients. Evidently, factors for our success can be attributed to effective use of a comprehensive assessment tool, good interfacing among health and social care providers, and adequate support to informal carers. These were determinants for the successful reduction over time of dependence on health care services among patients in the intervention group. These features facilitate subsequent 'ageing in place' without the need to transfer to hospitals or long-term care institutions.

As the project was a longitudinal randomised controlled trial on Chinese frail older adults, the findings have provided information on reducing their dependence on health services. However, owing to the policy of public hospital clustering under the Hospital Authority of Hong Kong, instead of inviting participants from the whole territory, we could only recruit participants from the Kowloon East Cluster. This could have affected the extent to which our findings generalise, for which reason they must be interpreted with due care.

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