

Disability and Handicap among Elderly Singaporeans

Satyender Singh Yadav

ABSTRACT

Singapore's elderly population has been growing rapidly and is expected to constitute more than 25 percent of the total population by the year 2030. The ageing process brings with it a host of health problems. Here the question arises - Are the increasing years of life going to create a high proportion of sick and disabled elderly people, or a rich human resource of healthy senior citizens? Since more women are living longer than men, who would face a higher risk of disability and handicap? These questions are yet to be answered in Singapore. This paper seeks answers to these questions. The study is based on a sample survey of 1209 elderly Singaporeans living in Kampong Glam, Kreta Ayer and Bukit Merah parliamentary constituencies which have some of the highest proportions of the aged population. The results revealed that more than half of the aged had a disability and the rate of disability was significantly higher among the women as compared to the men. More than one-third of the elderly had a handicap and the rate of handicap among the women was twice as much as that among the men. Severity of handicap was directly correlated with age.

Keywords: Ageing, Disability, Handicap, Area of Handicap, Severity of Handicap

Singapore Med J 2001 Vol 42(8):360-367

INTRODUCTION

An alarming increase in the proportion of the elderly population in the developed countries has led to an accelerating increase in the research on the issues related to ageing and health. A strong association between physical impairment and age has been identified by a number of studies⁽¹⁻³⁾. Their findings raise the argument that the increasing years of life may not create a rich human resource of healthy senior citizens, but may create a high proportion of the elderly who are frail and sick. It has also been found that the male and female health profiles differ

considerably, thereby affecting the risk of disability and handicap faced by the two sexes when they reach the elderly stage. Older women have higher risk of suffering from certain health disorders such as osteoporosis, arthritis, hypertension and diabetes, and they are also more likely to be bedridden or unable to perform self-care tasks⁽⁴⁾.

Singapore is a small country having a resident population of about 2.705 million people, of which 9.1 percent is in the elderly (60 years and over) age group⁽⁵⁾. However, the size of the elderly population in Singapore has been increasing at a fairly high rate and it is projected to increase about five times during the period 1990-2030⁽⁶⁾. Since the early 1980s, the government has set up a number of committees, which submitted their reports on various issues related to population ageing⁽⁷⁻¹²⁾. A range of studies on ageing in Singapore^(5,6,13-15), the health problems of the elderly^(16,17), health care for the elderly⁽¹⁹⁾, their socio-economic condition⁽²⁰⁾ and their expectations after retirement⁽²¹⁾ have also been published. While some of the above mentioned studies have raised some concern about the health of the elderly, these studies have rarely focused on the health of the elderly with the view to determine detailed levels of disability and handicap among them.

Health of the elderly is the most important factor for policy purposes because it has implications for the demand for almost everything that the elderly need. For example, a disabled elderly needs a different type of house than a healthy one. The health of the elderly will also have an impact on their financial status. The transportation needs of the elderly are also determined by their mobility status. In Singapore, while there have been an emphasis on the financial issues such as savings in the Central Provident Fund, Health Insurance for elderly, or the need for schemes like Medisave, the issue of their existing health conditions has not been addressed in adequate detail. In particular, there is a lack of studies focusing on the disability and handicap among elderly Singaporeans because detailed data on their health conditions is largely unavailable. Thus, despite being home to one of the fastest ageing

Humanities and
Social Studies
Education
National Institute
of Education
Nanyang
Technological
University
1 Nanyang Walk
Singapore 637616

Satyender Singh
Yadav, MA, MPhil
PhD Scholar

Correspondence to:
Satyender Singh Yadav
Email: ssyadav@
hotmail.com

populations in the world, the following questions remain unanswered for Singapore: Are the increasing years of life likely to create a high proportion of the sick and disabled elderly people, or a rich human resource of healthy senior citizens? Do women face a higher risk of disability and handicap than men?

Shantakumar⁽⁵⁾ has observed that the functional or disability status as measured in developed countries was not used in the 1990 census. Hence, there is a need for an in-depth study of the health conditions of elderly Singaporeans using the same parameters as those adopted in the developed world. Same parameters are important for comparability of data from other studies. Hence, this paper is a step towards bridging this gap in research on Singapore's ageing population. The main objectives of this research paper are: to study the health conditions of elderly Singaporeans in order to find out the level of disability and handicap among them; and to observe the variations in the occurrence of disability and handicap with differences in age and sex.

METHODOLOGY

Definitions

Elderly: Although there are various demarcations of older people in different countries, 60 years of age is used as the criterion for defining the old age for the purpose of this research because the Department of Statistics and other researchers^(5,6,14,20) in Singapore have also used this UN (United Nations) criterion. In this study, the terms 'elderly', 'aged', and 'senior citizens' are used interchangeably to refer to the people whose age is 60 years and over.

Disability: Similarly, many researchers and organisations use different definitions of disability and handicap status. For better compatibility and comparison of the results with other studies, it has been decided to adopt the definitions of a disability and a handicap as defined by the Australian Bureau of Statistics (ABS) for the '1993 Survey of Disability, Ageing and Carers'⁽²²⁾. However, the definitions provided by the ABS are based on the definitions proposed by the World Health Organisation (WHO) in the International Classification of Impairments, Disabilities and Handicaps (ICIDH). Accordingly, a disability is defined as the presence of one or more of the limitations, restrictions or impairments listed below, which had lasted or were likely to last for a period of six months or more:

- loss of sight (even when wearing glasses or contact lenses);
- loss of hearing;
- speech difficulties in native language;
- blackouts, fits, or loss of consciousness;

- incomplete use of arms or fingers;
- difficulty in gripping or holding small objects;
- incomplete use of feet or legs;
- treatment for nerves or an emotional condition;
- restriction in physical activities or in doing physical work;
- disfigurement or deformity;
- long-term effects of head injury, stroke or any other brain damage;
- a mental illness requiring help or supervision;
- treatment or medication for a long-term condition or ailment and still restricted; and
- any other long-term condition resulting in a restriction.

Handicap: A handicap is defined as a limitation to perform certain tasks associated with daily living. The limitation must be due to a disability and in relation to one or more of the areas listed below:

- self-care - difficulties in bathing, dressing, eating, toileting, bladder or bowel control;
- mobility - limitation in walking 200 metres, walking up or down stairs or using public transport; difficulties in going places away from the home, moving about the house, transferring to and from a bed or chair;
- verbal communication - difficulties in understanding or being understood by strangers/family/friends in the person's native language.

Severity of handicap: Four levels of severity (profound, severe, moderate and mild) were also determined for each of the three areas of handicap: self-care, mobility and verbal communication. These levels are as follows:

- profound handicap - personal help always required;
- severe handicap - personal help or supervision sometimes required;
- moderate handicap - no personal help or supervision required, but the person has difficulty in performing one or more of the tasks;
- mild handicap - no personal help or supervision required and no difficulty in performing any of the tasks, but the person uses an aid, or has a mild mobility handicap or cannot easily pick up an object from the floor.

The highest level of severity in any one of the areas of self-care, mobility and verbal communication determines the severity of total handicap.

Data Collection

A sample survey (Survey of the Health Conditions of Elderly Singaporeans, 1997) was conducted for the parliamentary constituencies of Kreta Ayer, Kampong Glam and Bukit Merah which have some of the

highest proportions (17.09, 16.71 and 14.43 per cent) of their population in the 60 years and over age group⁽²³⁾. The plan was to interview 2500 individuals living in family settings. A combination of the stratified and proportionate random sampling techniques was used to select the required sample from the list of aged persons provided by the National Registration Department, Ministry of Home Affairs, Singapore. The given elderly population was stratified into two groups by sex and again stratified by age group within each sex. Then the sample of elderly was selected randomly within each sub-stratum, according to their proportion in the given population by sex and age. This was done to ascertain that the various attributes such as the sex ratio and the proportions in different age groups of the elderly population were adequately represented in the sample.

A comprehensive questionnaire, adapted from the Australian Bureau of Statistics (1993 Survey of Disability, Ageing and Carers, Cat. No.4432.0), was developed to collect detailed information on the health conditions of the elderly. The questionnaire was pre-tested in order to find out if there were any problems in the understanding of any particular question by a respondent. The questionnaire was pre-tested on the senior citizens living in the St. Vincent Home, 263 Waterloo Complex, and residents of the Methodist Home for the Aged, 75 Whampoa Drive. Three interviewers who were conversant in English, Malay and Chinese dialects, were employed.

The survey commenced in April 1997 and was completed in August 1997, resulting in a total of 1209 people being interviewed out of a sample of 2500, with a response rate of 48.36 per cent. About 220 people (8.8 per cent) refused to be interviewed. Fourteen persons (0.56 per cent) had passed away during the survey period. About 250 persons (10 per cent) could not be located because they had been resettled due to the construction work for the new Northeast MRT line while the rest (about 32 per cent) could not be contacted because they were not at home or pretended not to be at home. In addition, the researcher also visited some day care centres and a hospice (Mount Alvernia Hospital) for the elderly in order to have an in-depth understanding of the health problems of the elderly.

Thus, the survey attained a response rate of 48.36 per cent. Given the limitations of time and resources, and considering that generally the response of Singaporeans to such surveys is quite low, this response rate is considered as relatively good. This can be ascertained from the fact that the National Survey of Senior Citizens in Singapore 1995, which was conducted jointly by the Ministries of Health,

Labour, and Community Development, Department of Statistics and National Council of Social Services, had a response rate of 59.38 per cent (Ministry of Community Development et al., 1996). Low response is not limited to social science surveys only. In Singapore, researchers in the field of medicine also face this problem. Chan et al⁽¹⁷⁾ observe that out of a sample of 2,582 persons, their study could obtain only 401 respondents (a response rate of 15.53 per cent!)

Analytical Techniques

The survey resulted in a large database. The questionnaires were edited before commencing with the data processing. The questionnaires provided detailed data (responses to 104 questions) on each respondent. Since the questionnaire was long, resulting in 110 original variables, for the rapidity of transfer of data and to minimise the errors in data entry, it was decided to enter the data in the form of codes into a code sheet and then transfer it to the computer. The database was checked for content errors. SPSS 8.0 (Statistical Package for Social Sciences) software package was used for the statistical analysis. The prevalence of disability and handicap among the elderly was measured in percentages. Chi-square test was used to measure the association between disability and attributes such as age and sex of the elderly. Furthermore, correlation analysis was used to determine the relationship of the severity of handicap with age.

RESULTS

Incidence of Disability

In all age groups, more than half of the aged had a disability, with a pattern of increasing disability with age (Table I). Chi-square test revealed that the occurrence of disability was significantly associated

Table I. Distribution of elderly Singaporeans with a disability, by age group and by sex, 1997.

Age Group	Data in Per Cent			Total (Number)
	Males	Females	Persons	
60-64	43.4	63.3	54.8	187
65-69	53.5	65.8	59.6	183
70-74	53.4	72.8	61.9	146
75-79	66.7	76.5	71.9	110
80-84	67.3	84.0	77.4	96
85+	73.1	81.8	77.1	37
Average	54.7	70.3	62.8	759
Number	317	442	759	759

Note: The percentage has been calculated for each age group by formula: (no. of persons having a disability in an age group/no. of persons in that age group)100.

Table II. Percentage of the elderly by type of disability, by age and by sex, Singapore, 1997.

Age Group	Eye	Ear	Speech	Arms	Grip	Legs	Physical Activity	Stroke etc.	Other
Males									
60-64	7.6	3.4	0.7	8.3	0.7	12.4	13.8	0.7	26.2
65-69	7.7	3.9	1.3	8.4	1.3	19.4	20.0	1.9	35.5
70-74	10.5	4.5	2.3	9.0	3.0	20.3	22.6	5.3	39.1
75-79	16.7	9.7	4.2	12.5	2.8	33.3	33.3	2.8	37.5
80-84	10.2	24.5	2.0	8.2	2.0	38.8	32.7	0.0	36.7
85+	23.1	23.1	3.8	23.1	3.8	34.6	46.2	0.0	46.2
Average	10.3	7.2	1.9	9.7	1.9	21.9	22.9	2.2	34.8
Females									
60-64	7.7	2.0	0.0	16.8	2.0	38.8	39.3	1.5	36.7
65-69	11.8	3.9	1.3	20.4	3.3	43.4	40.1	2.0	36.8
70-74	17.5	5.8	0.0	20.4	0.0	44.7	47.6	0.0	43.7
75-79	23.5	4.9	0.0	29.6	6.2	61.7	60.5	6.2	46.9
80-84	29.3	20.0	1.3	34.7	2.7	62.7	58.7	4.0	33.3
85+	40.9	27.3	4.5	31.8	4.5	54.5	59.1	0.0	27.3
Average	16.1	6.5	0.6	22.6	2.7	47.2	46.6	2.2	38.5

Note: One person may have more than one type of disabling condition. The percentage has been calculated for each age group by formula: (no. of persons having a disability in an age group/no. of persons in that age group)100. Therefore, the percentages do not add to hundred across the age groups or across different types of disability.

with age ($\chi^2 = 31.62$, d.f. = 5, $p < .05$). The lowest incidence of disability was 54.8 per cent among those aged 60-64 years while the highest was 77.4 per cent among those aged 80-84 years. The association between physical impairment and age has also been well established by studies in other countries^(1, 2, 3, 5, 24).

Disability rates were also significantly associated with sex ($\chi^2 = 31.48$, d.f. = 1, $p < .05$). Among all the men, the percentage of those having a disability was 54.7 per cent, whereas for the women, it was 70.3 per cent. In all age groups, the women had a higher disability rate than the men. The difference was found to be most prominent in the 60-64 years age group while the 85 years and over age group witnessed a narrowing of the difference (Table I). However, the rate of disability increased more rapidly with the increase in age among men than that among women. Studies elsewhere have also revealed that the males and females face different risks of disability and handicap when they reach the elderly stage⁽¹⁻⁴⁾.

Disabling Conditions

The incidence of various disabling conditions among the elderly was analysed by observing the percentage of the aged suffering from various disabling conditions. The data revealed that eye disability was significantly associated with age ($\chi^2 = 40.37$, d.f. = 5, $p < .05$) and also with sex ($\chi^2 = 8.53$, d.f. = 1, $p < .05$). Eye disorders increased among both men and women with the increase in age (Table II). About 10 per cent of all men had a disabling condition of the eye while about 16 per cent of the women had the same. In the 85 years and over age group, the proportion of women with an eye disability was almost twice that of men.

The occurrence of disability related to ear was found to be significantly associated with age ($\chi^2 = 82.71$, d.f. = 5, $p < .05$) but not so with sex. Table II reveals that the total incidence of disorders of the ear was almost equal among men and women. However, a higher rate of ear disorders was observed among men than women in all age groups, except in 70-74 and 85+ age groups.

The incidence of disability related to speech among men was almost three times as that among women (Table II). Men had a higher rate of speech disability as compared to women in all age groups except those in 85 years and over age group.

The incidence of disability of arms was found to be significantly associated with age ($\chi^2 = 17.00$, d.f. = 5, $p < .05$) as well as with sex ($\chi^2 = 36.78$, d.f. = 1, $p < .05$). Women were almost twice as likely as men to have disability of arms (Table II). The data revealed that disability of arms increased with age among both men and women. However, the increase was more gradual in case of women than that for men. The difference in the levels of disability of arms among men and women was significant in all age groups.

The incidence of disability of legs was found to be significantly associated with age ($\chi^2 = 43.57$, d.f. = 5, $p < .05$) as well as with sex ($\chi^2 = 84.96$, d.f. = 1, $p < .05$). The incidence of disability of legs was more than twice as likely to appear among women as that of among men (Table II). A clear male-female differential in the disability rates was observed in all the age groups. A majority of women aged 75 years and over had disability of legs. There was a sudden increase in the disability of legs in the 75-79 age group among both men and women.

Table III. Percentage of the disabled elderly by main disabling condition, by age and by sex, Singapore, 1997.

Main Disabling Condition	60-64	65-69	70-74	75-79	80-84	85+	Average
Males							
Disorders of the Eye	11.1	9.6	9.9	8.3	6.1	15.8	9.8
Musculoskeletal Disorders	28.6	22.9	19.7	33.3	33.3	36.8	26.8
Circulatory Diseases	33.3	36.1	47.9	33.3	27.3	31.6	36.6
Diabetes	11.1	18.1	7.0	14.6	6.1	0.0	11.4
Stroke	1.6	2.4	9.9	4.2	0.0	0.0	3.8
Cancer	1.6	0.0	0.0	0.0	0.0	5.3	0.6
Respiratory Diseases	4.8	3.6	1.4	0.0	12.1	0.0	3.5
Disorders of the Ear	3.2	2.4	0.0	4.2	15.2	0.0	3.5
Other	4.8	4.8	4.2	2.1	0.0	10.5	4.1
Total	100	100	100	100	100	100	100
Number of Disabled	63	83	71	48	33	19	317
Females							
Disorders of the Eye	4.0	7.0	6.7	9.7	11.1	16.7	7.5
Musculoskeletal Disorders	42.7	47.0	42.7	46.8	54.0	61.1	46.6
Circulatory Diseases	34.7	29.0	37.3	17.7	19.0	16.7	28.5
Diabetes	12.9	12.0	8.0	16.1	4.8	0.0	10.6
Stroke	1.6	3.0	0.0	8.1	1.6	0.0	2.5
Cancer	1.6	0.0	0.0	0.0	0.0	0.0	0.5
Respiratory Diseases	0.8	1.0	0.0	0.0	1.6	0.0	0.7
Disorders of the Ear	0.8	0.0	1.3	0.0	1.6	5.6	0.9
Other	0.8	1.0	4.0	1.6	6.3	0.0	2.3
Total	100	100	100	100	100	100	100
Number of Disabled	124	100	75	62	63	18	442

Note: Total may not add to hundred due to rounding up of decimal places.

Table IV. Distribution of elderly Singaporeans with a handicap, by age group and sex, 1997.

Age Group	Data in Per Cent		
	Males	Females	Persons
60-64	9.7	28.6	20.5
65-69	16.8	43.4	30.0
70-74	27.1	45.6	35.2
75-79	30.6	58.0	45.1
80-84	42.9	70.0	59.7
85+	53.8	77.3	64.6
Average	22.9	45.5	34.7
Number	133	286	419

Note: The percentage has been calculated for each age group by formula: (no. of persons having a handicap in an age group/no. of persons in that age group)100.

The disability related to physical activity was also found to be significantly associated with age ($\chi^2 = 36.74$, d.f. = 5, $p < .05$) as well as with sex ($\chi^2 = 73.96$, d.f. = 1, $p < .05$). The women were twice as likely as men to have disability related to physical activity. The women had higher level of this disability than men in all the age groups. Among men, the incidence of handicap increased more than three times from that in 60-64 year age group to that in 85 years and over age group.

The incidence of stroke, disability in gripping small objects and other disorders did not show statistically significant association with age and sex.

Main Disabling Condition

Main disabling condition is the condition that causes the most problems to a person who has multiple disabling conditions. The person himself was asked to identify the main disabling condition. When a person has only one disabling condition, that was considered to be the main disabling condition.

Musculoskeletal and circulatory disorders were the most reported main disabling conditions (Table III). Musculoskeletal disorders were the most prominent main disabling condition among women while circulatory diseases accounted for the number one position among men. It is important to note that there was a significant difference in the percentage of men and women reporting musculoskeletal disorders and circulatory diseases as the main disabling condition. However, diabetes appeared as the third ranking main disabling condition among both men and women (Table III).

Incidence of Handicap

More than one-third of elderly Singaporeans suffered from a handicap (Table IV). The data revealed that the incidence of handicap had a significant association with age ($\chi^2 = 93.69$, d.f. = 5, $p < .05$) as well as with sex ($\chi^2 = 67.68$, d.f. = 1, $p < .05$). There was an increasing prevalence of handicap with age. The elderly who were 85 years and older were three times more likely to have a handicap than their counterparts in 60-64 age group (Table IV). The total rate of handicap among females

was twice as much as that among the males. A clear difference between handicap rates among men and women was observed in all age groups.

Table V. Percentage of elderly Singaporeans with a handicap, by area of handicap, 1997.

Age Group	Self-Care	Verbal Communication	Mobility
60-64	0.9	0.9	20.2
65-69	2.3	2.0	30.0
70-74	4.7	4.7	33.5
75-79	5.9	5.9	43.1
80-84	0.8	8.9	57.3
85+	8.3	20.8	62.5
Average	2.9	4.1	33.7
Number	35	50	407

Table VI. Percentage of elderly Singaporeans with a handicap, by area of handicap, sex and age group, 1997.

Age Group	Self-Care	Verbal Communication	Mobility	Overall
Males				
60-64	0.7	0.7	9.0	9.7
65-69	1.9	1.9	16.8	16.8
70-74	3.8	4.5	25.6	27.1
75-79	2.8	9.7	26.4	30.6
80-84	0.0	8.2	40.0	42.9
85+	3.8	23.1	50.0	53.8
Average	2.1	4.7	21.6	22.9
Number	12	27	125	133
Females				
60-64	1.0	1.0	28.6	28.6
65-69	2.6	2.0	43.4	43.4
70-74	5.8	4.9	43.7	45.6
75-79	8.6	2.5	58.0	58.0
80-84	1.3	9.3	68.0	70.0
85+	13.6	18.2	77.3	77.3
Average	3.7	3.7	44.8	45.5
Number	23	23	282	286

Table VII. Percentage of elderly Singaporeans, by severity of handicap and by area of handicap, 1997.

Severity of Handicap	Area of Handicap							
	Mobility		Verbal Communication		Self-Care		Overall Handicap	
	Number	%	Number	%	Number	%	Number	%
None	802	66.3	1159	95.9	1174	97.1	790	65.3
Mild	304	25.1	2	0.2	1	0.1	291	24.1
Moderate	66	5.5	3	0.2	4	0.3	53	4.4
Severe	14	1.2	40	3.3	12	1.0	46	3.8
Profound	23	1.9	5	0.4	18	1.5	29	2.4
Total	1209	100.0	1209	100.0	1209	100.0	1209	100.0

Note: Total may not add to hundred due to rounding up of decimal places.

Area of Handicap

About 3 per cent of all the elderly Singaporeans had a handicap in self-care (Table V). The data revealed that the incidence of handicap in self-care was significantly associated with age ($\chi^2 = 19.79$, d.f. = 5, $p < .05$). Those who were 85 years old or more were eight times more likely to have a handicap in self-care than those who were 60-64 years old. Although there was no statistically significant association between sex and handicap in self-care, the women had a higher rate of handicap in self-care than men (Table VI). The male-female difference in self-care handicap was more prominent in the higher age groups. The women in 85 years and over age group were four times more likely to have a handicap in self-care than men.

In verbal communication, about 4 per cent of all the elderly had a handicap (Table V). The data revealed that the incidence of handicap in verbal communication had a significant association with age ($\chi^2 = 54.91$, d.f. = 5, $p < .05$). A sharp increase in the rate of handicap was noted at the age of 85. The aged in 85 years and over age group were about twenty times more likely to have a handicap in verbal communication than those in 60-64 age group. Although there was no statistically significant association between sex and verbal communication handicap, Table VI does show some male-female differences in the levels of this handicap in some age groups.

Nearly one-third of all the elderly in the study had a handicap in mobility (Table V). The incidence of handicap in mobility was found to be significantly associated with age ($\chi^2 = 84.35$, d.f. = 5, $p < .05$) as well as with sex ($\chi^2 = 73.24$, d.f. = 1, $p < .05$). The rate of handicap in mobility in 85 years and above age group was more than three times from that in 60-64 years age group. The women had twice the rate of handicap in mobility than the men. The male-female differential was prominent in all age groups (Table VI).

Severity of Handicap

The severity of handicap gives a more accurate picture of the degree of difficulty or limitation faced by the elderly with a handicap. Among all the elderly, the rates for mild, moderate, severe and profound overall handicap were 24.1, 4.4, 3.8 and 2.4 per cent respectively (Table VII). The severity of handicap was found to be directly correlated with age ($r = 0.288$, significant at 0.01 level). Table VIII reveals that the severity of handicap generally increases with the increase in age. The rates of profound and severe handicaps increase more than 5 and 25 times, respectively, from 60-64 to 85 years and over age groups.

The severity of handicap was found to be significantly associated with sex ($\chi^2 = 74.92$, d.f. = 4, $p < .05$). The rate of mild handicap among elderly women was more than twice that among the men. About one-third of all elderly women had mild handicap (Table IX). The rate of mild handicap among the women was twice as that among the men. The women were three times more likely to have a moderate handicap than the men. The women also had a higher rate of profound handicap.

DISCUSSION

Thus, both disability and handicap were found to be significantly associated with age and sex. Severity of handicap was also directly correlated with age. The results of this study, read in conjunction with the population projections^(5,6), imply that even if the rates of disability and handicap were to remain constant, there would be an almost five times increase in the demand for the services and facilities such as geriatric centres, nursing homes, rehabilitation and day care centres, fitness centres, carers, special housing and accessible environment, elderly-friendly transportation, safety and security during the period 1990-2030. It can also be concluded that the demand for the health care services was expected to be much higher for elderly females in future. The spatial patterns

Table VIII. Percentage of elderly population, by age and severity of handicap, Singapore, 1997.

Age Group	Severity of Handicap					Number
	None	Mild	Moderate	Severe	Profound	
60-64	79.5	17.9	0.6	0.6	1.5	341
65-69	70.0	23.8	2.6	2.0	1.6	307
70-74	64.8	23.7	3.0	5.9	2.5	236
75-79	54.9	26.8	9.8	3.9	4.6	153
80-84	40.3	37.1	12.9	8.1	1.6	124
85+	35.4	29.2	10.4	16.7	8.3	48
Average	65.3	24.1	4.4	3.8	2.4	1209

Note: Total may not add to hundred due to rounding up of decimal places.

of the future elderly population were expected to play a leading role in determining the location of these services. The need for government spending on support and health care services for the elderly was expected to increase, which could prove to be a big burden on the resources of Singapore.

The significance of the study lies in accumulating detailed data. The data collected is also important because although this is the first study of its kind in Singapore, the data collected can be compared with that from Australian studies. By using standardised international definitions of disability and handicap, the study provides a ready database on which further research can be based without the fear of generating data that are not comparable. Future researchers can use the results of this study for baseline comparison and to observe the trends of disability and handicap rates. These were the reasons for the decision to proceed with this study despite the problems faced in data availability and data collection. The data from this study will be used for projecting the future elderly population with disability and handicap in Singapore.

ACKNOWLEDGEMENT

Data collection was funded through a research grant from the NIE Research Fund (Grant no. NIE/NTU Academic Research Fund RP21/96 MS).

Table IX. Percentage of elderly Singaporeans, by severity of handicap, area of handicap and sex, 1997.

Severity of Handicap	Area of Handicap							
	Mobility		Verbal Communication		Self-Care		Overall Handicap	
	Male	Female	Male	Female	Male	Female	Male	Female
None	78.4	55.2	95.3	96.3	97.9	96.3	77.1	54.5
Mild	16.6	33.1	0.3	0.0	0.0	0.2	15.1	32.3
Moderate	2.8	7.9	0.2	0.3	0.3	0.3	2.1	6.5
Severe	0.9	1.4	3.6	3.0	0.7	1.3	3.8	3.8
Profound	1.4	2.4	0.5	0.3	1.0	1.9	1.9	2.9
Total	100	100	100	100	100	100	100	100

Note: Total may not add to hundred due to rounding up of decimal places.

REFERENCES

1. Australian Bureau of Statistics. Disability, ageing and carers, Australia, 1993: summary of findings, Cat. No. 4430.0. Canberra: Australian Bureau of Statistics, 1993.
2. Crimmins EM, Saito Y, Ingegneri D. Trends in disability-free life expectancy in the United States, 1970-90. *Population and Development Review* 1997; 23(3):555-72.
3. Manton KG, Stallard E, Corder L. Changes in the age dependence of mortality and disability: cohort and other determinants, *Demography* 1997; 4(1):135-57.
4. Garner JD, Mercer SO, editors. Women as they age: challenge, opportunity and triumph. New York: The Haworth Press, 1989.
5. Shantakumar G. The aged population of Singapore. *Census of Population, 1990: Monograph no. 1*. Singapore: Singapore National Printers Ltd, 1994.
6. Yadav SS. Ageing in Singapore - a population projection: 1990-2030. *Population Geography 1997. A Journal of the Association of Population Geographers of India*, Department of Geography, Panjab University, Chandigarh; 19:55-68.
7. Ministry of Social Affairs, Singapore. Report on the national survey of senior citizens. Singapore: The Ministry, 1983.
8. Ministry of Health, Singapore. Report of the committee on the problems of the aged. Singapore: The Ministry, 1984.
9. Ministry of Community Development, Singapore. Report of the advisory council on the aged. Singapore: The Ministry, 1989.
10. Ministry of Community Development, Singapore. Report of the national policy committee on the family and the aged. Singapore: The Ministry, 1991.
11. Ministry of Community Development, Ministry of Health, Department of Statistics, Singapore. The national survey of senior citizens in Singapore 1995. Singapore: Department of Statistics, 1996.
12. Ministry of Health, Singapore. Report of the inter-ministerial committee on health care for the elderly. Singapore: The Ministry, 1999.
13. Lee SMC. Dimensions of ageing in Singapore. *Journal of Cross-Cultural Gerontology* 1986; 1(3):239-54.
14. Chen AJ, Cheung PPL. The elderly in Singapore: the Singapore country report. Phase III, ASEAN Population Project. Singapore: Ministry of Health, 1988.
15. Kua EH. Ageing and old age among Chinese in a Singaporean urban neighbourhood. Singapore University Press: National University of Singapore, 1994.
16. Phoom WO, et al. Health problems of the older age groups in the community. Department of Social Medicine and Public Health, National University of Singapore, 1981.
17. Chan KM, Pang WS, Ee CH, Ding YY, Choo P. Epidemiology of falls among the elderly community dwellers in Singapore. *Singapore Medical Journal* 1997; 38(10):427-31.
18. Tan CH. Utilisation of inpatient health facilities by the elderly in Singapore (MS thesis). National University of Singapore, 1988.
19. Lun KC. Projecting the demand for institutional care by the aged in Singapore in the year 2000 using fragmented data. Department of Social Medicine and Public Health, National University of Singapore, 1982.
20. Singh M. Socio-economic circumstances of the future aged population in Singapore. Singapore: National Institute of Education, Nanyang Technological University, 1996.
21. Tham SC, editor. Study of ageing and retirement in Singapore. A Preliminary Report Submitted by the Multi-Disciplinary Research Group on Ageing and Retirement. National University of Singapore, 1989.
22. Australian Bureau of Statistics. Disability, ageing and carers, Australia, 1993: data reference package, Cat. No. 4432.0. Canberra: Australian Bureau of Statistics, 1993.
23. Lau KE. Singapore census of population 1990, Statistical release 1: demographic characteristics. Singapore: Singapore National Printers Ltd, 1992.
24. Yadava KNS, Yadava SS, Roberts RE. Ageing and health hazards in rural northern India. *Health and Population - Perspectives and Issues* 1996; 19(1):1-18.

INSTITUTE OF MENTAL HEALTH

6th Annual Scientific Meeting & 1st National Psychotherapy Conference
Theme: Bridging Research & Service

Day 1: 5 October 2001

Pre-conference workshop: 'Counter transference in psychotherapy'

Day 2: 6 October 2001

IMH lecture by Prof Tan Chorh Chuan: 'Bridging Research & Service'

Inaugural Edward Charles Winslow lecture by Prof Lee Eng Hin: 'Setting Standards in Training'

Plenary lecture 1: 'The Treatment of Schizophrenia: Where do we go from here?' by Prof John Kane

Plenary Lecture 2: 'Helping Troubled Therapists' by Dr Roy Menninger

Interdisciplinary case discussion: 'Stalking - Forever Yours'

Symposia: Neurology and Psychiatry; Geriatric Psychiatry; Child Psychiatry; International Collaborative Research on Psychotropic Prescription; Early Psychosis Intervention Program; Sleepless in Singapore and Hong Kong; Free Papers.

Day 3: 7 October 2001

Forum on Cultural Perspectives in Psychotherapy

Plenary lecture 3: 'Boundary Issues and Violations in Psychotherapy' by Dr Roy Menninger

Workshops: Counselling Troubled Students; Managing the Difficult Patient; Projective Techniques Nursing symposium: Nursing management of suicidal patients in a general hospital setting.

Venue : Auditorium & Seminar Rooms, Institute of Mental Health/Woodbridge Hospital,
10 Buangkok View, Singapore 539747Cost : \$100 for 2 days (6 & 7 October 2001); Pre-conference workshop (5 October 2001):
\$50 per personContact person : Ms Patricia Yau, Institute of Mental Health, Tel: 389 2060 / Fax: 385 1051,
e-mail: yau_patricia@imh.com.sg