Morbidity patterns of persons waiting for infirmary care in Hong Kong

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Ageing of the Hong Kong population is associated with an increased prevalence of physical and mental disability. For persons with severe disability, infirmary care is needed. In the present study, the morbidity pattern of persons waiting for infirmary service in Hong Kong was studied. Two hundred and four consecutive Central Infirmary Waiting List persons were included in the study. Clinical assessment was based on history review and physical examination. The commonest diagnoses giving rise to severe disability in this population, 89.2% of whom were elderly (aged ≥65 years), in descending order of prevalence were stroke (40.2%), dementia (27.0%), proximal femoral fracture (7.4%), and parkinsonism (5.9%); 67.5% of subjects were dependent physically. For cognitive function, 87.3% had a subnormal Abbreviated Mental Test score of ≤5. Approximately 80% had urinary incontinence and/or bowel incontinence. For the outcome of assessment, 93.6% needed infirmary care, while 6.4% did not. More adequate provision of infirmary beds, innovative medical, nursing, and social home-support programmes, and effective prevention and rehabilitation programmes for patients with these disabling diseases are urgently needed in Hong Kong.

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Introduction

The population of Hong Kong is ageing, with the proportion of elderly people aged ≥65 years now being more than 10%. Population mortality, expressed either as a standardised mortality ratio or an age- and sex-specific death rate, has fallen significantly over the past 30 years. The average life expectancy has also increased significantly. For example, from 1971 to 1996, the average life expectancy at birth for Hong Kong men increased from 67.8 years to 75.9 years. For Hong Kong women, the corresponding increase was from 75.3 years to 81.5 years.[1,2]

It has been recognised that increased life expectancy is accompanied by both an increased active-life expectancy, disability, and terminal dependency.[3,4] This dependency state may result in an increased demand for institutional long term care in the society.[5] From studies conducted overseas, various risk factors for institutionalisation have been identified. Advancing age, female sex, poor perceived health, limitations in physical functions, limitations in mental functions, self-care problems, bed disability, living alone, marital status (particularly loss of a spouse in men), poor social support, poverty, outpatient admission, hospital admission, poor accommodation, and ambulatory aid are all important risk factors for institutionalisation.[6]

In Hong Kong, a high prevalence of physical disability among the elderly has been reported for community-dwelling elderly people.[7] The prevalence of significant limitation of activities of daily living was 13% (men and women) for community-dwelling elderly people, and 21% (men) and 48% (women) for those living in institutions for the elderly. Functional limitations predisposed the individual to institutionalisation. Woo et al[8] reported that poor cognitive function, functional disability, poor vision, Parkinson's disease, stroke, past fractures, age, and marital status were factors associated with institutionalisation in elderly Hong Kong Chinese. The different types of institutions in that study were heterogeneous in terms of the level of care provided. The categories of institution included old-age hostels, old-age homes, care and

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attention homes, and private nursing homes, infirmary beds were not included in the study.[8] For persons with severe physical and/or mental disability, intensive nursing care is needed. In Hong Kong, intensive nursing and personal care is provided at present mainly by the Hospital Authority's infirmary service. As data on the disease(s) leading to severe disabilities or limitation of activities of daily living were not reported in the two previous Hong Kong studies,[7,8] it would be of great interest to know which disease(s) are responsible for severe physical and/or mental disability in Hong Kong.

The main purpose of the present study is to describe the morbidity patterns among persons waiting for infirmary beds in Hong Kong. Secondly, factors associated with the need for an infirmary service are also discussed.

Subjects and methods

A territory-wide Central Infirmary Waiting List (CIWL) is maintained and managed by the Hospital Authority of Hong Kong. Referral to the CIWL is usually initiated by a social worker, based on a simple scoring system (Box 1). If the score is 7 or more, the name of the person (with consent) is added to the list. There is no other additional requirement. In mid-1994, regional Community Geriatric Assessment Teams (CGATs) were set up in eight hospital clusters in Hong Kong. The authors' hospitals belong to the Hong Kong West CGAT. Our multidisciplinary CGAT comprises a geriatrician, a nurse, a physiotherapist, an occupational therapist, and a medical social worker.

All persons in the present study were assessed by the Hong Kong West CGAT. Our catchment areas were the Central and Western District, and the Southern District of Hong Kong Island. The total population in these areas was 496 390, which constituted 9% of the total Hong Kong population. Of the population in our catchment areas, 9.1% were elderly (aged ≥65 years). This percentage is comparable to the corresponding figure of 8.7% of the total Hong Kong population.[9] From 1 October 1994 to 30 June 1995, all persons on the CIWL whose addresses were in our catchment areas were included in the study. All subjects or their care givers were contacted within 2 days for assessment at the subject's home or place of residence.

The assessments were done by one member of our CGAT. Prior training and cross-training were offered to the team members regarding the assessment method. The home visiting and domiciliary assessment were usually performed by our team's geriatric nurse, physiotherapist, or occupational therapist. This approach would have been less costly than sending the whole CGAT for domiciliary visiting. Information was obtained from referral notes, the subjects or their care

Box 1. Referral criteria for infirmaries for the elderly and the chronically disabled

Infirmaries would accept referrals for patients with a **score of ≥7** according to the following scale:

1.	**Mobility**	**Score**
	Independent	1
	Aided	2
	Chairbound	3
	Bedbound	5
2.	**Mental state**	**Score**
	Normal/alert	1
	Disturbed/apathetic	2
	Confused with disturbing behaviour	3
	Confused with violent behaviour or stuporous or impaired state of consciousness	5
3.	**Continence state**	**Score**
	Normal	1
	Occasional urine or faecal soiling	2
	Frequent urine or faecal soiling	3
	Uncontrolled incontinence	5

Box 2. Admission guidelines for infirmary service

Patients should meet one or more of the following criteria:

1. Patients with chronic disability who, after assessment, are in need of long stay and active rehabilitation to maximise their residual abilities with the aim of returning them to appropriate level of care as far as possible.
2. Patients with terminal illness requiring continuous medical or nursing care.
3. Patients with chronic illness who, following assessment, are in need of intensive professional nursing care, e.g. patients requiring gastrostomy feeding, patients with Grade IV bed sores, etc.
4. Patients, despite trial of intensive rehabilitation, remain incapacitated and bedridden requiring constant medical and/or nursing attention.
5. Patients who, following psychiatric assessment and treatment, have persistent residual symptoms from chronic psychiatric illness requiring intensive psychiatric care.

givers, and from physical examination. Also recorded were data on sex, age, current place of residence, current care giver, waiting time prior to assessment (in months), the principal diagnosis, the number of diagnoses, and the urinary and bowel continence states. Walking ability was recorded on a 4-level scale (independent, supervised, assisted, dependent). The modified Barthel Index (score 0-20) was used for functional evaluation of the activities of daily living.[10] A previously validated Hong Kong version of the Abbreviated Mental Test (AMT) was used to assess cognitive function. The cutoff score for the AMT locally was 6.[11]

The need for infirmary care and placement were discussed in the weekly multidisciplinary case conference. Decisions on placement were made by the whole team. For uncertain cases (approximately 7%), a detailed reassessment by the whole team was arranged in the hospital on a day-patient or outpatient basis. The criteria for the need for infirmary care had been standardised and agreed by all CGATs in Hong Kong (Box 2). After assessment by our CGAT, subjects were replaced on the CIWL if their medical condition met one or more of the five criteria. Depending on whether there was an individual need for long-term care, subjects were either returned to the CIWL or removed from it. For the latter group of subjects, recommendations on alternative modes of care were given.

Data were analysed using the statistical programme SPSS/PC (Windows version 6.1). Descriptive analyses were performed on all variables (sex, age, waiting time, residence, principal diagnosis, number of diagnoses, AMT score, Barthel Index, continence states, and pressure sores). The outcome of multidisciplinary assessment, namely those who needed infirmary care and those who did not, was also analysed using descriptive statistics. The relationships between the two post-assessment outcome groups and their variables was analysed by bivariate analyses. Categorical data were analysed by the Chi squared test or Fisher's Exact test, as appropriate. Age was analysed by the unpaired Student's *t* test. Waiting time, number of diagnoses, AMT score, and Barthel Index were analysed by the Mann-Whitney U test.

Results

The total number of persons referred from the Hospital Authority CIWL Office was 243. Thirty-nine persons had died by the time of telephone contact. No further details were available for these subjects. Of the 204 subjects included in the study, only 30 (14.7%) were living in their own home, with the remainder living in institutions, most of whom (61.3%) were in private old-age homes (Table 1). The mean waiting time was 7.2±2.4 months and the mean number of diagnoses was 1.82±0.97 (Table 2). For walking ability, 67.5% of subjects were dependent (chairbound or bedbound); 18.8% needed assistance by another person in walking (assisted and supervised); and just 13.8% were independent. For cognitive function, 87.3% had a subnormal AMT score of ≤5. Eighty-two per-

Table 1. Sex, age, residence and care giver patterns

Variable		No. of patients (n=204) No. [%]
Sex	Male	67 (32.8)
	Female	137 (67.2)
Age group (years)	<65	22 (10.8)
	≥65	182 (89.2)
Residence at the time of assessment	Home	30 (14.7)
	Hostel	2 (1.0)
	Private old-age home	125 (61.3)
	Care and attention home	29 (14.2)
	Hospital	18 (8.8)
Care giver	Spouse	16 (7.8)
	Other relative	20 (9.8)
	Institution*	168 (82.0)

*Institution includes hostel, private old-age home, subvented care and attention home, and hospital.

Table 2. Mean age, waiting time, number of diagnoses, number of drugs, Abbreviated Mental Test score, and Barthel index

Variable	Mean ± SD (Range)
Mean age (years) [n=204]	77.8±11.0 (33-103)
Mean waiting time* (months) [n=204]	7.2±2.4 (0-24)
Number of diagnoses (n=204)	1.82±0.97 (1-7)
Abbreviated Mental Test score (n=195)†	2.65±3.05 (0-10)
Barthel index (n=202)‡	5.49±6.01 (0-20)

*Waiting time (to the nearest month) was the period from the date of Central Infirmary Waiting List referral to the date of assessment
†Missing data from 9 subjects
‡Missing data from 2 subjects

Table 3. Principal diagnoses

Principal diagnosis	No. (%)
Medical disease	82 (40.2)
Stroke	55 (27.0)
Parkinsonism	12 (5.9)
Other medical disease (e.g. heart failure, diabetes mellitus, gout)	9 (4.4)
Subtotal	158
Skeletal disease	
Fracture of proximal femur	15 (7.4)
Other orthopaedic disease (e.g. amputation below knee, osteoporotic vertebral compression fracture, osteoarthritis)	4 (2.0)
Subtotal	19
Neurosurgical condition	
Post–head injury brain damage	5 (2.5)
Hydrocephalus	1 (0.5)
Subtotal	6
Blindness	3 (1.5)
Other disease	
(includes paraplegia, tetraplegia, chronic obstructive airway disease, asthma)	18 (8.8)
Total	**204**

cent had urinary incontinence, while 81% had bowel incontinence. Pressure sores were present in 23.5% of the subjects.

The most prevalent principal diagnoses giving rise to severe disability, were stroke (40.2%), dementia (27.0%), proximal femoral fracture (7.4%), and parkinsonism (5.9%). These four diagnoses accounted for 80.5% of the whole group. Less prevalent diagnoses included lower limb amputation, post–head injury brain contusion, and hydrocephalus, and comprised the remaining 19.5% of diagnoses (Table 3). The outcome of assessment for 202 subjects (two subjects refused infirmary care) was as follows: 189 (93.6%) needed infirmary care and 13 (6.4%) did not. In the latter group, seven subjects needed subvented care and attention home care; three were fit to live in their own homes at the time of assessment and did not require rehabilitation (including one person who had an initial referral score of 6 and was thus an inappropriate referral); and three—two stroke patients and one patient with parkinsonism—improved functionally after a course of rehabilitation and did not need infirmary care thereafter.

Bivariate analyses showed that patients who needed infirmary care had a lower mean AMT score, lower mean Barthel Index, poor walking ability (chairbound or bedbound, assisted by another person), presence of pressure sores, urinary or bowel incontinence, and a lower mean number of medical diagnoses. The sex, age, and presence of a specific diagnosis had no significant relationship with the need for infirmary care (Table 4).

Discussion

This is the first Hong Kong study to describe the morbidity patterns of severe disability, using the Hospital Authority's CIWL clients. As our study sample was not randomised, some limitations in generalisation may be present. However, similarities do exist between our study population and the whole pool of CIWL patients. First, the referral criteria for referring a person to the CIWL were the same for all areas of Hong Kong (Box 1). Second, the elderly population proportion in our catchment areas was also comparable to that of the whole Hong Kong population (9.1% and 8.7%, respectively).[9] Therefore, we contend that our sample is largely representative of the overall Hong Kong situation.

In our study, the four most frequent severe disability-producing diseases were stroke (40.2%), dementia (27%), proximal femoral fractures (7.4%), and Parkinson's disease (5.9%), accounting for 80.5% of the study population. Our findings were consistent with previous western and Hong Kong reports on residual

Table 4. Factors associated with need for infirmary care

Variable	Infirmary care needed (Group 1; n=189)	Infirmary care not needed (Group 2; n=13)	P value
Sex = female*	126	10	ns
Mean age (years)†	77.8	78.9	ns
Mean waiting time (months)‡	7.2	7.0	ns
Mean number of diagnoses‡	1.8	2.5	0.005
Mean AMT§ score‡	2.4	6.0	<0.001
Mean Barthel Index‡	4.7	16.3	<0.001
Urinary incontinence‖	164	2	<0.001
Bowel incontinence‖	162	1	<0.001

*χ^2 test
†Unpaired Student's *t* test
‡Mann-Whitney U test
§AMT Abbreviated Mental Test
‖Fisher's Exact test (2-tail)
ns not significant

physical or mental disabilities after stroke (11%-43%), dementia (21% of disabled elderly people), hip fracture (6%-10.1%), and Parkinson's disease (80% after 10-14 years).[12-18] If there were effective measures to prevent these four diseases or to ameliorate the disease-induced disability to a non-severe degree, a significant portion of the demand for infirmary service would be eliminated. Although dramatic preventive measures are not available for all the four conditions, promising preventive measures have been reported for both stroke and proximal femoral fractures.[19-25]

For stroke prevention, adequate control of blood pressure and the use of aspirin in transient ischaemic attack are proven primary prevention measures. The use of warfarin and antiplatelet agents such as aspirin or ticlopidine for stroke prevention have been reported to be effective in treating non-valvular atrial fibrillation patients, particularly in the elderly.[19] Locally, this is probably underutilised. Regarding hypertension, one concern is the unknown proportion of unrecognised or inadequately controlled hypertensive subjects. These subjects would be more liable to have a stroke, which is potentially preventable. For secondary prevention, the values of aspirin, hypertension control, anticoagulation in atrial fibrillation, and endarterectomy for high grade carotid stenosis have also been demonstrated.[19]

The incidence of hip fracture has increased by approximately three-fold over the past three decades in Hong Kong.[20] Fall-related factors such as neuromuscular and visual impairment, and femoral neck bone mineral density have been recently reported to be significant and independent predicators of the risk of hip fracture in mobile elderly women.[21] Preventive measures are needed; falls can be reduced by appropriate prevention measures.[22,23] Another recent report, the Harstad injury prevention study, has demonstrated the value of environmental measures in reducing the rates of all fractures from falls in elderly people living in their own homes.[24] It is thus advisable to combine fall prevention measures and osteoporosis prevention with adequate dietary calcium, vitamin D, weight-bearing exercises, and postmenopausal hormonal replacement therapy.[22-25] In Hong Kong, many of these measures have yet to be introduced into clinical practice. At present, only small-scale fall assessment and prevention programmes have been set up in several geriatric services in Hong Kong. The main problem is the limited resources allocated for these programmes. Osteoporosis prevention and treatment is another poorly developed area in Hong Kong. The rate of hormonal replacement has been shown to be very low (approximately 3%) among postmenopausal women in Hong Kong.[26] In a questionnaire survey prior to an osteoporosis seminar, it was found that the awareness of osteoporosis among the general public was very poor.[27] These are all areas which need to be improved.

Another consideration is the maximisation of function through rehabilitation. From the present study, parameters of physical function (Barthel Index, bowel and urine continence states) and mental function (AMT score) were important independent factors in determining the need for infirmary care. Thus, once physical or mental disabilities were shown to be present, the primary disease producing the disability became less important than the disabilities themselves in determining the need for infirmary care. The implication that follows is the maximisation of function or minimisation of disability in these disease conditions, probably through rehabilitation.[15,16,19,28-35] Any significant func-

tional improvement may then decrease the demand for infirmary beds and enhance the patients' quality of life. In our study, only three patients (two stroke patients, one patient with parkinsonism) were found to have rehabilitation potential. All three improved in functional status after a course of rehabilitation and eventually did not require infirmary care. The small number of cases suitable for rehabilitation may be related to the long waiting time (mean, approximately 7 months). Earlier assessment might identify a larger number of subjects suitable for rehabilitation. Moreover, focused rehabilitation programmes for stroke, hip fracture, and probably dementia or Parkinson's disease should be developed. The setting for rehabilitation should also be considered; stroke units and day hospitals have been shown to be effective settings for stroke rehabilitation.[19,28,35]

The recent publication of the White Paper on Rehabilitation has paved the way for further development of the present rehabilitation services in Hong Kong.[36] Health professionals must focus on preventing or ameliorating functional decline in older persons. Well-documented rehabilitative measures should be practised widely. There is a need to better implement those interventions that are known to be efficacious; there is also a need to identify and test new interventions for conditions contributing to functional impairments, particularly in the elderly group.[37]

Our study also shows that elderly persons aged ≥65 years comprise the majority (approximately 90%) of those waiting for infirmary care. This is in marked contrast to their considerably smaller proportion in the overall population (approximately 10%). At present, the demand for long-term bed service is high, as illustrated by the long waiting list of approximately 7000 persons. Looking into the future, the situation is very likely to get worse, unless something definitive can be done about both the demand and the supply sides of infirmary bed provision. From 1996 to 2011, there will be an estimated 30% increase in the elderly population aged ≥65 years in Hong Kong; and, for the population group of those aged ≥75 years, the increase will be 77%.[2] Thus, a conservative estimate of the increase in demand for infirmary beds will be around 2100 beds (i.e. 7000 x 0.3). In our study, due to the inadequate number of infirmary beds, 61.3% of our infirmary list subjects had to live in private old-age homes, more than 97% of which were below standard.[38] For the 14.7% of subjects living at home, domiciliary geriatric medical, nursing, and social support should be explored as possible long-term care alternatives to infirmary care in the hospital.[39]

Conclusion

The most prevalent severe disability-producing diseases in Hong Kong are stroke, dementia, proximal femoral fracture, and Parkinson's disease. The degrees of resultant physical and mental disabilities are the main determining factors associated with the need for infirmary care. The majority of these severely disabled subjects are elderly. In view of the ageing trend of the Hong Kong population, population strategies in terms of prevention and rehabilitation of these severe disability-producing diseases should be developed by the Hong Kong Hospital Authority and the Department of Health. Innovative geriatric medical, nursing, and social home support programmes should be investigated as possible alternatives to infirmary care. In the meantime, an adequate number of infirmary beds should be made available to meet the present service demands in Hong Kong.

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