"Field Medicine" in Japan and Asian Communities

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Revolution in Life Expectancy and "Optimal Ageing"

The Japanese word *Koki* (古希 old and rare), celebrating 70 years of age, derives from a poem by the Chinese poet *Du Fu* (杜甫) who wrote the following: "A life of 70 years, rare since old times." In 8th century China, at the peak of the Tang Dynasty when Du Fu was alive, it was rare that a person lived to this age. Similarly, in the Japanese collection of ancient poetry *Kokinwakashu* (古今和歌集), there is a phrase that translates as "read a poem to celebrate the 40th birthday." This hints that during the Heian period of Japan (794–1185 AD), living to the age of 40 was considered to be an important milestone.

Going back 100 years, even in the 1910s, when geriatric medicine first began as a discipline, average life expectancy in Japan was just over 40 years. However, since 1947, when life expectancy passed the threshold of 50, it has increased rapidly and now stands at 79.9 years for men and 86.4 years for women.

By the mid-20th century, modern medicine had conquered a high infant mortality rate and infectious diseases such as tuberculosis and until the 1970s, medicine single-handedly pursued the goal of extending the human lifespan. Of course there have always been elderly persons who were bedridden or had dementia. But in general, few questioned the benefits of extending life, perhaps because there were fewer elderly people to remind them that old age is often accompanied by infirmity. It has only been during the last half century when aging came to be thought of as a societal issue rather than simply a personal one, and a challenge to be tackled by science and medicine.

In Japan, the segment of the population known as the fourth age (i.e., 75 years or older) will double between 2005 to 2025, increasing by 10 million. This group of people will then outnumber those in the third age, 65 to 74 years of age. The rapid ageing of the population, especially the increase in population aged 75 years and older has highlighted the quality rather than the quantity of human longevity. Accordingly, the primary focus of geriatric medicine has begun to shift from prolonging life at all costs to reducing disabilities associated with old age and increasing the quality of life (QOL).

Today, many people live to the age of 80 in Japan. However, even with the best quality medical care, the number of people who live to 100 years is still less than 1% of those who live to 80 years. Even with dramatic advances in medical technology, at least in my own opinion as a geriatrician, it is supposed to be almost impossible to survive beyond 130 years. As such due to a limit to life expectancy in human-beings, there is a strong need to consider "optimal aging."

The Post-Sphinx Era

"Which creature is that which in the morning goes on four feet, at noon on two, and in the evening upon three?" This is the riddle of the Sphinx, which appears in Greek mythology. Oedipus solved the riddle by answering "Man, who in childhood crawls on hands and knees, in manhood walks erect, and in old age with the aid of a cane. Therefore the correct answer to this riddle is a man."

Without needing to return to Greek mythology, until a half century ago, people in the world as a whole, did not seriously consider the issue of aging. Before the 19th century, human life expectancy was lower than 40 years in civilizations all over the world. People assumed that most people would die by the time they reached 50 or 60 years old. Furthermore, it was accepted that we would become progressively weaker, eventually require a cane, and ultimately die like a candlelight flickering out. Accordingly, societies were structured on the premise that the population of elderly persons older than age 60 would remain fairly small. For example, in Japan, the mandatory retirement are around these ages of 55 or 60, falling on the celebration of *Kanreki* (還暦 60th birthday). Japanese employee pension systems, and other aspects of society are premised on an expected lifespan of approximately 60 years.

However, with a current expected lifespan of 80 to 90 years, life does not end in the "evening of old age" as described in the riddle of the Sphinx. After the evening comes night, which is often characterized by infirmity, disability, and dementia. Seeking ways to respond to the needs of elderly persons requiring nursing care, preventing infirmity and need for care, and answering the question "what is optimal aging?" —these are the challenges and the most important agenda in geriatric medicine. The increase in the elderly population, a group that is not productive but is to be respected, will undoubtedly force us to change our sense of values in a young society; one that has been fundamentally materialistic, regards hard work as a virtue, and places the highest priority on production and efficiency. Further, there is a sense that young adults have had to hand over their roles as central characters in the narrative of life, to elderly people.

Ecological Viewpoints in Medical Research

As the name "clinical" implies (臨床 *rinsho* or bedside in Japanese), the original mission of clinical medicine was to diagnose illness and treat the patient at his or her bedside. However, as modern medicine developed, diseases were compartmentalized according to organs and organ systems. Medical disciplines have become specialized not only according to organs, but also extending down to the level of cells and genes, which

has been accompanied by dramatic medical advances. This advanced medical care has revolutionized the treatment of acute diseases and vastly increased our survival. As the result, average life expectancy in Japan has increased at a rate never seen before in human history, and now has the longest lifespan in the world. However, the resultant super-graying of society has produced a population of frail elderly people who require nursing care. Geriatric medicine is charged with finding ways to assist elderly persons who have chronic diseases affecting multiple organs and are still living within their communities. The need to provide comprehensive and holistic medical care has been called for; however, it is not easy to provide integrated health care within a hospital system that has been compartmentalized into specialties. Doctors working in hospitals tend to think in terms of diseases and conditions in his/her specialty and have little latitude to consider other issues. How is the patient spending his/her time? What kind of social interaction and support does the patient have from friends and family? What does the patient eat? What are the important issues this patient faces in daily life? What is their prajna (wisdom) regarding their purpose of life? These are not questions asked by medical staff in hospitals. In field medicine, in which clinicians with health care workers leave hospitals for the communities where their patients live, the fundamental approach is an attempt to unify medicine as opposed to compartmentalizing it.

"Field Medicine" Trials in Kahoku and Tosa, Kochi Prefecture

We were the first in Japan to incorporate the Comprehensive Geriatric Assessment in preventive intervention and evaluation of the medical problems of elderly people in field settings that could not be completely resolved in the hospital. We initiated field medical research in 1990 in Kahoku town, Kochi prefecture, called the "Kahoku Longitudinal Ageing Study (KLAS)." At that time, Kahoku town had a population of about 6000, of which 29% were 65 years or older, which was much higher than the national average (12%) or the average of Kochi prefecture (16%). In 1990, this town was thought to represent the population composition of Japan in year 2025. The second community-based geriatric study in Kochi prefecture was introduced in Tosa town in 2004 ("Tosa Longitudinal Ageing Study (TLAS)." In 2010, Tosa town had a population of about 4500, of which 40% and 25% were 65 years and 75 years or older, respectively. In 2010, Tosa town was thought to represent the population of Japan in year 2050, and is representative of towns where depopulation and aging societies are rapidly progressing.

Through an objective evaluation of mental and physical aspects of health and social functioning and annual follow-ups, the projects in both these towns aimed to identify the key factors affecting the comprehensive health of elderly persons to prevent a decrease in functions that accompanies aging. This level of extensive community research in geriatric medicine and was the first such attempt both domestically and internationally. This project required the participation and cooperation of geriatric researchers, local government, and residents of the towns.

Our main findings in Kahoku (KLAS) are placed as achievements before the introduction of the Long-term Care Insurance system (LTCI) in 2000, and those in Tosa (TLAS) are placed as achievements after LTCI. Field medicine in Kahoku (KLAS) continued for 17 years until the town ended the project because of a municipal merger, while the project in Tosa (TLAS) still continues. Some Field Medicine achievements in Kochi were listed in Table 1.

International Development of "Field Medicine" and Mutual Feedback with Japan

From these two long-term studies, we obtained important information about ageing through contacts with elderly persons in Kochi prefecture. However, the generalizability of the findings obtained in Kochi remained unclear. Therefore, we chose to continue further evaluation beyond elderly persons living in areas of Japan other than Kochi prefecture, and traveled to oversea-communities whose natural, cultural, and societal environments were very different from those in Japan. This led us to conduct studies using the CGA in the seven Asian communities in Singapore,[1] South Korea,[2] Vietnam,[3] Laos[4] (Photo 1), Indonesia,[5] Myanmar,[6] Thailand,[7] Himalayan highlands,[8-11] (Photo 2) and Bhutan,[12] and allowed us to compare these findings to those obtained in Japan. Through these field medicine-based

Photo 1: Field medical examination for centenarian in Songkong, Laos

Photo 2: Blood pressure measurements for Tibetan highlanders

Table 1. Major Findings in "Field Medicine" in Kochi during 20 years from 1990 to 2010

Findings	Authors	Article Sources
Incidental brain lesions on MRI and neurobehavioral functions of elderly	Matsubayashi, K. et al.	Stroke 1992, 23: 175-180
Actual situation of ADL dependency in community-dwelling elderly in Kahoku	Shimada, K. et al.	Lancet 1993, 342: 1241-1241
Secular improvement of independence rate in basic ADL in community elderly	Matsubayashi, K. et al.	Lancet 1996, 347: 60-60
Does surge in blood pressure precede or follow stroke?	Osaki, Y. et al.	Lancet 1996, 347: 472-473
Effects of exercise on neurobehavioral functions in the elderly aged 75 and older	Okumiya, K. et al.	JAGS 1996, 44: 569-572
Serum cholesterol levels and cogniton assessed by p300 in the elderly	Wada, T. et al.	JAGS 1997, 45: 122-123
Cognitive and functional status of the Japanese oldest old	Matsubayashi, K. et al.	JAGS 1997, 45: 385-386
Home blood pressure controls in Japanese hypertensive population	Matsubayashi, K. et al.	Lancet 1997, 350: 472-473
Older adults' views for Diseases	Matsubayashi, K. et al.	Lancet 1997, 350: 144-144
J-curve relation between blood pressure and decline in cognitive function	Okumiya, K. et al.	JAGS 1997, 45: 1032-1033
Postural hypotension and postural hypertension in the elderly	Matsubayashi, K. et al.	Stroke 1997, 28: 2169-73
Quality of life of old people living in the community	Matsubayashi, K. et al.	Lancet 1997, 350: 1521-1522
Lower serum chlesterol levels and decline of cognitive functions in the elderly	Wada, T. et al.	JAGS 1997, 45: 1411-1412
ADL independence and medical cost	Matsubayashi, K. et al.	JAGS 1998, 46: 1484-1485
Timed Up & Go test predicts falling of the elderly	Okumiya, K. et al.	JAGS 1998, 46: 928-929
Risk factors of ADL dependecy	Matsubayashi, K. et al.	Lancet 1999, 353: 1445-1445
Timed Up & Go test and manual dexterity predict ADL dependency	Okumiya, K. et al.	JAGS 1999, 47: 497-498
U-curve association between systolic blood pressure and mortality	Okumiya, K. et al.	JAGS 1999, 47: 1415-1421
Hypertension in Japanese old-old	Ho, H. K.	Lancet 2002, 359: 804-804
Depression screening of the Japanese community-dwelling elderly	Wada, T. et al.	JAGS 2003, 51: 1328-1329
Depression and ADL in the elderly	Ishine, M. et al.	GGI 2003, 3: 262-264
Depression is associated with ADL and QOL in the elderly	Wada, T. et al.	AGG 2003, 39: 13-23
Usefulness of cognitive rehabilitation for elderly with MCI	Okumiya, K. et al.	GGI 2005, 5: 267-775
Older adult's view of "successful ageing"	Matsubayashi, K. et al.	JAGS 2006, 54: 184-186
Close association between hearing disturbance and ADL, QOL in the elderly	Ishine, M. et al.	JAGS 2007, 55: 316-317
Trends in diabetes in a rural town in Japan	Fujisswa, M. et al.	Lancet 2007, 369: 1257-1257
Effects of long-term exercise on prevention of falls in community-dwelling elderly	Fujisswa, M. et al.	GGI 2007, 7: 357-362
Prevalence of hypertension and its awareness, treatment and satisfactory control	Ishine, M. et al.	JAGS 2008, 56: 374-375
Lifestyle change improves glucose intolerance in communty-dwelling elderly	Okumiya, K. et al.	JAGS 2008, 56: 767-769
Falling in the elderly and age, ADL, depression in the community	Wada, T. et al.	JAGS 2008, 56: 1570-1571
Subjective sleep disturbance and ADL, QOL and depression	Ishine, M. et al.	JAGS 2008, 56: 1571-1572
Chewing difficulty and ADL, QOL and depression	Kimura, Y. et al.	GGI 2009, 9: 102-104
Difference between participants and non-participants in geriatric examination	Ishimoto, Y. et al.	JAGS 2009, 57: 360-362
Food diversity and ADL, QOL and depression in the community-dwelling elderly	Kimura, Y. et al.	JAGS 2009, 57: 922-924
Age and sex siginificantly influence fall risk in community-dwelling elderly	Ishimoto, Y. et al.	JAGS 2009, 57: 930-932
Effect of glucose tolerance on central and brachial pressure in the elderly	Yamamoto, N. et al.	JAGS 2009, 57: 1120-1122
Hobbies and health in the community-dwelling elderly	Hirosaki, M. et al.	JAGS 2009, 57: 1132-1133
Changing attitudes of elderly Japanese towards diseases	Matsubayashi, K. et al.	JAGS 2009, 57: 1732-1733
21-item Fall Risk Index predicts falls in community-dwelling Japanese elderly	Wada, T. et al.	JAGS 2009, 57: 2369-2371
Self-rated health and comprehensive geriatric functions in the community elderly	Hirosaki, M. et al.	JAGS 2010, 58: 207-209
Insomnia increases insulin resistance and insulin secretion in the elderly	Yamamoto, N. et al.	JAGS 2010, 58: 791-793
Community-based CGA and CGI lowered medical expenses for the elderly	Matsubayashi, K. et al.	JAGS 2010, 58: 791-793
Community-based CGA and Long-Term Care Insurance in Japan	Fukutomi, E. et al.	Lancet 2013,381, 116-116

JAGS: Journal of the American Geriatrics Society
GGI: Geriatrics and Gerontology International
AGG: Archives of Gerontology and Geriatrics

Photo 3: Professors Matsubayashi Kozo (CSEAS) and Matsuzawa Tetsuro (Primate Research Institute, Kyoto University) with Jigme Singye Wngchuk, former King of Bhutan (4th Dragon King), 19 October, 2010

comparative area studies, we have recognized that the developed world became rich before it became old. However, developing countries are becoming old before they become rich.

"Optimal Ageing" and Spirituality

Medical care for the elderly has aspects qualitatively different from medical care in general. While general medical care is standard and universal in nature, medical care for the elderly is personal and richly diverse. Whereas general medical care treats life as the supreme end, medical care for the elderly values ADL and QOL as well as life. While general medical care requires a high degree of specialization, medical care for the elderly demands interdisciplinary teamwork. Whereas the main site of general medical care is the hospital, important sites for medical care for the elderly are the home and community. In that sense, general medicine is clinical, while in nursing care one might say that the aspect of fieldwork must be emphasized. Our impression from conducting not only longitudinal research in Japan, but also investigations of the conditions of elderly people in various Asian countries, was that it is not simply the qualitative level of modern medical care, but also the natural environment and cultural background that influences Activities of Daily Living (ADL) and Quality of Life (QOL) of community-dwelling elderly. We feel that it will be possible to enjoy a broad vision of the 21st century's global elderly society once we fully comprehend the elderly in terms of both the universality and diversity apparent in the phenomenon of human aging.

The factors that define optimal ageing include good health and economic and societal participation. Self-awareness and a spiritual life are also likely to be important. From the practice of field medicine in various Asian communities, we have learned much about how important it is for the elderly to be aware of the meaning of life and to have a purpose in their later years. Elderly persons living a satisfying, purposeful life followed by a peaceful death—this is the ideal. However, it poses a challenge as to whether we are able to create a society in which this can be achieved.

Acknowledgements

I cordially thank all the elderly people for the participation in our community-based geriatric examinations in Japan and Asian communities. These field medical works and findings were partly supported by various JSPS Grant-in-Aid for Scientific Research between 1991 to 2013.

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