THE AGEING OF ELDERLY PEOPLE

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ABSTRACT

Objective: To assess the performance of activities of daily living, social resources and incidence of dementia in a cohort of elderly Chinese.

Design: This was a longitudinal study which measured changes in a five-year interval.

Setting: The study was conducted in the Henderson district of Singapore at the subjects' homes and at a day centre.

Subjects: A random sample of elderly Chinese was selected in 1985 from the electoral roll of the Henderson constituency and re-assessed after 5 years.

Outcome measures: A semi-structured questionnaire adapted from the Older American Resources and Services, and the computerised mental state programme, GMS-AGECAT.

Results: There was no apparent change in social resources after 5 years and the majority of the elderly (80.3%) were still living with their families. On activities of daily living, there was a significant decline especially after the age of 75. The incidence of dementia was 2.01% – the rate for Alzheimer's disease was 0.67% and multi-infarct dementia 1.34%.

Conclusion: The change in performance of activities of daily living after the age of 75 and the low incidence of dementia were similar to studies in Europe and the United States.

Keywords: elderly, Chinese, longitudinal study

INTRODUCTION

A longitudinal study is probably the best way to examine age-related changes in human characteristics. Most developmental research on ageing is based on cross-sectional survey, which is less expensive and does not require long-term commitment by the researcher. But a major shortcoming in cross-sectional study is the difficulty in interpreting whether the observed differences among the age groups are due to the ageing process, generational or cultural differences, or time-related changes in the attitudes and values of the society.

There are very few longitudinal studies of elderly people and all previous studies were in the United States[1,2], the United Kingdom[3,4] and Scandinavia[5]. Probably the most exhaustive and comprehensive research ever undertaken was conducted at the Duke University Centre for the Study of Aging and Human Development – two long-term multi-disciplinary longitudinal studies of 'normal ageing' were started in 1955 and 1968[1,2]. The first longitudinal study was devoted to understanding the ageing nervous system and the emphasis of the second study was the adaptation to change over time and response to important life events. The Duke University longitudinal studies have yielded valuable information on normal ageing; changes in electro-encephalographic recordings, cerebral blood flow and pyschometric measurements, eg intelligence and personality, have been reported. A problem in longitudinal study of elderly people is the high mortality and therefore the initial cohort has to be quite large. For example, in the Edinburgh study by Maule et al[3] from a cohort of 487 elderly people only 261 were alive after 5 years.

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An epidemiological study of mental disorders in elderly Chinese people was conducted in the districts of Henderson, Tiong Bahru and Bukit Merah in 1985[6]. In this study, a stratified random sample of 612 elderly Chinese was assessed at home and at a day care centre using a semi-structured questionnaire adapted from the Older American Resources and Services or OARS[7]. Mental state of the subjects was assessed with the community version of the Geriatric Mental State or GMS schedule[8,9], which can also generate a computerised diagnosis from the AGECAT programme[10]. The results of the 1985 survey indicated that the majority of elderly Chinese in the cohort (79% young-old or 65-74 years, and 73% old-old or 75 or more years) had good or mild impairment of social resources, meaning that social relationships were satisfactory and at least one person would take care of him/her indefinitely. On activities of daily living, 2.3% of the young-old and 14.5% of the old-old had moderate or severe impairment and needed help daily. The prevalence of dementia was 1.8% and depressive illness 4.6%[11-13].

This paper describes the changes after 5 years in the performance of activities of daily living and social resources, and the incidence of dementia in a subsample of the cohort.

METHODS

In this follow-up study, only the subjects in the Henderson district were re-assessed. The semi-structured questionnaire with items on activities of daily living or ADL, and social resources are similar adaptations from the OARS:

A. *Activities of daily living*
   (ie walking, bathing, eating, toileting, dressing, shopping, and light chores, eg sweeping)
   1 Good ADL – can perform all activities
   2 Mild impairment – can perform all except 1 or 2 activities; some help is required but not daily.
   3 Moderate impairment – need assistance in 3 or more activities; help required daily but not whole day.
   4 Severe impairment – requires help day and night.

B. *Social resources*
   1 Good – social relationships are satisfactory and one

person can take care of him/her indefinitely.

2 Mild impairment - social relationships are not satisfactory. but one person can take care of him/her indefinitely; *or* social relationships are satisfactory but only short-term help is available.

3 Moderate impairment - social relationships are not satisfactory and only short-term help is available; *or* social relationships are satisfactory but help is only available now and then.

4 Severe impairment - social relationships are not satisfactory but help is available now and then; *or* social relationships are satisfactory but help is not even available now and then.

A nurse with previous training in psychogeriatrics visited the homes of all the Henderson district subjects who were assessed 5 years previously. The questionnaire on ADL and social resources was completed during the home visits.

The assessment of dementia was conducted by a two-phase design. The first phase screening utilised the 10-item Elderly Cognitive Assessment Questionnaire or ECAQ[16]. We have found that other screening instruments like the Mini-mental State[17] or the Mental Status Questionnaire[18] are less appropriate for the Asian elderly because of cultural differences or low literacy. The ECAQ assesses two facets of cognitive functions, namely memory and orientation-information. The suggested cut-off on the ECAQ for 'case' and 'non-case' is a score of 5/6. The validity coefficients of the ECAQ are:

1	Sensitivity	85.3%
2	Specificity	91.5%
3	Positive predictive value	82.8%
4	False positive rate	17.2%
5	Overall miscalculation	10.5%

The nurse administered the ECAQ during the home visit and all those who scored 5 or less on the ECAQ were invited for a second assessment by the author at the day centre. The GMS was used in the second phase examination. The data from the GMS can be applied to the computerised diagnostic system, AGECAT. In this system, each subject is awarded a confidence level from 0 - 5 for the various diagnostic syndromes. A 'syndrome case' is reached at the AGECAT diagnostic confidence levels of 3 or more. In Singapore the AGECAT diagnoses had been compared to those made by the psychiatrist and the Cohen's kappa value for overall agreement was 0.85, and the value for dementia was 0.87.

A physical examination was conducted for all subjects diagnosed as probable cases of dementia, and further investigations included a full blood count, blood electrolytes, folate, vitamin B_{12}, thyroid function tests, VDRL and computerised tomography of the brain. The differentiation of dementia into Alzheimer's Disease and multi-infarct dementia was based on the International Classification of Diseases, tenth revision[19].

All data were coded and keyed into the IBM computer and data processing executed through SPSS in IBM 3081 KX2 main frame. For statistical analysis, chi-square test was used to test significance of difference; and the level of significance was set at a probability of less than 0.05.

RESULTS

Characteristics of the elderly
There were 198 subjects in the 1985 survey at the Henderson

district. After 5 years, 40 had died, 7 shifted residence, 2 returned to China and the remaining 149 were interviewed again. Probable causes of deaths obtained from the relatives were: heart diseases 15, strokes 9, cancer 9, chest infection 6, head injury 1 and unknown 10; the 7 who shifted away could not be contacted.

The demographic characteristics of the Henderson cohort in 1985 and 1990 are shown in Table I. There was a preponderance of women (57.1% in 1985 and 61.7% in 1990)

Table I - Characteristics of cohort in 1985 and 1990 (in percentages)

		1985 (n=198)	1990 (n=149)	p value
1.	Marital status			
	married	48	41.6	
	widowed	44	51	ns
	single	8	7.4	
2.	Living with			
	family	83.8	78.5	
	friends	9.6	14.1	ns
	alone	6.6	7.4	
3.	Activities of daily living			
	good/mild impairment	94.9	87.9	$x^2=5.66$
	mod/severe impairment	5.1	12.1	p<0.02
4.	Social resources			
	good/mild impairment	80.8	82.6	
	mod/severe impairment	19.2	17.4	ns

over men (42.9% in 1985 and 38.3% in 1990). In marital status, 51% of the sample in 1990 were widowed compared to only 44% in 1985 – the difference was not significant. There was no apparent change in living arrangement and the majority of the elderly still lived with their families (83.8% in 1985 and 78.5% in 1990); less than 10% were living alone.

Fig 1 - Performance of ADL of cohort after 5 years (in percentage)
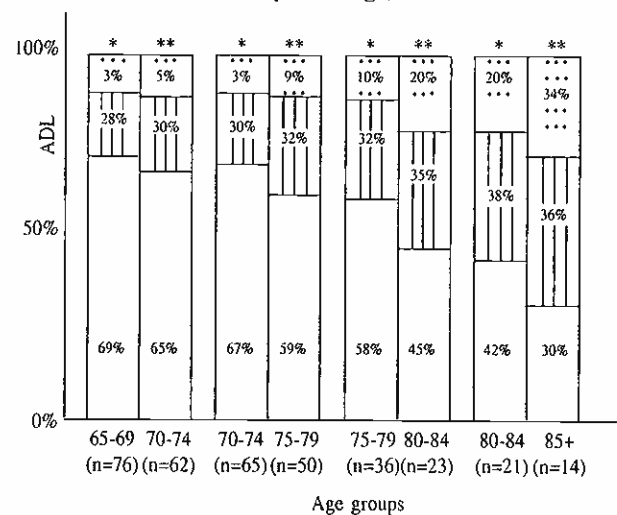
* 1985
** 1990

□ good ADL
Ⅲ mild impairment
⁙ mod/severe impairment

Activities of daily living

The ADL categories good and mild impairment were compared with categories moderate and severe impairment. The deterioration in performance of ADL was significant (p<0.02). Fig 1 illustrates the change of performance in ADL of the various age groups after 5 years. The decline was less obvious for those in the age group 65-69, and the same group in 1990 had only 5% with moderate or severe impairment. But more dramatic deterioration occurred in the age groups 70-74, 75-79 and 80 and over, after 5 years. For example, one-third of the 85 and over had mild impairment and another third had moderate to severe impairment requiring help daily.

Social resources

There was no apparent change in social resources after 5 years and the majority of the elderly felt that their social relationships were good and care was available for short term or indefinitely. Less than 20% had moderate or severe impairment, with help available for only short term or not at all. Comparing the sense of loneliness in the cohort, about 33% of the elderly in 1990 indicated that they felt lonely compared to only 19% in 1985 – the difference was significant ($x^2 = 9.26$, p<0.01).

Incidence of dementia

Eighteen subjects scored 5 or less points on the ECAQ, and in the second phase assessment with the GMS, only 15 were diagnosed as cases of dementia on level 3 confidence limit of the AGECAT programme. Of these 15 cases, 6 had been admitted to hospital previously for stroke and 4 for ischaemic heart disease; the history of these 10 cases suggested a multi-infarct dementia. The other 5 cases had been investigated for possible secondary dementia but the results were inconsequential – the history and symptomatology of progressive memory, intellectual and personality deterioration were consistent with Alzheimer's disease. The incidence of dementia was estimated as 2.01% per annum, the rate for Alzheimer's disease was 0.67% and multi-infarct dementia at 1.34%.

DISCUSSION

This paper does not discuss the 5-year follow-up study of depression in the cohort because the results have been published elsewhere[20]. In summary, it was found that of the 35 cases of depression diagnosed in the 1985 study, 10 were still depressed (32.3%), 8 had recovered (25.8%), 2 had symptoms of anxiety disorder (6.5%), one had dementia (3.2%) and 5 had died (16.1%).

There was no apparent change in the social support of this cohort of elderly people. The majority still relied on family members, especially the spouse of children. There was no evidence that the family would abandon the frail elderly in a home, and over 80% of the cohort felt that there would be help available for short term care or indefinitely. Most elderly people in Singapore are still dependent on their children for financial support besides providing care. More of the cohort in 1990 felt a sense of loneliness than in 1985; this could be due to the fact that those with physical disabilities could not venture out of the flats as often as before and many had lost close friends who had died or shifted elsewhere. The proportion of the elderly living with friends had increased from 9.6% in 1985 to 14.1% in 1990 – the increase was due to those elderly who had moved to an old people's home or preferred to share a flat with other elderly friends.

The performance of activities of daily living very often reflects the severity of physical and mental health; it is also an index of independence. People with chronic illness like diabetes mellitus may still have good ADL if the diabetes is well controlled and there is no complication. In this study it was noted that deterioration of ADL began after the age of 75 and most elderly in the young-old age group were able to lead independent lives. The apparent good health of the young-old group had also been reported in the eleven countries study in Europe[21]; and in England the report by Jagger et al[4] showed that rapid deterioration of physical health in fact began after the age of 80.

There are only a few studies on the incidence of dementia, and a low incidence rate of Alzheimer's disease had been reported in Sweden[22] and the United States[23] – all these reports indicated a rate of less than 2%. A recent Japanese research by Fukunishi et al[24] showed an even lower rate of only 0.4% for both Alzheimer's disease and multi-infarct dementia, compared to the incidence in Singapore of 2.01%.

In a previous paper, the author had discussed the elderly 'at risk' as those who lived alone, lacking social support, with poor economic resources and disabled[15]. These are the elderly who are more prone to depression and suicidal tendency. With limited geriatric services, resources would have to be rationalised to provide for the needs of the 'at risk' elderly – the study has confirmed previous findings that deterioration of health of most elderly people begins after 75 years. There should be a greater focus on resources and services for the old-old, especially if they live alone. It has been projected that in the near future there will be a proportionate increase in the old-old and a decrease in the young-old population of Singapore. Future research on the Singapore elderly should concentrate more on the old-old group, eg what are their needs and functional status, what services would benefit them to live independently in the community, what assistance do their carers need, etc.

A longitudinal study can be very exacting, laborious and expensive. Schaie[25] has proposed an efficient design involving a combination of cohort-sequential, cross-sequential and time-sequential research strategies. From a cross-sectional study of two or more age groups, the researcher can retest these groups after a few years to provide longitudinal data on several cohorts. Two or more new age groups are also tested to form a second cross-sectional study. This can be repeated every 5 years, retesting previously tested age groups to add to the longitudinal data and testing new age groups to add to the cross-sectional data.

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