

Perceived Need for Community Geriatric Services: A Survey at a Regional Hospital in Singapore in an Inpatient Setting

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Abstract

Our primary aim was to study the need for community services as perceived by the elderly and their relatives. A secondary objective was to determine the predictive factors of need for these services.

This is a survey of 11.5 consecutive non-institutionalised patients admitted to a hospital geriatric department and their relatives. Twenty-seven elderly patients without cognitive impairment and 115 relatives were interviewed as to their need for community services after discharge. Services most needed by patients were: 24-hour medical helpline (33%), emergency alarm system (19%), social helpline (14%) and day care centre (13%). Services most needed by relatives were: 24-hour medical helpline (70%), emergency alarm system (40%), home visits by doctors (40%), respite care (35%), day care centre (35%) and transport service (33%). There were low levels of need for home help service, meal delivery service and the befriender service. Important predictive factors of need were: low ECAQ (Elderly Cognitive Assessment Questionnaire) score, low Barthel score, and absence of a carer. The development of community geriatric services in Singapore should be guided by the perceived needs of the elderly and their relatives/care-givers. This study is limited by its hospital-based perspective and small numbers. We recommend that further community-based studies be carried out to complement our study and extend our findings.

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Key words: Elderly, Emergency services, Non-institutionalised patients, Predictive factors

Introduction

Singapore has one of the most rapidly ageing populations in the world.¹ The number of the very aged (>75 years old) has already increased from 42,700 in 1985 to 75,500 in 1995.²

The majority of the elderly in Singapore live with their children (84.6% among those aged 65 to 74 years and 84% among those aged >74 years) and most of them are satisfied to do so.³ With increasing age, co-morbidity of multiple chronic illness and disability, the burden of care on families will increase. One major challenge of this scenario is to develop a comprehensive range of community services to support the elderly in their own homes for as long as possible. This is in line with the current trend towards a shift from institutional to community care of the elderly in many western European countries as well as North America.⁴ It has also been found that for the majority of elders, community care is less costly than nursing home care.⁵

In the planning of services, it is now recognised that the consumers of services have a valid role to play in the

identification of areas of need.^{6,7} Services which have been developed based on negotiation with informed users might be more efficient and effective.^{8,9} Many overseas studies have been done, looking into the service needs of stroke patients, mental patients, cancer patients and their carers, and the carers of demented elderly.¹⁰⁻¹⁴ Since the perception of need among the consumers of different societies are different due to social and cultural differences as well as personal beliefs, studies are needed to look into the perception of our local population.

Our primary objective was to study the need for community services as perceived by our elderly and their relatives. This would help in the planning and prioritisation of geriatric services in the community.

As a secondary objective, we also attempted to determine the predictive factors of need for these community services. This would help doctors, geriatricians or any worker involved in the care of the elderly to identify those at risk who may need any of these services.

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Materials and Methods

The study population comprised all non-institutionalised patients admitted to the geriatric department of a hospital in the western part of Singapore from 17 December 1997 to 22 January 1998. Patients admitted from the community but whose ultimate plans were to be discharged to nursing homes, and the cognitively impaired with no relatives were excluded. Patients who were admitted more than once (i.e. recurrent admissions) during the study period were interviewed only once.

A survey was conducted on the study population upon stabilisation of their medical conditions and before discharge from hospital. The presence of medical conditions such as cerebrovascular accidents (CVA), Parkinson's disease, dementia, depression and terminal malignancy were determined from the casenotes of the patients.

The modified Barthel Index¹⁵ was used as a measure of functional status. This index of activities of daily living (ADL) measures the severity of disability in self-care, sphincter control and mobility. The maximum score is 20, indicating independence. The scores were obtained for each patient based on direct observation by the nurses, physiotherapists and occupational therapists.

The Elderly Cognitive Assessment Questionnaire (ECAQ) was used as an objective screen for cognitive impairment.¹⁶ This 10-item questionnaire has less bias on educational status and is more suitable for elderly people in developing countries. It has a maximum score of 10. A cut-off value of 6/7 was used to indicate the presence of cognitive impairment. Out of the two possible cut-off points of 5/6 or 6/7 discussed by the author, we chose the higher one in anticipation of difficulties involved in getting appropriate responses from elderly patients with borderline cognitive impairment, given the complexity of the interview questionnaire. Patients who scored 7 or more on the ECAQ and their relatives were interviewed on separate occasions. For those who scored less than 7, only the relatives were interviewed.

Interview questionnaires were administered by the lead author to the patients and the relatives. The first part of the questionnaire sought demographic data, class of ward, housing and living arrangements of the patients and the availability of a day-time carer after discharge from hospital. A day-time carer was defined as someone who helps the elderly in any personal or instrumental activity of daily living (PADL or IADL) during the day. As far as possible, the main carers (except maids) of the patient were interviewed. Failing that, any immediate family members, preferably one living with the patient, were interviewed.

For the second part of the questionnaire, need for the services and the various methods of health education

listed in Table I after discharge from hospital were studied. The patients were asked the necessity of services 1 to 7 and health education (Table I) to themselves; and that of services 8 to 10 to themselves or their relatives. The relatives were asked the necessity of the services and health education to the elderly or the elderly's relatives, including themselves. The possible responses were:

- 1 – not necessary,
- 2 – slightly necessary,
- 3 – moderately necessary, and
- 4 – very necessary.

Patients and relatives were not asked about services which were not applicable to the particular patient. Lastly, the patients and relatives were asked if they had ever utilised each of the services and health education avenues before. Standardised descriptions were used for each of the services. Pamphlets and brochures were used to aid in their descriptions. The issue of cost was not specifically brought up during the interview but if mentioned by the interviewee, they were asked to base their responses on the services being "affordable".

The interviews were conducted in the 3 official languages (English, Mandarin, Malay), and dialects (Hokkien, Cantonese, Teochew). Official translation of the questionnaire and the service descriptions from English into Chinese and Malay was performed by the

TABLE I: TYPE OF SERVICES STUDIED

Type of service*
1. Day care centre
2. Meal delivery service
3. Home help service: . laundry service . house-keeping/house-cleaning service . personal hygiene and grooming . escort to and from hospital/clinic
4. Befriender service: . companionship . sitter service . errand-running, help with simple tasks e.g. shopping, marketing
5. Transport service to hospital/clinic, or other medical appointments
6. Home visit by doctors
7. Emergency alarm system
8. 24-hour medical helpline, manned by doctor or nurse
9. Social helpline
10. Respite service
11. Health education: . public seminars, lectures . telephone information line . pamphlets, brochures from hospitals and clinics . educational video programmes . individualised teaching and counselling of medical condition

* Full description of each service is available from authors

Ministry of Information and the Arts.

Analysis was performed using SPSS 7.5 statistical package. Tabulation was performed of the various responses. Responses were dichotomised by grouping 1 with 2 and 3 with 4 (i.e. a response of 1 or 2 was taken to be the responder's perception of "no need" for the particular service; a response of 3 or 4 taken as "need" for the service). Relative risk and confidence intervals were calculated and chi-square tests were performed to assess individual predictive factors of need for each class of service. Forward stepwise regression using modified Cox proportional hazard models was used to determine a set of independent predictive factors for each outcome. All potential predictive factors studied were considered in the multivariate modelling process for every outcome. Polychotomous nominal exposure variables were fitted using indicator variables. The end-point of need was taken to be that perceived by either the elderly or the relative. The log likelihood ratio test was used for model testing. A *P* value of 0.05 was accepted for conventional statistical significance.

Results

A total of 158 non-institutionalised patients were admitted to the geriatric department during the study period. Eleven patients died, 6 were recurrent admissions and 16 patients were ineligible. The 16 ineligible patients consisted of 12 who were planned for nursing home admission after discharge, 2 with low ECAQ scores and no relatives, and 2 Malaysians. Of the remaining 125 eligible patients, 10 were missed and 115 were recruited into the study. Most were direct admissions from the Accident and Emergency Department based on an age-related admission criteria of 75 years and above, the rest admitted via the specialist outpatient geriatric clinics or Hua Mei Mobile Clinic, or transferred in from other departments.

There were 52 (45%) male and 63 (55%) female patients. Most females (83%) were widowed while most males (54%) were married. Ninety-three (81%) were Chinese, 16 (14%) were Malays and 6 (5%) were Indians. The majority (92%) were more than 74 years old. The mean age was 82 years and the median age was 81 years. Majority (89%) of the patients live with their families or relatives, only 3 patients live alone. A large proportion (76%) of patients would have 1 main day-time carer after discharge, 19% would have no carer. Maids made up 28% of the care-givers.

The Barthel and ECAQ scores of the patients are shown in Table II. In addition, 50% had urinary incontinence and 35% had faecal incontinence. The prevalence of the following conditions among the patients was: new cerebrovascular accident (CVA), 10%; old CVA, 15%; Parkinson's disease, 5%; dementia, 42%; depression, 10%; terminal malignancy, 4%.

TABLE II: ECAQ AND BARTHEL SCORES

	Numbers	%
ECAQ score		
5 or less	59	51
6 or more	56	49
Total	115	100
Barthel score		
20	37	32
16-19	24	21
11-15	13	11
6-10	15	13
0-5	26	23
Total	115	100

ECAQ: Elderly Cognitive Assessment Questionnaire

Only 27 patients were interviewed, as 77 (67%) of the patients scored less than 7 on the ECAQ and 11 patients were not interviewed due to various difficulties (most commonly patient refusal and severe hearing impairment among the patients). The relatives of all 115 patients were interviewed: 30% were the main day-time carers of the elderly, 63% lived with the elderly in the same household, most were either daughters (40%) or sons (38%) of the elderly.

The patients' and the relatives' perceptions of need for the various services are shown in Table III. Their need for health education is shown in Table IV. Services most frequently felt to be needed by the 27 patients interviewed were: 24-hour medical helpline (33%); emergency alarm system (19%); social helpline (14%); and day care centre (13%) (Table III). Services most frequently needed by the 115 relatives were: 24-hour medical helpline (70%); emergency alarm system (40%); home visits by doctors (40%); respite care (35%); day care centre (35%); and transport service (33%) (Table III).

Utilisation of the services studied was uncommon: 79% of the elderly had never had a home visit by a doctor, 94% had never attended a day care centre and none had ever utilised the home help or befrienders' service (Table III). Utilisation of health education resources was also poor (Table IV).

Potential predictive factors studied were: age, sex, race, marital status, housing and class of ward to reflect socioeconomic status, presence of carer, ECAQ score, Barthel score, presence of depression and length of stay in the hospital.

The statistically significant predictive factors found for each service are shown in Table V. A low ECAQ score was found to be an important predictor of needs, being significantly associated with increased need for respite care, social helpline, transport service, and home visit by doctors. A low Barthel score was significantly associated with need for transport service, and home visit by doc-

TABLE III: NEED FOR COMMUNITY SERVICES AS PERCEIVED BY THE ELDERLY PATIENTS OR THEIR RELATIVES, AND THEIR UTILISATION

Type of service	Proportion with need for service (%)		Proportion with utilisation (%)*
	Patients' response	Relatives' response	
Day care centre ¹	3/24 (13)	30/87 (35)	6/94 (6)
Meal delivery service	1/27 (4)	8/111 (7)	1/112 (1)
Home help service:			
Laundry service	0/27 (0)	3/115 (3)	0/115 (0)
House-keeping service	0/25 (0)	4/115 (4)	0/115 (0)
Personal hygiene	0/127 (0)	8/113 (7)	0/115 (0)
Escort service	1/26 (4)	20/112 (18)	0/115 (0)
Befriender service:			
Companionship	2/26 (8)	16/112 (14)	0/115 (0)
Sitter service ²	0/16 (0)	14/94 (15)	NA
Errand-running	0/27 (0)	2/115 (2)	0/115 (0)
Transport service	1/26 (4)	38/114 (33)	4/115 (4)
Home visit by doctors	0/27 (0)	45/113 (40)	24/113 (21)
Emergency alarm system ³	4/21 (19)	31/77 (40)	2/83 (2)
24-hour medical helpline	7/21 (33)	79/113 (70)	0/115 (0)
Social helpline	3/21 (14)	29/113 (26)	1/114 (1)
Respite service ⁴	1/22 (5)	38/109 (35)	5/113 (4)

NA: not applicable

* Proportion of patients or relatives who has ever utilised the service.

¹ Not applicable for those who are bed-bound or ADL totally dependent.² Not applicable for those who are alone at home in the day.³ Not applicable for those who are not able to activate alarm appropriately, e.g. those with severe dementia.⁴ Not applicable for those who live alone and do not have carers.

tors. Further analysis into the relationship between ECAQ and Barthel scores revealed that they were significantly positively correlated with each other (Pearson correlation coefficient = 0.76, $P < 0.001$).

On multivariate analysis, the independent predictive factors of need found for the various community services are listed in Table VI. There were no predictive factors found for emergency alarm system, 24-hour medical helpline, social helpline and home help service.

Discussion

This is the first local study looking into the perceived needs of our elderly and their relatives, with regards to community services. The 1995 national survey of senior citizens studied awareness and utilisation of these services, rather than perceived needs.

The development of community geriatric services in Singapore should be guided by the perceived needs of the elderly and their relatives. Emergency services (24-hour medical helpline and emergency alarm system) were most felt to be needed among our elderly patients and their relatives. These services are currently not widely available. The National Life-line, a private organisation, provides its members with both services but subscriptions are expensive and not within the means of many elderly. A few blocks of refurbished HDB flats for the elderly in the Bukit Merah area are equipped with emergency alarm systems, and in future, the new concept studio flats for the elderly will have this facility as well.

The next group of much needed services were home visits by doctors and transport services. This is hardly surprising as a large proportion of our studied cohort were dependent in ADL, and had impaired mobility. The need for both these services is predicted by a low Barthel score. Ideally, these patients should be seen by the doctor in their own homes as far as possible, but if periodic reviews by specialists in the hospitals are necessary, an efficient and affordable transport service should be available to cater to their needs. While 40% of the elderly studied reported a need for home visits by doctors, only 21% had ever had one. Domiciliary medical service for the elderly in Singapore is still a relatively underdeveloped area. General practitioners should be encouraged to perform more house calls.

Respite care featured prominently as the fourth most needed service. The need for it is predicted by a low ECAQ score. Respite care of demented patients has been shown to relieve stress and improve the quality of life in carers.^{17,18} It is also perceived to be needed by these

TABLE IV: NEED FOR HEALTH EDUCATION AS PERCEIVED BY THE ELDERLY PATIENTS OR THEIR RELATIVES, AND THEIR UTILISATION

Health Education	Proportion with need for service (%)		Proportion with utilisation (%)*	
	Patients' response	Relatives' response	Patient	Relative
Lectures and seminars ¹	4/12 (33)	39/112 (35)	4/12 (33)	16/112 (14)
Telephone information line ²	1/12 (8)	54/111 (49)	0/12 (0)	5/112 (5)
Pamphlets and brochures ¹	5/14 (36)	63/110 (57)	4/14 (29)	70/109 (64)
Video programmes ¹	2/11 (18)	64/106 (60)	2/11 (18)	59/108 (55)
Individualised counselling	7/122 (32)	67/114 (59)	1/20 (5)	17/110 (16)

* Proportion who has ever utilised the health education resource.

¹ Not applicable for those who cannot understand written or spoken English, Chinese or Malay.² Not applicable for those who cannot understand spoken English, Mandarin, Malay or Tamil, or who are not able to use the telephone.

TABLE V: PREDICTIVE FACTORS OF NEED FOR COMMUNITY SERVICES

Service	Factor	RR	95% CI	P value
Day care centre	Sex			0.0054
	Male	2.4	1.2-4.6	
	Female	baseline		
Respite care	ECAQ score			0.0023
	6 or more	baseline		
	5 or less	2.3	1.3-4.2	
Social helpline	ECAQ score			0.043
	6 or more	baseline		
	5 or less	1.9	1.0-3.5	
Transport service	ECAQ score			0.02
	6 or more	baseline		
	5 or less	1.8	1.1-3.1	0.009
	Barthel score			
	20	baseline		
	16-19	1.8	0.69-4.7	
	11-15	3.8	1.6-8.9	
	6-10	2.9	1.2-7.2	
Home visit	Carer			0.0033
	Present	baseline		
	Absent	0.28	0.095-0.82	0.005
	ECAQ score			
	6 or more	baseline		
	5 or less	2.0	1.2-3.2	
	Barthel score			<0.001
	20	baseline		
	16-19	3.0	1.0-8.9	
	11-15	3.8	1.2-11.7	
24-hour medical helpline	Age (y)			0.03
	65-79	baseline		
	80-99	1.3	1.0-1.7	
Meal delivery	Carer			0.0033
	Present	baseline		
	Absent	6.1	1.6-23.8	

carers in several studies.^{9,13,14} Currently in Singapore, respite care is offered by the community hospitals as well as certain residential and nursing homes.¹⁹ These respite vacancies are limited and there is a lack of organised, regular respite programmes for stressed carers²⁰ who are frequently not aware of their existence.

Social day care centres were reported to be needed by 35% of the relatives and 13% of the patients interviewed. We only studied the need for social day care and not rehabilitative day care. Currently our social day care centres are equipped to accept mainly ambulant elderly who are fairly independent in ADL. Although social activities may not be suitable for the dependent elderly, day care is a form of effective short term respite for their carers.^{21,22}

TABLE VI: RESULTS OF MULTIVARIATE ANALYSIS SHOWING INDEPENDENT PREDICTIVE FACTORS OF NEED FOR COMMUNITY SERVICES

Community service	Independent predictive factors
Day care centre	Male sex
Respite care	Low ECAQ score
Transport service	Low Barthel score
Meal delivery service	Absence of carer
Befrienders	Absence of carer, low Barthel score, Chinese*, Indian*
Home visits by doctors	Presence of carer, low Barthel score

* Chinese and Indian have more needs compared to Malay

The need for home help, meal delivery and befriender services was rather low in our study. This is supported by the low levels of utilisation of these services found in a national survey.²³ One possible explanation is that the majority of our cohort of elderly live with their families or relatives, and most of them have carers. Another explanation may be that certain subgroups of elderly (mentioned below) with the most needs were not studied.

Two important services were noticeably absent from our study. They were rehabilitative services which offer physiotherapy and occupational therapy, and home nursing service. We feel that the perception of the patients and their relatives does not feature importantly in the assessment of need for these two services. The need for rehabilitative services may be better assessed by the physiotherapists, occupational therapists and doctors-in-charge, while need for home nursing is dictated by the patients' medical condition (e.g. patients on long-term tube feeding or indwelling urinary catheter will need regular changing of their nasogastric tube or urinary catheter.)

We were careful to use the appropriate population at risk as the denominator in calculating the proportion of needs. Hence, exclusions were made as appropriate for the various services and patients were not asked about services which were not applicable to them. For example, severely demented patients who were not able to activate the emergency alarm system appropriately (and their relatives) were not asked about need for this service. The absolute number of patients with needs can be interpreted as an indicator of "burden", bearing in mind that the denominator is the total number of patients in the study population.

It is not surprising that greater need for services was reported by relatives compared to the patients interviewed, given that the 27 elderly patients interviewed were the healthier of the cohort and had high ECAQ scores.

Our study found that there was a great disparity between "need for service" and "utilisation". This is

likely to represent a significant degree of unmet need, which supports the development of more geriatric services. Besides the availability of services, other factors which affect utilisation include consumer awareness and affordability. Further studies are recommended to look into specific areas of unmet needs and to study these factors.

This study has several important limitations. Ideally, the study should be community-based. The hospital setting implies that the study population would have more medical illness, greater functional disability and hence more needs than a sample of the elderly living in the community. However, from another perspective, it is important to study this group of elderly, because meeting their needs would facilitate their discharge and re-integration into the community. This would free up valuable resources within our hospitals.

Within the elderly Singapore population, the sicker and more frail old-old segment is expanding at a faster rate,²⁴ placing an increasing stress on the family and social support systems. Studying the needs of a sample of elderly with chronic illness or disability residing in the community would be important for prioritisation in the development of community geriatric services. However, this group of frail elderly is also most likely to be disproportionate users of hospital services and very often, need for community services is triggered by the onset of acute illness.

Two groups of elderly were missed out in our study. Our questionnaire queried the need for community services after discharge back to the community and excluded the cognitively impaired patients from the interview. Hence, those who had failed community living and were to be discharged to nursing homes as well as the cognitively impaired elderly with no relatives were not studied. Furthermore, out of our 115 elderly, only 3 lived alone. This group is under-represented in our study, perhaps because of the difficulty of independent living in the community when one has chronic medical illness. These subgroups of elderly probably have the most needs. Other, more specifically designed studies are recommended to look into their needs.

The study results are mainly the perceived needs of the relatives as only 27 out of 115 elderly subjects were interviewed. It can be argued that the needs of the relatives/carers may be different from those of the elderly patients.

We only succeeded in interviewing 40% of the main carers of the elderly patients, due to time and place constraints, and also because 28% of the main carers were maids who were excluded from the interviews. The views of the main carers would be deemed to be most important among the relatives, although 63% of the relatives interviewed live with the elderly.

Efforts were made to overcome the potential pitfalls present in any interview study. The interviewer was careful not to influence the interviewees' responses. The conduct of the interview in the various languages and dialects, as well as the use of pamphlets and brochures, served to aid the interviewees' understanding of the services described. There was no restriction on time taken for the interview. Each interview lasted about 30 minutes. Nevertheless, other factors, such as the educational level and socioeconomic status of the interviewees may influence responses.

The issue of cost may be a confounding factor influencing response. To minimise this, when the issue was brought up during the interview, the patients and relatives were told to base their responses on the services being affordable.

The perception of patients and their relatives with regard to need for services may not be accurate if there has been a substantial change in the patients' functional status. However, comparison of pre-morbid and post-admission Barthel score was not attempted, since direct observation is recommended for proper measure of disability.²⁵

Caution has to be exercised in the interpretation of the results of the analysis of predictive factors, especially multivariate analysis if numbers are small. Nevertheless, certain factors stood out as important predictive factors. These were: low ECAQ score, low Barthel score and absence of carer.

ECAQ and Barthel scores were associated with need for transport service and home visits by doctors. However, in multivariate modelling, ECAQ score is not an independent predictor of need for both these services although Barthel score is in the final model. This may indicate that the effect of cognitive impairment, as measured by ECAQ score, on need for these two services is mediated through functional disability as measured by the Barthel score.

In our study, we found that age, socioeconomic status, race, marital status, length of stay in the hospital and the presence of depression did not emerge as important predictive factors of need for community services. However, it may be that the numbers are too small to detect any significant associations.

Conclusion

In conclusion, we recommend that the development of community geriatric services in Singapore should be guided by the perceived needs of the elderly and their relatives. From our study, the services most needed by the elderly and their relatives were: emergency services (24-hour medical helpline and emergency alarm system), home visits by doctors, transport service, respite care and social day care centres. We recommend that

primary care physicians be encouraged to perform more house calls to cater to the needs of this group of dependent elderly. The great disparity between “need for service” and “utilisation” represents unmet need. This is an area which deserves further study, particularly with respect to factors such as availability, awareness and affordability. The results of the study should be taken in the light of its limitations. We recommend that further community-based studies be carried out to complement our study and extend our findings.

REFERENCES

- Merriman A. Handbook of International Geriatric Medicine. Singapore: PG Publishing, 1989:1-15.
- Department of Statistics. Yearbook of Statistics Singapore, 1995. Singapore: Ministry of Trade and Industry, 1995:23.
- The National Survey of Senior Citizens in Singapore, 1995. Singapore: Interministry, 1996:15-6.
- Tester S. Community care for older people. Great Britain: Macmillan Press Ltd, 1996:15-6.
- Harrow B S, Tennstedt S L, McKinlay J B. How costly is it to care for disabled elders in a community setting? *Gerontologist* 1995; 35:803-13.
- Myers F, MacDonald C. 'I Was Given Option Not Choice': Involving older users and carers in assessment and care planning. In: Bland R, editor. *Developing Service for Older People and Their Families*. London: Jessica Kingsley, 1996:97-111.
- Walker A, Warren L. *Changing Services for Older People*. Buckingham: Open University Press, 1996:17-20.
- Pfeffer N, Coote A. Is quality good for you? A critical review of quality assurance in welfare services. London: Institute For Public Policy Research, 1991, Social Policy Paper No.5.
- Caserta M S, Lund D A, Wright S D, Redburn D E. Caregivers to dementia patients: The utilisation of community services. *Gerontologist* 1987; 27:209-14.
- McLean J, Roper-Hall A, Mayer I, Main A. Service needs of stroke survivors and their informal carers: a pilot study. *J Adv Nurs* 1991; 16:559-64.
- Levin G, Wilder J F, Gilbert J. Identifying and meeting clients' needs in six community mental health centers. *Hosp Community Psychiatry* 1978; 29:185-8.
- Wingate AL, Lackey N R. A description of the needs of noninstitutionalised cancer patients and their primary care givers. *Cancer Nurs* 1989; 12:216-25.
- Fortinsky R H, Hathaway T J. Information and service needs among active and former family caregivers of persons with Alzheimer's disease. *Gerontologist* 1991; 30:604-9.
- Brown P J, Holmes A B, Mitchell R A. Australian care givers of family members with dementia. *J Gerontol Nurs* 1991; 17:25-9.
- Collin C, Wade D T, Davies S, Horne V. The Barthel ADL Index: a reliability study. *Int Disabil Stud* 1988; 10:61-3.
- Kua E H, Ko S M. A Questionnaire to screen for cognitive impairment among elderly people in developing countries. *Acta Psychiatr Scand* 1992; 85:119-22.
- Lawton M I, Brody E M, Saperstein A R. A controlled study of respite service for caregivers of Alzheimer's patients. *Gerontologist* 1989; 29:8-16.
- Larkin J I, Hopcroft B M. In-hospital respite as a moderator of caregiver stress. *Health Soc Work* 1993; 18:132-8.
- Senior Citizens and Social Services Branch. *Directory of Services for Senior Citizens*. Singapore: Ministry of Community Development, 1995:15.
- Lee K S, Owen R E, Choo P W J, Jayaratnam F J. The role of community health care team in the care of the elderly. *Singapore Med J* 1991; 32:262-4.
- Strang V, Neufeld A. Adult day care programs: a source for respite. *J Geront Nurs* 1990; 16:16-20.
- Feinberg L F, Kelly K A. A well-deserved break: respite programs offered by California's statewide system of Caregiver Resource Centers. *Gerontologist* 1995; 35:701-5.
- The National Survey of Senior Citizens in Singapore, 1995. Singapore: Interministry, 1996:61-84.
- Cheung P. The ageing population. In: Chan KM, Yap K B, Wong S F, editors. *Geriatric Medicine for Singapore*. Singapore: Gerontological Society Singapore: Interministry, 1996:5.
- Wade D T. *Measurement in Neurological Rehabilitation*. New York: Oxford Univ Press, 1992:72.