



Mongolian National University of
Medical Science

University of Trento

Psychological Well Being and Determinants among Mongolian Older Adults

Co-tutelle degree, PhD Thesis
Index: ...

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Monday 30th December, 2024

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Abstract

This research explores the psychological well-being of older adults in Mongolia and identifies the key factors influencing their mental health. With the aging population in developing countries on the rise, the World Health Organization (WHO) emphasizes the need for healthy aging policies. In Mongolia, older adults (60+ years) represent 10.5% of the population, with significant health disparities, particularly between genders in life expectancy.

This study employed mixed methods, combining quantitative surveys and qualitative interviews to assess the psychological well-being of 304 participants aged 55 and older from both urban and rural areas. Statistical analyses revealed that social participation, family support, and volunteer activities positively influenced life satisfaction, while loneliness and poor health were detrimental factors.

The study highlights the transformative role of creative engagement programs tailored for older adults, particularly women, in improving psychological well-being. Key recommendations include enhancing social connections, volunteer opportunities, and accessible communication technologies to support the mental health of Mongolia's older adults.

Abstract (Italian)

Questa ricerca esplora il benessere psicologico degli anziani in Mongolia e identifica i principali fattori che influenzano la loro salute mentale. Con l'aumento della popolazione anziana nei paesi in via di sviluppo, l'Organizzazione Mondiale della Sanità (OMS) sottolinea la necessità di politiche per un invecchiamento sano. In Mongolia, gli anziani (60+ anni) rappresentano il 10,5% della popolazione, con notevoli disparità di salute, in particolare tra i generi in termini di aspettativa di vita.

Questo studio ha utilizzato metodi misti, combinando sondaggi quantitativi e interviste qualitative, per valutare il benessere psicologico di 304 partecipanti di età pari o superiore a 55 anni provenienti da aree urbane e rurali. Le analisi statistiche hanno rivelato che la partecipazione sociale, il supporto familiare e le attività di volontariato hanno avuto un impatto positivo sulla soddisfazione della vita, mentre la solitudine e la cattiva salute erano fattori negativi.

Lo studio evidenzia il ruolo trasformativo dei programmi di coinvolgimento creativo su misura per gli anziani, in particolare per le donne, nel migliorare il benessere psicologico. Le raccomandazioni chiave includono il miglioramento delle connessioni sociali, delle opportunità di volontariato e delle tecnologie di comunicazione accessibili per supportare la salute mentale degli anziani mongoli.

Acknowledgement

I would like to extend my gratitude to the DREAM IT project team, based at the University of Trento in Italy, led by Professor Fabio Casati, who initiated this study in Mongolia in 2016. Special thanks to Professor Fabio Casati for bridging the collaboration between Mongolian and Italian universities, developing a participatory research model project at the University of Trento, and creating opportunities for implementation in Mongolia as part of my doctoral research. My sincere thanks go to my esteemed mentor, Professor M. Sugarmaa, for her invaluable guidance and expertise throughout the study, providing me with essential research methodology and support since the beginning of the research in Mongolia. I am also deeply grateful to Professor Denis Burnette, who offered critical advice on publications and overseas journals from afar in the United States.

I extend my heartfelt appreciation to the 352 older adults who generously shared their valuable insights. I also thank the Mongolian Older Adults Association and the National Center of Gerontology, as well as the branch offices of the Older Adults Association in Ulaanbaatar and rural areas, for their support in coordinating and facilitating data collection. In addition, I thank the provincial and district health center teams for providing research facilities and helping to gather participants.

Lastly, I want to express my deep gratitude to my dear friends, who were by my side through challenging times, including personal health struggles, accidents, and family bereavements. Their support, understanding, and encouragement gave me the strength to overcome these obstacles and continue my academic journey.

I would like to express my heartfelt gratitude to my esteemed teacher, Professor Khorolsuren; my research partner, Yerkebulan; and the director of NEMS, Professor Davaalkham, along with her team of dedicated educators. I am also very grateful to my students and younger colleagues who devoted countless hours to support me throughout this journey.

My sincere thanks go to my mother, who has always been there for me, caring for my family and my child with boundless love and support during crucial times. I am also profoundly grateful to my beloved husband, siblings and the grandparents of my son, who have supported me through challenging circumstances, both at home and abroad, and in times of health difficulties. I extend my gratitude to Ajia Rinpoche and all my friends in the charitable community who have stood by me, providing comfort and encouragement during moments of spiritual loneliness and unwavering dedication to the cause of older adults. Finally, I dedicate this work to my beloved grandmother, Bayar Nyamsuren, with deep respect and gratitude. Your care and the strength you instilled in your heart have guided me through every challenge, giving me the responsibility to complete this journey and face the trials of life. Thank you, Grandma.

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Abbreviations

- USA - United States of America
- MNUMS -Mongolian National University of Medical Sciences
- ROK - Republic of Korea
- PRC - People's Republic of China
- WHO - World Health Organization
- UK - United Kingdom
- ICT - Information and Communication Technology
- MGL - Mongolia
- MLSP - Ministry of Labor and Social Protection
- SES - Socio-Economics
- SPH - School of Public Health
- IIEA - International Economic Cooperation
- RF - Russian Federation
- SD - Standard Deviation
- KOT - Kingdom of Thailand
- FRG - Federal Republic of Germany
- MAX - Maximum Value
- MIN - Minimum Value
- KOS - Kingdom of Sweden
- DSSW - Department of Social Work and Social Sciences in Health

Chapter 1

Introduction

1.1 Background

Global population aging is accelerating, with the older adult population increasing from 600 million in 2001 to an estimated 1.2 billion by 2025. The number of those aged 80 and above is projected to reach 137 million, with over 70% expected to reside in developing countries [1]. In Mongolia, this demographic shift is considered to be in its early stages. In 2015, individuals aged 60 and above accounted for 6.4% of the total population, a figure projected to rise to 11.9% by 2030 and 21.1% by 2050, meaning that one in five Mongolians will be older adults [2].

As of 2021, the average life expectancy for men in Mongolia is the lowest in Central Asia at 67.5 years, with women's life expectancy following closely behind Uzbekistan and Tajikistan at 76.5 years. The gender gap in life expectancy is significantly larger in Mongolia, at 9.4 years, compared to the global average of 4.2 years (67.1 years for men and 76.5 years for women). Consequently, older women outnumber men by 2.5 times, comprising 69.2% of the senior population [3]. In terms of healthy life expectancy in 2019, Mongolian men averaged 57.1 years and women 63.8 years, indicating that men face health issues for their last 10 years on average, while women face similar challenges for their last 9 years [4].

Healthy life expectancy is closely tied to a country's quality of life, which is shaped by various social and demographic determinants [5]. Macro-level determinants, such as geography, regional characteristics, economic development, urban-rural differences, infrastructure, and access to healthcare and social services, indirectly impact the quality of life. On a personal level, determinants such as education, family status, social relationships, health, and psychological characteristics directly influence individual well-being [6].

According to the Global Age Watch Index, which assesses the well-being, health, capabilities, and environment of older adults, Mongolia ranked 72nd out of 96 countries in 2015. Specifically, Mongolia was ranked 31st in well-being, 93rd in health, 64th in capability, and 62nd in environment [7]. These rankings underscore the need for targeted policies and interventions to improve the well-being of Mongolia's older adult population. The condition of older adults in Mongolia is currently vulnerable and challenging. They often face economic insecurity, with limited opportunities to increase income [8], and pensions or allowances are generally insufficient to support a healthy standard of living. Moreover, many lack information on available resources, increasing their susceptibility to poverty [9].

Older adults living in poorly developed rural areas or urban outskirts have less access to social services and support compared to those in central urban districts. Among the older adult population, loneliness [10], depression [8], and anxiety are common [11],

compounded by limited social networks. However, many of them do not fully access social [10], psychological, or healthcare services, further highlighting the need for improved infrastructure and support systems for Mongolia’s aging population [12].

Among Mongolia’s older adult population, unhealthy habits are prevalent [13], low levels of preventive healthcare, and high health risks; 8 out of 10 older adults face physical health risks, including common issues such as obesity and hypertension [14]. Additionally, 80% of the older adults rate their living environment as moderate or poor. Determinants contributing to falls include loss of balance (91%), psychological determinants (44%), external environmental determinants (38.7%), and carelessness (41%). Visual and auditory impairments are also widespread, affecting 85-93% of older adult individuals [15].

Detailed research on the social, psychological, environmental, and quality-of-life challenges faced by older adults in Mongolia are limited [16]. Without a comprehensive understanding of these determinants, it is challenging to improve

quality of life and extend healthy life expectancy. Therefore, this study aims to provide evidence-based insights into the quality of life of older adult individuals by examining their health, psychological well-being, and social participation, thereby supporting policies and initiatives to promote healthy life expectancy among Mongolia’s population.

1.2 Purpose of the Study

To assess the psychological well-being of older adults and explore the determinants Research Objectives:

1. Measure the flourishing levels among older adults and its’ determinants.
2. Measure life satisfaction among older adults and its determinants.
3. Measure affect balance level among older adults and its determinants.
4. Explore information communication technology solutions for older adult-friendly co-design activity.

1.3 Hypothesis of the Study

1. The education level and the self-rated health of older adults are positively correlated with flourishing, life satisfaction, and affect balance.
2. Flourishing, life satisfaction, and affect balance are directly and positively influenced by the following determinants:
 - (a) Household size,
 - (b) Number of children and grandchildren,
 - (c) Frequency of assistance received in daily activities,
 - (d) Frequency of social participation,
 - (e) Family and sibling network,
 - (f) Friend network,
 - (g) Internet usage,
 - (h) Employed last month
3. Urban older adults have higher psychological well-being scores compared to rural older adults.
4. Age and years retired are inversely related to life satisfaction among older adults.

1.4 Practical Significance of the Study

This study is the first in Mongolia to comprehensively evaluate positive psychological indicators, such as flourishing, happiness, and affect balance, among older adults using internationally recognized methodologies. This holistic approach brings a new perspective to the assessment of the well-being of older adults in the country.

1. Identified social, demographic, and environmental determinants the psychological well-being of older adults, with distinctions based on urban and rural settings and gender differences.
2. Developed evidence-based recommendations for planning and implementing social policies, programs, and activities to support older adults.

1.5 Academic Discussion of Research

1. Discussed the topic and methodology in the Department of Behavioral and Public Health at NEMS on October 26, 2016 (Meeting No. 2016/16/24).
2. Approved the topic, methodology, and supervisors during the NEMS Academic Council meeting on December 14, 2016 (Meeting No. 2016/11/1).
3. Obtained ethical approval from the Research Ethics Committee of the Health Sciences University of Mongolia on December 16, 2016 (Meeting No. 2016-13-2016-22).
4. Discussed the research progress findings in NEMS's Public Health and Nutrition Department on May 28, 2018 (Meeting No. 2018/25).
5. Discussed the research results at an extended meeting of NEMS's Public Health and Nutrition Department on May 8, 2020 (Meeting No. 20/08).
6. Discussed the research findings at the NEMS Academic Council meeting on June 21, 2022 (Meeting No. 21/28).
7. Obtained an ethical assessment stating no violations of ethical guidelines from the Research Ethics Committee of the Health Sciences University of Mongolia on September 25, 2022 (Meeting No. 2022-d-08).
8. Reviewed the Mongolian terminology of foreign terms used in the publication by the Terminology Council of the Health Sciences University of Mongolia on April 17, 2023 (Meeting No. 2022/14).
9. Presented at the Doctorate Council of Public Health Sciences at the Health Sciences University of Mongolia on April 25, 2024 (Meeting No. 24/02/13).

1.6 Publications

Journal Articles: Published in Domestic Journals–4

1. O. Saranchuluun, M. Sugarmaa, F. Casati. "Psychological Well-being of Older Adults People in Urban and Rural Areas and Influencing Determinants," *Journal of Public Health Era*, Issue No. 13, 2019, pp. 258-263.
2. O. Saranchuluun, F. Casati, M. Sugarmaa, O. Dulguun. "Encouraging the Older Adults through Creative Engagement," *Journal of Public Health Era*, Issue No. 14, 2020, pp. 158-168.

3. O. Saranchuluun, F. Casati, M. Sugarmaa, L. Khorolsuren. "Determinants Older Adults Satisfaction," *Health Science Journal*, Issue No. 1(65), 2022, pp. 18-23.
4. O. Saranchuluun, M. Yerkyebulan, L. Zuchi, M. Sugarmaa. "Affect Balance of Older Adults People and Determinant Determinants," *Journal of Education Studies*, Issue No. 23(583), 2023, pp. 363-370.

Journal Articles: Published in International Journals - 2

1. Saranchuluun Otgon; Sugarmaa Myagmarjav; Denise Burnette, Fabio Casati; Khorolsuren Lkhagvasuren. Sociodemographic predictors of flourishing among older adults in rural and urban Mongolia, Scientific Report. 2023. <https://doi.org/10.1038/s41598-023-28791-x>, (Cite Score:7.6, Scopus IF:4.9)
2. Saranchuluun Otgon, Denise Burnette, Yerkyebulan Mukhtar, Fabio Casati, Sugarmaa Myagmarjav; Life Satisfaction among Older Adults in Rural and Urban Mongolia: A Cross-Sectional Survey Study. Biomed Hub Oct25 2023;8(1):79-87. <https://doi.org/10.1159/000533917>,(PUBMED indexed.)

Conference abstracts: International - 4

1. Saranchuluun Otgon, Denise Burnette, Sugarmaa Myagmarjav, Fabio Casati. Psychological Flourishing among Urban and Rural Older Adults in Mongolia: Implications for Health and Social Policy and Practice. IAGG Asia/Oceania Regional Congress 2023. Social Sciences. Yokohama, Japan, June 12-14, 2023. Poster Presentation
2. Saranchuluun Otgon, Sugarmaa Myagmarjav, Khorolsuren Lkhagvasuren, Yerkebulan Mukhtar, Anujin Baatar, Casati Fabio, Agnieszka Czajka. The Determinants of life satisfaction among Mongolian older adults. The Gerontological Society of America (GSA) 2022 Annual Scientific Meeting, Indianapolis, Indiana, USA. November 2-6, 2022. Oral presentation. DOI: <https://doi.org/10.1038/s41598-023-28791-x>
3. Saranchuluun Otgon, Sugarmaa Myagmarjav, Khorolsuren Lkhagvasuren, Fabio Casati. Sociodemographic Predictors of Flourishing among Older Adults in Rural and Urban Mongolia. World Academy of Science, Engineering, and Technology International Journal of Psychological and Behavioral Sciences, ICPP2022: International Conference on Positive Psychology, Vol:16, No:04, Venice, Italy.14-15, April 2022. Oral presentation. DOI:publications.waset.org/abstracts/146298/pdf
4. Saranchuluun O, Khorolsuren L, Yerkebulan M, Anujin B, Casati F, Sugarmaa M. The Determinants of life satisfaction among Mongolian older adults. International Conference on health science research and innovations. September 29, 2022. Abstract book.p118

Conference Abstracts: Domestic -7

1. O. Saranchuluun, M. Sugarmaa, F. Casati. "Psychological Well-being and Influencing Determinants among the Older Adults in Mongolia." *Public Health Scientific Conference-60*, Ulaanbaatar. Oral Presentation. Abstract. April 11, 2018, pp. 105-106.
2. O. Saranchuluun, M. Sugarmaa, F. Casati. "Psychological Well-being and Influencing Determinants among the Older Adults in Mongolia." *Mongolian Medical Science Conference - A Decade*, Ulaanbaatar. Oral Presentation. Abstract. April 19, 2018, pp. 50-51.

3. O. Saranchuluun, M. Sugarmaa, F. Casati, O. Dulguun. "Supporting the Well-being of the Older Adults through Creative Participation." *Conference Proceedings on Pandemic and Aging, National Center for Gerontology*, Ulaanbaatar. No. 000124233. October 1, 2020, pp. 38-39.
4. O. Saranchuluun, M. Sugarmaa. "Psychological Well-being, Social Network, and Activities of the Older Adults." *"Doctor, You are a Researcher" Scientific Conference Proceedings*, No. 000124233. October 20, 2021, pp. 39-43.
5. O. Saranchuluun, L. Khorolsuren, M. Yerkyebulan, B. Anujin, F. Casati, M. Sugarmaa. "Determinants Life Satisfaction of the Older Adults." *Public Health Sector Conference*. Abstract. April 6, 2022, p. 222.
6. O. Saranchuluun, M. Sugarmaa. "Psychological Well-being and Social Relations of the older adults." *Aging and Geriatric Pathology Scientific Conference Proceedings*, Ulaanbaatar. October 1, 2022, No. 05, pp. 35-39
7. O. Saranchuluun, M. Yerkyebulan, L. Zuchi, M. Sugarmaa. "Affect Stability and Determining Determinants among the older adults." *National Public Health Scientific Conference: Public Health as a Priority in Health Services*, December 7, 2023, No. 01

Chapter 2

Literature Review

2.1 Aging is the Public Health issue

Aging is an inevitable continuation of human life. The World Health Organization (WHO) defines healthy aging as "the process of developing and maintaining functional ability to ensure well-being in old age [17]. Supporting healthy aging through a public health model classifies older adults into three groups: high-functioning and stable capacity, declining capacity, and lost capacity [18]. This model delivers services in three main areas: health care, long-term support, and environmental determinants, each tailored to the needs of these groups.

The strategy provides a comprehensive vision and a globally coordinated approach to public health, making it significant. Furthermore, it highlights the importance of prioritizing healthy aging within public health and expresses the need for member countries to take sustainable, evidence-based public health responses. This strategy aligns with various approaches and solutions, including universal health coverage, addressing social determinants of health, combating non-communicable diseases, preventing disabilities and violence, promoting age-friendly cities and communities, strengthening the health workforce, developing person-centered, integrated services, addressing dementia, and providing palliative care [19] (Figure 2.1).

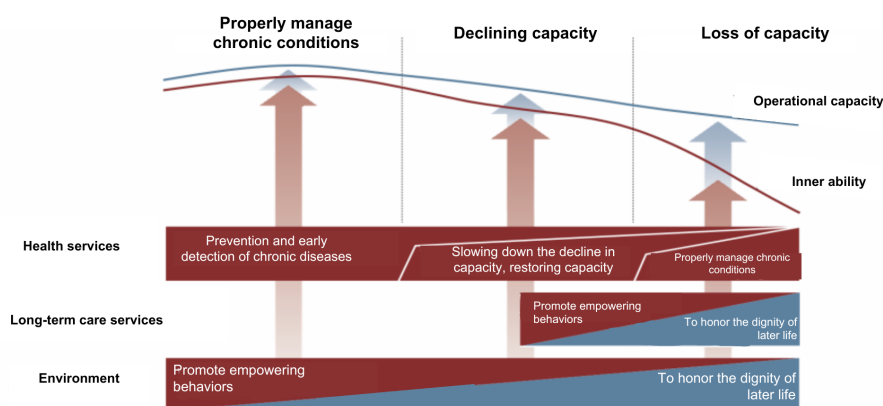


Figure 2.1: Public Health Model for Healthy Aging

Healthy aging is greatly influenced by genetic and individual characteristics. According to the genetic theory of aging, all living cells are born, reproduce, age, and eventually

die, with the biological aging process in humans largely dependent on cellular determinants, specifically telomeres [20]. Non-genetic theories, on the other hand, suggest that humans and animals can control the aging process by supplying essential nutrients to cells, enhancing their resilience to aging or disease, and potentially even regenerating tissues [21]. Social and psychological theories explain how aging affects and alters a person's behavior, affect balance, and relationships [17]. For example, the disengagement theory by Cumming and Henry posits that aging naturally leads to a reduction in social interactions and activities due to health changes, causing individuals to lose autonomy and engagement over time. This process, to be successful or well-adjusted, requires the individual and their environment to prepare for these changes.

Activity theory suggests that as people age, they lose social connections and should compensate by seeking out new relationships to the extent possible [17]. Erikson's psychosocial development theory highlights a conflict between generativity and stagnation for individuals aged 40-65. During this stage, a person may either contribute positively to society or fall into a state of inactivity. For those over 65, the focus shifts to reflecting on life experiences, where individuals may feel either satisfaction with their memories and achievements or regret and frustration over unfulfilled expectations [17].

Continuity theory proposes that as people age, they face the choice to adapt while using their past experiences and resources to maintain internal and external stability. Those who have not accumulated sufficient experiences and resources in their youth may find it more challenging to adapt in later life.

Clark and Anderson further divide aging into five developmental stages, highlighting a structured approach to understanding the progression and adaptation processes throughout aging [22]. The stages include:

1. Recognizing the aging process and becoming aware of its limitations,
2. Learning to adjust health and social conditions,
3. Considering possible options for achieving life satisfaction,
4. Reassessing oneself and establishing new criteria in response to changed circumstances,
5. Revising and improving life goals and values, and, if necessary, taking steps to adapt to a new way of life,

The success of these stages largely depends on the resources, Affect strength, and individual characteristics accumulated in youth. These theories commonly highlight that experience, health resources, and life productivity gathered over time can help manage the aging process effectively [22].

Based on these theories, the modern definition of healthy aging centers on functional ability—whether an individual can independently pursue valuable and desired activities based on their internal resources. Internal resources are defined as a combination of physical and mental capabilities [23]. In other words, active aging refers to the ability of an older adults person to independently engage in activities they consider valuable and meaningful, relying on their internal resources within their environment.

The environment here includes not only the physical surroundings but also relationships, attitudes, values, health, social policies, legal conditions, and support services. If healthy and active aging is crucial for everyone, identifying and supporting the determinants that influence it is equally important. Researchers suggest that the psychology of healthy aging is directly influenced by an individual's life satisfaction, Affect Balance, and outlook on the future.

In 2002, a global legal framework on healthy aging, known as the "International Plan of Action on Aging," was adopted at the inaugural conference in Madrid, Spain. The goal of this strategy is to ensure that people everywhere can live to an old age with accessible care and protection, while continuing to participate fully in society as citizens [1]. Its ultimate objective is to create an inclusive society that addresses the needs of all age groups [24]. In line with this, the WHO issued a 10-point guideline for member states to improve the health and social conditions of the older adults from 2020 to 2030. This includes recommendations to enhance well-being by supporting research to identify current and future needs of the older adults and improving [25] age-friendly cities and community networks.

The "Global Report on Aging and Health," published in 2015, emphasized that the most important indicators of healthy aging are health and well-being, stating that without these, sustainable development and the goals of the Madrid Declaration cannot be achieved.

Countries, especially developing ones, face the challenge of addressing the implications of a growing older adults population on the quality and productivity of health, social protection, and labor sectors. A higher number of individuals with health issues increases healthcare costs, while a larger proportion of healthy, resourceful older adults can enhance productivity and wealth generation in any nation. Researchers predict that by 2030, the older adults population will be healthier, better educated, and have improved living conditions compared to previous generations. Additionally, their political influence is expected to increase due to their numbers and experience, driving favorable conditions for social and healthcare services to meet their needs.

The growing older adults population also implies economic burdens due to the demand for sustained health and social services, insurance, and pension provisions. As their numbers rise, the proportion of healthcare and service needs within the total population is projected to grow significantly.

****Article 5**** of Mongolia's Law on older adults defines state principles for ensuring the rights of older adults, which include equal participation in social life, opportunities for personal development, the ability to live healthily and actively within society, passing on knowledge and experience to future generations, respect for dignity and honor, non-discrimination, income security, and respect for personal choice.

****Article 6**** of the same law stipulates: "If not detrimental to their health, older adults have the right to live independently according to their desires and interests. They have the right to participate in social life either independently or through senior organizations or legal representatives, to work according to their skills and interests, receive services and assistance, participate in socially beneficial voluntary activities, and engage in self-development. They also have the right to develop their capacities through access to training." This clearly affirms the right of older adults to pursue active aging through self-development [2].

2.2 Psychological Well-Being and Healthy Aging

The WHO defines health as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" [26]. This concept of health is measured through quality-of-life indicators, which, broadly speaking, refer to an individual's perception of their position in life within the context of their culture, values, goals, expectations, and concerns [27]. The WHO's definition includes subjective assessments of health, culture, social life, and environment, meaning that "health status," "lifestyle," "life satisfaction," "mental state," and "well-being" cannot fully encapsulate it individu-

ally. When assessing quality of life, countries not only evaluate diseases, conditions, and disabilities but also consider the impact of these health determinants on a person’s self-defined quality of life [28]. As such, reports on population health that solely focus on mortality and morbidity do not capture the comprehensive socio-psychological aspects defined by the WHO. Consequently, researchers have suggested expanding measurement criteria [29] to more fully reflect this multidimensional approach to health and quality of life [30].

This also highlights the need to incorporate humanitarian values into modern healthcare services, which are currently based on a medical model focused on alleviating diseases and symptoms. Healthcare services are fundamentally a crucial part of the humanitarian mission to improve patients’ well-being.

To update and expand the indicators of quality of life in health:

1. Physical health: includes disease and illness, sleep, physical capabilities, medication use, and work capacity.
2. Social relationships: encompasses social support, intimate relationships, and personal connections.
3. Psychological: includes positive and negative emotions, beliefs, self-esteem, and the ability to learn.
4. Environmental: covers job security, economic and financial resources, access to information, leisure activities, transportation, and health and social services [6].

These determinants vary depending on an individual’s adaptation to their environment, and subjective determinants such as psychological and social relationships play a significant role, suggesting that people have the potential to regulate these determinants themselves. In this study, we focused on measuring the foundational aspect of quality of life—psychological well-being—that is within the individual’s control and can be managed independently.

Psychological well-being refers to a state where individuals perceive, value, and accept all aspects of their life, big or small, and assess their mental resources and capabilities regarding the past, present, and future [31], [32]. According to the situational theory, psychological well-being is directly influenced by the social environment one is born and raised in, daily life events (positive or negative), significant life events, and the Affect responses and memories associated with these experiences. Behavioral and structural theories propose that psychological well-being is shaped by genetic determinants and biological and behavioral characteristics, which influence how individuals perceive and interpret their life, relationships, and significant events [31]. Cultural theory suggests that well-being varies based on cultural context, with individualistic or collectivist cultures shaping family values, group mentality, emotions, thoughts, and behaviors, which, in turn, affect psychological well-being [33]- [24].

2.3 Studies on Psychological Well-being in the Older Adults

Researcher Ed Diener (1984) identified key indicators of psychological well-being, including resilience and resources measured through flourishing, overall life satisfaction, and a balance between positive and negative emotions [34]. In 2010, the Organization for Economic Cooperation and Development (OECD) developed the “Better Life Initiative” based on Diener’s tripartite measure. This initiative provided member countries with a model for measuring well-being and developing policies with relevant sub-indicators tailored to

the needs of their populations [35]. The model includes 11 dimensions of life conditions, quality, and stability, with psychological well-being being one of these key indicators [36].

Most comparative studies on life satisfaction have been conducted in Western countries, particularly in North America and East Asia. As countries begin measuring socio-economic development through various indicators, life satisfaction has become an essential metric [24]. A Gallup International study on over 160 countries used the Cantril [37] Ladder to assess how older adults evaluate their lives overall. The study found that life satisfaction in English-speaking Western countries declines after age 50 but later increases with age, showing a "U-shaped" pattern [38]. Additionally, negative emotions such as worry and anger decrease after age 50, while general life satisfaction and positive emotions remain relatively stable. In contrast, life satisfaction among older adults in Eastern Europe, Africa, and former socialist countries decreases with age. For this group, dissatisfaction with life, physical pain, and worry increase as they age, although feelings of anger diminish [38]. Compared to younger populations, older adults individuals in these regions experience more worry, physical discomfort, and fewer positive emotions, often placing them among vulnerable social groups. In 2013, German researchers Valerie and Alfonso conducted a review on changes in psychological well-being among the older adults, examining how life satisfaction varies with age. They found three patterns of correlation: U-shaped curve – Common in highly developed Western countries, where life satisfaction is lowest around midlife (around age 30) and then rises again with age. B) Inverse U-shaped curve C) Linear pattern [39]. These patterns are influenced by social conditions, income levels, and socio-economic differences, with the traditional U-shape linked to the concept that life satisfaction dips during midlife but increases in later years. The inverse U-shaped correlation is rare, but it has been observed in studies involving war veterans, where life satisfaction peaks around age 65 and then sharply declines over the following 5+ years. Additionally, a socio-demographic survey conducted in the United States from 1973 to 1994 highlighted that life satisfaction was highest in middle age, around 40. However, this survey included individuals between 18-51 years old [39]. In an analysis of the 2007-2010 international population report on older adults health and well-being by researchers Wang He and Mark, older adults populations in various countries reported general life satisfaction. Among them, Mexican seniors showed the highest life satisfaction level (79% and above), while only about half of older adults Ghanaians were satisfied with their lives. Life satisfaction was notably higher among younger seniors (ages 50-69) compared to those aged 70 and above. In neighboring countries China and Russia, approximately 6 out of 10 older adults individuals reported satisfaction with their lives, and 1 in 2 reported feeling happy [40]. Social, demographic, and other Determinants older adults psychological well-being often emphasize health status. Recent findings show that older adults living with a spouse experience 20% higher satisfaction and lower stress levels compared to widowed or single seniors. However, in India, married seniors were reported to experience more depression [40]. In China and South Africa, urban older adults were found to be more satisfied with their lives than those in rural areas. Sex, education, and age differences also impact life evaluation among the older adults, as shown in a 2005 study by Carol and Burton [41]. Key indicators of life satisfaction—such as life goals, personal growth, self-activation, and positive relationships—were linearly correlated with education level. Goals, external control over the environment, and overall satisfaction were higher among male seniors compared to female seniors. Researcher Yanni Hao, in a cohort study involving 7,830 seniors aged 55-66, observed that engaging in social activities and volunteering positively impacts psychological well-being in the older adults, highlighting the significance of social networks [42].

Self-reported life satisfaction varies depending on time and location. In member coun-

tries of the Organization for Economic Co-operation and Development (OECD), older adults tend to report lower satisfaction levels than younger populations [43]. Research by Baird and colleagues (2010) using national surveys in Germany and the United Kingdom revealed a gradual decline in life satisfaction during middle age, with a sharp drop observed around age 70. In the UK, life satisfaction was highest between 1940 and 1970 [44]. A 2008 Gallup survey across 160 high-income, English-speaking countries found a U-shaped correlation between well-being and age, with life satisfaction lowest between 45-54 and then increasing after age 55 [45]. The importance of measuring psychological well-being in the aging population lies in the so-called "well-being paradox," where life satisfaction tends to rise with age despite physical and social challenges. Hudomiet and colleagues (2020) studied this paradox in a health and retirement cohort in the United States, finding that life satisfaction typically rises prior to retirement but declines thereafter, influenced by determinants such as bereavement and illness [46]. Healthier, more satisfied older adults individuals generally experience a longer, more peaceful life, yet promoting life satisfaction and quality in old age is often considered too late; researchers suggest this process should start in youth. Key determinants affecting life satisfaction include life experiences and personal values [47]. As people age, family and friendships often become more important than income. Studies by Levenson and others found that self-rated health has a more significant impact on life satisfaction than objective health measures [48]. Furthermore, Puvill (2016) found that mental health is critical to both physical and psychological well-being in older adults, with a significant impact on overall life satisfaction as they age [49]. Interestingly, Gerstorf (2008) suggested that cognitive and physical decline in older age might prevent individuals from accurately assessing their health status, potentially leading to higher self-reported life satisfaction [50]. A study by Ying Ge and colleagues in China found that older adults individuals who were female, well-educated, financially aware, lived with family, resided in urban areas, regularly attended preventive health check-ups, and participated in community services reported higher satisfaction levels in physical, mental, and cognitive health [51]. The World Gallup survey found that in former socialist and Eastern European [45] countries, older adults individuals who receive quality social services and live in a safe, healthy environment report higher life satisfaction [52]. One component of psychological well-being is affect balance [53]. However, older adults tend to be more reserved and often conceal their emotions [54], [55], making it challenging to assess their psychological state [56]. Researchers [57] recommend using composite indicators that average responses to multiple sub-questions to accurately gauge their affect balance. In psychosomatic medicine [58], a field studying the mind-body connection, it is observed that vulnerability to illness is directly linked to fluctuations in daily emotions, a trend that is particularly common among the older adults. Additionally, there is a growing need for international strategies, policies, and programs to improve the health, economic security, and social well-being of the older adults. This study can serve as foundational information for policies and programs that aim to assess and address the psychological challenges faced by the older adults, using positive psychological approaches to improve their well-being.

Health is the most critical determinant indication quality of life for the older adults. Studies have shown that older adults often rate their health positively regardless of actual conditions [59], suggesting they may rely more on subjective rather than objective measures [20]. This positive self-rate has been linked to longer life expectancy among seniors [60]. Although doctors may find it challenging to accept these subjective health assessments over objective evaluations, older adults often rate their health by comparing themselves to others of the same age and considering others' expectations. Additionally, as long as they remain free from serious illnesses and can manage daily tasks, they con-

sider their health to be relatively good [61]. This shift in health perception illustrates how attitudes towards health change with age.

Most mental health challenges in the older adults are associated with physical ailments, loss of ability, and lingering injuries or illnesses from youth [62]. Furthermore, determinants such as lifelong stress, significant life events, gender, economic status, cultural background, and beliefs also affect their mental health. Another crucial determinant influencing psychological well-being in the older adults is family status and experiences of shared life. Levinson's developmental theory outlines seven stages of marriage, with those over 60 entering the final stage. At this stage, declining health, the loss of a spouse, and a greater focus on Affect support characterize the marital relationship. Conflicts often stem from fears of loneliness and a decline in physical intimacy, and seniors may shift their energy toward maintaining external relationships to mitigate the loss of close connections.

After age 50, individuals tend to focus more on their inner Affect world and self-confidence rather than external expressions [48]. Although older adults are often viewed as diminished in health and ability compared to younger generations, there is significant evidence of their strengths and resources. For example, studies by Calvin and colleagues suggest that those over 60 can maintain an active intimate life, cognitive abilities remain sharp, and they demonstrate greater wisdom and capability due to accumulated experience [20].

2.4 Psychological Well-being and Creative Engagement

For older adults, engaging in creative activities as active participants rather than passive consumers can enhance their psychological well-being and provide them with a sense of purpose. By acknowledging the value and significance of their contributions [63], seniors gain confidence and feel a sense of acceptance [64]. Sociologist Siegrist explained that engaging in creative activities to express needs and desires brings positive psychological rewards to the [64] older adults. Can seniors express their needs creatively, devise solutions, and serve as innovators? Does creative engagement positively affect their psychological well-being?

To address these questions, we reviewed international studies on creative participation among seniors. Creative engagement [65] includes activities like volunteering, supporting new initiatives, participating in recycling projects, and other community-based endeavors [66], whether paid or unpaid, driven by personal interest. These activities positively impact the well-being and health of seniors. For instance, older adults involved in volunteering report higher levels of psychological well-being compared to non-participants [67]. Long-term involvement in creative projects fosters rewarding [68] relationships among older adult participants and innovators, enabling socialization, interaction with younger generations, and mutual learning [69]. Through creative engagement, seniors earn respect from others, positively [70] influencing their self-esteem. In the field of information and communication technology, senior participation remains limited, and technology designed for them requires further improvement. Innovators often lack insight into the needs and preferences of older adult users, while seniors express a strong need for creative, socially supportive activities. This study aims to explore ways to support the psychological well-being of the older adults through creative engagement, helping them strengthen social connections and enhance their sense of community.

Chapter 3

Methodology

3.1 Research Design

For this study, a cross-sectional design was used for objectives 1, 2, and 3, while a participatory design was employed for objective 4 [71] (See Table 3.1).

Table 3.1: Research Design

Aspect	Cross-sectional study	Participatory study
Data Collection Method	Quantitative Methods	Qualitative Methods
Materials	Standard Questionnaire	Team Interviews, Individual Interviews
Items Studied	Sub-indicators of psychological well-being	Determinants well-being, Participation satisfaction, Initiative and creativity, Motivation for creative participation
Data Processing and Analysis	Identifying Determinants psychological well-being, Social participation correlation	Evaluation of new model, assessment against criteria, Summary of interview results

3.2 Scope and Sampling of the Study

To calculate the sample size, we based our approach on the 2016 National Statistics Office census data, which reported a total of 294,971 older adults in Mongolia (women aged 55 and above and men aged 60 and above). Of these, 163,928 resided in rural areas and 131,043 in Ulaanbaatar. Using a proportional stratified sampling method to ensure representation by location and sex, the optimal sample size was calculated to be 306. The formula used to calculate sampling error and representativeness is provided below.

The formula for calculating the sample size is:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2}$$

where:

- n is the sample size.
- Z is the Z-score, which corresponds to the confidence level. For a 95% confidence level, $Z = 1.96$.

- p is the probability of occurrence, which in this case is 15%, or $p = 0.15$.
- e is the precision level, which in this case is 4%, or $e = 0.04$.

In this calculation, we added 5% (16 individuals) to account for non-sampling error, resulting in a total sample size of 322 participants (Table 3.2).

Table 3.2: Proportional quota sampling strategy

Age Group	Total Population	Sample	Urban	Rural
55-59	115,125	125	68	58
60-64	65,496	71	39	32
65-69	43,089	47	25	22
70+	71,976	78	42	36
Total	295,686	322	174	148

For the quantitative study, data was collected from a total of 322 older adult participants—women aged 55 and above and men aged 60 and above. The sample was drawn from three districts in Ulaanbaatar (Songinokhairkhan, Khan-Uul, and Chingeltei) as well as from rural areas, specifically the centers and one selected soum each in Övörkhangai and Dornogovi provinces. The sampling was conducted according to the age and sex distribution of the total population (See Table 3.3).

Table 3.3: Urban and Rural Sample Representation (by Age and Sex)

Age Group	Ulaanbaatar						Rural Areas			
	Songinokhairkhan		Khan-Uul		Chingeltei		Dornogovi		Övörkhangai	
	Total	Female	Total	Female	Total	Female	Total	Female	Total	Female
55-59	33	33 (100.0%)	19	19 (100.0%)	16	16 (100.0%)	21	21 (100.0%)	37	37 (100.0%)
60-64	18	9 (57.0%)	11	5 (58.0%)	10	5 (58.0%)	11	5 (54.0%)	21	10 (55.0%)
65-69	12	6 (59.0%)	7	3 (59.0%)	6	3 (60.0%)	7	3 (57.0%)	15	7 (58.0%)
70+	19	9 (60.0%)	12	6 (62.0%)	11	5 (12.0%)	10	5 (65%)	26	13 (60.0%)
Total	82	57 (69.5%)	49	33 (67.3%)	43	29 (67.4%)	49	33 (67.3%)	99	67 (67.6%)

Quantitative data for the study was collected between October and December 2016. Participants included older adults with normal daily independence and a residence history of more than a year at their current address. Those hospitalized at the time or classified in IV-V health categories were excluded from the study [72]. Data collection sites in Ulaanbaatar included district older adults centers and health offices, while in rural areas, the facilities of the provincial older adults centers and health rooms were used in provincial and soum health centers. For the qualitative study, announcements about the creative participation training were distributed in January 2020 through specialists in the Centers for older adults of the Bayangol and Songinokhairkhan districts in Ulaanbaatar. Based on these announcements, 30 older adults attended two preliminary meetings. Of these, 23 were selected to participate in the creative participation training, with exclusions based on health, cognitive capacity, and availability. The participants were divided into three types of groups in seven teams: exclusively older adults, older adults with students, and older adults with a designer (See Figure 3.1).

3.3 Research Data Collection Tools

To identify dependent and independent variables for the quantitative study, the following tools were used:

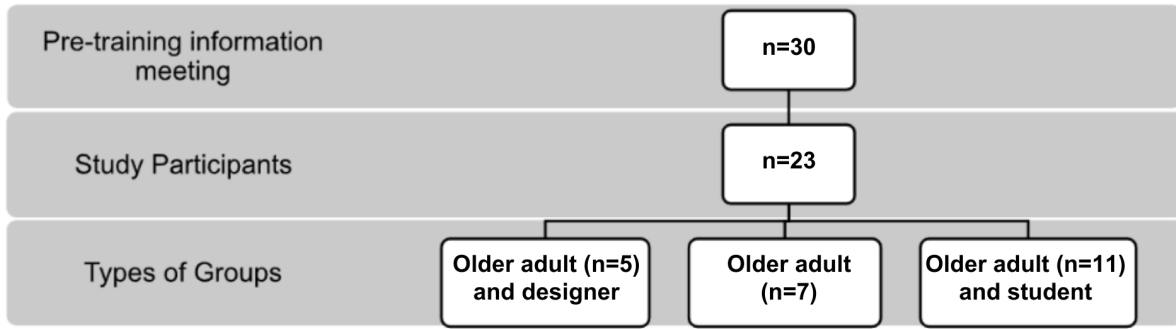


Figure 3.1: Structure of Qualitative Study Participants

A. Dependent Variables: The psychological well-being of participants was measured using the following three key indicators:

1. Flourishing: This refers to an individual's ability to evaluate their competence based on life experiences, along with others' perceptions and expectations about him, reflecting inner strength and resources [73]. Diener's questionnaire was used to measure flourishing, consisting of eight questions with a 7-point scale, scoring between 8 and 56. A higher score indicates a higher level of inner strength and resources.
2. Life satisfaction: This was measured with a single question from the subjective well-being assessment of the OECD. Participants rated their satisfaction with life on a scale of 0-10, with higher scores indicating greater satisfaction with life.
3. Affect Balance: This is balance of positive and negative emotions. We generated a composite variable from the short form of the subjective well-being scale was used [35]. Positive emotion, measured by the question 'How happy did you feel yesterday?' (scored 0-10) was calculated by subtracting the average score of two questions assessing negative emotions: 'Did you feel down or sad yesterday?' and 'Did you feel worried about something yesterday?' The resulting score ranges from -10 to +10, where a higher score indicates a positive affect balance, reflecting a positive attitude, and a lower score indicates a negative affect balance, suggesting a more pessimistic outlook. Scores closer to zero suggest limited affect expression, indicating either closed-off or negative underlying sentiments [74].

B. Independent Variables

1. Social Network: A shortened version of the Lubben Social Network Scale was used to assess the social network of older adults participants [75,76]. This includes three questions each on the number, frequency, and support from family and friends, with total scores ranging from 0 to 15. Higher scores indicate a stronger family and friends network.
2. Social Participation: Participation in seven types of social activities during the past month, including volunteering, sports clubs, political involvement, helping family / friends, attending educational courses, caring for the sick or disabled was evaluated using a questionnaire from studies on older adults populations in European countries [77].
3. Loneliness: The UCLA Loneliness Scale, developed by researchers at the University of California, Los Angeles, was used to assess loneliness through three questions: a) feeling disconnected from others, b) feeling abandoned, and c) feeling isolated. The total scores range from 0 to 9, with higher scores indicating greater loneliness [78].

4. Self-rated health: A standard question on the self-rated health in the past year was used, measured on a 5-point Likert scale [6].
5. Assistance in Daily Living Activities (ADL) Thirteen daily living activities, such as dressing, walking independently, bathing, eating, using the bathroom, sitting and standing, spatial awareness, cooking, shopping, use of phones, visit to the pharmacy, plant care and financial management, were evaluated by whether the participants needed assistance. The total score reflects the sum of activities that need help. Additionally, self-rated health and presence of chronic illness question included.
6. Sociodemographic information: This includes age, sex, marital status, education level (categorized into five levels: illiterate or primary, secondary, high school, vocational, or higher/college university), and place of residence or living area (urban, rural, province, or soum which is sub-province), as well as household size, number of children, and grandchildren in household and employed last month included.
7. Information Technology Usage: To assess Internet use, daily information sources and frequency of use, a standard Pew Research Center questionnaire was used [79]. Barriers to Internet usage were identified using a standard questionnaire developed by the International Telecommunication Union [80].

The cross-sectional survey questionnaire consisted of 108 questions covering various areas: 19 on general information, 8 on health and independence, 7 on employment and retirement, 6 on social networks, 3 on loneliness, 23 on psychological well-being, 14 on social participation, and 28 on information technology and internet usage. For this dissertation, based on a review of responses with more completeness of 85% and relevant variables identified by literature review, 68 questions were selected in 17 grouped indicators for a detailed analysis. The average interview time per participant was approximately 35 minutes.

Qualitative data was collected following a structured process, which will be outlined below.

- Participant Selection: Before starting the study, older adults [81] were invited to participate based on evaluations of their age, sex, place of residence, and cognitive ability.
- Pre-study information meeting: A preliminary information meeting was held to motivate participants, during which reflection questions and a homework assignment were given.
- Group assignment: To ensure similarity across groups, participants were divided into three types of groups based on age (60-70 and 70+), cognitive ability scores, and the nature of the group: older adults-only, older adults with students, and older adults with a designer, resulting in seven teams across the three groups [82].
- Motivation and Creative Stimulation: The Stanford Design School's 5-phase, 1.0 Design Thinking training program [83] was utilized to encourage participants' social interaction, positive emotions, and flourishing, along with team exercises, instructions, and homework assignments. Instructions were tested for clarity among 13 older adult participants on January 19, 2020, and adjustments were made accordingly (See Figure 3.2).

The qualitative study was conducted on February 8 and 9, 2020, with two sessions, each lasting 4 hours. During the study, participant feedback on satisfaction, motivation for creating something new, and their experiences working in groups was collected through

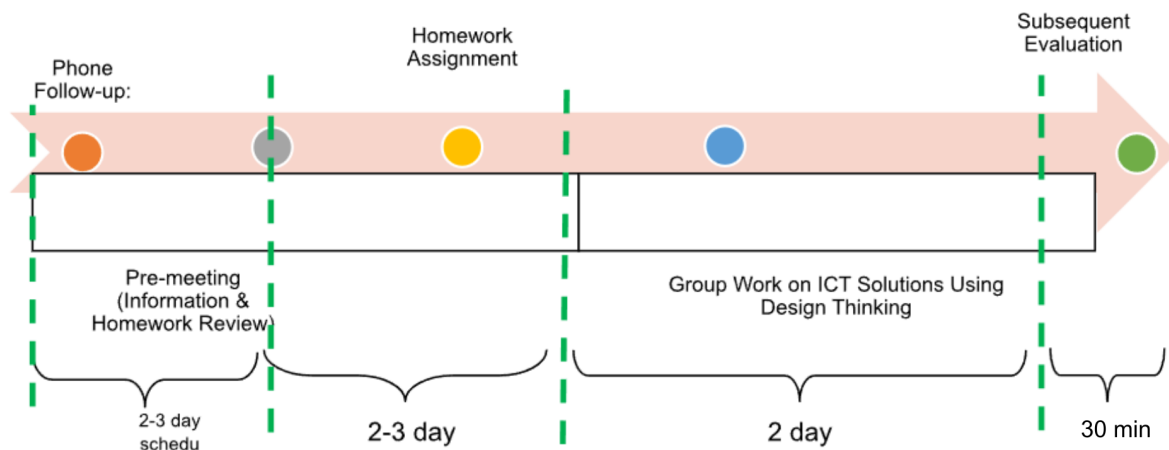


Figure 3.2: Process of Engaging Participants in the Qualitative Study

interviews. The feedback focused on three main areas [84]: a) Motivation: Participants were asked if any new ideas or plans had emerged that they wished to apply in their lives following the training. b) Group Work: Participants shared what they liked or disliked about working in teams over the two days, and what they learned from their team members. c) Satisfaction: Participants identified which part of the training they enjoyed most and gave their overall impression of the experience. These questions provided insights into participants' engagement and learning outcomes from the qualitative study sessions.

The communication technology prototypes developed through participatory involvement were evaluated [85] using Nielsen's "10 Usability Heuristics." These principles include:

1. The product should be visually clear and easy to understand at first glance.
2. It should use language, icons, and symbols that are familiar to the user.
3. The product should be straightforward and easy to operate.
4. Actions should be consistent and follow a uniform standard, making the product predictable and understandable.
5. There should be steps in place to prevent errors during use.
6. Instead of repeatedly prompting users or asking them to confirm actions, the design should suggest previous steps to streamline actions.
7. The product should offer options for completing actions in different ways, making it time-efficient and effective.
8. Avoid unnecessary features and maintain a clean, straightforward design.
9. Users should be able to correct their mistakes, make new selections, and know their location within the menu.
10. Provide comprehensive guidance and information on how to use the product.

3.4 Data Processing and Statistical Analysis

For the quantitative study, data from 322 participants were entered into SPSS software, with 18 incomplete responses removed, leaving 304 participants for analysis.

a. Measurement of Quantitative and Qualitative Variables

1. Descriptive Analysis: Distributions of qualitative indicators were analyzed to identify any outliers or systematic patterns. Mean and standard deviation were calculated for quantitative indicators.
2. Quantitative Variables: Variables such as age, self-rated health, household size, family and friends networks, number of social participation, loneliness, and psychological well-being scores were analyzed using mean and standard deviation.
3. Qualitative Variables: The responses for categorical variables, such as educational level, residence, marital status, employed last month internet use, and social participation, were presented in frequency and percentage.
4. Variable Grouping: The marital status of the participants was classified into two groups: "married" (including married and co-habiting) and "single" (including never married, separated, widowed, and divorced).

b. Statistical analysis

1. This test was used to analyze the association between sex and categorical variables such as marital status, education level, residence, self-rated health, types of social participation, employed last month and whether participants received assistance. Statistical significance was determined if ($p < 0.05$).
2. This test was used to analyze gender differences in quantitative variables such as age, family/friend networks, years since retirement, household size, number of children, and life satisfaction. Statistical significance was determined if ($p < 0.05$).
3. Determinants affecting indicators of psychological well-being (flourishing, affect balance, life satisfaction) were analyzed. Independent variables included age, sex, education level, place of residence, marital status, household size, number of grandchildren and children, social participation, internet use, social networks, self-rated health, assistance with daily activities, internet use, and communication tools.
4. The normality of the distributions was checked. For nonnormally distributed values, nonparametric tests were used.
5. Regression was performed to assess the determinants that affect flourishing, divided by total, urban, and rural participants. The regression model used: $Y = a + b \cdot X$, X_1 age, X_2 sex, X_3 .
6. Four models were created based on demographic, health, social-psychological, and residence determinants.
7. The determinants that affect life satisfaction were analyzed separately for men and women, using a stepwise approach by adding variables one by one according to the significance levels.
8. The determinants that affect the balance were analyzed for the total sample and by sex. The variables were added one by one according to significance ($p < 0.05$).
9. The interviews of qualitative participants were coded and grouped in two stages. The average interview duration per participant was 10 minutes (See Table 3.4).

Table 3.4: Content Analysis of Interview Data

Data Processing Stage	Steps Taken	Results and Frequency ¹
Data Transcription	Transcribed audio recordings into an Excel file, organized by question per participant	Recorded responses from 23 participants; on average, each participant responded to 4 sets of questions in 4 minutes.
Data Filtering and Coding	Reviewed and coded responses, checking for completeness	3 participants provided very detailed answers, 12 provided complete answers, while others had partial or missing responses.
Thematic Grouping	Identified recurring themes in responses given by 3+ participants	Key terms identified: teamwork (34), think (26), new (25), idea (23), talk (23), nice (17), good (17), guide (16), connect (16), enjoy (14), familiar (13), home (12), learn (7), instruct (6), interest (6), important (6), easy (5), members (4), explain (4), satisfaction (4), create (4), very good (4), clear (4), support (3), future (3), personal (4), useful (2), alone (3).
Thematic Grouping	Grouped words with similar meanings	Categories included: <ul style="list-style-type: none"> • Teamwork (team, connect, members, support) • Learning New Things (guide, instruct, new, explain, learn, interest, useful) • Positive Feelings (nice, good, very good, enjoy, satisfaction, ease) • Interpersonal Relations (talk, familiar, personal, alone) • Motivation (think, home, future, create)
Thematic Grouping	Summarized grouped themes	Key insights: <ul style="list-style-type: none"> • New Motivation: interest in future activities at home, positive feelings, and enjoyment • Teamwork: participants appreciated clear guidance and enjoyed team discussions • Learnings from Training: positive feelings gained • Satisfaction: participants reported positive experiences and willingness to participate again

¹ The frequency of words was ranked based on repetition

Chapter 4

Results

4.1 Social and Demographic Information

The study included 304 older adults who participated between the ages of 55 and 88, representing three districts in Ulaanbaatar and two provinces from the Gobi and Khangai regions. Among the participants, 94 men with an average age of 67.1 years and 210 women with an average age of 62.5 years (See Table 4.1).

Regarding the family status of older adults, 48.0% are married and live with their spouses, while 46.4% are widowed. Specifically, more than half of older adults (56.3%) and one in four older adult men have lost their spouses. Only a small percentage (5.2% or 16 individuals) are single, unmarried, or divorced. Among the older adults who participated, 16.1% live alone, with the majority being women. In terms of residence, 53.3% (162 individuals) live in Ulaanbaatar, 22.0% (67 individuals) in provincial centers, and 24.7% (74 individuals) in or near the soum centers. Education level among older adults shows that 16.2% have primary education, 16.5% completed secondary school, 26.1% attended high school, 17.8% received vocational training, and 23.1% completed college or university. The average household size is 2.97 people and they have an average of four children, with few grandchildren living with them (average of 0.5 ± 0.96). Among older adults, 15.8% have participated in some income-generating activity in the past month. The self-rated health was similar between the sexes, with more than half (51.6%) rating their health as moderate, 30.9% as good, 6.6% as very good, and 10.9% as poor or very poor. Furthermore, 86.0% of older adults receive some form of assistance or support for daily activities.

Table 4.1: Social and Demographic Indicators by Sex

Variable	Total	Male	Female	P-Value
Sample Size, n (%)	304	94 (30.9)	210 (69.0)	
Age, Mean±SD	64±7.09	67.8±6.20	62.3 ±6.8	< 0.001 ^a
Age group n(%)				
55-59	111 (36.5)	4 (4.3)	107 (51.0)	
60-64	67 (22.0)	30 (31.9)	37 (17.6)	
65-69	51 (16.8)	23 (24.5)	28 (13.3)	< 0.001 ^b
70+	74 (24.7)	37 (39.4)	38 (18.1)	
Marital Status, n(%)				
Married	146 (48.0)	64 (68.1)	82 (39.0)	
Separated	1 (0.3)	1 (1.1)		
Single/Never Married	11 (3.6)	5 (5.3)	6 (2.9)	0.001 ^b
Widowed	140 (46.4)	24 (25.5)	117 (55.7)	
Divorced	5 (1.6)		5 (2.4)	
Place of Residence, n (%)				
Ulaanbaatar	162 (53.3)	50 (53.2)	112 (53.3)	
Provincial Center	67 (22.0)	19 (20.2)	48 (22.9)	0.814 ^b
Sub-province	75 (24.7)	25 (26.6)	50 (23.8)	
Education Level, n (%)				
Illiterate or primary (0-4 years)	49 (16.1)	15 (15.9)	34 (16.2)	
Secondary (8 years)	53 (17.4)	17 (18.1)	36 (17.1)	
High-School (9-10 years)	79 (26.0)	22 (23.4)	57 (27.1)	0.070 ^b
Vocational	53 (17.4)	10 (10.1)	43 (20.5)	
Higher Education	70 (23.0)	30 (31.9)	40 (19.0)	
Household Size, Mean±SD	2.00 ±2.03	2.9±2.00	3±2.06	0.908 ^a
Grandchildren in household, Mean±SD	0.49±0.96	0.42±0.98	0.53±0.96	0.345 ^a
Number of Children, Mean±SD	4.13±2.16	3.89±1.98	4.5±2.21	0.024 ^a
Employed last month, n (%)	48 (15.8)	19 (20.2)	29 (13.8)	0.157 ^b
Living Alone, n (%)	49 (16.1)	12 (12.2)	37 (17.9)	0.468 ^b
Self-rated health, n (%)				
Very Good	20 (6.6)	9 (9.6)	11 (5.2)	
Good	94 (30.9)	29 (30.9)	65 (31.0)	
Average	157 (51.6)	46 (48.9)	111 (52.9)	0.582 ^b
Poor	31 (10.2)	10 (10.6)	21 (10.0)	
Very Poor	2 (0.7)	0 (0.0)	2 (1.0)	
Assistance in Daily Activities, Mean±SD	0.62±1.55	0.62±1.55	0.62±1.1	0.592 ^c

^aIndependent two-sample T-test, ^bPearson's Chi-square test, ^cFisher's Exact test, n: Sample size, SD: Standard deviation

4.2 Social Functioning among Older Adults

The social activity determinants included support for activities of daily living, loneliness, social networks of family and friends, social participation, and the use of the Internet and information technology to assess overall well-being. Loneliness among older adult participants was evaluated based on feelings of disconnection, abandonment, or isolation. Although a high number of participants reported feelings of disconnection, most stated that they did not experience loneliness (See Table 4.2).

The average composite score for the social networks of the older adults who participated in the study was 18.20±6.00, with family and sibling connections averaging 9.93±3.30 and friendships averaging 8.90±4.00. However, no statistically significant dif-

Table 4.2: Social Functioning by Sex

Indicator	Total (n=304)	Male (n=94)	Female (n=210)	P Value
Loneliness (alpha=0.75)	3.56±1.1	3.56±1.08	3.55±1.11	0.349 ^a
Feels disconnected from others	1.20±0.48	1.24±0.45	1.24±0.49	0.965 ^a
Feels abandoned by others	1.16±0.43	1.17±0.43	1.15±0.43	0.473 ^a
Feels isolated from others	1.16±0.43	1.14±0.40	1.17±0.44	0.399 ^a
Social Network (alpha=0.77), Mean±SD (alpha=0.77)	18.20±6.00	18.45±7.12	18.18±5.41	0.965 ^a
Friends Network, Mean±SD (alpha=0.82)	8.86±4.00	8.73±4.58	8.91±3.73	0.738 ^b
Family Network, Mean±SD (alpha=0.75)	9.33±3.64	9.48±3.53	9.26±3.29	0.604 ^a
Social Participation (0-7 points)	3.11±1.87	3.78±1.66	2.80±1.89	0.048 ^a
Volunteering n(%)	112 (36.8)	36 (38.3)	76 (36.2)	0.725 ^b
Cared sick/Disabled n(%)	87 (28.6)	22 (23.4)	65 (31.0)	0.178 ^b
Helped Family/Friends/Neighbors n(%)	240 (78.9)	81 (86.2)	159 (75.7)	0.039 ^b
Educational Courses n(%)	64 (21.1)	17 (18.1)	47 (22.4)	0.396 ^b
Sports/Social/Club n(%)	154 (50.4)	40 (42.6)	114 (54.3)	0.059 ^b
Religious Activities n(%)	137 (45.1)	41 (43.6)	96 (45.7)	0.734 ^b
Political/Public Activities n(%)	146 (48.0)	43 (45.7)	103 (49.0)	0.594 ^b

^a Independent sample T-test, ^b Pearson's Chi-square test, ^α Cronbach's alpha, *n* - Sample size, SD - Standard deviation.

ferences were observed between these scores. When asked if they received regular support from family, friends, or neighbors in daily activities, 30.9% of the older adult participants responded affirmatively. This may be attributed to the fact that our sample consisted mainly of individuals in health groups 1-3, indicating a relatively independent population. The average friendship network score for older adults was 0.2 points lower than that for women, while the family and sibling network score for men was 0.2 points higher than for women, with no statistically significant differences observed. On average, each older adult participant participated in 3.11 social activities per month, with men participating more frequently (3.78±1.66) compared to women (2.80±1.89), indicating a higher level of social participation among men. During the past month, the types of social involvement among participants in older adults were classified as follows: 36.8% engaged in volunteering, 28.6% cared for a sick or disabled individual, 78.9% provided support to family or friends, 21.1% attended educational courses, 50.7% participated in sports or club events, 45.1% participated in religious activities, and 48.0% participated in political/public activities. Female participants were twice as likely as males to engage in social participation activities such as volunteering and supporting friends or family. A comparison of social, demographic, and self-reported health indicators in urban and rural settings is summarized in Table 4.3.

Table 4.3: Sociodemographic Characteristics among Study Population

Indicator	Urban (n=162)	Rural (n=142)	Total (n=304)	P Value
Demographic Determinants, n (%)				
Age, Mean±SD	63.9±7.21	64.2±6.99	64.0±7.10	0.728
Age Group				
55-59 years, n (%)	62 (20.4)	49 (16.1)	111 (36.5)	0.868 ^b
60-64 years, n (%)	36 (11.8)	31 (10.2)	67 (22.0)	
65-69 years, n (%)	25 (8.2)	26 (8.6)	51 (16.8)	
70+ years, n (%)	39 (12.8)	36 (11.8)	74 (24.7)	
Male, n (%)	50 (30.9)	44 (31.0)	94 (30.9)	1.000 ^b
Married, with spouse, n (%)	87 (53.7)	59 (41.5)	146 (48.0)	0.040 ^b
Number of Children, Mean±SD	4.06±2.03	4.60±2.23	4.31±2.16	0.032 ^c
Grandchildren in household, n (%)	50 (31.0)	38 (27.0)	88 (28.9)	0.052 ^c
Education Level, n (%)				
illiterate or primary (0-4 years)	7 (4.3)	42 (29.6)	48 (15.8)	< 0.001 ^b
Secondary (8 years)	17 (10.5)	36 (25.4)	53 (17.5)	
High School (9-10 years)	46 (28.4)	33 (23.2)	79 (26.1)	
Vocational	36 (22.2)	17 (12.0)	53 (17.5)	
Higher Education	56 (34.6)	14 (9.9)	70 (23.1)	
Employed last month, n (%)	25 (15.4)	23 (16.2)	48 (15.8)	0.850 ^b
Live Alone, n (%)	18 (11.1)	31 (21.8)	49 (16.1)	0.011 ^a
Years retired, Mean±SD	11.7 ±8.8	11.8 ±9.5	11.7 ±9.0	0.975 ^c
Health Determinants				
Self-rated health, Mean±SD				
Excellent	17 (10.5)	3 (2.1)	20 (6.6)	0.290 ^a
Good	37 (22.8)	57 (40.1)	94 (30.9)	
Average	88 (54.3)	69 (48.6)	157 (51.6)	
Poor	18 (11.1)	13 (9.2)	31 (10.2)	
Very Poor	2 (1.2)		2 (0.7)	
Receives Daily Activity Assistance, n (%)	0.49 (0.9)	0.76 (1.5)		0.680 ^c
Social and Psychological Determinants, Mean±SD				
Social Network ($\alpha = 0.77$)				
Friends Network ($\alpha = 0.82$)	17.69± 6.23	18.80± 5.79	18.2± 6.0	0.097 ^c
Family Network ($\alpha = 0.75$)	8.54± 4.19	9.23± 3.76	8.86±4.00	0.135 ^c
	9.11± 3.22	9.58± 3.51	9.33±3.64	0.228 ^c
Loneliness				
	3.42± 0.92	3.64± 1.15	3.52±1.02	0.086 ^c
Social Participation, Mean±SD				
Volunteering, n (%)	2.53± 1.82	3.74± 1.72	3.09±1.87	< 0.001 ^c
Cared for Sick/Disabled, n (%)	50 (30.9)	62 (43.7)	112 (36.8)	0.021 ^a
Cared for Sick/Disabled, n (%)	45 (27.8)	42 (29.6)	87 (28.6)	0.729 ^a
Helped Family/Friends/Neighbors, n (%)	126 (77.8)	114 (80.3)	240 (78.9)	0.593 ^a
Educational Courses, n (%)	32 (19.8)	32 (22.5)	64 (21.1)	0.553 ^a
Sports/Clubs/Social, n (%)	65 (40.1)	89 (62.7)	154 (50.37)	<0.001 ^a
Religious Activities, n (%)	40 (24.7)	97 (68.3)	137 (45.1)	< 0.001 ^a
Political/Public Activities, n (%)	51 (31.5)	95 (66.9)	146 (48.0)	< 0.001 ^a

^a Chi-square test, ^c Independent sample T-test, α Cronbach's alpha, *n* - Sample size, *SD*-Standard deviation.

The average age of all participants was 64. A statistically significant difference ($p < 0.040$) was found in marital status, with 53.7% of urban older adult participants living with their spouse, compared to 41.5% of rural older adult participants. The average number of children was 4 for urban older adults, whereas it was 4.6 for rural participants. Additionally, approximately one in two urban older adults took care of their grandchild-

dren, while this figure was one in three for rural older adults, also showing statistical significance ($p < 0.052$). Regarding education, 56.8% of urban older adults reported having vocational or higher education, compared to only 22.0% in rural areas, indicating a significant difference ($p < 0.001$). Urban older adult individuals also rated their health higher and required less assistance with daily activities than rural older adults. Rural older adults participated in an average of 3.7 types of activities per month, compared to 2.5 for urban older adults, showing a statistically significant difference ($p < 0.032$). Social participation analysis revealed that approximately 6 out of 10 rural older adults engaged in sports, social, religious, and public activities, while this ratio was 4 out of 10 among urban older adults, again with a statistically significant difference ($p < 0.001$).

4.3 Flourishing and Determinants among Older Adults

The first indicator used to assess the psychological well-being of older adults was flourishing, which reflects mental strength and resilience. This was measured through the following 8 statements:

1. I live a purposeful and meaningful life.
2. The people I interact with support and encourage me.
3. I have things to do each day, and I enjoy them.
4. I actively contribute to the happiness and well-being of others.
5. I am capable and have the ability to accomplish things that matter to me.
6. I am a good person and lead a fulfilling life.
7. I look forward to the future with flourishing.
8. People respect me.

Participants responded to each statement on a scale from 1 to 7, indicating their level of agreement. The median score for flourishing among older adults was 52, reflecting a high level of mental resilience and strength. The Cronbach's alpha coefficient, which indicates the consistency of these flourishing sub-indicators, was 0.76. Using multiple regression analysis, we examined the determinants from demographics, health, social, and psychological domains that influenced the overall flourishing score. Differences were observed in determinants affecting flourishing between urban and rural older adult individuals (Table 4.4).

For the overall population of older adults, flourishing differed significantly according to urban or rural residence, employment status in last month, self-rated health status, participation in social activities, and social network of friends. Individuals of older men (median score = 51) tended to have a lower flourishing than females (median score = 52), although the difference was not statistically significant ($p = 0.082$). In more detail, most older adult respondents, in both sexes, selected the lowest scores for statements such as "I am capable of doing what I consider important" and "People I interact with support and encourage me" (See Figure 4.1).

Table 4.4: Determinants of Flourishing: Multiple Linear Regression Analysis

Variable	Total (n=300)	Urban (n=160)	Rural (n=140)
	β (Std. Error)	β (Std. Error)	β (Std. Error)
Constant	45.909 (3.845)	55.524 (5.040)	40.573 (6.503)
Age	-0.016 (0.058)	-0.078 (0.076)	0.049 (0.095)
Sex (female)	-1.194 (0.684)	-0.799 (0.888)	-1.664 (1.100)
Education Level	0.478 (0.232)	-0.141 (0.326)	0.834 (0.361)
Married (living with spouse)	-0.199 (0.580)	-0.224 (0.752)	-0.654 (0.955)
Household Size	0.294 (0.135)	0.063 (0.178)	0.522 (0.215)
Years retired	0.045 (0.042)	0.056 (0.057)	0.047 (0.065)
Self-rated health	-0.693 (0.376)	-0.629 (0.475)	-1.028 (0.672)
Assistance with ADL	-0.725 (0.230)	-0.565 (0.415)	-0.795 (0.285)
Employed last month	1.720 (0.772)	0.786 (1.126)	2.213 (1.119)
Family Network	0.047 (0.083)	-0.051 (0.125)	0.084 (0.118)
Friend Network	0.311 (0.077)	0.21 (0.100)	0.468 (0.124)
Social Participation	0.318 (0.153)	0.519 (0.205)	0.049 (0.243)
Internet Usage	-0.053 (0.747)	0.390 (0.897)	-0.153 (1.442)
Lives in Urban Area	1.819 (0.65)		
R ² / Adj.-R ²	0.304 / 0.270	0.168 / 0.094	0.436 / 0.378

P-values: $P > 0.05$, R^2 - Determination Coefficient, Adj.- R^2 - Adjusted Determination Coefficient, ns ($P > 0.05$), * ($P \leq 0.05$), ** ($P \leq 0.01$), *** ($P \leq 0.001$), B - Regression Coefficient.

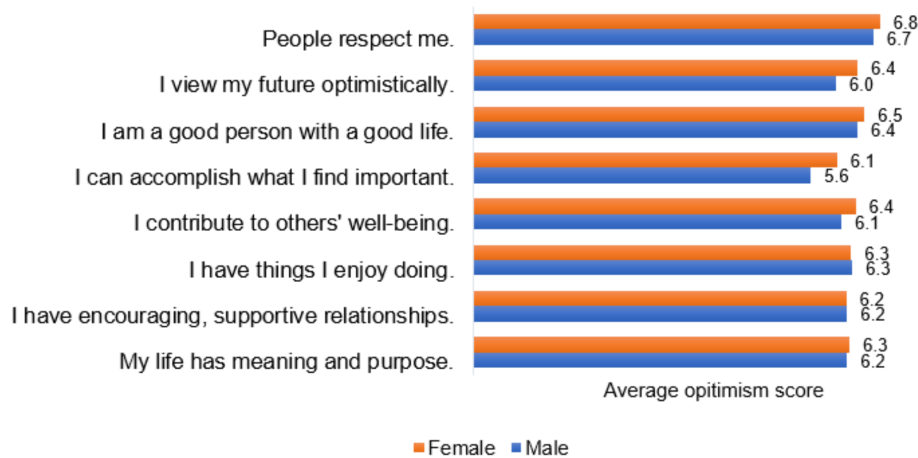


Figure 4.1: Flourishing Sub-Indicators by Sex

When examining marital status, married older adult individuals living with their spouses had higher flourishing scores compared to those who were single, widowed, or divorced; however, this difference was not statistically significant (See Figure 4.2).

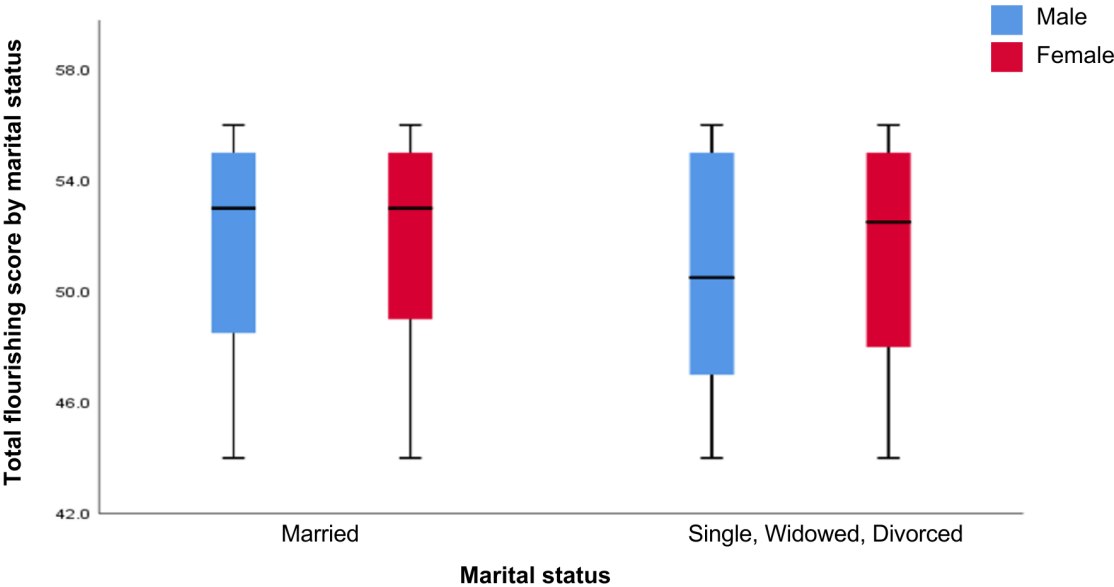


Figure 4.2: Flourishing and Marital Status

In terms of location, older adult residents of Ulaanbaatar (median score = 53) exhibited significantly higher flourishing compared to those living in rural areas (median score = 50), as illustrated in the box plot (See Figure 4.3).

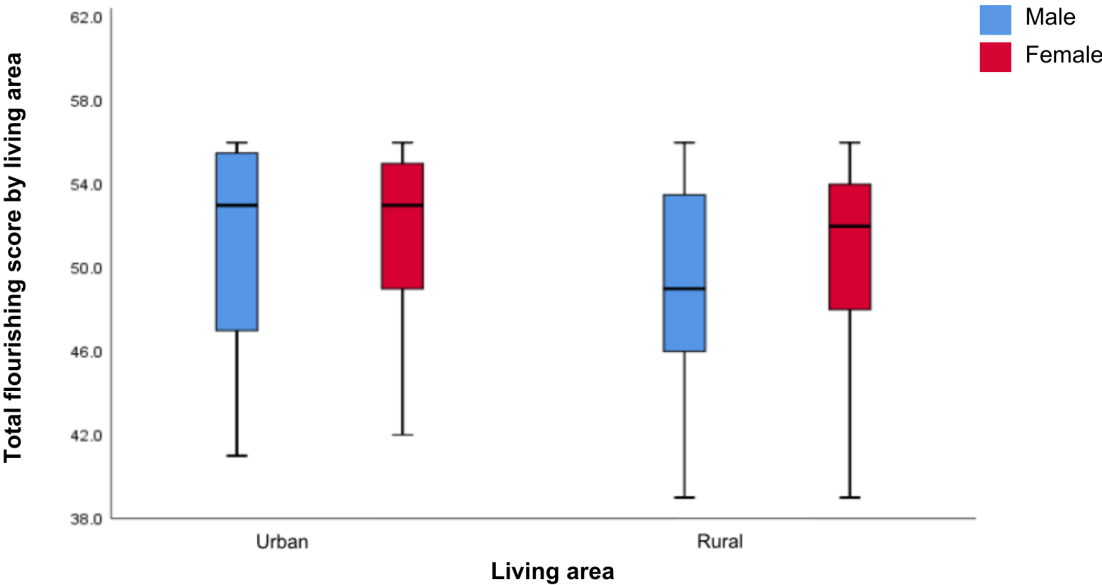


Figure 4.3: Flourishing by Residence and Sex

When analyzing the subscales of flourishing for older adults living in rural areas, they

showed lower scores compared to those living in urban areas for all subscales (See Figure 4.4).

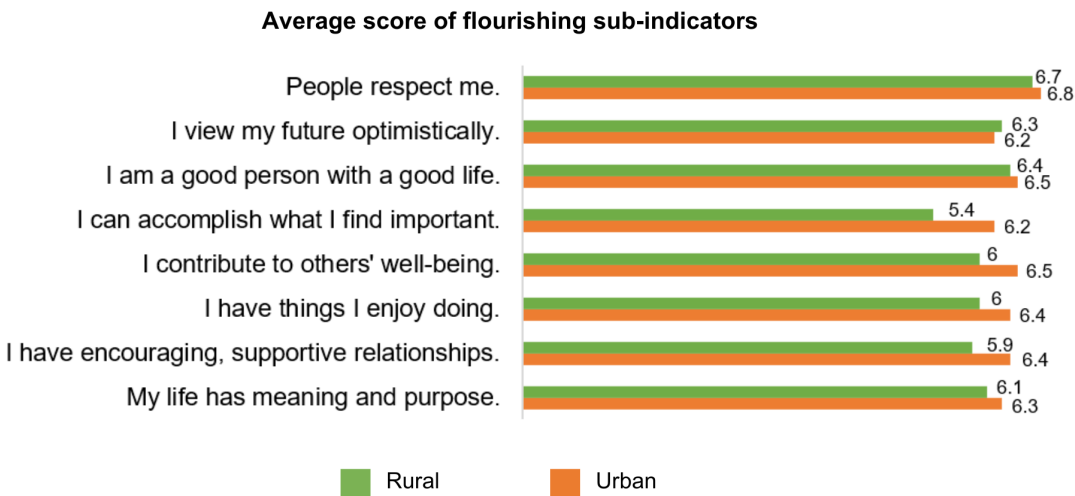


Figure 4.4: Flourishing in Urban vs. Rural Areas

The Flourishing levels of older adult individuals show a statistically significant correlation with education level. Specifically, for each increase in education level, flourishing scores rose by 0.5 points ($p=0.041$) among the general older adult population, while in rural areas, the score increased by 0.7 points ($p=0.022$) (See Table 3.3). Figure 4.5 illustrates the flourishing scores by education level in urban and rural settings, highlighting that older adults with higher education have consistently higher average flourishing scores across city, provincial, and district areas compared to those with lower levels of education, such as illiterad, primary or secondary education (0-4 years or up to 8 years).

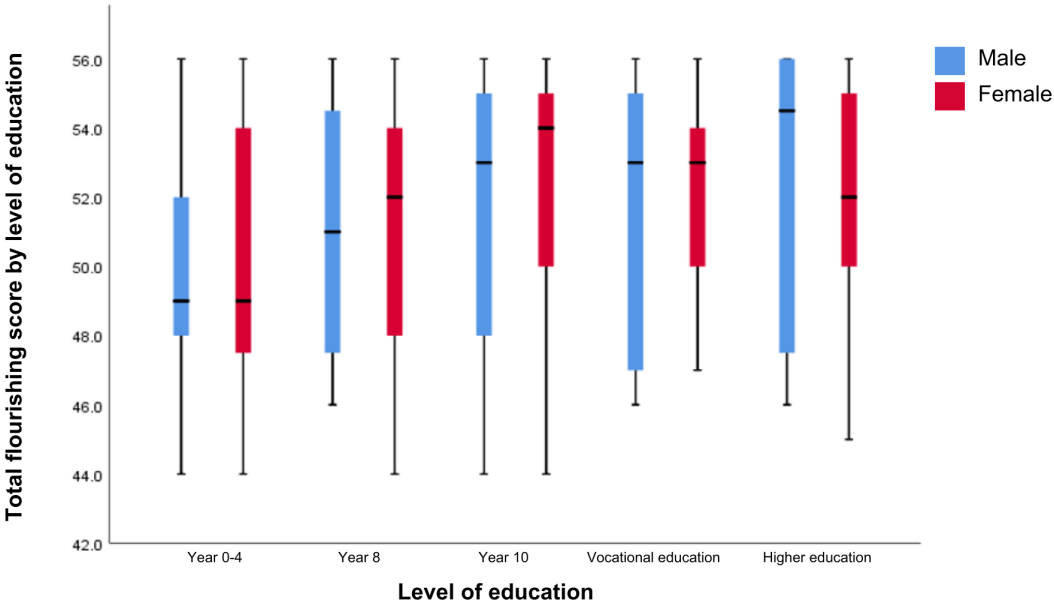


Figure 4.5: Flourishing by Education Level and Residence

The flourishing scores of older adult participants were also correlated with household size. Specifically, each additional household member increased flourishing scores by 0.3 points ($p=0.030$) for the total older adult population, and by 0.5 points ($p=0.017$) among rural participants. Older adults with a positive their self-rated health had higher flourishing scores, whereas those who rated their health as fair or poor had lower flourishing scores. For each one-level increase in self-rated health, flourishing scores tended to increase by 0.7 points ($p=0.070$) (See Figure 4.6).

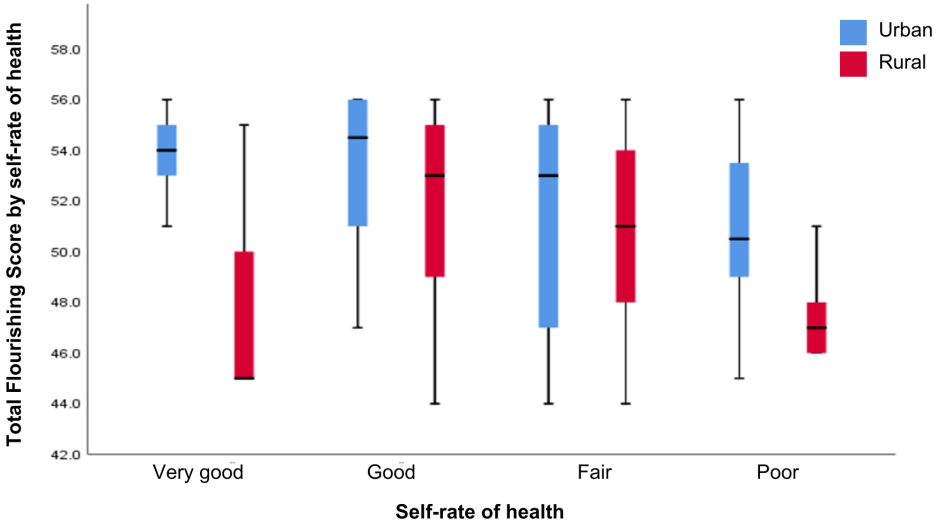


Figure 4.6: Flourishing and Health by Residence

In the study, the number of participants receiving assistance on daily living activities was inversely correlated with flourishing indicators, showing statistical significance for rural and overall older adults populations. Specifically, each 1-point increase in assistance for daily activities led to a 0.7-point decrease in flourishing score ($p=0.002$) for the general older adults population and a 0.8-point decrease ($p=0.006$) in rural areas (See Figure 4.7).

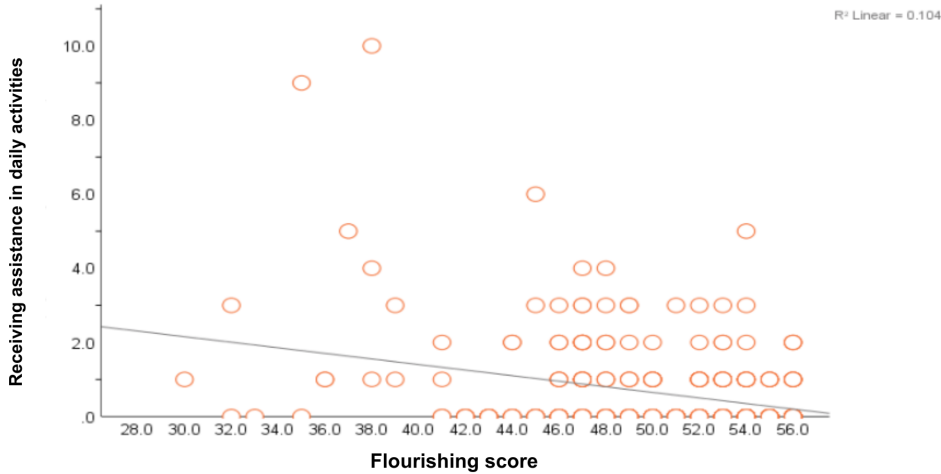


Figure 4.7: Flourishing and Number of Instances of Receiving Assistance in Daily Activities

Let us elaborate on the determinants of social participation that influence the flourishing of the older adults. In our study, employed older adults participants ($p=0.027$) exhibited a higher level of flourishing compared to those who were unemployed (See Figure 4.8). In rural areas, this indicator increased further, showing statistical significance ($p=0.005$).

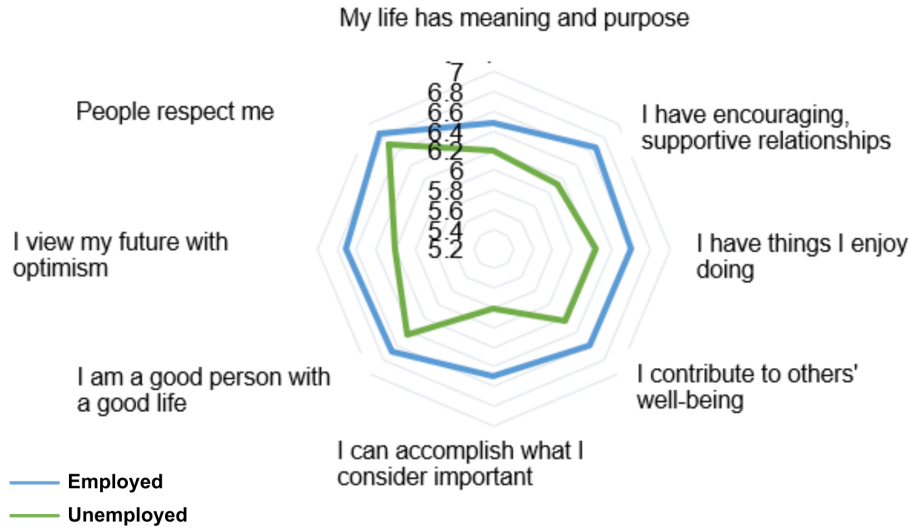


Figure 4.8: Flourishing and Employment

As the social network of friends among the total older adults population increased, their flourishing scores also rose. Specifically, for urban older adults, each 1-point increase in the social network score led to a 0.21-point increase in flourishing ($p=0.038$), while in the rural group, it increased by 0.47 points ($p=0.001$). For the overall older adults population, the flourishing score increased by 0.31 points ($p=0.001$), indicating high statistical significance (See Figure 4.9).

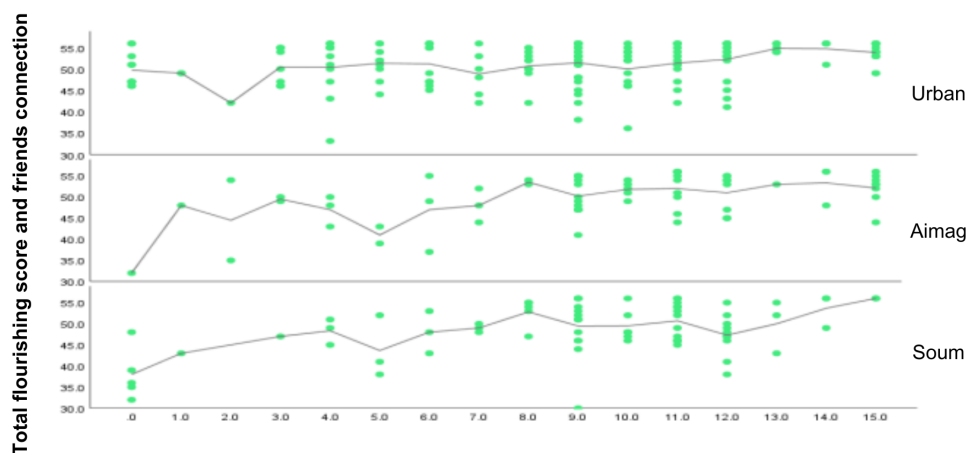


Figure 4.9: Flourishing and Social Network of Friends

In examining social participation, we studied whether participants had engaged in seven types of activities over the past month, which included: 1) volunteering, 2) care-

giving for individuals who are ill or disabled, 3) helping family, friends, or neighbors, 4) attending educational courses or training, 5) participating in sports, social, or club activities, 6) religious activities, and 7) political or public events. In the multiple regression analysis, the total number of activities was compared to the flourishing indicators. For urban older adults, each additional social participation led to a 0.52-point increase in flourishing ($p=0.012$), while for the overall older adults population, it increased by 0.32 points ($p=0.039$). When social participation was analyzed by type in relation to flourishing, the highest levels were observed among older adults participants in both urban and rural areas who engaged in educational courses, training, or volunteering (See Figure 4.10).

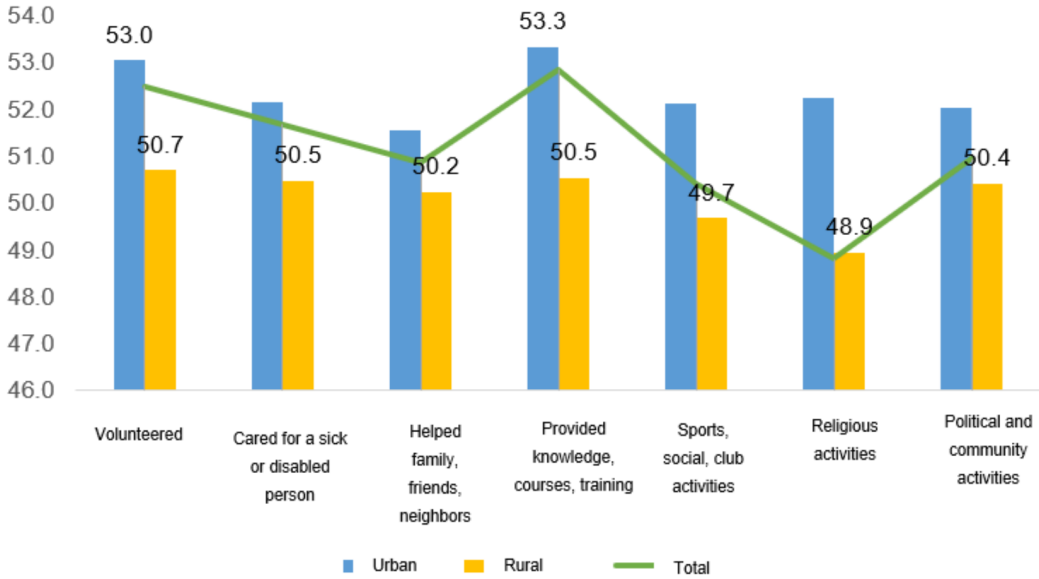


Figure 4.10: Flourishing and Social Participation

In conclusion, older adults who engage in self-development activities, participate in volunteering, maintain strong social networks with friends, are employed, and positively assess their health exhibit higher levels of flourishing in both urban and rural settings.

4.4 Life Satisfaction and Determinants among Older Adults

A secondary measure of psychological well-being is an individual’s assessment of their satisfaction with their current life. Life satisfaction was evaluated using the question, “How satisfied are you with the life you have lived?” Responses were scored on a scale from 0 to 10, with the average satisfaction level among older adult participants being 7.5. This score showed no significant gender differences; however, it revealed statistically significant differences based on residence. For instance, the average satisfaction score for older adult men living in urban areas was 8.2, while those residing in rural areas had an average score of 7, indicating a difference of 1.2 points (See Figure 4.11).

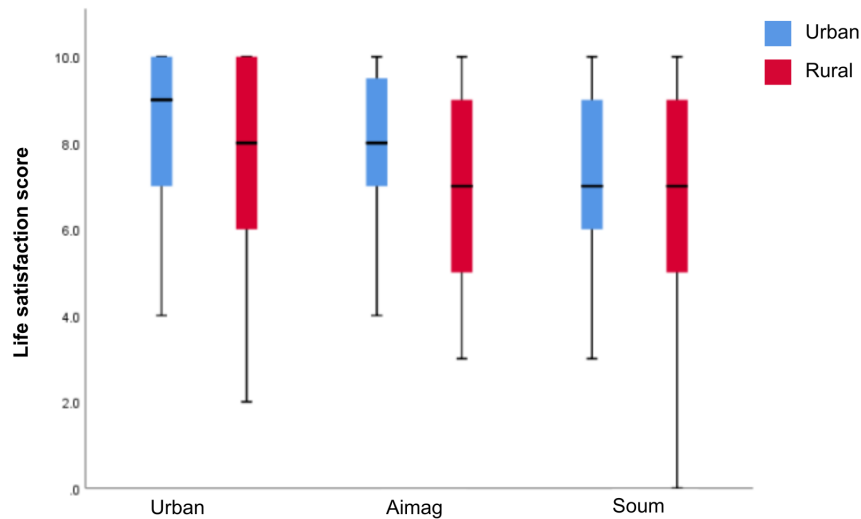


Figure 4.11: Life Satisfaction by Residence and Sex

When examining age-related differences in life satisfaction, a decline was observed beginning in the first 10 years following retirement, with no significant differences between urban and rural areas. Although life satisfaction levels among older adult women appeared to vary with age more than in men, this difference was not statistically significant (See Figure 4.12).

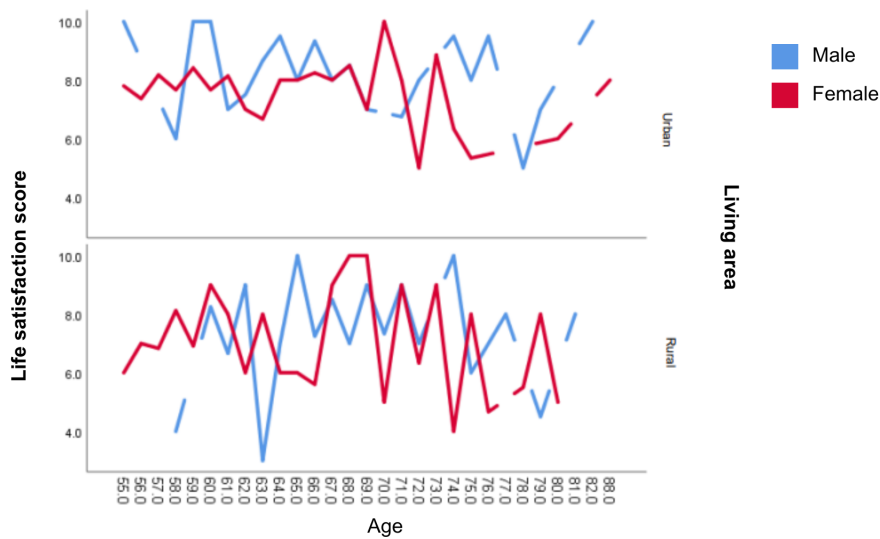


Figure 4.12: Life Satisfaction and Age

To explore the determinants of these differences in life satisfaction, a hierarchical linear regression model was created using the following groups of determinants: a) demographic determinants including age, sex, marital status, education level, presence of children and grandchildren, and employed last month; b) health determinants such as self-rated health, assistance on ADL, and presence of chronic illness; c) social and psychological determinants including participation in seven types of social participation, loneliness, and Affect Balance; and d) rural or urban residence. Four models were analyzed accordingly. In the first model, demographic determinants such as age, sex, marital status, education

level, number of children in household or children, and employment explained 10% of the variance in life satisfaction. Among these, higher education, number of grandchildren in household, and employment had the strongest positive impact on life satisfaction ($R^2 = 0.103, p < 0.001$). In the second model, adding self-rated health and need for assistance in daily activities increased the explained variance to 15% ($R^2 = 0.153, p < 0.001$). self-rated health had a consistent positive effect on life satisfaction, independent of other determinants ($\beta = -0.64; SE = 0.17, p < 0.001$); a one-level increase in health rating corresponded to a 0.6-point rise in life satisfaction. In the third model, adding social participation, family, and network determinants, as well as loneliness indicators, further increased the explanatory power to 26% ($R^2 = 0.261, p < 0.001$). Notably, caregiving for a sick or disabled individual showed an inverse relationship, decreasing life satisfaction by 0.5 points ($\beta = -0.52, p = 0.001$), while loneliness scores correlated negatively, decreasing by 0.3 points ($\beta = -0.25, p = 0.003$). Finally, adding residential location as the fourth determinant increased the explained variance to 27% ($R^2 = 0.278, p < 0.010$). Older adults residing in Ulaanbaatar reported significantly higher life satisfaction levels compared to those living in rural areas ($\beta = 0.74, p = 0.001$) (See Table 4.5).

Table 4.5: Determinants of life satisfaction: Multiple regression analysis

Model	I	II	III	IV
Independent Variables	B (SE)	B (SE)	B (SE)	B (SE)
Constant Value	7.47 (1.31)	9.63 (1.44)	9.22 (1.64)	10.30 (1.68)
Age	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Sex=Female	-0.50 (0.30)	-0.42 (0.29)	-0.39 (0.03)	-0.43 (0.28)
Marital Status=Married	0.03 (0.25)	0.11 (0.25)	0.06 (0.25)	0.06 (0.24)
Education=Secondary	0.65* (0.31)	0.59* (0.30)	0.51 (0.30)	0.33 (0.30)
Education=Vocational	1.19*** (0.35)	0.94 (0.35)	0.80* (0.35)	0.53 (0.36)
Education=Higher	0.84** (0.32)	0.75* (0.32)	0.60 (0.32)	0.27 (0.36)
Number of Children	0.06 (0.06)	0.06 (0.06)	0.02 (0.06)	0.02 (0.06)
Grandchildren in household	0.27* (0.12)	0.26* (0.12)	0.27* (0.12)	0.25* (0.12)
Employed last month=Yes	0.89* (0.33)	0.69* (0.32)	0.42 (0.32)	0.49 (0.31)
self-rated health		-0.64** (0.17)	-0.48** (0.17)	-0.50** (0.06)
Assistance in Daily Activities		-0.07 (0.10)	-0.02 (0.10)	0.02 (0.10)
Chronic Illness=Yes		-0.32 (0.25)	-0.45 (0.24)	-0.41 (0.24)
Affect Balance			0.10** (0.03)	0.10** (0.03)
Loneliness			-0.25* (0.11)	-0.23* (0.11)
Family Network			0.04 (0.04)	0.05 (0.04)
Friends Network			0.01 (0.03)	0.02 (0.03)
Volunteering=Yes			0.46 (0.28)	0.43 (0.27)
Caregiving for Sick/Disabled=Yes			-0.52* (0.26)	-0.52* (0.26)
Helping Family/Friends=Yes			0.31 (0.30)	0.24 (0.29)
Training Participation=Yes			0.39 (0.31)	0.33 (0.31)
Sports Events Participation=Yes			-0.24 (0.25)	-0.18 (0.25)
Religious Activities=Yes			-0.19 (0.25)	0.01 (0.26)
Political/Public Events=Yes			0.04 (0.25)	0.23 (0.26)
Residence=Rural				-0.74** (0.28)
R ² / Adj.-R ²	0.103/0.075	0.153/0.118	0.261/0.200	0.278/0.216
F change/ Sig.F.Change	3.734/0.0002	5.779/0.0008	3.714/0.0001	6.690/0.0102

Explanation: ^B Regression Coefficient: Indicates the strength and direction of the relationship between each independent variable and life satisfaction. SE - Standard Error: Measures the accuracy of the coefficient estimate. R^2 - Coefficient of Determination: Represents the proportion of variance in life satisfaction explained by the model. Adj.- R^2 - Adjusted Coefficient of Determination: Provides a more accurate R^2 by adjusting for the number of predictors in the model. ns - Not Significant ($P > 0.05$): Indicates no statistically significant relationship. * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$: Levels of significance, with more asterisks indicating stronger statistical significance.

Let us discuss the determinants that positively and negatively influence the life satisfaction of older adult participants in the study. Among the respondents, 28.9%, or approximately one in ten older adults, live with one or more grandchildren. The number of cohabiting grandchildren appears to positively impact life satisfaction. Specifically, when examining the relationship between the number of grandchildren and life satisfaction levels, those living with one grandchild reported an average life satisfaction score of 7.9, while those living with three or more grandchildren reported a higher score of 8.4 (See Figure 4.13).

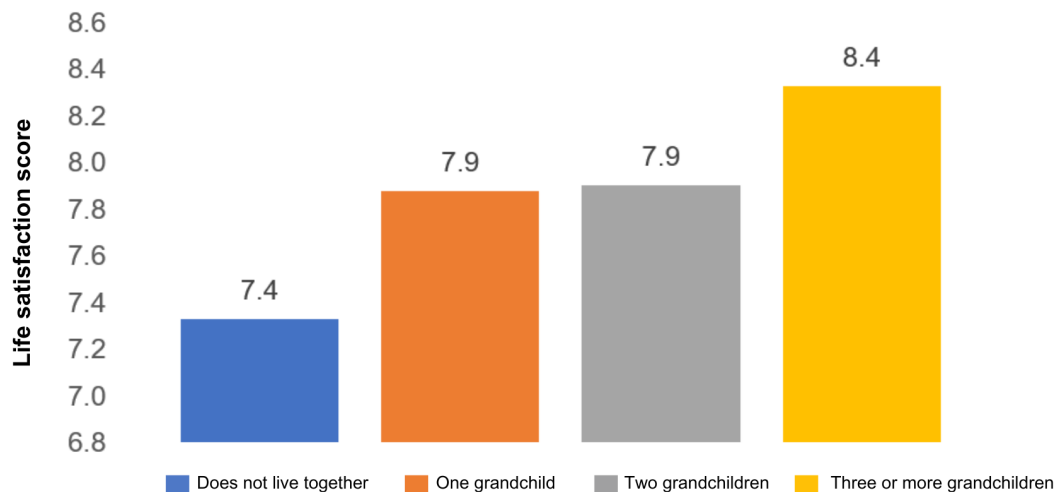


Figure 4.13: Life Satisfaction and Number of Grandchildren

The self-rated health of older adult participants in the study was directly correlated with their life satisfaction. Older adults who rated their health as good had life satisfaction scores 1.2 points higher than those who rated their health as poor or average, showing statistically significant differences across both urban and rural areas ($p < 0.001$) (See Figure 4.14).

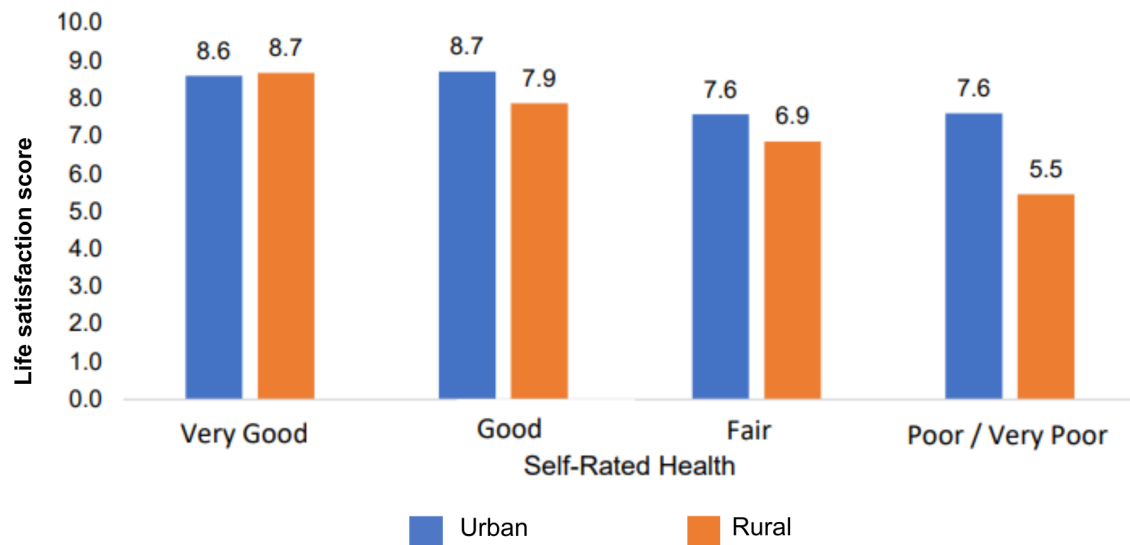


Figure 4.14: Life Satisfaction and self-rated health

Two social determinants demonstrated an inverse relationship with life satisfaction scores among older adult participants: feelings of loneliness and caregiving for sick or disabled individuals. The measure of loneliness included three statements—feeling disconnected from others, feeling abandoned, and feeling isolated—creating a combined coefficient. This measure showed statistically significant differences between urban and rural participants. In the study, 6% of the older adult respondents reported feeling lonely all the time, while 19% occasionally felt disconnected from others (See Table 4.6).

Table 4.6: Subscale of Loneliness

Response Option	Feels Disconnected from Others n(%)	Feels Abandoned n(%)	Feels Isolated n(%)
Never	240 (79.0)	267 (88.0)	265 (87.0)
Sometimes	58 (19.0)	31 (10.0)	32 (11.0)
Always	6 (6.2)	6 (6.2)	7 (7.2)

The negative impact of loneliness on life satisfaction scores is illustrated in the figure below. Figure 4.15 shows the prevalence of loneliness and the corresponding average life satisfaction scores. For those who experience feelings of loneliness sometimes or always, life satisfaction scores fluctuate between 5 and 6.5.

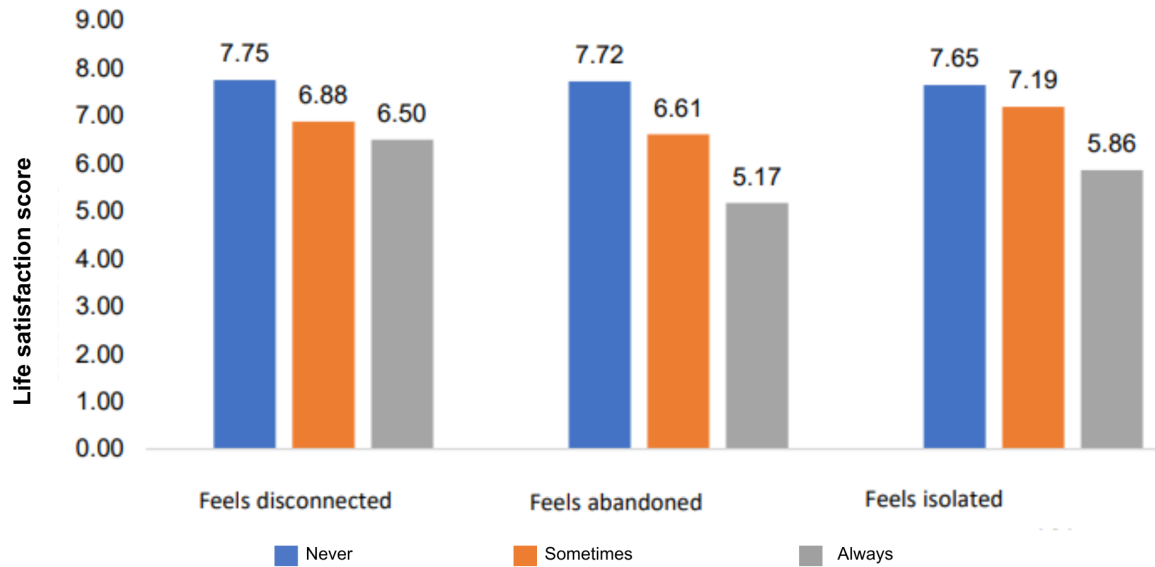


Figure 4.15: Life Satisfaction by Loneliness Subscale

A social determinant negatively impacting life satisfaction among older adults was recent caregiving for someone who is sick or disabled. When examining life satisfaction scores in relation to participation in social activities, scores generally increased with all activities except caregiving (See Figure 4.16).

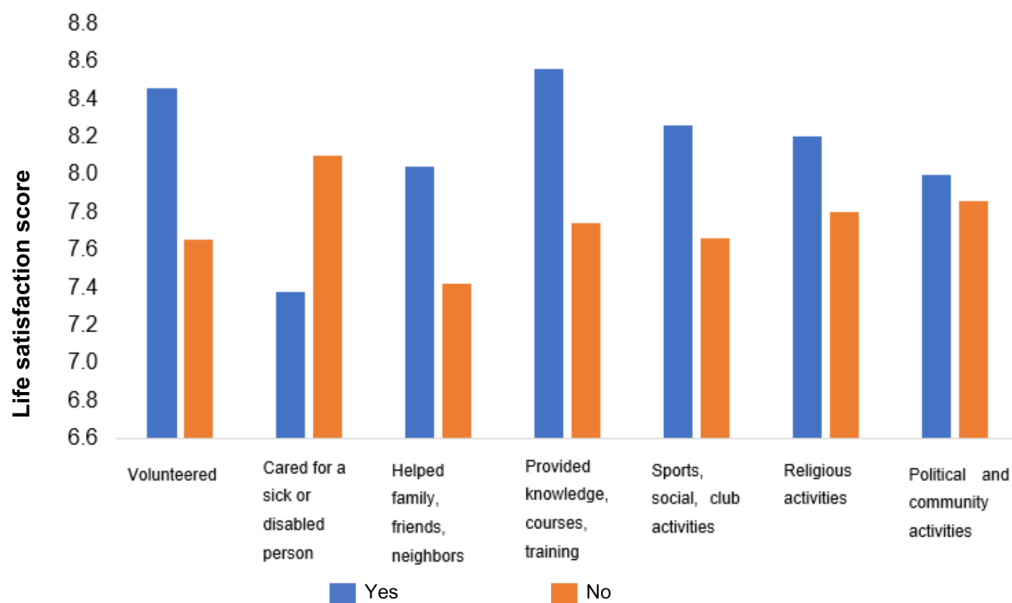


Figure 4.16: Life Satisfaction and Social Participation

To identify the determinants with the greatest gender-based impact on life satisfaction among older adults, a two-sample t-test and multiple regression analysis were conducted. The determinants of life satisfaction showed gender-based differences, as illustrated in Table 3.6. For older adult men, a one-level increase in education level resulted in a 0.3-point increase in life satisfaction. Those who reported low education level had a 1.7-point

decrease in life satisfaction ($\beta = -1.704, p = 0.001$). Furthermore, a poor self-rated health assessment decreased life satisfaction by 1.8 points ($\beta = 1.786, p = 0.002$), while employment contributed to a 0.9-point increase ($\beta = 0.924, p = 0.035$), all of which were statistically significant. For older adult women, a positive self-rated health assessment increased life satisfaction by 1.5 points ($\beta = 1.456, p = 0.001$), employment by 0.8 points ($\beta = 0.834, p = 0.037$), living in an urban area by 0.9 points ($\beta = 0.929, p = 0.002$), and volunteering by 0.8 points ($\beta = 0.790, p = 0.006$). In contrast, each point increase in loneliness score led to a 0.3-point decrease in life satisfaction ($\beta = -0.353, p = 0.013$), (See Table 4.7). In summary, positive determinants affecting life satisfaction among older adults included good self-rated health, employment, and living with grandchildren. Negative determinants included loneliness, poor health assessments, caregiving for sick or disabled individuals, and rural residence.

Table 4.7: Determinants Life Satisfaction by Sex

	Overall		Male		Female	
R ²	0.183		0.278		0.200	
Variables	β	SE	β	SE	β	SE
Constant Value	7.456***	0.46	8.097***	0.22	7.318	0.6
Low Education			-1.704***	0.49		
Poor self-rated health			-1.786**	0.57		
Good self-rated health	1.013***				1.456***	0.31
Employed last month	0.793**		0.924*	0.43	0.834*	0.4
Urban Residence	0.954***				0.929**	0.3
Loneliness	-0.328**				-0.353**	0.14
Volunteering	0.847***				0.79**	0.29

Explanation: *B* - Regression Coefficient: Indicates the strength and direction of the effect each variable has on life satisfaction. *SE* - Standard Error: Measures the accuracy of the coefficient estimate, showing the degree of variance in the prediction. *R*² - Coefficient of Determination: Represents the proportion of variance in life satisfaction explained by the model. ns-Not Significant ($P > 0.05$): Indicates no statistically significant effect. ($P > 0.05$),*($P \leq 0.05$), **($P \leq 0.01$), ***($P \leq 0.001$).

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$: Levels of statistical significance, with more asterisks indicating stronger significance.

4.5 Affect Balance and Determinants among older adults

As part of the third objective of the study, we defined a latent variable for the affect balance of the older adults and identified influencing determinants. It is understood that as people age, they tend to restrain themselves, avoid open expressions, and conceal their emotions [34], [86] making it more appropriate to measure their affect states through latent variables [56]. Therefore, we calculated the latent variable using positive emotions, such as "joy," measured by the question, "How joyful did you feel yesterday?" with a score range of 0-10. From this score, we subtracted the average score of two questions representing negative emotions: "Did you feel down or depressed yesterday?" and "Did you worry about something yesterday?". This approach results in a scale from -10, indicating negative Affect Balance, to +10, indicating positive Affect Balance. Higher scores suggest a tendency for positive responses, while lower scores indicate a tendency for negative responses. No significant impact of sex or residence was observed on the affect balance scores among older adult participants (See Figure 4.17).

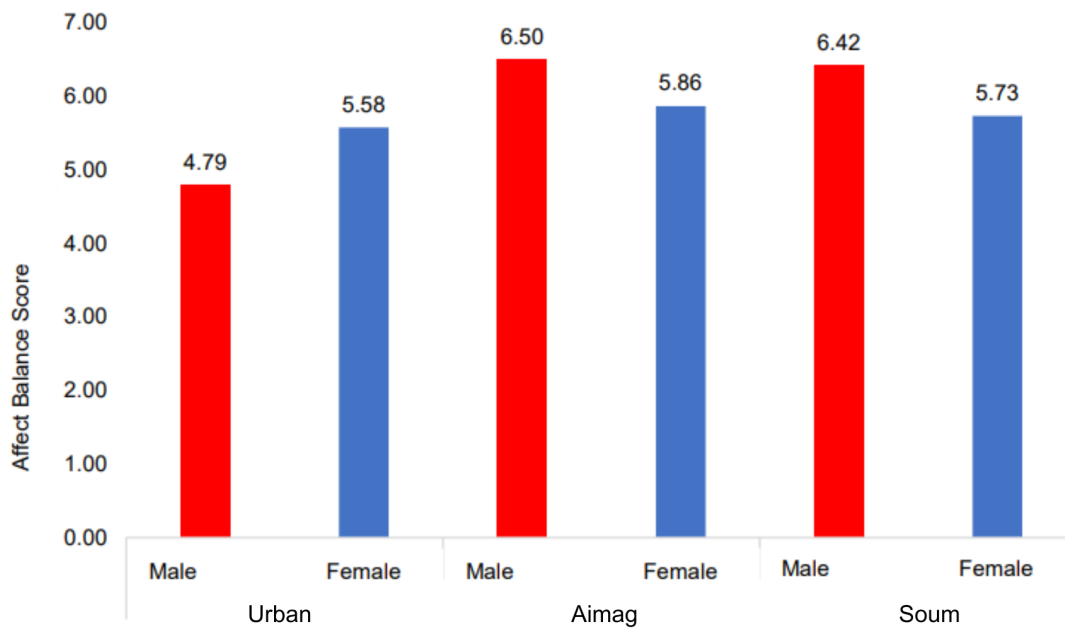


Figure 4.17: Affect Balance by Residence and Sex

Older adults living in urban areas showed slightly higher affect balance than those in rural areas, though this difference was not statistically significant. When comparing affect balance to the number of years since retirement, a negative balance was observed in the first 10 years post-retirement, shifting to a positive balance during the 10-20 year period. However, after 20 years, affect balance gradually declined again. Despite these trends, no statistically significant relationship was observed (See Figure 4.18).

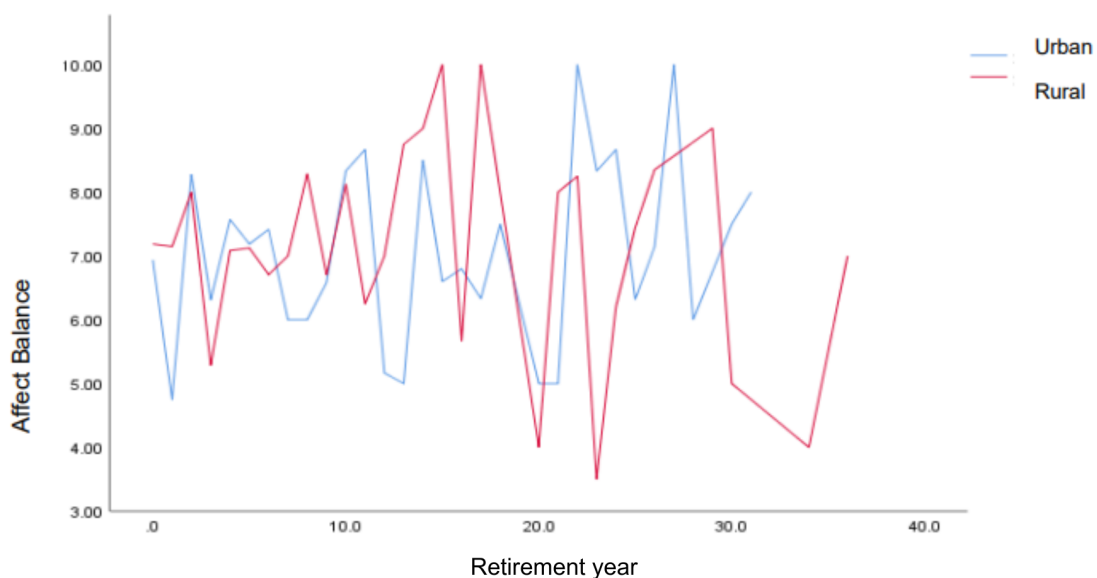


Figure 4.18: Affect Balance and years retired

Affect balance is considered an indirect measure reflecting self-rated health, showing a direct effect when analyzing these two indicators (See Figure 4.19).

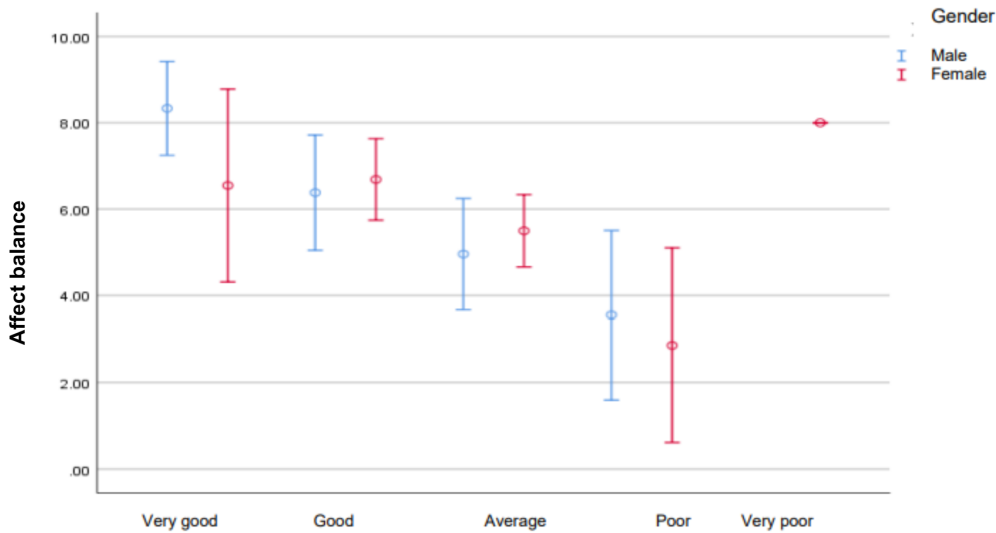


Figure 4.19: Affect Balance and self-rated health

Older adults who rated their health as good exhibited a positive affect balance, while those who rated their health as poor displayed a negative affect balance, a statistically significant relationship. Similar to previous variables, determinants affect balance were analyzed by sex using multiple regression analysis. The analysis revealed that different demographic and social determinants influenced affect balance in men and women. For the overall older adults population, those who rated their health as average ($\beta = -0.510, p = 0.021$) or poor ($\beta = -3.064, p < 0.001$) showed a direct effect on affect balance. For instance, volunteering increased affect balance by 2.2 points ($\beta = 2.219, p < 0.001$), while a poor health rating decreased it by 2.8 points ($\beta = -2.830, p = 0.003$). A summary of the detailed statistical findings is presented in the figure (See Figure 4.20).

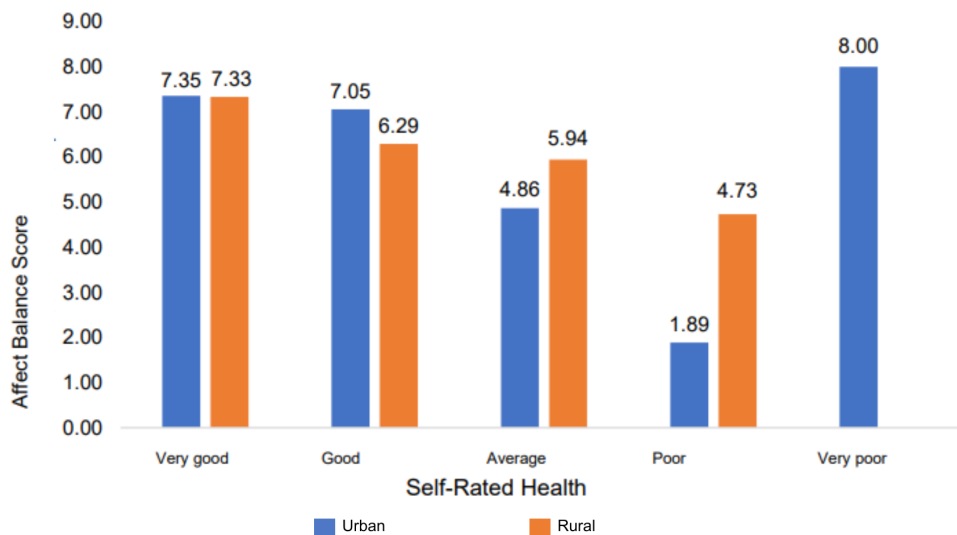


Figure 4.20: Affect Balance and self-rated health by residence

Regression analysis showed a negative correlation between loneliness and Affect Balance ($\beta = -0.510, p = 0.021$). Specifically, for men, a one-point increase in loneliness led

to a one-point decrease in Affect Balance ($\beta = -1.166, p = 0.001$), indicating an inverse relationship. When analyzing loneliness by subscale, participants who reported feeling isolated had the lowest affect balance scores (See Figure 4.21).

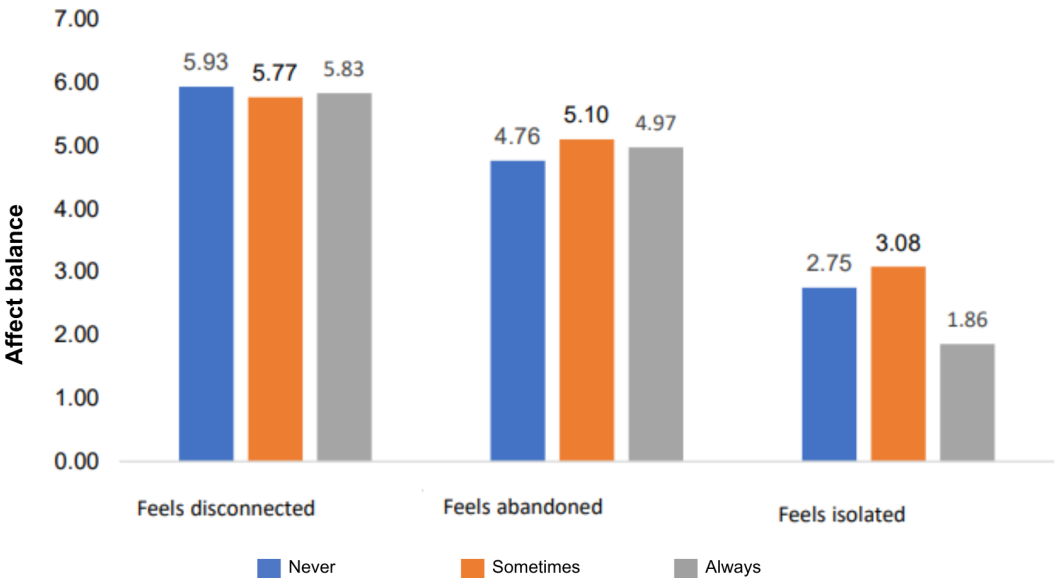


Figure 4.21: Affect Balance and Loneliness

Multiple regression analysis identified volunteering as a social determinant with a positive influence on Affect Balance. This impact is further detailed by sex in Figure 4.22.

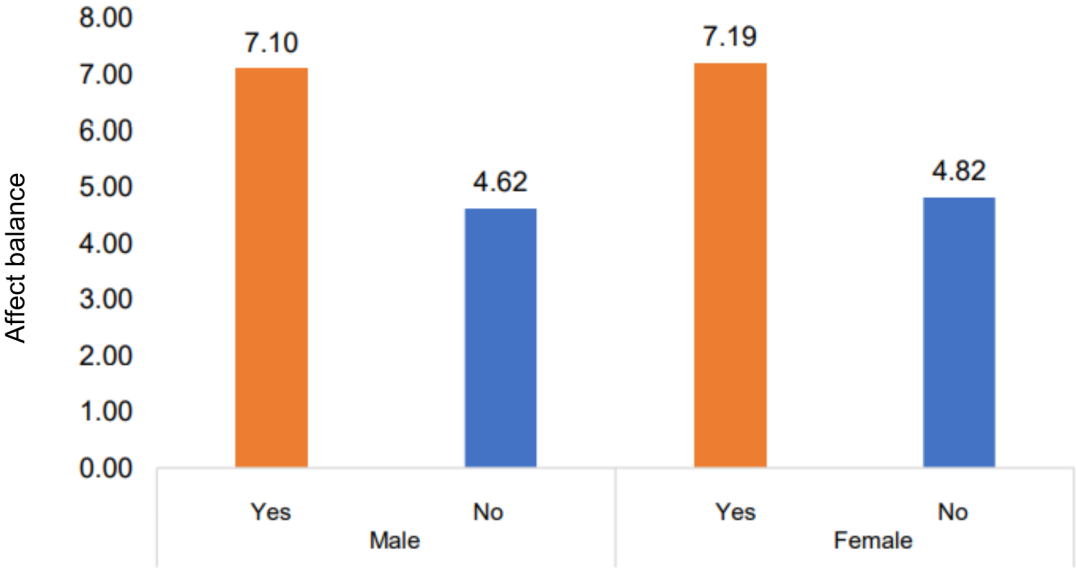


Figure 4.22: Volunteer Work and Affect Balance

For education level, older adult men with completed vocational education showed a 2.3-point increase in affect balance ($\beta = 2.321, p = 0.049$), indicating a positive correlation.

Specifically, volunteering within the past month increased the affect balance score by 2.2 points overall ($\beta = 2.182, p < 0.001$), with a 2.4-point increase for men ($\beta = 2.415, p = 0.002$) and a 2.2-point increase for women ($\beta = 2.285, p = 0.001$), as summarized in Figure 4.22.

In conclusion, positive determinants of affect balance among older adults included volunteering and having vocational education. Conversely, negative determinants impacting affect balance were poor self-rated health and feelings of loneliness or isolation (See Table 4.8).

Table 4.8: Determinants Affect Balance: Multiple Linear Regression Analysis

	Overall		Male		Female	
R2/Adj.-R2	0.144/0.132		0.239/0.214		0.107/0.098	
Variables	β	SE	β	SE	β	SE
Constant	7.507	0.843	8.603	1.278	5.159	0.375
Specialized secondary education			2.321*	1.161		
Poor self-rated health	-3.064***	0.804			-2.83**	0.954
Average self-rated health	-1.078**	0.486				
Volunteering	2.182***	0.47	2.415**	0.738	2.218***	0.596
Loneliness	-0.51**	0.22	-1.166***	0.324		

Explanation: β - Beta Coefficient: A standardized coefficient indicating the strength and direction of the relationship between each independent variable and the affect balance. R^2 (Coefficient of Determination): Represents the proportion of variance in affect balance explained by the model. adj.- R^2 (Adjusted Coefficient of Determination): Adjusted R^2 , accounting for the number of predictors in the model, providing a more accurate measure of explanatory power. SE (Standard Error of the Regression Equation): Measures the accuracy of predictions made by the regression model.

Explanation: Multiple Linear Regression Model Evaluation: Assessment of the relationship between multiple determinants and Affect Balance. β (Beta Coefficient): Standardized coefficient indicating the strength and direction of the relationship between each independent variable and the dependent variable (Affect Balance). R^2 (Coefficient of Determination): Represents the proportion of variance in Affect Balance explained by the model. adj.- R^2 (Adjusted Coefficient of Determination): Adjusted R^2 , accounting for the number of predictors in the model, offering a more accurate measure of explanatory power. SE (Standard Error of Regression Equation): Measures the accuracy of predictions made by the regression model. (Minimum Value): The lowest observed value within the data range for each variable. (Maximum Value): The highest observed value within the data range for each variable.

4.6 Co-designing with older adults

4.6.1 Usage of information and communication technology by the older adults

A review of previous study findings suggests that volunteering contributes to increased flourishing and affect balance, while employment enhances life satisfaction and flourishing. Friendships promote flourishing, relationships with grandchildren enhance life satisfaction, and positive self-rated health is associated with greater life satisfaction and flourishing. Conversely, determinants such as loneliness, poor self-rated health, reliance on assistance

for daily activities, and caregiving for sick or disabled individuals negatively impact psychological well-being (See Table 4.9).

Table 4.9: Determining factors of Psychological Well-being

Impact	Flourishing	Life satisfaction	Affect balance
Positive	<ul style="list-style-type: none"> • Participation in self-development activities • Employed last month • Positive self-rated health • Urban residence 	<ul style="list-style-type: none"> • Positive self-rated health • Employed last month • Grandchildren in household 	<ul style="list-style-type: none"> • Participation in volunteering • Specialized education
Negative	<ul style="list-style-type: none"> • Dependence on assistance for daily activities • Unemployed last month • Limited friendships • Rural residence 	<ul style="list-style-type: none"> • Poor self-rated health • Feelings of loneliness • Caregiving for sick or disabled individuals • Rural residence 	<ul style="list-style-type: none"> • Poor self-rated health • Feelings of loneliness or isolation

Information and communication technology (ICT) plays a significant role in maintaining social connections and reducing loneliness. This study also examined the older adults’s usage of information technology and internet access. According to quantitative findings, 95.7% of older adult participants reported receiving information from television, 23.4% from radio, 12.2% from computers, and 44.1% from newspapers and magazines. Additionally, approximately 4 in 10 older adults, or 37.8%, were members of some organization. Among the older adults surveyed, 61 individuals (20.1%) reported having a desktop computer at home, 105 (34.5%) owned a smartphone, and 198 (65.1%) used a basic mobile phone (See Figure 4.23).

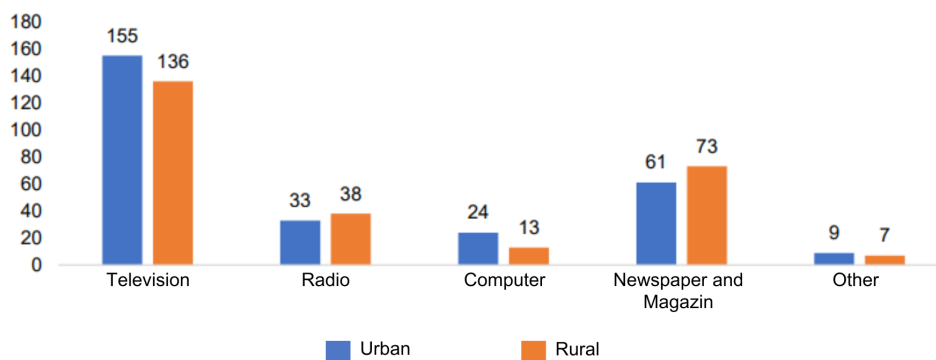


Figure 4.23: Types of Media Used by Older Adults for Receiving Information

In terms of internet usage, only 1 in 5 older adults reported using the internet. Reasons for not using the internet included lack of network access (n=92), no perceived need (n=61), high cost (n=57), poor eyesight (n=51), and lack of interest (n=47) (See Figure 4.24).

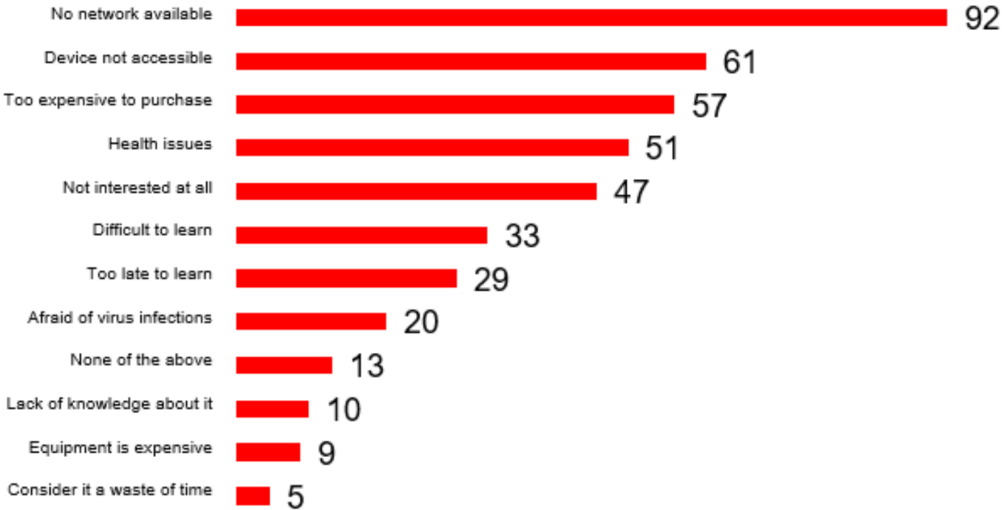


Figure 4.24: Reasons for Not Using the Internet, by Number

Among the older adults, 20.7% (63 individuals) reported regularly using the internet, primarily accessing it through their mobile phones. On the day before the survey, when asked which social networks they accessed via their phones, 7 participants mentioned Facebook, and 2 mentioned Twitter or forums. When asked about their primary purposes for internet use, the most frequent responses included messaging or leaving a message for someone, gaining knowledge, communicating with someone abroad, using social media, and accessing banking services (See Figure 4.25).

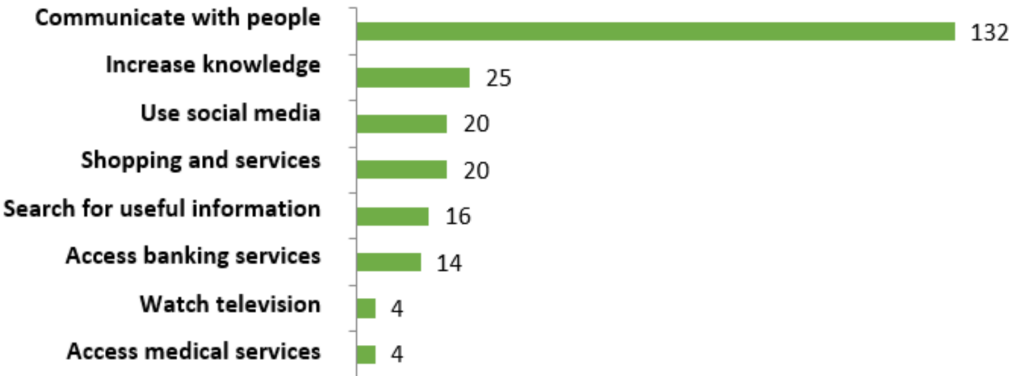


Figure 4.25: Reason for Using the Internet, by Number

Over the past 30 years, information and communication technology (ICT) experts and researchers have collaborated with professionals from sociology, psychology, health, and social sciences to better understand users, leading to the development of the "creative participation" model. This model engages users as co-creators, generating new ideas to enhance the accessibility, quality, and utilization of new technologies. Including older adults in this creative participation approach yields several psychological and social benefits:

- Being volunteer-based, it enhances life satisfaction.
- Through "creating something new," it enables reflection on future aspirations.
- Working with younger generations promotes a positive balance state.
- Teamwork fosters improved social connections.
- Viewing each person as a co-creator ensures balanced participation.

As part of our fourth objective, we engaged older adult participants in creative participation, assigning them the task of designing the best model for information and communication themselves. After the creative participation training and group work, we assessed their participation satisfaction and motivations through short questions and conducted a qualitative study analyzing the model proposed by each group. The older adults co-creators were divided into groups, with a total of 4 men and 19 women participants. To teach creative participation, we extended Stanford d.school's 5-stage "Design Thinking" program from [87] 4 hours to 8 hours over 2 days. The instructions [81, 82, 88, 89] for creative participation followed the principles derived from international teaching methods and findings from similar studies tailored to older adult participants. These included:

- Allow time to understand instructions, provide explanations, and give opportunities to ask questions.
- Write notes on the board in large text.
- Ensure the trainer's voice is audible to everyone in the room.
- Verify that each group understands the teamwork instructions.
- Ensure instructions are unambiguous and use clear language.
- Maintain a room temperature that is neither too hot nor too cold, and provide hot drinks and light snacks.
- Assign responsibilities to each group member and create an environment that fosters interpersonal communication.
- Remind participants to actively engage in group tasks and establish clear boundaries for discussions.
- Reinforce the value of participation by explaining how the new technology they create could positively impact their lives and social relationships.
- Plan rewards for each participant.
- Include instructions that allow participants to express themselves, boosting their confidence.

After participating in creative activities, older adult participants experienced increased motivation to initiate new things. During the training and group work, the following outcomes were observed among the three groups of participants: The group composed solely of older adults emphasized the importance of learning something new, talking with others, and working as a team, sharing feelings, and expressed interest in joining similar activities in the future. Meanwhile, those who worked in groups with students discovered new ideas for applying what they learned in their daily lives and interactions with family. They also expressed a desire to involve children and family members in creative participation activities.

For example, participants voiced aspirations such as: "I feel like learning English," "I want to learn to use the internet," "I want to learn to use my phone better to stay in

touch with my children more frequently,” “I’d like to connect my business activities with my mobile phone,” and “I would be interested in attending similar trainings in the future.”

4.6.2 Co-Designing Low Fidelity Prototype of Information and Communication Tools

Through creative participation instructions and group exercises, older adult participants worked through the following steps to understand and identify common issues in information and communication:

1. Developing Design Thinking Skills: The instructor introduced the concept of design thinking and its applications. Emphasizing that everyone has creative potential, the instructor explained the importance of developing these skills and provided visual examples of how users actively participate in creating the solutions they need.
2. Understanding the User: The first step in design was to understand the user. Instructions were given to observe, empathize, and deepen insights into user experiences. Each group prepared questions to gauge others’ opinions on communication tools and conducted interviews and observations with other groups. The sequence, steps, and timeframe for questioning and observation were provided. Afterwards, each group consolidated their collected data.
3. Defining Phase: Using the gathered information, participants created visual representations on a board, illustrating what the user thought, said, did, and felt, capturing both concrete and abstract levels. They focused on clarifying the essence of the needs, the user, and the differences in needs. The participants then discussed and defined these three elements (user, needs, and essence) to address a specific problem (See Figure 4.26).



Figure 4.26: Exercise in Understanding and Defining

4. Generating New Ideas: An exercise was conducted to demonstrate the value of refining ideas by either supporting or challenging them, establishing rules for generating new ideas. Participants categorized their ideas based on criteria such as user appeal, effective problem-solving, and feasibility. Instructions were given to retain the top

idea in each category. As homework, participants were asked to expand on their newly generated idea by linking it to the pre-training assignment (See Figure 4.27).

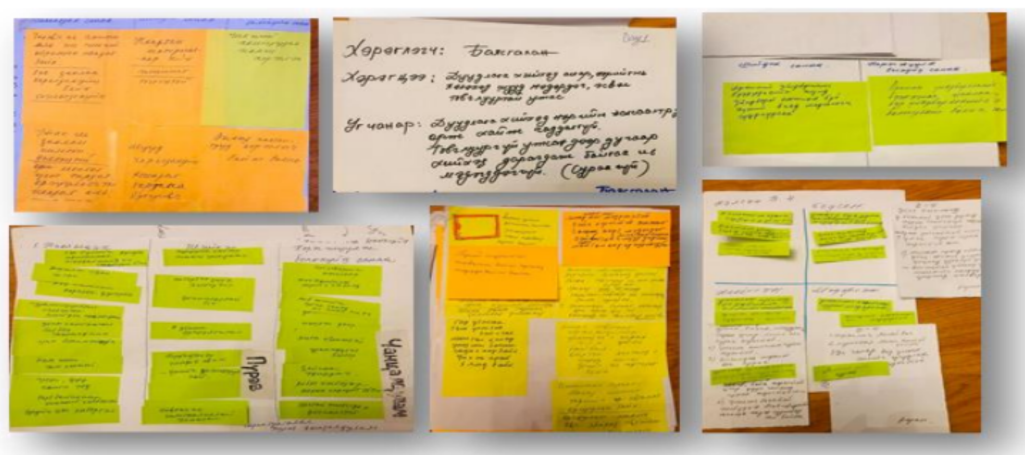


Figure 4.27: Consolidation of New Ideas

5. Prototyping: On the second day of the training, participants aimed to create a prototype using their new ideas. They refined their ideas from the first day, and instructions were provided for building a test model. To support the creative exercise, materials such as colored paper, modeling clay, glue, scissors, colored pencils, and plain paper were provided. Each team used the materials to construct a prototype of their idea, and then presented their new model as per the instructions (See Table 4.10).

Table 4.10: New Solution in Information and Communication Technology

Group	Issues encounter	Solutions by team
Older adult participants	Unable to send messages, understand the language, or share photos on their phone, causing communication barriers; Mobile phones are harmful to children's health, heavy to carry, and too large for small hands	A phone that can read thoughts and provides alerts to prevent negative actions, with simple functionality; A health-safe, lightweight phone for children, equipped only with call functionality and a camera
Older adults & Students	Phones lack a Mongolian language option, fonts, buttons, and commands are confusing, phones are often lost; Current phones have low sound quality, difficult to read for those with poor eyesight, no internet connectivity; Phones are too heavy, buttons are hard to detect, and they are difficult to use	A phone with instructions in Mongolian, secure against loss, and wearable; A phone capable of making calls, reading books, switching channels, and retrieving nearby items; A compact, lightweight, durable phone that can be worn, with voice command and slim enough to fit in a wallet
Older adults & Designer	Cannot visually connect with distant children, causing anxiety; Difficulty finding contacts and often misplace the phone	A phone with large buttons that enables real-time visual conversations; A voice-activated phone that can make calls by saying the contact's name

To solidify their solutions and test their assumptions, participants were encouraged to imagine their designs as actual products. Instructions were given to expand upon their ideas with additional information. Two members from each group presented their new designs, and based on feedback and questions from other participants, the models were further refined. The resulting low fidelity prototypes included:

- Thought Reader and Behavior Modifier,
- Children's Phone,
- Wrist-Worn Phone,
- Household Helper Robot "BAT,"
- Phone as Thin as a Payment Card,
- Phone with Bright Buttons that Enables Real-Time Conversations like a Robot,
- A small and lightweight mobile phone, similar to a keychain

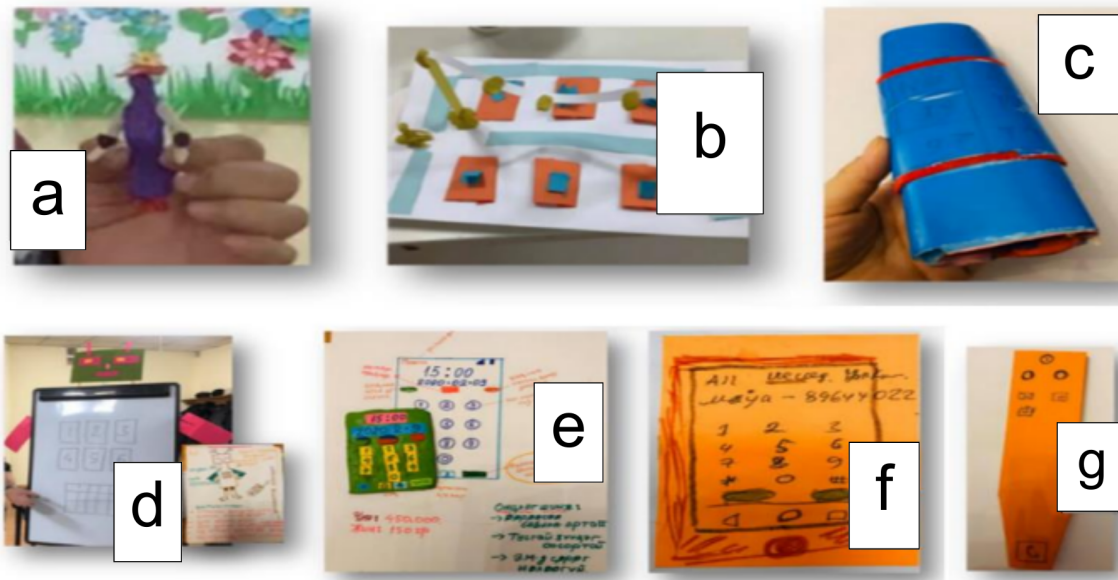


Figure 4.28: Low fidelity prototype of Information and Communication device
 Image Description: a. Thought Reader and Behavior Modifier, b. Children's Phone, c. Wrist-Worn Phone, d. Household Helper Robot "BAT", e. Phone as Thin as a Payment Card, f. Phone with Bright Buttons Enabling Real-Time Conversations like a Robot, g. A small and lightweight mobile phone, similar to a keychain (See Figure 4.28).

When evaluating the seven models created by the groups for technological feasibility, no significant differences were observed between the models in terms of practical applicability (See Table 4.11).

Table 4.11: Heuristic Usability Characteristics of Low Fidelity prototype

Sub-criteria	Older Adults		Older Adults & Designer		Older Adults & Student		
	B-IV	A-I	A-III	B-III	B-I	B-II	A-II
Visually Understandable	§	✓	✓	§	✓	✓	✓
Familiar Language, Symbols, and Interface	✓	✓	✓	✓	✓	✓	✓
Easy to Understand and Use	✓	✓	✓	✓	✓	✓	✓
Consistent and Standardized Actions	∅						
Error Prevention During Use	∅						
Easy to Confirm/Undo Actions		∅		✓	∅	✓	∅
Time-saving, Multiple Options	∅						
Simple, Minimal Actions Required	✓	✓	✓	§	✓		✓
Ability to Correct Mistakes and Navigate	∅						
With Instructional Guide	∅			✓	∅	✓	∅
Total Score (0-10)	3	4	4	4	4	5	4

Explanation: ✓ - Criteria are met, §- Absence, ∅ - Uncertainty

Chapter 5

Discussion

5.1 Psychological well-being among older adult

This study evaluated the psychological well-being of older adults in Mongolia using three indicators: Flourishing, life satisfaction, and Affect Balance. It also identified the determinants of these indicators in urban, rural, and gender differences. The study included older adults who are independently healthy. Older adults showed great appetite and high resilience, positively influenced by urban residency, education level, social participation, and social networks with friends. While social determinants were more influential for urban older adults in enhancing flourishing, individual determinants had a stronger impact on rural older adults. Life satisfaction was significantly influenced by self-rated health, grandchildren in household, social participation, feelings of loneliness, and family and friends' social networks. While flourishing and life satisfaction varied by gender and residential area, affect balance, the third indicator, was consistently influenced by determinants such as volunteering, loneliness, and self-rated health, or place of residence.

In addition to variations in a country's socioeconomic development, the well-being of older adults is also affected by numerous social and demographic determinants [90]. These determinants include residential location, age, sex, self-rated health, education level, marital status, number of children and grandchildren, employment status [43], social participation, loneliness, and social networks [91]. Similar to other developing countries, Mongolia is experiencing an increase in its older adults population, which now accounts for approximately 10% of the total population. However, unlike other post-transition countries, there is a significant gap in the average life expectancy between men and women, which has been continuously widening over the past five years to 9 years, with female older adults accounting for approximately 69.2% of the older adults population [4]. Over the next 30 years, the older adults are expected to constitute around 20% of the total population, posing a challenge for Mongolia to implement age-friendly policies and programs targeted at this demographic [92].

5.2 Determinants of Flourishing

The average flourishing score among older adult participants was 52 out of a possible 56 points, which, according to the author's theoretical interpretation, falls into the category of "psychologically strong, highly optimistic," as any score above 48 indicates a high level of flourishing and resilience [93]. Researchers suggest that flourishing tends to be higher in individualistic societies [94], in contrast to collectivist ones. Diener et al. have explained that in East Asian countries, where individualistic culture prevails, people place

high importance on personal interests, aspirations, and self-fulfillment, emphasizing personal achievements and striving for positive affect experiences, which strengthens their psychological resilience and flourishing [94].

Some researchers have also noted that Mongolians embody a culture with individualistic tendencies, favoring personal independence [95] over collectivism. Another determinant explaining the high flourishing scores among Mongolian older adults could be the integration of Buddhist philosophy, originating from India and Tibet, into the daily lives of nearly half of the population [96]. Participation in religious practices, in this context, is said to provide social support, enhance life meaning, and boost self-confidence [97], which aligns with the sub-indicators in the flourishing questionnaire used in this study. Despite similar socio-economic transitions, the flourishing levels of older adult Mongolians are notably higher than those in Russia, Ukraine [98], and eastern European countries [99], where Buddhism is not as prevalent. This suggests that cultural and spiritual determinants play a significant role in supporting the psychological well-being of Mongolian older adults.

Older adults in rural areas reported lower levels of flourishing compared to urban older adults. This difference may be attributed to internal migration towards cities [100], the loss of social security among rural older adults [101], particularly pastoralists [102] and the scarcity of health, education, social services [100], and information [102] as one moves further [103] from urban centers [104]. Rural areas also face shortages in human resources and are impacted by harsh weather conditions. Another finding that reinforces this conclusion is that older adults employed in rural areas showed higher levels of flourishing than their unemployed counterparts. This trend is similarly observed in rural areas with unequal access to infrastructure and social services, such as in Malaysia [105] and Thailand [62], where pension income is often insufficient for daily living, and the number of older adults with incomes below the subsistence level has risen in recent years [9].

Self-rated health also emerged [106] as a determinant affecting flourishing. Participants who rated their health as good tended to be more optimistic, while those who viewed their health as poor had correspondingly lower flourishing. Similar correlations have been found in studies conducted in Malaysia [107], Thailand [108], and Russia's Siberian region [109]. Good health promotes flourishing; however, older adults in post-socialist countries often rate their health poorly [45], linked to inadequate healthcare quality, particularly in rural areas where infrastructure and social services are underdeveloped. Additionally, challenging working and living conditions further deteriorate health, and there is a lack of sufficient rehabilitation services to aid recovery.

Older adults with strong social ties and friendships exhibited higher levels of flourishing than those with limited social connections, a trend observed in rural areas as well. Social participation and relationships are essential determinants that support flourishing [110] [111]. This correlation aligns with similar studies conducted [110] internationally and reinforces theoretical foundations [41] that underscore the role of social connections in enhancing well-being. In rural Mongolia, the traditional "khot ail" culture, where neighbors assist each other, herd livestock together, and maintain strong community bonds [112], [113], continues to positively impact flourishing [114]. The findings reflect the importance that Mongolians place on traditional social connections, family, and kinship [113]. Pinkwart and colleagues highlighted that support provided to older adult individuals significantly contributes to their well-being [115], particularly social and psychological support, which is crucial for overcoming life's challenges. This observation is supported by research conducted in Russia's Siberian region, which emphasizes the importance of community and social support [109] in navigating difficult life events.

Older adults who participate in social activities demonstrate higher levels of flourish-

ing than those with lower participation, a trend particularly noted among rural groups. Various forms of social participation—such as employed last month, volunteering, and helping family and friends—contribute positively to seniors’ self-confidence, self-worth, sense of value, and independence, enhancing their overall well-being. Similar findings from other studies suggest that older adults involved in creative and supportive social activities report a higher sense of well-being [116]. For instance, in European countries, older adults who volunteered and engaged in creative activities show higher psychological positivity and well-being than those with less involvement [117]. Research by Hank and colleagues suggests that participating in meaningful activities helps older adults project a positive self-image, and combining this involvement with social or religious traditions can increase its benefits [118]. In this study, 7 out of every 10 older adult participants from rural areas reported participating in religious or community activities, such as visiting temples, compared to only 2 participants from urban areas. Aligning with the above research, organizing volunteer and religious charity activities may serve as an effective means to boost flourishing among older adults.

Gender differences did not appear to influence flourishing levels among the older adults in this study. While previous research indicates that men and women often differ in their perception of life’s value and meaning, leading to noticeable differences [115], [119], [120], [90] in flourishing levels across genders in many countries, this was not observed in our findings [105], [121], [122].

Although rural areas have fewer older adults with higher education, education has a direct impact on flourishing for rural older adults compared to urban areas. Malaysian studies suggest that the relationship between education and flourishing is largely tied to economic determinants [105]. On the other hand, Diener et al. have noted that, for older adults, the impact of education is less significant than family relationships, household composition, and friendships [94]. This aligns with Carol Ryff’s concept that evaluating one’s potential, skills, and resources directly relates to accumulated experience and competencies [41].

In this study, family and individual determinants had a less pronounced impact on the flourishing of urban older adults compared to rural ones. Family dynamics affect older adults’ flourishing differently across countries; for example, family cohesion in Thailand [121], close spousal relationships in Russia [109], children’s support and independence in South Korea [123], and the number [122] of children in Japan all influence flourishing among the older adults. For the participants in this study, receiving assistance with daily activities correlated negatively with flourishing, suggesting that those included in the study were relatively healthy and independent.

5.3 Determinants of Life Satisfaction

The older adult participants in this study, regardless of gender, reported high levels of life satisfaction, with an average score of 7.58 on a 0-10 scale—significantly higher than the 6.5 average commonly found in economically developed countries. Typically, countries with similar socio-economic backgrounds to post-socialist nations report lower life satisfaction among their populations [124]. For example, in a 2012 study by Carol and Milen, older adults in Russia had lower life satisfaction scores. In countries like Taiwan and Germany, life satisfaction begins to decline at age 65, in the UK at 70, and in the United States around 45 [124]. The relatively high life satisfaction among Mongolian older adults, despite limited [100] socio-economic infrastructure and income security, may be attributed to cultural and traditional determinants. Specifically, Mongolian researcher N.L. Zhukovskaya noted that concepts of happiness in Mongolia are deeply rooted in cul-

tural expressions and blessings. For instance, the common Mongolian greeting "sain baina uu" (are you well?) and its response "eruulerei boloh" (may it be by blessing) reflect a traditional etiquette that invokes well-being and prosperity [125]. This aligns with the Mongolian principle of "amnai bilegees ashdyn bileg" (words shape one's future), possibly contributing to a culturally embedded sense of life satisfaction.

Beyond the socioeconomic development of a country, several essential determinants influence life satisfaction among older adults. These include personal determinants such as age, sex, self-rated health, place of residence, education level, household composition, number of children, marital status, and employment. Social determinants such [44] as new learning experiences, volunteering, helping others, social networks, and loneliness also play a significant role [118].

In this study, education level was particularly important for male participants, while family and social networks were key for female participants. Research from the U.S. and Japan indicates that friendships and family relationships significantly impact life satisfaction among older adult women, with determinants such as the number of children, grandchildren, and frequency of family interactions contributing to increased life satisfaction [126].

For older adults in Mongolia, life satisfaction was more influenced by whether they were involved in caring for their grandchildren than by the number of children they had. While Mongolia has policies encouraging population growth [127], economic and social challenges [100] over the past 30 years have led to a steady decline in birth rates [128]. Although rural participants had more children on average than urban participants, this did not significantly affect life satisfaction, unlike in other countries where a larger household size typically correlates with higher life satisfaction scores [129].

The high life satisfaction scores among older adult individuals who care for their grandchildren align with findings from studies in other countries, highlighting the importance [130] of promoting positive, intergenerational relationships. In Germany, for instance, national studies have shown that while caring for grandchildren may not directly increase life satisfaction, it serves as a protective determinant and contributes to longevity [129]. In China, older adult individuals who care for healthy grandchildren report high life satisfaction and greater confidence in their future [131], with larger numbers of grandchildren further enhancing life satisfaction [132]. Similar conclusions have been drawn in European countries, where an international cohort study examining data from 13 countries found that grandmothers involved in caring for grandchildren had notably higher life satisfaction [133]. These findings suggest that offering structured, creative involvement opportunities with grandchildren could be beneficial for older adult Mongolians. Furthermore, educating young parents about the value of such intergenerational engagement could further support well-being among older adults.

Among the older adults who participated in our study, life satisfaction scores increased with higher levels of education. Education is often considered a lifelong foundation, with higher education levels acting as protective [61] determinants that support physical and mental health [134], affect well-being, and social participation [126]. This aligns with multiple theoretical explanations. Older adult participants with vocational or specialized education reported higher life satisfaction compared to those with only secondary or primary education, a distinctive finding in this study. This may relate to Mongolia's focus on technical and vocational training during the socialist era [135], with many participants representing this generation. The educational disparity between urban and rural older adults reflect post-transition inequalities [136], as educated individuals tended to migrate to urban areas, leaving those with semi-nomadic lifestyles in rural regions. However, the impact of education on life satisfaction was not significantly greater than the influence of

place of residence in this study.

Older adults who rate their health positively tend to report greater life satisfaction, a direct correlation that is consistently observed [137]. This finding aligns with studies in the United States, the United Kingdom, the Netherlands, Austria, Italy, China [138], Germany, and Japan, emphasizing the importance [45] of health care and preventive measures. Increased life satisfaction also positively impacts recovery and resilience in facing illnesses [139]. In a prior study by researchers Chuluun and Graham on adults in Mongolia, it was found that life satisfaction increases with age and correlates directly [16] with self-rated health [140]. Our study similarly observed that self-rating of health has a consistent, direct influence on life satisfaction across genders, independent of other health and social determinants. Although Mongolia has seen rapid social development and urbanization [102], along with reforms in the health sector, rural areas still experience growing health and economic [141] disparities, potentially impacting [142], [104] the health of older adult residents. The finding that rural older adults report lower life satisfaction, closely tied to their health assessments, highlights the need to improve rural health services [143]. Health inequality negatively affects overall population health and life satisfaction, as supported by our hypothesis that inadequate health services contribute to lower life satisfaction among rural older adults [101].

Social participation significantly impacts life satisfaction among the older adult participants. Older adults involved in volunteering, employment, and maintaining strong family and friend networks report higher life satisfaction, regardless of gender. Previous studies with different populations also confirm that social networks and participation enhance life satisfaction among the older adults [42]. Family and friend networks are especially beneficial for life satisfaction among older adult women [144], as demonstrated in studies from the United States and Japan [145]. Social participation positively affects not only the general older adults population but also older adults with disabilities or health issues, benefiting both their physical and mental health [146]. This emphasizes the value of fostering social engagement opportunities to support the well-being of all older adults.

Older adults in our study who reported feeling lonely had lower life satisfaction. Among this group, 7 out of 10 were women, most of whom were widowed, single, or divorced. These individuals had lower life satisfaction scores compared to those living with family. Similar findings from studies in China [147], Poland [148], and South Korea [149] show that loneliness and single status decrease life satisfaction among the older adults [40].

Studies from Russia and China have also shown that older adults with family experience less stress and report higher life satisfaction compared to those without family. Research by Wang et al. highlights that family presence contributes to reduced stress and enhanced life satisfaction for older adults, emphasizing the importance of family support in improving well-being.

The most significant determinants affecting life satisfaction among older adult participants in this study were their place of residence, more so than age, sex, education, marital status, or employment. Older adults living in rural areas reported lower life satisfaction than those in urban areas, independent of other social, demographic, and psychological determinants. While studies in countries such as the United States, the United Kingdom, and former socialist states in Eastern Europe indicate that rural older adults often have higher life satisfaction than their urban counterparts, this pattern is reversed in developing countries like China and South Africa [117]. Our findings suggest that disparities in health and social services between urban and rural areas in Mongolia may contribute to this difference. Additionally, the conditions that define “rural” in Mongolia differ from those in highly developed Western countries. Mongolia’s rural areas resemble the periph-

eral districts of major cities in terms of inadequate infrastructure, social services, and living conditions [150]. Similarly, older adults living in suburban areas of developed countries such as Canada, the United Kingdom, and Eastern Europe also report lower life satisfaction due to these challenges [151]. This outcome aligns with findings from remote regions in China, where limited social, health services, and infrastructure, as well as a lack of activities for older adults, contribute to lower life satisfaction among the rural older adults [152].

5.4 Determinants of Affect Balance

Affect Balance, a key measure of psychological well-being, directly impacts life satisfaction. More frequent positive emotions, such as days filled with joy, enhance life satisfaction, while frequent negative emotions, such as anger or sadness, reduce overall life satisfaction [153]. This correlation was also observed among the older adult participants in our study, and we further analyzed the influence of social and demographic determinants on affect balance across genders.

Both male and female participants showed high Affect Balance scores, displaying a generally positive outlook. Other researchers explain similar findings by noting that (a) older adults tend to avoid negative emotions to maintain a harmonious environment, and (b) compared to younger individuals, the older adults often approach situations with positive emotions and put effort into preserving their social relationships. This tendency to foster positive interactions supports Affect stability and overall well-being in later life [119], [154].

Due to lifestyle determinants, older adults are more susceptible to physical, mental, and social decline and have a higher risk of chronic diseases compared to younger individuals [60]. Jorm et al. (2001) studied the relationship between hypertension and affect states, finding that older adults with more frequent negative emotions had a higher incidence of hypertension [155]. Similarly, Hu and Kenneth's (2008) research showed that seniors with lower depression, greater daily functional abilities, and a higher self-rate of physical and mental health experienced more positive emotions and fewer negative emotions [156]. Positive emotions such as joy and gratitude are directly associated with longevity and have protective effects against cardiovascular-related mortality [157]. Positive affect states also aid in recovery from conditions like hypertension [158], stroke, and falls [159], [160]. In our study, older adults who rated their health as good had more positive emotions, while those who viewed their health negatively experienced more negative emotions. Supporting positive emotions among the older adults can help protect their physical health and enhance their resilience in overcoming illness. This finding suggests that interventions aimed at fostering positive affect states can be beneficial for both physical and psychological well-being in the older adults.

Our study found that volunteering is positively contributes to maintaining affect balance among the older adults. Engaging in volunteer activities led to more positive emotions and fewer negative emotions in participants, a trend observed in studies from other countries as well. For example, low-income older adults who participate in helping others experience increased positive emotions [161], and altruistic acts without expecting returns positively [162] impact their overall mental health. As people age, opportunities for socially beneficial roles and responsibilities decrease, making volunteering a meaningful way to restore their sense of purpose and responsibility [66].

Based on these findings, encouraging older adults to engage in suitable volunteer activities can be beneficial for their mental health, supporting affect well-being and enhancing their quality of life.

In our study, feelings of loneliness were found to impact negative emotions among older adult male participants. This aligns with findings by Kang et al. (2018), who demonstrated that loneliness negatively affects quality of life among South Koreans aged 65 and older [163]. Davidson et al. (2022) reported that positive emotions reduce feelings of loneliness, while an increase in negative emotions weakens this effect [164]. Furthermore, Bennardi et al. (2019) found that while suicidal ideation in those under 60 is primarily driven by negative emotions [54], in those over 60, loneliness becomes a direct influencing determinant. Researchers explain that affect stability and feelings of loneliness are directly connected to quality of life, highlighting the importance of addressing loneliness in older adults to support their mental health and overall well-being.

5.5 Enhancing the Psychological Well-being of the older adults through Creative Engagement

In the previous section, we analyzed the determinants affecting flourishing, life satisfaction, and affect balance among the participants of older adults, comparing protective (positive) and risk (negative) determinants with the findings of other studies. These determinants were categorized as protective (beneficial) or risk (harmful) at both individual and social levels.

Negative individual risk determinants for psychological well-being include lower education level, unemployment, poor self-rate of health, lack of support, and loneliness. Social risk determinants include residing in rural areas, limited access to health services, weak family and social networks, and low social participation. Conversely, protective individual determinants include employment, a positive self-rate of health, caregiving for grandchildren, and having vocational education. At the social level, protective determinants include living in urban areas, strong family and social networks, volunteering, helping family and friends, engaging in religious activities, and participating in community events. These findings emphasize the potential for creative engagement to enhance the psychological well-being of the older adults by fostering supportive networks and meaningful activities that can strengthen both individual and social resources.

In their 2012 report, researchers B. Orgil and D. Gan-Ochir discussed the participation of Mongolian older adults in social activities in the study “Current State of Household Nursing Care for older adults’. They found that over 70% of participants rated their participation in health education programs as “good” or “average” [12]. In our study, older adult participants who actively helped family, friends, and neighbors and engaged in community, club, or sports activities reported higher life satisfaction than those who did not participate. This suggests that establishing senior-friendly networks and organizing community, club, and sports activities can significantly enhance the psychological well-being and quality of life of older adults. Key activities that positively influence psychological well-being and quality of life for the older adults include: volunteering, training, and educational programs to improve knowledge and prepare for retirement; intergenerational experience-sharing activities; artistic and cultural events that support affect balance; mutual aid groups and physical activity programs; opportunities for creativity and innovation; strengthening social connections with friends and family.

These activities foster meaningful engagement, enhancing mental well-being and supporting the overall life satisfaction of older adults.

Enhancing older adults’ social participation through creative engagement with technology. Aligned with the principle of increasing and creatively enhancing social participation among the older adults, we conducted a qualitative training study using participatory

methods to foster intergenerational relationships and positive emotions by engaging older adult participants in creating information and communication technology (ICT) solutions. Older adults are a unique group of technology users, and previous international efforts have involved their input primarily in health, living environment [165], household technology [166], or at the final stages of service [167] or product development [82]. Our study aimed to assess whether involving older adults users in the process of developing ICT could positively impact their affect well-being and enhance their creative involvement in envisioning the future of ICT in Mongolia. Creating something new fosters individual creativity and helps [168] older adult participants feel valued by emphasizing their role in technology development [169]. Participants in our study highlighted the value of teamwork, noting that activities like these would be very beneficial in breaking the monotony of home life and increasing social interaction. Some older adults also expressed that they could apply what they learned in their daily lives and family interactions. Similar studies in Poland have shown that involving older adult participants in creative team activities fosters not only new skills but also positive intergenerational relationships and mutual understanding [89]. During our study, older adult participants exchanged ideas and enjoyed the process of collaboration. Many shared that they felt encouraged to interact more with younger generations, indicating, "I learned from the younger ones," and "I would like to talk with my children more." If we consider that a sense of purpose, flourishing, and a drive to try new things contribute to well-being [63], then this study effectively motivated participants to pursue new goals, such as learning English, becoming proficient with the internet, staying connected with distant family members through mobile devices, and even integrating mobile technology into their business activities. Many expressed a strong interest in continuing similar training sessions, highlighting the potential for further enhancing their skills and engagement.

In the process of generating and developing new ideas in information, communication technology (ICT), vulnerable users, such as older adults, people with disabilities, and low-income individuals—plays [170] a crucial role in creating products that meet their specific needs [171]. However, their participation in the design and ideation stages is often limited [172]. Researchers suggest that increased involvement [173] from these groups could enrich innovation and lead to the development of more accessible and inclusive products and services [174]. From this participatory study, seven different solutions were developed across seven teams. Most of these solutions connected current mobile usage and skills. Teams composed of designers and students focused on improving existing technologies, while older adults-only groups were more inclined to express visions of future technologies. We acknowledge certain limitations of our study, including: The sample population for this study was defined according to Mongolian law, which designates “Older adults” as women aged 55 and older and men aged 60 and older [2]. This differs from the World Health Organization’s age classifications, which may result in some discrepancies between our sample and the samples in studies referenced in the discussion section.

- Cross-sectional data: This study used cross-sectional data, measuring participants’ psychological states at a single point in time. Consequently, interpretations of influencing determinants do not imply causation.
- Self-adjustable determinants only: The study focused on determinants related to psychological well-being that individuals could potentially influence or change themselves. It did not include socio-economic determinants, such as income or pension amounts—variables considered significant in other countries—that are beyond personal control.
- Limitations due to follow-up challenges: A follow-up evaluation of the qualitative

assessment was planned for one month after the initial study; however, due to the pandemic, re-contact was not possible. Thus, the conclusions are based on data collected during the initial assessment only.

Future researchers in this field are encouraged to further explore the following areas:

- Cultural and lifestyle specifics of Mongolians: Examine the unique lifestyle, traditions, values, and distinctions in the daily lives of Mongolians.
- Life Satisfaction related children's well-being: Investigate whether older adults are satisfied with the lives and well-being of their children.
- Income adequacy and types, housing conditions: Assess income sufficiency, income sources, and the types and conditions of housing.
- Satisfaction with received healthcare services: Measure satisfaction levels regarding healthcare services received. Incorporating these aspects could provide valuable insights for policies, programs, and initiatives aimed at supporting the well-being of older adults.

Chapter 6

Conclusion

1. High levels of flourishing: Older adult participants exhibited high levels of flourishing, demonstrating resilience and psychological strength. Positive association with high levels of education, positive self-rated health, employment, social participation, helping family and friends, and volunteering.
2. High life satisfaction: Older adults reported high life satisfaction. Determinants contributing positively to life satisfaction included spending time with grandchildren and a positive self-rated health. Negative influences included feelings of loneliness, poor self-rated health, caregiving responsibilities, and residing in rural areas.
3. Affect Balance: The participants displayed Affect Balance and a generally positive outlook. Positive self-rated health and volunteer work contributed to this balance, while loneliness had a negative impact.
4. Preferences for communication technology: Through creative participation, older adults identified desirable qualities for communication technology, including being lightweight, available in their native language, capable of understanding thoughts and behaviors, compact, and resistant to loss or damage.

Chapter 7

Recommendations

Based on the study's findings, several recommendations are proposed for promoting healthy and quality aging at the individual, family, organizational, community, and policy levels:

A) Inclusion in Mongolia's Long- and Medium-term Programs:

- "Vision 2050": Within the "Health" and "People-centered Cities" sections of the 2021-2030 action plan under Mongolia's Vision 2050 long-term development policy, expand mental health services to the general population and integrate them with social and health insurance systems.
- Long-term Care Centers: The Vision 2050 document mentions the establishment of long-term care centers for older adults, primarily aimed at seniors with significant health needs (Groups 4-5). It is recommended to broaden the concept to include community-based services that support the development and social engagement of older adults.
- Reducing Life Expectancy Gap: In the second chapter of Vision 2050's Human Development and Health section, which aims to position Mongolia among the top 10 countries for healthy aging, it is recommended to add initiatives to reduce the life expectancy gap.
- Government Resolution No.19 (2017): In the third section of the guidelines for spending the Older Adults Fund's resources, it would be beneficial to include activities that encourage intergenerational relationships, experience sharing, social participation, and volunteerism.

B) At the Individual and Family Levels:

- Purpose and Values: Encourage young people to consider their life goals, values, and memories as investments in their future inner well-being, and prioritize worklife balance.
- Support intergenerational Relationships: Families with young children should create time and supportive environments for meaningful relationships between grandchildren and grandparents.
- Pre-Retirement Planning: Starting 10 years before retirement, individuals should focus on balanced life planning, including creating a savings plan and preparing for a smooth transition.

At the organizational and community levels:

- Employee Well-being Programs: Implement human resource programs and activities focused on enhancing employees' psychological well-being.

- Social Activities for Retirees: Organize and facilitate social engagement activities for retired employees through the organization's older adults support fund.
- Intergenerational Connections: Establish programs linking new employees with retired seniors, and plan creative activities that actively involve older adults participants.

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