PERSPECTIVES AND FACTORS INFLUENCING HEALTHY AGING AMONG OLDER ADULTS AND CAREGIVERS IN LISHUI, CHINA: A MIXED-METHOD STUDY

CHEN JIANHUA

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by

CHEN JIANHUA

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LIST OF SYMBOLS, ABBREVIATIONS AND ACRONYMNS

ADL	Activity of daily living
AD8	Ascertain dementia 8 questionnaire
ANOVA	Analysis of variance
AHSMSRS	Adult health self-management skills (ability) rating scale
%	Percentage
∼	About
>	More than
≥	Great than or equal to
≤	Less than or equal to
B	Partial regression coefficient
BPNS	Basic psychological needs satisfaction
COVID-19	Coronavirus disease 2019
95% CI	95% Confidence interval for B (Lower bound- Upper Bound)
E	Environment
EDR	Elderly dependency ratio
EPR	Elderly population ratio
FAS	Family adaption scale
GRPpc	Gross regional product per capital
HA	Healthy aging
HAI	Healthy Aging Index/Instrument
HPAQ	Health promotion activity questionnaires
HSMA	Health self-management ability
ICOPE	Integrated Care for Older People

IADL	Instrumental activities of daily living
KAP	Knowledge-Attitude-Practice
LR	Linear regression
M	Mean
MM	Mixed method
N	Number
NCD	Noncommunicable disease
OR	Odds ratio
PA	Physical activity
PE fit	Person-environment fit
PHQ-9	Patient Health Questionnaire
PIS	Person-in-situation
QOL	Quality of life
SD	Standard deviation
SE	Standard error
β	Standard regression coefficient
SF	Social support
SFQCOA	Social Function Questionnaire for Chinese Older Adults
SPHA	Self-perceived healthy aging
SP	Self-perceived
SRH	Self-rated health
SPSS	Statistical Package for the Social Sciences
USM	Universiti Sains Malaysia
UPR	Urban population rate
URRBMI	Urban-Rural Resident Basic Medical Insurance

WHO	World Health Organization

LIST OF APPENDICES

PERSPEKTIF DAN FAKTOR YANG MEMPENGARUHI PENUAAN SIHAT DALAM KALANGAN WARGA EMAS DAN PENJAGA DI LISHUI, CHINA: KAJIAN KAEDAH CAMPURAN

ABSTRAK

Penuaan sihat (Healthy Aging, HA) semakin diiktiraf sebagai objektif kritikal dalam menangani cabaran populasi dunia yang semakin menua. Kajian ini meneliti status, penentu dan perspektif HA dalam kalangan warga emas di kawasan pergunungan Lishui, China, sekali gus mengisi jurang penyelidikan sedia ada. Reka bentuk kajian bercampur (mixed-methods) berbentuk eksploratori berurutan telah digunakan dalam dua fasa. Fasa I bertujuan menentukan kelaziman HA dan faktor-faktor yang berkaitan dengannya. Satu tinjauan keratan rentas telah dijalankan di Daerah Liandu menggunakan kaedah persampelan kelompok berstrata pelbagai pusat. Data dikumpul daripada 389 responden (kadar respons 99.7%) melalui soal selidik berstruktur yang merangkumi Indeks Penuaan Sihat (HAI), pemboleh ubah sosiodemografi, tingkah laku gaya hidup, persepsi penuaan sihat kendiri (SPHA), serta lapan instrumen yang disahkan untuk menilai kesihatan, persekitaran dan interaksi individu–persekitaran (IE). Data dianalisis menggunakan SPSS versi 27.0 dengan regresi linear untuk mengenal pasti faktor yang berkaitan dengan HA. Purata skor HAI ialah 136.5 (SD = 18.22), dengan 65.5% responden diklasifikasikan mempunyai tahap HA yang tinggi. Terdapat 13 faktor yang menunjukkan perkaitan signifikan dengan skor HA ($p < 0.05$). Faktor pelindung termasuk kebebasan ekonomi, insurans perubatan, aktiviti fizikal, penilaian kesihatan kendiri yang baik, kecekapan kepuasan keperluan psikologi asas (BPNS), penglibatan komuniti, sokongan sosial, kesedaran pengurusan kesihatan (HSM-consciousness), tingkah laku pengurusan kesihatan

(HSM-behaviour), dan SPHA. Faktor risiko pula termasuk pengambilan alkohol, kemurungan dan halangan yang dirasai dalam aktiviti promosi kesihatan. Fasa II melibatkan temubual mendalam dengan 36 warga emas dan 26 penjaga tidak formal. Analisis tema mengenal pasti empat tema utama: (1) persepsi terhadap HA, termasuk pengalaman hidup, kebergantungan dan akibat apabila keperluan tidak dipenuhi; (2) faktor yang mempengaruhi, dikategorikan sebagai pemudah cara, halangan dan unsur berkaitan takdir; (3) perubahan selepas pelaksanaan agenda kemakmuran bersama, seperti peningkatan kesihatan, taraf hidup dan keyakinan terhadap kerajaan, walaupun masih terdapat jurang; dan (4) cadangan bagi mengukuhkan HA melalui strategi berasaskan individu, persekitaran dan interaksi individu–persekitaran. Dapatan kajian menekankan sifat HA yang pelbagai dimensi dan dinamik, dibentuk oleh pengaruh sosiodemografi, individu, persekitaran, budaya dan sejarah. Lebih penting lagi, perspektif daripada warga emas dan penjaga menegaskan keperluan strategi yang relevan dari segi budaya dan sensitif kepada komuniti. Kesimpulannya, kajian ini memberikan perspektif menyeluruh mengenai HA dalam komuniti pergunungan, sekali gus menekankan keperluan intervensi pelbagai peringkat yang disasarkan untuk menangani cabaran setempat sambil menyokong kesejahteraan fizikal, psikologi, sosial dan persekitaran warga emas.

Kata kunci: Warga tua; penjaga; penuaan sihat; perspektif; faktor-faktor yang mempengaruhi

PERSPECTIVES AND FACTORS INFLUENCING HEALTHY AGING AMONG OLDER ADULTS AND CAREGIVERS IN LISHUI, CHINA: A MIXED-METHOD STUDY

ABSTRACT

Healthy aging (HA) is increasingly recognized as a critical objective in addressing the challenges of global aging populations. This study examines the status, determinants and perspectives of HA among older adults in mountainous regions of Lishui China, thereby addressing an existing research gap. A mixed-methods exploratory sequential design was employed across two phases. Phase I aimed to determine the prevalence of HA and its associated factors. A cross-sectional survey was conducted in Liandu District using a multicentre stratified cluster sampling method. Data were collected from 389 participants (99.7% response rate) through structured questionnaires incorporating the healthy aging index (HAI), sociodemographic variables, lifestyle behaviours, self-perceived healthy aging (SPHA), and eight validated instruments measuring health, environmental and individual-environment (IE) interactions. Data was analyzed using SPSS version 27.0 with linear regression to identify factors associated with HA. The mean HAI score was 136.5 (SD = 18.22), with 65.5% of respondents classified as having a high level of HA. Thirteen factors were significantly associated with HA scores ($p < 0.05$). Protective factors included economic independence, medical insurance, physical activity, good self-rated health, basic psychological need satisfaction (BPNS) competence, community participation, social support, HSM-consciousness, HSM-behaviour, and SPHA. Risk factors were alcohol consumption, depression, and perceived barriers to

health promotion activities. Phase II involved in-depth interviews with 36 older adults and 26 informal caregivers. Thematic analysis revealed four themes: (1) perceptions of HA, including lived experiences, dependencies, and consequences of unmet needs; (2) influencing factors, categorized as facilitators, barriers, and fate-related elements; (3) changes following the common prosperity agenda, such as improved health, living conditions, and trust in government, though some gaps persisted; and (4) recommendations for strengthening HA through individual, environmental, and IE interaction-based strategies. Findings highlight the multidimensional and dynamic nature of HA, shaped by sociodemographic, individual, environmental, cultural, and historical influences. Importantly, perspectives from both older adults and caregivers underscore the need for culturally relevant, community-sensitive strategies. In conclusion, this research provides an integrative perspective on HA in the mountainous communities, highlighting the necessity for targeted, multi-level interventions that address local challenges while supporting the physical, psychological, social, and environmental well-being of older adults.

Keywords: Caregivers; healthy aging; older adults; perspectives; influencing factors

CHAPTER 1

INTRODUCTION

1.1 Introduction

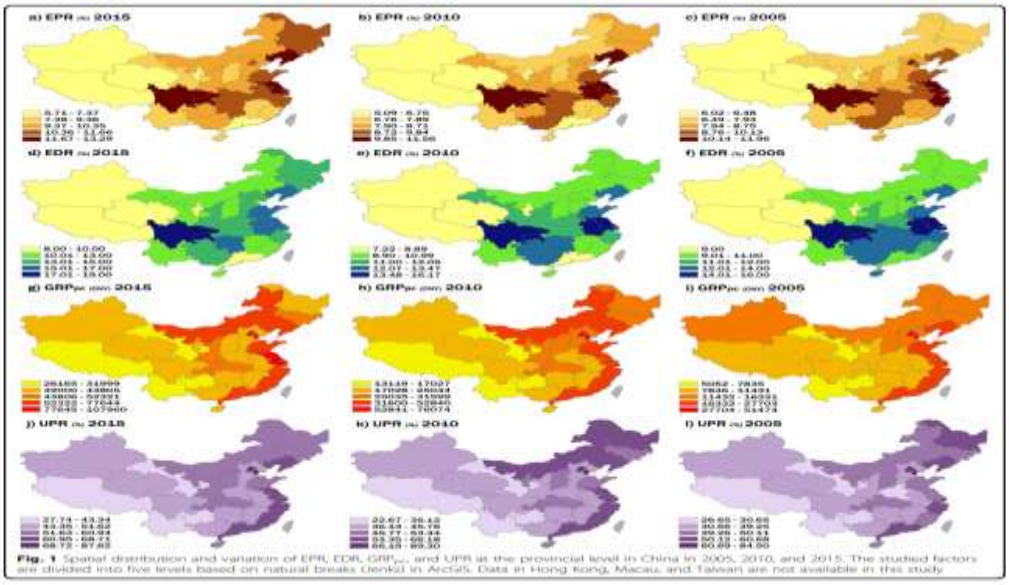
It is essential to have a good understanding of the concept of the aging population, age-related diseases, and older adults as part of the crucial problems of healthy aging (HA) issues and the increasing rate of the aging population, non-communicable diseases (NCDs). These components are described in this introductory chapter.

1.2 Background of the study

1.2.1 Aging population in the world, China, Zhejiang province and Lishui

A country may be considered an aging nation when its citizens aged above 60 or 65 years account for more than 10 or 7% of its total population, respectively. According to the World Health Organization (WHO), in 2019, the number of people aged 60 years and above at one billion worldwide and it is expected to increase 1.4 billion by 2030 and 2.1 billion by 2050, making an unprecedented growth (WHO, 2019). This scenario used to affect high-income countries like Japan, where 30 % of its population is already above 60 years. However, aging populations are also increasingly impacting low- and middle-income countries, and by 2050, two-thirds of the world population aged above 60 years is expected to be found in these countries (WHO, 2022). The aging population of China, as an upper-middle-income country, has already surpassed that of many high-income countries (WHO, 2015), and by 2050, 35 % of its population is expected to be aged above 60 years, making this country the 'oldest society' in the world (Bao *et al.*, 2017).

The proportion of older adults within the total population has increased markedly in China. The spatial variations in aging and socioeconomic factors across Chinese provinces at five-year intervals from 2005 to 2015 are illustrated in Figure 1.1. The distribution patterns of older adults and their proportion have risen significantly during this period. The spatial disparities reveal similar aging trends in eastern provinces such as Liaoning, Beijing, Zhejiang and Jiangsu as well as Sichuan province, all of which exhibit the highest value. By contrast, most western provinces demonstrate comparatively low values. Moreover, the centres of gravity for the elderly population ratio (EPR) and elderly dependency ratio (EDR) shifted northeastward, whilst the centres of gravity for the economic and urbanization factors moved southwestward, indicating opposing spatial trends relative to population aging. The annual movement rates of EPR and EDR (15.12 km/year and 18.75 km/year, respectively) even exceeded those of gross regional product per capital (GRPpc) and urbanization rate (UPR) (13.79 km/year and 6.89 km/year, respectively) over the study period, thereby suggesting an emerging polarization in population aging and socioeconomic factors as characterized by contrasting dynamics between southwestern and northeastern in China (Man *et al.*, 2021).



Notes: EPR = The elderly population rate, which refers to the percent of the aged population of the total population; EDR = The elderly dependency ratio, commonly defined as the ratio between the elderly population and the working-age population; GRPpc = Gross Regional Product per capita; UPR = urban population rate.

Figure 1.1 The variation of population aging and socio-economic factors at the provincial level in China with a five-year interval in 2005, 2010, and 2015 was depicted (Man *et al.*, 2021)

The 2020 China National Census found that the percentage of adults aged 60 and 65 years has reached 18.7 % and 13.5 %, respectively (National Bureau of Statistics, 2021), whilst the proportion of adults aged 60 years or above in the total population has risen from 8.87 % to 14.42 % from 2010 to 2020. These trends highlight that the country's aging population has risen at a much faster pace. According to the 2020 census, the proportions of adults aged 60 and 65 years in Zhejiang Province are equal to the national averages of 18.7 % and 13.3 %, respectively, and this province is ranked 19th in the census data (Zhejiang Province Bureau of Statistics, 2021). Zhejiang Province is located in eastern China (Figure 1.2), and Lishui—a prefecture-level city—lies in the southwest of the province (Figure 1.3). The province enjoys a good reputation as a 'health preserving land and hometown of longevity', and its aging population is largely a consequence of longer life expectancy. According to the Census and Statistics Department, the proportion of elderly citizens aged 60 years or above in

Lishui has reached 21.24 % of its total population in 2020, whilst the proportion of older adults aged 65 years and above has reached 15.37 % (Lishui Municipal Statistics Bureau, 2021). Although Lishui has achieved great economic progress in recent years as reflected in its gross domestic product (GDP), its contribution to the national GDP remains the middle amongst all cities in China, whilst its economic development is the lowest in Zhejiang (Zhejiang Province Bureau of Statistics, 2021).

The Chinese government considers Zhejiang as a priority province to support its development into 'a shining example of common prosperity' (Xinhua News Agency, 2021). In 2021, the Zhejiang government issued some policies to assist 26 counties in its mountainous regions, including Lishui, in achieving prosperity (Department of Natural Resources of Zhejiang Province, 2021). Therefore, to a certain extent, research on Lishui can comprehensively reflect the current situation of the aging population in Zhejiang Province and China as a whole.

Figure 1.2 Zhejiang Province is located in eastern China

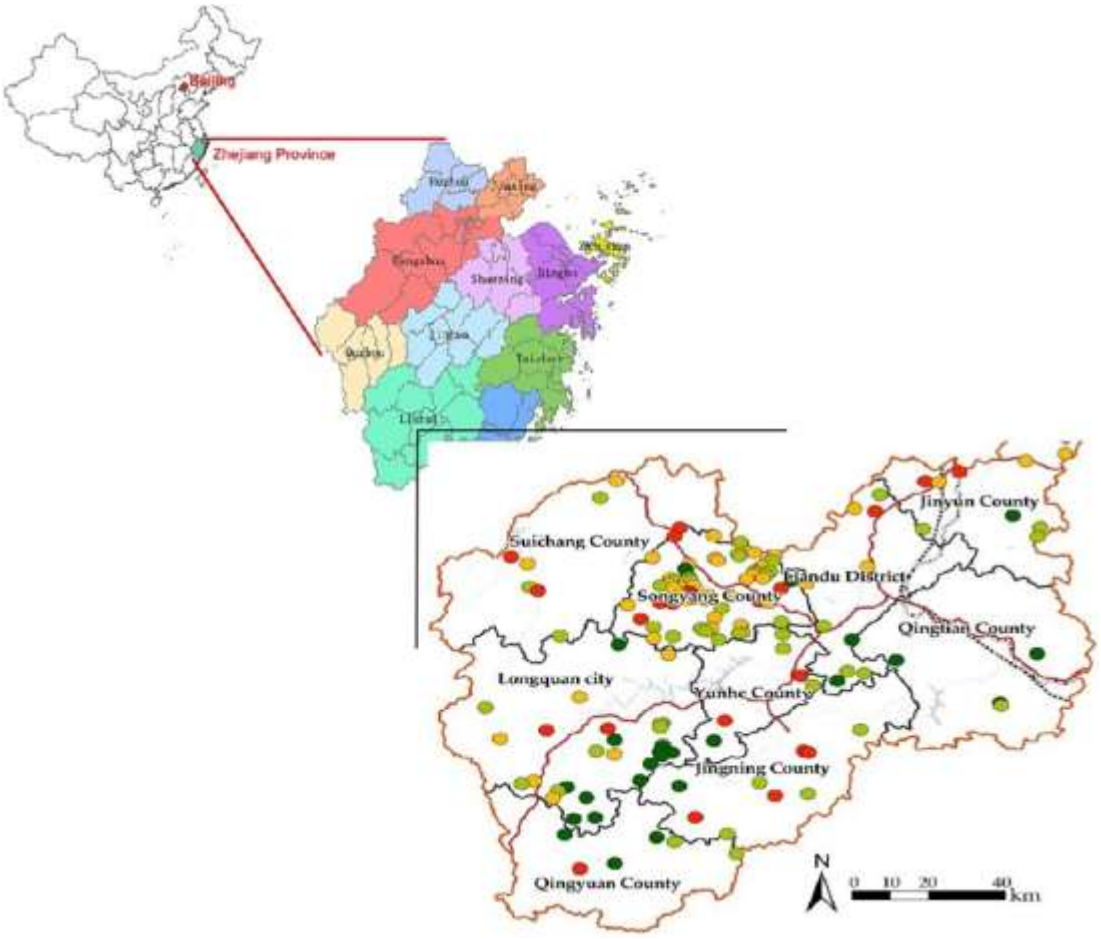


Figure 1.3 Lishui lies in the Southwest of Zhejiang Province

1.2.2 Aging-related diseases in China

The fundamental causes of China's aging population are the same as those reported in other countries, such as low fertility, longer life expectancy and effective control of infectious diseases. Statistics from the National Health and Family Planning Commission (NHFPC) show that nearly 50 % of people aged above 60 years in China suffer from chronic diseases like high blood pressure, diabetes, Alzheimer's, stroke and coronary heart disease (Figure 1.4) (Bao *et al.*, 2017). Diabetes, dementia and accidental falls are also included amongst the leading factors contributing to the high morbidity rates amongst older adults aged above 65 years, and the incidence of

dementia is particularly high amongst those aged 80 years and older (Bao *et al.*, 2017). Zhou *et al.* (2019) arrived at a similar conclusion, which they attributed to the significant changes in the causes of disability-adjusted life years in China, especially cancer and mental disorders (Figure 1.5). Therefore, healthcare services must pay attention to blood pressure, dietary habits, smoking and non-communicable diseases amongst the elderly (Zhou *et al.*, 2019).

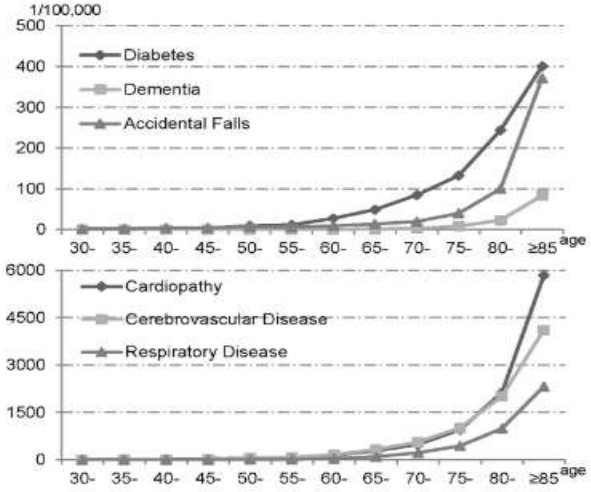


Figure 1.4 Mortality from geriatric diseases for Chinese citizens in 2015 (Bao *et al.*, 2017).

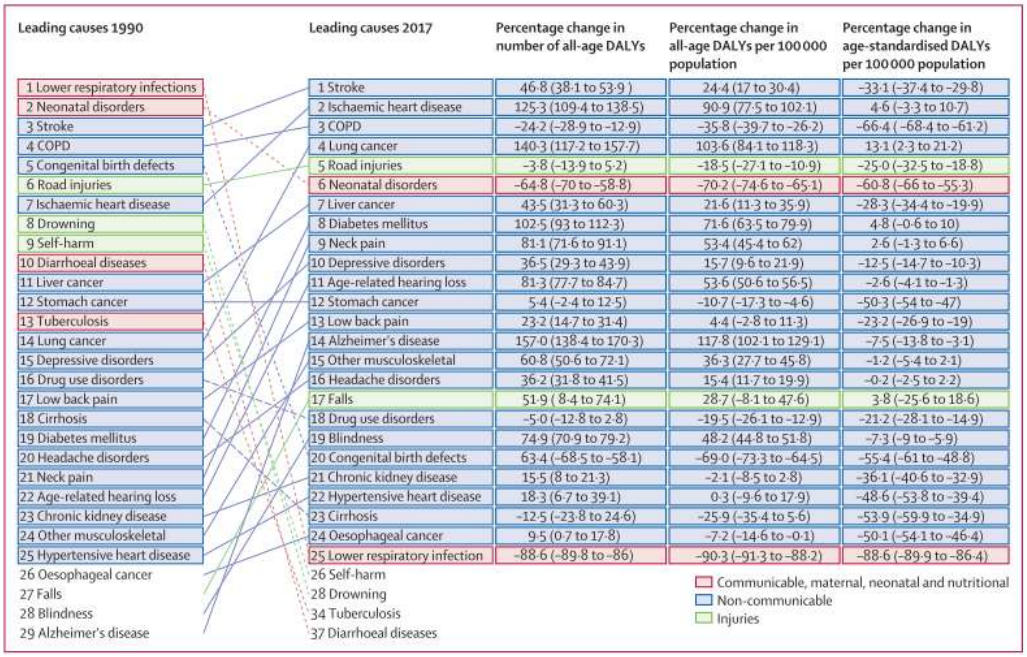


Figure 1.5 Top 25 causes of DALYs in China, 1990–2017 Causes are ranked by number of DALYs in 2017. DALY=disability-adjusted life-years (Zhou *et al.*, 2019)

1.2.3 Implementation/strategy of healthy aging in the aging population

To address the aging population problem, the WHO has implemented two strategies, the first is of which requires every country to commit to action on healthy aging (HA) (WHO, 2016) given that the level of HA can predict the risk of mortality (Kim *et al.*, 2021). The health status of older adults is unequally distributed, and most of their health problems are linked to chronic conditions, particularly non-communicable diseases (NCDs) that can be avoided entirely by making healthy lifestyle choices. Significant differences can be observed in the lifestyle choices of individuals within and between countries (WHO, 2016). To reduce health inequities and improve the lives of older adults, the WHO declared the years 2021–2030 the 'Decade of HA' and said 'Families and communities can take collective action in different areas to promote HA' (WHO, 2021).

Whilst all countries in the world face a shift in key demographics as people start to live longer lives, biological adaptability issues, such as cumulative molecular

and cellular damage, can gradually impair people's physical, mental and social adaptability and trigger non-linear or inconsistent changes that affect their ability to age gracefully. Environmental factors, including national policies, traditional culture, religious beliefs and economic development as well as major life events, such as retirement, relocation to more appropriate housing and deaths of friends and life partners, may also affect the ability of people to age well (WHO, 2021). Therefore, confronting and coping with an aging population are considered historically significant challenges that societies and governments should address.

The WHO and researchers from different countries have attempted to define HA and how to measure its influencing factors. For instance, the WHO has published a scoping review in peer-reviewed journals where they examined implemented interventions with outcome measures based on the previously mentioned factors, specifically for people aged above 60 years in countries where English, Spanish, German, Portuguese or French is predominantly spoken (Arias-Casais *et al.*, 2022). This review helped the organization identify long-term care interventions for older adults around the world. These interventions were diverse and over-arching and involved multiple aspects to prevent, treat and restore the loss of functional abilities and intrinsic capacities of people aged above 60 years.

However, interventions from low-resource settings have not been identified (Arias-Casais *et al.*, 2022). In response to these emerging challenges, the Chinese government, through its 13th Five-Year Plan for Healthy Ageing, formally released the first national policy focusing on HA in March 2017, making HA a key priority in the national political agenda for health (National Health Committee of China, 2017). However, despite the strong political will to promote HA in China, empirical research

on the aging landscape is lacking, especially in China's rural areas. Therefore, the gaps are in the country's quest for HA remain largely unidentified.

WHO has set down 10 priorities that provide concrete actions to reach the objectives of its Decade of Healthy Ageing (2020–2030) initiative (WHO, 2020c). These actions largely focus on specific goals and adopt a pragmatic approach to continuously improve HA amongst older adults.

Researchers and governments have also highlighted the need to adapt person-centred integrated care that focuses on the needs of older adults, considers their preferences and ensures their access to age-friendly services actively within the communities (Rudnicka *et al.,* 2020). Researchers have stated that public health policies should address the diverse health levels and functional states experienced by older adults and maximise the number of people to achieve positive ageing trajectories. Integration initiatives need action at the macro-level (legislation and funding), meso-level (age-friendly environment) and micro-clinical level (older adults). Several countries have managed to sustainably deliver integrated care for older adults. However, evidence of the effectiveness of integrated care approaches remains inconsistent (Rudnicka *et al.*, 2020).

China is the first country to have a national policy focused on HA, namely, the 13th Five-Year Plan for Healthy Ageing introduced by the Chinese central government in March 2017. From 2016 to May 2020, the Chinese government has presented HA-related policy documents to the State Council and its affiliated ministries (Figure 1.6) (National Health Committee of China, 2017; Ye *et al.*, 2021a).

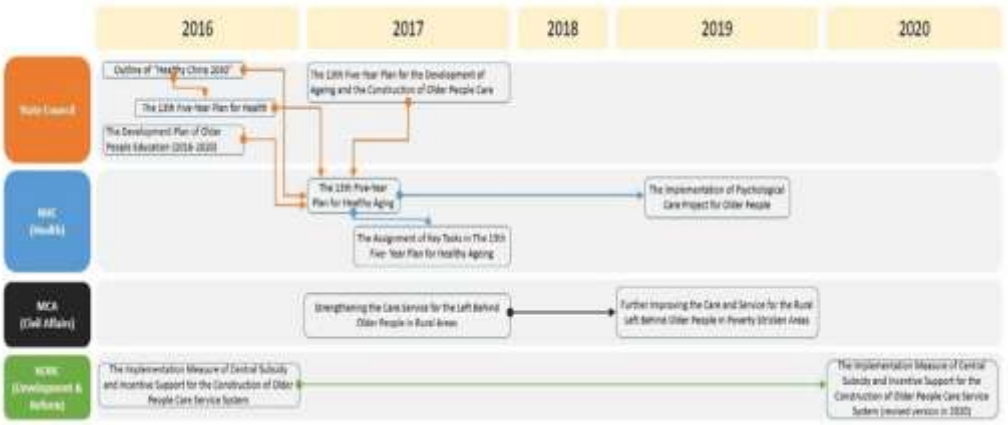


Figure 1.6 The interrelationship of selected healthy ageing-related policy documents among the State Council and its affiliated ministries in China from 2016 to May 2020 (Ye *et al.*, 2021).

1.2.4 The background of the common prosperity agenda in Lishui China and healthy aging

The fundamental principle since the establishment of New China, the concept of 'common prosperity' refers to the equitable distribution of wealth and resources within society (Dunford, 2022). The income inequities stemming from the earlier developmental model, particularly urban-rural, regional and social disparities, have been left unaddressed until significant efforts were initiated in 2021 under Xi Jinping's leadership (The Communist Party Member Network, 2022). Health shocks, particularly amongst older adults in rural areas, have been identified as barriers to achieving common prosperity (Zhang *et al.*, 2022). The 14th Five-Year Plan outlines that 'By 2035, China will have basically achieved socialist modernization', with a long-range objective that 'Our people will lead even better lives, with more substantive advances in people's well-rounded development and common prosperity' (UNDP in China, 2021). This initiative encompasses a broad scope of objectives that all three pillars of economic, social and environmental development.

Common prosperity is a pivotal concept within China's socialism with distinctive characteristics and serves as a foundational assurance for the happiness and comprehensive development of its people (The Communist Party Member Network, 2022). Characteristics of common prosperity include fostering harmonious relationships between humans and the environment and promoting sustainable economic and social growth through high-quality economic development. Common prosperity also serves as a key strategy for narrowing the income and health disparity and developing a sharing alongside medical and social insurance (Chen & Xu, 2023; Cheng & Zhang, 2022). In other words, common prosperity, which aims to reduce developmental disparities and promote well-rounded human development, is the essential goal of China's approach to modernization (The Communist Party Member Network, 2022) and serves as a vital foundation for enhancing the well-being and HA of older adults.

Zhejiang was designated as China's first common prosperity demonstration zone in 2021 (Xinhua News Agency, 2021). This designation requires the provincial government, along with local authorities at the city and county levels, to develop policies that support the achievement of common prosperity across various governance tiers. Situated in the southwestern region of Zhejiang, Lishui is one of 26 counties in the mountainous areas tasked with advancing common prosperity within the province (Department of Natural Resources of Zhejiang Province, 2021). Enhancing common prosperity through equitable resource distribution is essential for supporting HA. By assessing the extent of HA achievement and exploring older adults' and caregivers' perspectives towards HA and its influencing factors, a positive feedback loop can be established that benefits individuals and society as a whole, particularly in mountainous regions.

1.3 Problem statement

The definition of ‘HA’ warrants exploration considering the diverse contexts and perspectives of various groups. HA is a multidimensional concept encompassing physical health, psychological health, cognitive function and social aspects, all of which affect the quality of life (QOL) of older adults regardless of their chronic illness or disability. Definitions of HA vary across cultures, complicating the establishment of a universal definition. Even within a single country, a comprehensive assessment of HA is challenging due to cultural differences, policies, legislation, retirement funding and primary healthcare disparities.

At the macro level. including cultural, legislation and funding factors, older adults in major cities like Beijing, Shanghai and Chongqing benefit from better access to support networks and resources, such as healthcare, education and employment. Consequently, HA levels reflect broader social challenges faced by older adults. At the meso-level, environmental factors—such as age-friendly community health services, participation in social activities and harmonious neighbour relations—significantly enhance HA. These elements may vary based on interactions between older adults and their environments.

However, the specific roles and impacts of factors at the micro level—such as sociodemographic factors, individual perceptions and experiences with HA, self-rated health (SRH), basic psychological needs satisfied (BPNS), cognitive functions, family adaptation, community participation, social support, health self-management ability (HRSMA)—remain largely unexplored. Residents of capital cities and rural mountainous regions differ substantially in educational background, financial

security, healthcare access and socioeconomic status, with those in mountainous areas experiencing limited macro- and meso-level interactions.

Understanding how these multi-level factors interact to influence HA is critical, especially among older adults residing in mountainous regions of China, a population largely overlooked in research. Furthermore, insight into the perceptions of HA held by older adults and their caregivers is scarce. Recognizing individual perceptions is essential for developing effective health policies. Enhanced understanding may also improve caregivers' ability to support and improve the QOL of their dependents.

Prior studies indicate that a primary challenge in achieving HA lies in balancing value and attainability, and the main challenge is to find a 'sweet spot' (Freund *et al.*, 2021). Mixed method research (MMR) is valued in capturing this complexity, integrating qualitative insights with quantitative data to add a human dimension to patient care and facilitate policy implementation (Holloway & Wheeler, 2010). To address these issues, this study adopts an MMR approach featuring sequential design, prioritization and integration.

Lishui, among the first Chinese cities to implement common prosperity policies, remains economically moderate nationally but is the least affluent city in Zhejiang Province, with low average incomes and a mountainous terrain (latitude: 28°N). As an underdeveloped region within a developed province, Lishui provides a unique context to explore factors influencing HA among older adults and their caregivers in mountainous areas.

1.4 Significance of the study

HA has emerged as a worldwide problem not only because of its influence on the national economy and QOL of older adults but also because of the associated

healthcare and infrastructure issues. The MMR approach is rooted in pragmatism, views the world as a product of diverse experiences and mainly considers the practical consequences of actions and expedience. This approach can complement a study (Holloway & Wheeler, 2010) by offering references and new insights for policymakers and caregivers when dealing with an aging population.

HA affects all stages of a person's life, but earlier aging can influence one's health concepts later in life. Caregivers can influence their dependents' attitudes and behaviours by providing the necessary information and support for living healthy, happy and active life (Newland *et al.*, 2021). Understanding the associations amongst SRH, HRSMA, family function, community participation, social support, and HA can guide caregivers (either informal with family members or formal caregiving nurses) in making decisions that can optimise their dependents' health outcomes across a variety of healthcare settings. Therefore, HA warrants further evaluation to determine and develop appropriate interventions that can benefit the caregivers and their dependents.

For the elderly, HA is an important part of a family and an invaluable asset to society. HA not only enables older adults to live their later life to the fullest but may also unleash the intellectual and social connection capacities of society as a whole (Chen *et al.*, 2022). The needs of older adults should be taken into account by creating an age-friendly environment for the aging population to achieve HA (Chen *et al.*, 2022).

MMR not only allows researchers to determine those factors influencing HA but may also be combined with intersectionality theory, person-in-situation (PIS) paradigm and person-environment (PE) fit to guide policy design and lay the foundations for future research. This study focuses on the underdeveloped areas in a developed province in China. Therefore, the findings can provide helpful insights for

researchers around the world to learn about China and generate points of reference for further research.

From the perspectives of caregivers such as nursing professionals, preventive medicine is the basic role responsibility of nurses, and all nurses have an important part to play in helping people achieve HA. Previous studies show that healthcare workers (including nurses) regard each meeting with patients as an opportunity to share information about behavioural changes and how HA may help them determine those changes that they need to implement to achieve health later in life (Rudnicka *et al.*, 2020; Tomás *et al.*, 2016). However, these studies have not paid much attention to the informal caregivers of older adults in the community, especially those care recipients without so serious illnesses.

Understanding the perceptions of older adults and caregivers towards HA can help nurses and healthcare workers develop a harmonious relationship with their patients and improve the quality of care. The requirements of older adults and their caregivers can serve as a good foundation for healthcare workers to enhance their knowledge on HA and encourage nursing professionals to consider the evidence-based interventions that can be implemented from the family, community and social support perspectives. At the individual level, caregivers and older adults can develop their skills and create supportive environments for themselves and their families, encouraging community action and fostering healthy public policy.

For the elderly, the findings related to the perceptions and influencing factors of HA can provide a guideline to realize the role of existing or potential resources for themselves and their environment (such as family, community and social support), as well as helpful in making them more aware of what lies ahead, their beliefs regarding HA from the position of physical, psychological health, social adaptability and

cognitive health. These findings also lay the foundation and plan of care for achieving HA by promoting healthy behaviour, family support, engagement in community activities and the ability to seek social support when necessary.

For caregivers, the findings of this study can enhance their awareness of the importance of older adults in society, especially in improving the extant HA policies and initiatives. These findings may also inform caregivers about how they can make the best use of existing or potential resources and provide the necessary interventions specific to certain dimensions of HA among older adults.

For governments and policymakers, the findings of this study not only provide valuable references for the rational allocation of medical resources but also offer a solid basis for formulating policies or measures to improve HA. HA is a cost-effective approach to preventing diseases and improving the management and quality of medical and health services.

Above all, the findings of this study provide valuable evidence for related research on the level, prevalence, perceptions and influencing factors of HA from a person-centred perspective, thereby encouraging researchers to examine HA from multiple viewpoints.

1.5 Research questions

This study seeks to answer the following questions:

1. What is the prevalence of healthy aging level among community-dwelling older adults in Lishui, China?
2. What are the factors that influence the healthy aging score among community-dwelling older adults in Lishui, China?

3. What are the perspectives on healthy aging among older adult and their caregivers in Lishui, China?

1.6 Research objectives

1.6.1 General objective

To determine the prevalence, perspectives and factors influencing healthy aging among older adults and caregivers in Lishui, China.

1.6.2 Specific objectives

Phase I

1. To determine the prevalence of healthy aging level among community-dwelling older adults in Lishui, China.

2. To determine the factors (sociodemographic, individual-related, social-environmental related, and individual-environment interaction) influencing healthy aging score among community-dwelling older adults in Lishui, China.

Phase II

3. To explore the lived experiences, perceived facilitators of and barriers to healthy aging among older adults and their caregivers in Lishui, China.

1.7 Research hypothesis

Hypotheses were developed to address the main research questions and were tested according to the proposed framework (section 2.7)

H_1 = There is a significant relationship between socio-demographic factors, individual factors, social environmental factors, and individual-environmental

interaction factors with healthy aging among community-dwelling older adults in Lishui, China.

1.8 Operational definition

An operational definition elucidates a process — such as a variable, term, or object — by specifying the particular process or validation tests employed to ascertain its presence and quantify it, which clarifies what to measure or observe (what a word or term means for the study) it, especially defining the meaning of a term within the context of the study (Polit & Beck, 2017). The subsequent chapters explained the operational definition of the terms utilized in this study.

1.8.1 Healthy aging

Healthy aging (HA) is a multifaceted concept that extends the mere absence of disease. It emphasizes the importance of creating supportive environments and fostering intrinsic capacities that enable older adults to live fulfilling lives. The WHO defines HA as 'the process of developing and maintaining the functional ability that enables well-being in older age.' This definition encompasses four elements: functional abilities (health-related attributes that allow people to do what they have reason to value), intrinsic capacities (all the physical and mental capabilities that an individual can draw on), environments (all the factors in the extrinsic world that form the context of a person's life), and well-being (happiness, security, and fulfilment) (WHO, 2015a). In addition, a systematic review highlighted the necessity for a comprehensive operational definition of HA that captures its complexity, taking into account biological, social, psychological, and behavioural determinants (Menassa *et al.*, 2023). Ultimately, the operational definition of HA reflects the interplay of cultural,

biological, social, psychological, and behavioural factors, underscoring the process of developing and maintaining the functional abilities that contribute to well-being in older age. In this study, the Healthy Aging Index (HAI) together with self-perceived healthy aging (SPHA) were utilized to measure it.

1.8.2 Older adults

According to the constitution of China, the age of 60 years is widely recognized as the onset of old age among Chinese citizens, and the official retirement age in China is 50 or 55 years for females and 60 years for males. This cut-off age of 60 years is also prevalent in various studies (Liu *et al.*, 2022; Zhang *et al.*, 2020). Furthermore, individuals aged 60 to 74 years are categorized as young elderly, while those aged 7 years and above are classified as old elderly (Wu & Sheng, 2020). Consequently, in this study, individuals at the age of 60 years and above are considered older adults, those aged 60 to 74 years are referred to as young older adults, and those aged 75 years and older are designated as old older adults.

1.8.3 Caregiver

A caregiver, also known as a carer or support worker, is an individual aged 18 or older who provides care to adults unable to fully care for themselves due to factors such as age, illness, disability, psychological health issues, gender, race/ethnicity, or the specific type of disability affecting the care recipient (Grossman & Webb, 2016; Kong *et al.*, 2021; Reinhard *et al.*, 2015; Roth *et al.*, 2015). Caregivers assist with activities of daily living (ADLs), for instance, bathing or dressing, as well as instrumental activities of daily living (IADLs), the duration of care provided ranges from either currently or within the past month to the last 12 months, and involves at

least one adult relative (AARP Public Policy Institute, 2015; Hopps *et al.*, 2017; Reinhard *et al.*, 2015).

The operational definition of a caregiver encompasses several key responsibilities: supporting daily life activities (e.g., housekeeping, shopping, meal preparation); personal care (e.g., medication monitoring, bathing); physical assistance (e.g., mobility support, supervision, direct medical care); emotional and social support (e.g., visiting, transportation, emotions communication); service navigation (e.g., securing housing, obtaining medical supports); behavioural support (e.g., effective communicating, managing challenging behaviours); and financial assistance (e.g. providing funds, managing finances) (Desai & Metgud, 2017; Kong *et al.*, 2021; Roth *et al.*, 2015). Paid professionals and unpaid family members may fulfil this role; the latter are referred to as informal caregivers. This study focuses on informal caregivers, who take care of an older person, particularly family members who typically share a close personal relationship with the older adults they assist.

In identifying informal caregivers, one study set a minimum care threshold as providing at least four hours of assistance daily or support with at least one ADL (Grossman & Webb, 2016), though these individuals may not explicitly self-identify as ‘caregivers.’ Another study limits inclusion to those identified as the ‘primary’ caregiver (Brantner *et al.*, 2024) without specifying the types of assistance provided. Broader definitions often require only some impairment in the care recipient, such as difficulties with two IADLs (Mobolaji, 2024). Notably, inconsistencies exist between subjective and objective assessments of informal caregiving status. To accurately identify community-dwelling informal caregivers, it is advantageous to use both objective measures (e.g., ‘During the last 12 months, have you provided personal care for one month or more to a family member or friend due to a physical or medical

condition, illness, or disability?') and subjective measures (e.g., 'Are you currently or have you been in the last year a caregiver for a family member or friend?'). Accordingly, this study employs both types of measures to assess community-dwelling informal caregivers' status.

1.8.4 Perspectives

Perspective is defined as a particular way of seeing or understanding the world, shaped by individual viewpoints or mindset (Kulig & Krystyna, 2015). This concept can be applied across various domains, including art and design, religion, history, science, and research. Each individual or discipline possesses a unique perspective that influences their interpretation and interaction with their surroundings. Historically, the notion of perspective has evolved, serving as a convention for depicting three-dimensional objects on a two-dimensional plane (Kulig & Krystyna, 2015). In academic discourse, perspective is often associated with the expression of a specific worldview and can be linked to scientific instrumentalism. It plays a crucial role in human perception and understanding, stemming from the premise that every designer interprets their concepts of art and design in distinctive ways, which in turn shapes their interactions with the world. This study will examine the perspective on HA held by older adults and caregivers, highlighting how their unique interpretations of HA reflect their interactions with the world from various dimensions.

1.8.5 Sociodemographic variables

Sociodemographic characteristics are quantifiable factors that describe the social and demographic attributes of a population or group. The operational definition of sociodemographic characteristics includes several key variables: gender, age, level

of education, employment status and or past occupation for older adults, marital status, total number of persons living in the household and living arrangements (Koukouli *et al.*, 2002).

1.8.6 Individual related variable

Individual-related variables can be defined as the qualities and distinctive properties that express the essence of an individual (Bakhramzhanova, 2023), which refers to the personal characteristics, behaviours, and traits of an individual that can influence various outcomes in health. An operational definition of an individual-related variable refers to the specific procedures and criteria employed by researchers to measure or quantify that variable within the context of a study. This process involves translating abstract concepts into measurable terms, ensuring clarity and consistency in research. Individual health conditions encompass the pursuit of a healthful lifestyle aimed at decreasing disease risk. In accordance with the research questions and aims of this study, individual-related variables include individuals' lifestyle-related behaviours and their health conditions (see Section 3.4.5).

1.8.7 Social Environment

The environment constitutes one of the four meta paradigms in the nursing field. According to Nightingale's theory, the environment is a primary determinant of health outcomes, encompassing both natural and social environments (Nightingale, 1969). The WHO identifies various factors within social environments, including the built-in environment, interpersonal relationships, attitudes and values, health and social policies, support systems, and the services that they implement (WHO, 2015a). The operational definition of 'socio-environment' emphasizes the interconnectedness

of social and environmental systems, highlighting the interactions between individuals and their contexts. This definition underscores the importance of understanding the dynamic relationships between human societies and their environments, advocating for integrated approaches to address sustainability challenges. In the context of community-dwelling older adults and related studies, key aspects of the social environment focus on family support and networks, community cohesion and social function, all of which significantly impact healthy aging (Bosch-Farré *et al.*, 2020; Wu & Sheng, 2019b). Consequently, this study defines the social environment as encompassing family function, community participation, and social function (section 3.4.6).

1.8.8 Individual—Environmental Interaction Variables

An operational definition of individual-environmental interaction variables refers to the conditions under which individuals engage and adapt to their surrounding environments. These interactions are detected when changes in behaviour, functioning, or perceptions occur in response to environmental factors (Menassa *et al.*, 2023). To measure such dynamics, the study applies statistical analyses within the framework of three interrelated theories: intersectionality theory, the person-in-situation (PIS) paradigm and person-environment (PE) fit theory (Blakely & Dziadosz, 2008; De Cooman & Vleugels, 2022; Heard *et al.*, 2020).

Intersectionality theory highlights how overlapping social identities and contexts shape individual experiences and responses to the environmental influences (Heard *et al.*, 2020). The PIS paradigm emphasizes the importance of situating individuals within their environments, recognizing that their behaviours, beliefs and well-being are influenced by multiple environmental layers—micro (e.g., physical and

psychological needs), meso (e.g., family, neighbourhood) and macro (e.g., health care, policies). This perspective provides guidance for assessing how environmental conditions shape lived experiences and identifying opportunities for interventions that enhance outcomes (Blakely & Dziadosz, 2008) . Complementing this, PE fit theory provides a structural approach for evaluating the degree of congruence or misfit between individual characteristics and environmental contexts. A strong fit promotes positive outcomes, whereas misalignment may lead to stress or reduced functioning (De Cooman & Vleugels, 2022). Together, these frameworks allow for a comprehensive assessment of how individuals and environments mutually influence on another.

For the purposes of this research, two constructs operationalize individual-environment interactions. Health self-management ability (HSMA) reflects the older adults' capacity to manage their health in light of available environmental resources and demands (Zhao & Huang, 2011). Self-perceived healthy aging (SPHA) captures the subjective evaluations of one's aging process and health status in relation to one's living environment (Menassa *et al.*, 2023). Accordingly, HSMA and SPHA are employed as key indicators of individual-environment interaction, providing insight into their influence on HA outcomes.

1.9 Focus and organization of thesis

The thesis is divided into several chapters.

Chapter 1 Introduction: This introduces the problem statement being studied and the intent of the study.

Chapter 2 Literature review: This chapter describes the present situation of problem in terms of epidemiology and statistics, as well as a series of previously published study