

Evaluation of Geriatric Day Hospitals

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Summary

In assessing the efficiency of a geriatric day hospital, occupancy and total attendance can only provide information on the utilization of its capacity but not on its activity, which is better measured by the corrected new patient index or the new referral rate. Objective measurement of the effectiveness of a geriatric day hospital depends on some form of validated instrument to measure the physical and mental functioning.

Day hospitals are part of a complex continuum of care for the elderly. Optimum contribution of a day hospital to an active geriatric service depends on the provision of suitable transport, adequate nursing and rehabilitation staff, supervision by senior doctors, adequate in-patient beds in geriatrics, an integrated health service; together with day centre facilities, community care and elderly residential service. Shortage of these resources accounts for the low indices of activity in our local geriatric day hospitals.

Introduction

The geriatric day hospital is a relatively new form of care. It was established with the aim of providing multi-disciplinary care for those elderly in the community who would benefit from it. The range of disciplines involved includes medicine, nursing, physiotherapy, occupational therapy, chiropody, speech therapy, and medico-social service. Patients can thus obtain a greater range of treatments than if they attend an outpatient clinic since emphasis is placed on rehabilitation to maximize independence in mobility and activities of daily living. This rehabilitative input helps patients to recover from the disabling diseases associated with old age such as strokes and arthritis, and in enabling the elderly to cope with difficult social conditions such as living alone.

The first geriatric day hospital was opened in 1958 in Cowley Road Hospital in Oxford and by 1989, over 350 geriatric day hospitals were found in England. A day hospital is now regarded as an essential part of the geriatric service¹. In Hong Kong, the first geriatric day hospital was opened in 1975 in Princess Margaret Hospital, and currently there are 4 geriatric day hospitals in the public sector, serving Kowloon and the New Territories. The local geriatric day hospitals are operated from 9am to 5pm. Most

patients are taken to and from the day hospital by ambulance at a frequency of thrice weekly to 4-weekly.

Various authors have emphasized the need for evaluation of day hospital^{2,3,4}. Critical evaluation is essential not only for cost-effectiveness analysis but also for self-appraisal and for advancing our knowledge in rehabilitation. The present article aims to review the current literature on this subject and to apply this knowledge to the evaluation of local geriatric day hospitals. In assessing the performance of day hospital, there are two approaches; one is to measure the final outcome - how effective it is in achieving the objectives that were set, The other approach is to measure the "intermediate outcome" - how efficient it is in providing the service that was intended.

Measures of Intermediate Outcome

1. Occupancy

The place occupancy of a geriatric day hospital can be calculated as:

$$\text{occupancy} = \frac{\text{average daily attendance} \times 100\%}{\text{size}}$$

e.g. in a day hospital with a size of 40 places and average daily attendance of 32, the occupancy is 80%. A high occupancy indicates full use of capacity, but it could equally reflect inactive units with long lengths of stay and low turnover^{5,6}.

2. Total attendance

The yearly total attendance has commonly been employed to assess the performance of a day hospital. However, it is a poor indicator of activity^{6,7} because it is affected by the number of working days (e.g. reduced by ambulance strikes, typhoons, public holidays), the size of day hospital and the occupancy (increased in inactive units with low turnover). Its dependence on factors unrelated to activity is shown by the formula below:

$$\text{total attendance} = \text{working days} \times \text{size} \times \text{occupancy}$$

If used as an indicator for funding, it would be counter-productive and would encourage large static rather than smaller rehabilitative units, resulting in a tendency to run a day hospital as a day centre, but financed from the hospital service instead of the social welfare service^{7,8,9}.

3. Average frequency of attendance (number of visits per week)

A high number may reflect intensive rehabilitation, but this should be interpreted relative to the length of stay. Various studies have reported this as from 1.2 to 2.5 (Table 1). Brocklehurst² gave a similar average attendance of 1.9 visits per week. Cost-effectiveness studies have shown that treatment up to twice weekly at a day hospital provides good value for money, but more frequent treatments can prove costlier than inpatient or residential care¹⁰.

4. Average length of stay

The average length of stay can either be expressed as the average number of visits per patient to complete a course of therapy or the duration (in weeks) stayed; the two being related by:

$$\text{Number of visits} =$$

$$\text{Frequency (visits/wk)} \times \text{Duration stayed (wk)}$$

The results of various studies on the average length of stay in day hospitals are shown in Table 1. The length of stay should be short because day hospitals are meant to rehabilitate people to a more independent level of functioning. Martin and Millard⁶ thought that 10 visits represented a therapeutic spell in an active day hospital, and used this to formulate his concept of new patient index (see below). In a recent study in Oxford comparing a consultant-led day hospital with general practitioner-controlled day hospitals, Barker and McCarthy¹¹ found that the average therapeutic spell was 19 visits over a period of 13 weeks for the former, and 66 visits over 48 weeks for the latter, demonstrating the better performance of a consultant-led day hospital. Most studies showed an average length of stay around 3 months, which coincides with the natural period of recovery after stroke and flare-up of arthritis, two of the commonest disorders treated in day hospitals. Martinez¹⁴ classified day hospital attenders as once-only (for assessment), short-term (2-6 visits, for investigation), medium-term (7 or more visits, for rehabilitation), and chronic (long-term till death, for medical or social supportive care).

Table 1

Average Length of Stay in Day Hospitals in U.K.

	Number of visits	Frequency (visits/wk)	Duration (wk)
Pathy ¹²	10.25-20.1	1.6-1.8	6.4-11.2
Martin, Millard ⁶	9.5-18.6	1.7-1.2	5.5-15.1
MacFarlane ¹³	33	2.5	13
Hildick-Smith ⁹	18-27	1.66-1.8	10-16
Donaldson ⁵	9-25	1.2-1.6	7.5-15
Barker ¹¹	19-66	1.4-1.6	13-48

5. Proportion of chronic cases

Chronic cases are static patients for whom a positive decision has been made to continue attendance until readmission or death. Their condition would no longer be improved by continued attendance at day hospital, but are "maintained" at day hospital for medical or social supportive care.

The proportion of chronic cases should be low because day hospitals are not designed to provide social care, a function that is dealt with more economically by day centres. It can be estimated by the proportion of patients still attending after one year; this was reported as 20% by Hildick-Smith⁹ and in Barker's study¹¹: 24% for consultant-led day hospital and 48% for general practitioner-controlled community-based day hospitals.

The problem with such patients is that if the demand for day hospital places increases, they have to be either discharged to home or admitted to different facilities which provide a more appropriate form of care. However, appropriate outlets (residential service for the elderly, day centre with transport facilities) are often not readily available. Therefore, if spare capacity exists in the day hospital they continue to attend, sometimes for considerable periods of time.

6. Readmission number

A low number indicates successful treatment, but some cases may be treated in a sporadic manner⁵.

7. Discharge destination

Discharge home would indicate achievement of an acceptable level of functioning for independent living⁵. However, other factors may be over-riding, such as the availability of caring relatives or friends at home and of social support service such as home-help or meals-on-wheels.

8. Percentage of inactivity

Zeeli and Issacs¹⁶ used four measures of efficiency for day hospital, namely: loss of patients; loss of attendances; time spent doing nothing at the day hospital; and time spent waiting for transport at home. Observing the way in which patients spent their time in the day hospital by time-sampling posed a different approach. Ng¹⁷ suggested that the performance of a day hospital might be assessed by the percentage of time spent in active rehabilitation or conversely, the percentage of time of no activity.

9. Indices of new patient referrals

Martin and Millard⁶, and Evans³ have proposed activity indicators based on the number of new patient referrals.

Activity Indicators

1. New patient index

Martin and Millard⁶ pointed out that since the primary objective of day hospitals is to give an out-patient rehabilitative service to the community, a rehabilitative factor should be taken into account when reporting activity and this they meant an assessment of the optimum average length of attendance of new patients at day hospital. In their study of the activity of three day hospitals, they showed that the most active day hospital had an average length of stay of 9.5 visits for new patients. By taking 10 days of attendance as the optimum length of treatment of new patients at day hospital, Martin & Millard have devised a new patient index (NPI) to measure the activity of a day hospital:

$$\text{New patient index (NPI)} = \frac{\text{number of new patients} \times 10}{\text{size of unit} \times \text{days worked}}$$

An active day hospital would have a NPI approaching one, whereas an inactive day hospital would have a NPI approaching zero. In his study using the NPI as a measure of activity of day hospitals, he concluded that smaller units (size 12, NPI 0.59) are active, rehabilitative and promote independence; while larger units (size 28, NPI 0.22) are inactive, custodial and promote dependence. In those larger "day-centre" type units, there is a tendency to reduce frequency of attendance and prolong length of stay. Thus they advocated day hospitals of smaller sizes⁸. The recommended size of day hospitals have recently been reduced from 50 to 30 places¹⁰. Rational planning of the size of day hospitals may also be possible by using the calculation of the NPI in reverse:

$$\text{Size of day hospital} = \frac{\text{Number of new patients expected} \times 10}{\text{Projected NPI} \times \text{expected working days}}$$

Hildick-Smith⁹ reported NPI of 0.15-0.32 for three day hospitals of size 50; the low figures she attributed to the lack of day centre support. In Donaldson's study⁵, the derived NPI were 0.18 (size 55)- 0.65 (size 20).

2. Corrected new patient index

The limitation of the NPI is that it is affected by the occupancy rate, so that units not working to full capacity will have an apparent reduction in activity when assessed by the NPI. Millard¹⁵ has recently revised his new patient index to correct for variation in the occupancy rate:

$$\text{Corrected NPI (CNPI)} = \frac{\text{Number of new patients} \times 10}{\text{size of unit} \times \text{occupancy} \times \text{days worked}}$$

$$= \frac{\text{Number of new patients} \times 10}{\text{total attendance}}$$

It can readily be shown that the average length of stay (expressed as number of visits) is related to the CNPI by:

$$\text{Average length of stay} \times \text{CNPI} = 10$$

3. New referral rate

Evans³ has devised the new referral rate (NRR) to assess the activity of a day hospital by measuring the proportion of attendances that represent new patient referrals:

$$\text{New referral rate (NRR)} = \frac{\text{Number of new patients} \times 100\%}{\text{total attendance}}$$

Comparing the formula for NRR with that for CNPI, it can be seen that NRR is numerically ten times CNPI; thus a CNPI of 1 is equivalent to a NRR of 10%. Evans thought that a NRR of 15% would indicate an active unit. It is unclear why he chose 15% and not 10% as the standard. However, it is doubtful whether any day hospital can achieve an activity with a NRR of 15%, for this would mean a very short average length of stay of 6.7 visits. In the recent study by Barker¹¹, the NRR was 5.2% for a consultant-led day hospital and 1.4% for general practitioner-led day hospitals. Gathering the data from various studies (Table 2), the highest activity that a day hospital of size 40 places can achieve correspond to a NRR of 5% or equivalently a CNPI of 0.5. For a day hospital of average daily attendance of 40, this would mean 2 new referrals per day and an average length of stay of 20 visits.

Table 2

Activity Indicators of Day Hospitals in U.K.

	NRR (%)	CNPI	NPI	Size
Pathy ¹²	8.9-5	0.89-0.5	-	?
Martin, Millard ⁶	10.5-5.4	1.05-0.54	0.59-0.22	12-28
Hildick-Smith ⁹	-	-	0.32-0.15	50
Donaldson ⁵	8.5-2.2	0.85-0.22	0.65-0.18	20-55
Barker ¹¹	5.2-1.4	0.52-0.14	0.39-0.10	40-78

NRR=new referral rate, CNPI=corrected new patient index, NPI=newpatient index, Size = number of places.

Measures of Final Outcome

1. Subjective measures

Crude measures of final outcome can be obtained by asking doctors, staff, patients and carers whether the objectives set for attendance were attained. Zeeli and Issacs¹⁶ found that in only one-third of referred patients were the objectives set by the doctor attained, only one-third of patients felt that they had im-

proved, and one-third of carers experienced relief of strain. Similarly, MacFarlane¹³ reported that one-third were considered to be improved. However, Brocklehurst¹ noted that 24% of staff were not sure that the day hospital fulfilled its purpose, physiotherapists being the professional group which most often took this critical view.

2. Objective measures

Final outcome can be assessed by measuring the improvement in dependency, clinical, social and psychological functioning. The whole issue on the measurement of rehabilitation has been critically discussed by Tallis¹⁸. He suggested measurements should be made at the four different levels of handicap, disability, impairment and pathology corresponding to the WHO classification of disabilities. We have adopted a modified form of the Rivermead ADL scale¹⁹ and of the abbreviated mental test²⁰ for assessment of the physical and mental functioning of our day hospital patients. In a randomised controlled trial of the effectiveness and cost of day hospital care in New Zealand, Tucker et al.²¹ found that day hospital patients showed a significant improvement in performance of activities of daily living (as assessed with the abbreviated Northwick Park ADL index) at six weeks but not at five months. They also found an improvement in mood (as assessed by the Zung depression index) both at six weeks and at five months, which they attributed to continuing social interaction at day hospital.

Factors Affecting Performance

The following factors were recognized as important in influencing the performance of a geriatric day hospital:

1. Social supportive services

Discharge of treated but isolated patients depends on the availability of appropriate social support: day centres, community care and special residential support. If such resources are not available, the proportion of chronic attenders will increase and the activity of a day hospital will drop. The importance of day centre support to day hospital has been emphasized by various authors^{1,9,12,13}. Many patients, especially those who live in isolation, may require only social contact or simple daytime supervision. Without this support, they may return to a state of apathy and neglect and rapidly deteriorate. This often comes to light at the time of a patient's discharge when it is clear that continued social contact is desirable. Day centres are often not equipped with transport service so that they cannot benefit the more handicapped. One solution is to have a day centre located next to a day hospital so that a number can 'graduate' from day hospital to day centre.

2. Medical supportive services

Optimum functioning of a geriatric day hospital depends on the availability of in-patient beds in geriatrics/ psychogeriatrics, psychogeriatric day hospital and an integrated health service. Lack of in-patient beds may reduce the length of in-patient rehabilitation and thus results in a longer length of stay at day hospital. The distinction of day hospital from day centre and the referral of appropriate new patients suitable for rehabilitation will restrict the number of social cases.⁵

3. Day hospital staffing and operation

Martin and Millard emphasized the importance of adequate staffing by therapists⁸. A day hospital has to be supervised by a senior geriatrician¹⁴, and regular multi-disciplinary case conferences held to decide on patient management and future care. Each day patient should have stated goals and should move on to some other form of care once these goals have been achieved. This helps to prevent the accumulation of chronic attenders. Barker¹¹ showed that a day hospital led by consultants performed better than by general practitioners.

4. Transport

The ambulance service was thought to be the greatest weakness of any day hospital scheme^{12,13} since the transport of day patients is given a relatively low priority. Precise planning of a patient's daily programme can be upset by unpunctuality.

Performance of Local Geriatric Day Hospitals

Study by Leung and Ng²² of the geriatric day hospital in Princess Margaret Hospital in the years 1979-81 showed a high proportion of chronic attenders (46.4% attending over one year) and low new patient index (0.19). Study by the author (Table 3) showed that the corrected new patient indices for the first half of the year 1990 for Ngau Tau Kok and Yung Fung Shee geriatric day hospitals were 0.24 and 0.27 respectively and the proportion attending over one year were 41.4% and 32%. Several factors account for the low CNPI when compared with the United Kingdom figures. The local geriatric day hospital population actually consisted of a combination of a static core (30-40%) of chronic attenders (CNPI approaching 0) together with a higher turnover group (CNPI approaching 0.5) undergoing active rehabilitation; so that the overall CNPI appear low. The high proportion of chronic attenders is due to the lack of day centre facilities, the long waiting time for elderly residential service (3 years for care and attention homes, 7 years for infirmary), and the lack of an integrated health service similar to the National Health Service to provide medical care for the elderly upon discharge. Shortage of in-patient beds also reduces the length of in-patient rehabilita-

tion and thus the length of stay at day hospital is correspondingly longer.

Table 3

Performance of 2 Local Geriatric Day Hospitals
1990 Jan.-June

	NTKGDH	YFSGDH
Size (places)	40	40
CNPI	0.24	0.27
NRR (%)	2.39	2.73
Occupancy (%)	92.5	80.6
Average visits/ wk	0.83	1.07
No. attending (30.6.90)	203	158
Proportion attending over 1 year (30.6.90) (%)	41.4	32

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