

Successful Ageing of the Oldest Old in China

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- Introduction
- Previous study
- Data and method
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- Discussion

I. Introduction

- Concept of successful ageing dates back to 1960's.
- Quite different definitions:
physical functioning or psychological state?

- Traditionally research in ageing has emphasised average –related losses and neglected the substantial heterogeneity of older persons
- Used to group the elderly into dichotomous categories: impaired or normal ageing

- This classification concealed the vast heterogeneity among the elderly population without impairment
- Such a classification may limit our further research into the most psychologically and physically healthy group and their characteristics

Usual Ageing and Successful ageing

- In 1987, Rowe and Kahn suggest that within the category of normal ageing, a distinction can be made between usual ageing and successful ageing
- Several studies have now sought to identify subgroups of old people in the population that exhibit minimal functional limitations, using a variety of approaches

Definition of Successful Ageing

- Among these studies, successful ageing was often defined as:
 - living in the communities,
 - without disability on activities of daily living,
 - no serious difficulties on gross mobility and physical performance,
 - a high score on a cognitive screening test,
 - excellent or good self-rated health.

II. Previous Study

MacArthur study of ageing in the United States

- First reported by Berkman *et al.*(1993)
- The MacArthur studies aimed to identify, within a population-based cohort of older men and women,
 - a subgroup with higher levels of physical and cognitive function,
 - and to compare their characteristics in a range of domains with those of subgroups functioning at intermediate and lower levels, respectively.

- The MacArthur studies examined data from participants aged 70-79 years drawn from three community-based populations
- High, medium, and low functioning subgroups were defined on the basis of predetermined criteria of physical and cognitive function, and significant differences were identified among these three subgroups in biomedical, physiological, psychological and social functioning.

Australian studies

- Australian studies (Jorm, Christensen, Henderson, Jacomb, Korten & Mackinnon, 1998; Andrews, Clark & Luszcz, 2001) have addressed the issue of the prevalence of successful ageing and factors associated with it.
- In ALSA study, consistent with the MacArthur studies, they used both physical and cognitive criteria to distinguish *successful* from *usual* ageing.

ALSA study

- Discrete groups of individuals aged 70 or more and showing higher, intermediate or lower degrees of successful ageing were identified.
- More importantly, they could be distinguished from each other on additional measures of physical functioning and health, lifestyle and psychological status and key indicators remained after controlling for the effects of age, gender, education and income.

Successful Ageing: A case study on Beijing elders

- By Du Peng and Gary R. Andrews(2003)
- The Beijing study is based on the data of the Beijing Multidimensional Longitudinal Study on Aging, 1992-2000

Beijing Multidimensional Longitudinal Study on Aging

- The target population in the Beijing Multidimensional Longitudinal Study on Aging was those people aged 55 years and over living in Beijing
- Data was collected through home interview as well as physical examination
- 2035 community dwelling respondents for whom necessary information was available for the analysis of successful ageing.

III. Data and Method

- Survey on Determinants of Healthy Longevity in China
- Base line survey in 1998
- 8959 oldest old aged 80 and over
- 22 provinces covered
- Two follow-ups in 2000 and 2002

7737 cases included

- Live in community
- Aged 80-105
- Answered questions about SRH & MMSE

Measurement

- Self-reports of health were rated from excellent (1) to poor (5).
- Medical conditions were obtained by asking participants to indicate which of a comprehensive list of conditions they had ever suffered from.
- Measurement of activities of daily living (ADL)

- Physical performance:

Able to pick up a book from the floor?

Able to stand from a chair?

Questions on physical exercise was used to classify exercise intensity as often or not.

- The cognitive function was assessed with the Mini Mental State Examination (MMSE).
- Personality was measured by giving optimistic or pessimistic answers to questions.

Successful group

- **Individuals were classified as higher functioning (N = 1161 or 15.0%) if they fulfilled all of the following 5 criteria:**
 1. **according to the score of Mini-Mental State Examination (MMSE), the respondents are grouped as successful;**

2. with good or very good self-rated health;

3. no disability in 6 activities of daily living (bathing, dressing, toileting, eating, indoor mobility, continence);

4. no problem on physical performance:

Able to stand up from a chair without using hands;

Able to pick up a book from the floor.

- Individuals were classified as lower functioning (N =3222 (41.6%) if they fulfilled any of the following five criteria:
 - unable to answer the MMSE question
 - giving wrong answers for more than five questions;
 - with poor or very poor self-rated health;
 - 1 or more disabilities in activities of daily living;
 - 1 or more disabilities in physical performance.

Intermediate functioning

- Individuals were classified as intermediate functioning (N = 3354 or 43.4%) if they fulfilled the criteria neither for higher nor lower functioning.

Analytic approach

- Data analysis evaluated the relative importance of a large number of potential risk or protective factors for successful ageing and was a two-stage process

- First, univariate analyses were conducted of the relationship between each predictor and the functional classification of successful ageing.
- Secondly, a logistic regression model is used that controlled for the effects of age, sex, education ,urban/rural residence and marital status.

IV. Results

Table 1 Control Variables by Level of Function

| Variable | High | | Intermediate | | Low | | χ^2 | Df |
|-----------|------|------|--------------|------|------|------|-------------|----|
| | no. | % | no. | % | no. | % | | |
| Age group | | | | | | | 711.747 *** | 8 |
| 80-84 | 504 | 43.4 | 768 | 22.9 | 486 | 15.1 | | |
| 85-89 | 291 | 25.1 | 672 | 20.0 | 488 | 15.1 | | |
| 90-94 | 208 | 17.9 | 688 | 20.5 | 576 | 17.9 | | |
| 95-99 | 99 | 8.5 | 513 | 15.3 | 613 | 19.0 | | |
| 100+ | 59 | 5.1 | 713 | 21.3 | 1059 | 32.9 | | |
| Gender | | | | | | | 342.458 *** | 2 |
| Male | 725 | 62.4 | 1465 | 43.7 | 1023 | 31.8 | | |
| Female | 436 | 37.6 | 1889 | 56.3 | 2199 | 68.2 | | |
| Education | | | | | | | 384.223 *** | 4 |
| 0 year | 513 | 44.3 | 2152 | 64.4 | 2428 | 75.7 | | |
| 1-6 years | 460 | 39.8 | 871 | 26.1 | 587 | 18.3 | | |
| 7+ years | 184 | 15.9 | 320 | 9.6 | 192 | 6.0 | | |
| Residence | | | | | | | 52.981 *** | 2 |
| Urban | 508 | 43.8 | 1239 | 36.9 | 1034 | 32.1 | | |
| Rural | 653 | 56.2 | 2115 | 63.1 | 2188 | 67.9 | | |
| Marriage | | | | | | | 218.578 *** | 4 |
| Married | 365 | 31.4 | 613 | 18.3 | 398 | 12.4 | | |
| Widowed | 759 | 65.4 | 2657 | 79.2 | 2739 | 85.0 | | |
| Other | 37 | 3.2 | 84 | 2.5 | 85 | 2.6 | | |

*** p< .001

Table 2 Medical Conditions by Level of Function

| Variable | High | | Intermediate | | Low | | χ^2 |
|---------------------------|------|------|--------------|------|-----|------|-----------|
| | no. | % | no. | % | no. | % | |
| Hypertension | 169 | 14.6 | 485 | 14.5 | 383 | 11.9 | 29.65 *** |
| Diabetes | 8 | 0.7 | 32 | 1.0 | 22 | 0.7 | 30.75 *** |
| Heart disease | 60 | 5.2 | 246 | 7.3 | 279 | 8.7 | 36.33 *** |
| Stroke or CVD | 19 | 1.6 | 75 | 2.2 | 129 | 4.0 | 48.10 *** |
| Bronchitis | 108 | 9.3 | 427 | 12.7 | 432 | 13.4 | 33.23 *** |
| Tuberculosis | 6 | 0.5 | 31 | 0.9 | 30 | 0.9 | 25.81 *** |
| Cataract | 133 | 11.5 | 595 | 17.7 | 697 | 21.6 | 81.92 *** |
| Glaucoma | 9 | 0.8 | 72 | 2.1 | 98 | 3.0 | 48.87 *** |
| Cancer | 5 | 0.4 | 10 | 0.3 | 22 | 0.7 | 27.77 *** |
| Prostate tumour | 52 | 4.5 | 131 | 3.9 | 113 | 3.5 | 36.20 *** |
| Gastric or duodenal ulcer | 30 | 2.6 | 118 | 3.5 | 107 | 3.3 | 27.88 *** |
| Parkinson's disease | 6 | 0.5 | 26 | 0.8 | 44 | 1.4 | 35.08 *** |
| Bedsore | 2 | 0.2 | 20 | 0.6 | 35 | 1.1 | 38.88 *** |

*** $p < .001$

Table 3 Logistic Regression Summary: Level of Function by Medical Conditions Entered as a Block

| | Higher vs intermediate | | Higher vs Low | |
|---------------------------|------------------------|--------------------|---------------|------------|
| | AOR ^a | 95%CI ^b | AOR | 95%CI |
| Hypertension | 1.08 | 0.88-1.32 | 0.75 * | 0.60-0.94 |
| Diabetes | 1.61 | 0.71-3.65 | 1.31 | 0.53-3.25 |
| Heart disease | 1.56 ** | 1.14-2.14 | 2.47 *** | 1.76-3.47 |
| Stroke or CVD | 1.67 | 0.98-2.85 | 4.05 *** | 2.37-6.92 |
| Bronchitis | 1.54 *** | 1.22-1.95 | 1.82 *** | 1.41-2.34 |
| Tuberculosis | 1.66 | 0.64-4.30 | 1.64 | 0.59-4.53 |
| Cataract | 1.47 *** | 1.18-1.83 | 1.57 *** | 1.25-1.98 |
| Glaucoma | 2.54 * | 1.23-5.28 | 3.67 *** | 1.72-7.82 |
| Cancer | 0.65 | 0.20-2.14 | 1.31 | 0.40-4.25 |
| Prostate tumour | 1.08 | 0.75-1.56 | 1.18 | 0.78-1.77 |
| Gastric or duodenal ulcer | 1.44 | 0.93-2.21 | 1.23 | 0.77-1.97 |
| Parkinson's disease | 1.28 | 0.50-3.33 | 2.36 | 0.90-6.20 |
| Bedsore | 2.61 | 0.58-11.74 | 3.74 | 0.83-16.74 |

a Adjusted Odds Ratio, where odds ratio are adjusted for age, gender, education, place of residence and marital status

b 95% confidence interval

* p<.05 ** p< .01 *** p< .001

Table 4 Activity, Physical Performance, Health and Psychological Indicators by Level of Function

| Variable | High | | Intermediate | | Low | |
|--|-------|------|--------------|------|------|------|
| | % | n | % | n | % | n |
| Intensity of exercise | | | | | | |
| Often | 48.1 | 559 | 31.3 | 1051 | 17.6 | 567 |
| No | 51.9 | 602 | 68.7 | 2303 | 82.4 | 2655 |
| Self-rated health | | | | | | |
| Excellent/good | 100.0 | 1161 | 54.7 | 1833 | 44.3 | 1428 |
| Fair/poor | 0.0 | 0 | 45.3 | 1521 | 55.7 | 1794 |
| Able to pick up a book from the floor? | | | | | | |
| Yes | 100.0 | 1161 | 71.0 | 2383 | 47.0 | 1514 |
| No | 0.0 | 0 | 29.0 | 971 | 53.0 | 1708 |
| Able to stand up from a chair? | | | | | | |
| Yes | 100.0 | 1161 | 74.4 | 2494 | 51.6 | 1661 |
| No | 0.0 | 0 | 25.6 | 860 | 48.4 | 1561 |
| Look on the bright side of things | | | | | | |
| Always/often | 100.0 | 1161 | 100.0 | 3354 | 83.4 | 2687 |
| Sometimes/never | 0.0 | | 0.0 | | 16.6 | 535 |
| Keep my belongings neat and clean | | | | | | |
| Always/often | 92.0 | 1068 | 83.2 | 2792 | 74.9 | 2413 |
| Sometimes/never | 8.0 | 93 | 16.8 | 562 | 25.1 | 809 |
| Feel fearful or anxious | | | | | | |
| Always/often | 9.5 | 110 | 11.2 | 376 | 13.6 | 437 |
| Sometimes/never | 90.5 | 1051 | 88.8 | 2978 | 86.4 | 2785 |
| Feel lonely and isolated | | | | | | |
| Always/often | 9.3 | 108 | 13.2 | 444 | 18.5 | 595 |
| Sometimes/never | 90.7 | 1053 | 86.8 | 2910 | 81.5 | 2627 |
| Make own decision | | | | | | |
| Always/often | 71.5 | 830 | 59.4 | 1993 | 49.3 | 1590 |
| Sometimes/never | 28.5 | 331 | 40.6 | 1361 | 50.7 | 1632 |
| Feel useless with age | | | | | | |
| Always/often | 24.1 | 280 | 35.0 | 1173 | 44.2 | 1424 |
| Sometimes/never | 75.9 | 881 | 65.0 | 2181 | 55.8 | 1798 |
| Be happy as younger | | | | | | |
| Always/often | 65.3 | 758 | 48.3 | 1620 | 39.4 | 1270 |
| Sometimes/never | 34.7 | 403 | 51.7 | 1734 | 60.6 | 1952 |

Table 5 Survival rate of the oldest old by level of function

| | High | | Intermediate | | Low | |
|----------------------------|------|------|--------------|------|------|------|
| | % | n | % | n | % | n |
| Lost to follow-up | 11.4 | 133 | 9.1 | 306 | 9.4 | 303 |
| Still alive at 2000 survey | 72.4 | 840 | 57.4 | 1925 | 46.5 | 1498 |
| Died before 2000 survey | 16.2 | 188 | 33.5 | 1123 | 44.1 | 1421 |
| Total | 100 | 1161 | 100 | 3354 | 100 | 3222 |

($\chi^2 = 308.21, p < .001$)

1. Successful ageing is associated with lower age, male sex, more years of education.
2. In this oldest old study, rural living and widowhood are also associated.

3. The relationship among physical, psychological and social functioning with ageing is evident.

4. The Chinese oldest old could be distinguished from each other on additional measures of physical functioning, health and psychological status.

5. The mortality data showed that death in the intervening years was more likely in those originally classified as ageing less successfully.

V. Discussion

- Different risk factors:
Ageing or geographical difference?
- Some controversial findings need further exploration.

Beijing Study

| | Higher vs intermediate | | Higher vs low | |
|----------------------|------------------------|--------------------|---------------|------------|
| | AOR ^a | 95%CI ^b | AOR | 95%CI |
| Hypertension | 1.74 ** | 1.21-2.49 | 1.87 ** | 1.22-2.86 |
| Coronary heart | 1.68 * | 1.12-2.54 | 2.44 *** | 1.52-3.93 |
| Chronic bronchitis | 1.29 | 0.83-2.01 | 1.23 | 0.72-2.11 |
| Cataract | 1.06 | 0.69-1.65 | 1.23 | 0.74-2.05 |
| Arthritis | 1.65 | 0.86-3.15 | 3.13 *** | 1.55-6.30 |
| Cervical spondylosis | 1.74 | 0.97-3.14 | 2.51 * | 1.19-5.27 |
| Tuberculosis | 1.05 | 0.63-1.73 | 0.72 | 0.37-1.39 |
| Stroke | 2.15 | 0.80-5.77 | 7.94 *** | 2.85-22.09 |
| Diabetes | 0.88 | 0.43-1.81 | 1.83 | 0.85-3.94 |
| Peptic ulcer | 1.24 | 0.66-2.33 | 2.17 * | 1.02-4.60 |
| Neurosis | 0.73 | 0.36-1.47 | 1.94 | 0.91-4.12 |
| Emphysema | 1.16 | 0.40-3.33 | 3.89 ** | 1.31-11.60 |
| Asthma | 1.90 | 0.70-5.18 | 4.16 ** | 1.40-12.34 |

Thank you