

The multidimensional well-being of Asian senior citizens: A systematic review

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Abstract

Since the 1960s, global societies have been characterized by a decline in both fertility and mortality rates: this trend has led populations to be rapidly ageing worldwide. In such a scenario, ageing populations have become a significant challenge, especially for Asian developing countries where both healthcare and pension systems still need to be properly shaped. Thus, this paper aims at providing an up-to-date systematic review of the empirical and theoretical literature on the well-being of elderlies in developing Asia. First, we analyse the current framework, and we provide a definition to the concept multidimensional well-being. Then, we discuss the main relevant empirical and theoretical outcomes from the literature, focusing on the ones related to the three main dimensions of well-being (i.e., socio-economic, mental, and physical). Furthermore, we highlight the current barriers and the future challenges that policymakers in ageing economies will face. Finally, we suggest priorities for policy initiatives in developing Asia and we emphasize areas of future research.

Keywords: Ageing, developing Asia, well-being, mental, socio-economic, physical

1. Introduction

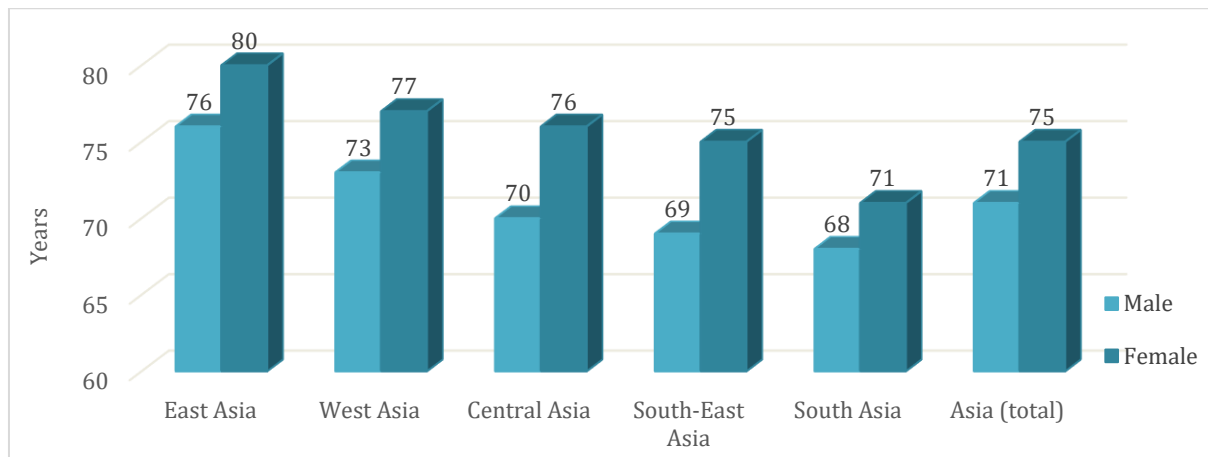
Since the 1960s, humanity has been facing a decline in both fertility and mortality rates, giving rise to the phenomenon of ageing societies (Bloom et al., 2010). Although data show that the aged population is currently at its highest historical level (United Nations, 2015), the situation is expected to keep escalating in the next decades: while there were 703 million persons aged 65 years or over in 2019 in the world, the number of older persons in 2050 is projected to double to 1.5 billion (United Nations, 2019). Whereas increasing longevity is an undoubtedly positive outcome of social, economic and technological development, the rapid pace of ageing has proven profound, far-reaching implications (OECD and WHO, 2020).

Besides being harmful for potential economic growth (Otsu and Shibayama, 2016), a rapid increase in the share of elderly population could threaten public social safety net systems (see Appendix, Figures A and B). Aside from being economically unproductive, ageing bodies also suffer from limited regenerative biological activities, leading more citizens to be subject to age-related diseases, which could hamper both their mental and physical conditions (He and Tang, 2021). Contemporaneously, this biological process will also be marked by significant socio-economic changes, characterized by retirement, relocation to new living arrangements and an alteration in lifestyle, as well as by the deaths of some beloved ones (Kadariya et al., 2019). It is clear that rapid ageing will not just be an individual issue that can be tackled within singular households: given its broader social implications, the phenomenon will lead to unexpected challenges for those countries where old-age support systems are not properly shaped yet.

Particularly, the trend of ageing population has become a significant threat for the Asian baby boomers¹ generation. Since 2000, the life expectancy in Asia-Pacific countries has increased by about 6 years in low and lower-middle income countries, and by 4 years in upper-middle- and high-income countries (see Appendix, Figure C); on average, as can be seen in Figure 1, Asians are currently expected to live up to more than 70 years, namely 71 for males and 75 for females (Statista Research Department, 2021). However, in the last two decades average fertility has decreased, going from 2.6 children per woman to the current level of 2.1 (OECD and WHO, 2020). This relevant shift in age structure has been mainly driven by better access to reproductive healthcare and a wider use of contraceptives, in conjunction with an increase in female labour force participation and in total years of education (Bloom et al., 2010). Hence, projections expect that by 2050 the share of older people will be particularly large all over the Asian continent, with developed countries such as Japan, South Korea and Singapore having more than one third of their population aged 65 and over. Meanwhile, the growth in the share of the population aged above 80 years will be even more dramatic: across lower-middle- and low-income Asia-Pacific countries, the share of the population aged 80 years and over is expected to triple in the next thirty years (OECD, 2020).

¹ Baby boomers are the demographic cohort born from 1946 to 1964, during the post-World War II baby boom (Sheehan, 2011). They are known as the first generation to create tension with the previous ones. In the West, boomers' childhoods saw significant reforms in education and an increase in wealth, both as part of the ideological confrontation that was part of the Cold War. In Asia, this period was one of deep political instability: boomers lived through the Chinese Cultural Revolution and experienced the success of the Asian Tigers.

Figure 1: Average life expectancy in Asia for those born in 2020.



Source: Population Reference Bureau. (2020).

In such a scenario, the cultural transition has made things worse. While for centuries Asian countries have been heavily relying on intergenerational support and co-residence (Huda, 2020; Teerawichitchainan et al., 2015), the processes of industrialization and internationalisation have led to a substantial change in family values and in the role of filial piety² (Silverstein et al., 2006). Industrialisation has slowly disrupted the traditional family norms by emphasising new values, such as individual achievement, economic independence and social/geographical mobility. Consequently, these changing family structures -combined with migration and new values- have been resulting in a gradual weakening of informal support systems. Since the nuclear family (consisting of a married couple with or without unmarried children) has slowly become the most adopted family structure in Asia (Sengupta and Benjamin, 2015), the promptly growing senior population has started seeking help from the State. Unfortunately, most of the Asian social security systems are still characterized by the inability to meet the needs of geriatric care and related services. In light of these facts, the topic of Asian elderlies' well-being has become more relevant than ever.

According to the WHO Constitution (1949), “*well-being*” is a vital concept that depends on basic resources for healthy living and a positive state of health. More than the absence of an illness, it describes the status enabling people to develop their potential, to work

² For Confucius, filial piety is a ritual based on respect to one's parents and ancestors, as well as an inward personal attitude. Filial piety is thus related to the awareness of repaying the burden borne by one's parents, by reciprocating the care received throughout life.

productively and creatively, to form positive relationships with others and to meaningfully contribute to the community (Goswami, 2008). Although the contentment conditions of senior citizens have been deeply analysed in developed Western countries, at the moment the literature focusing on the welfare and happiness of elderlies in developing regions is relatively more scant. Nonetheless, providing well-being to elders has proven to be a complex task for governments and institutions of many Asian countries (Khan and Husnain, 2019). Therefore, the goal of our paper is to better understand the living conditions of senior citizens in developing Asia, by analysing the factors that impact their socio-economic, mental, and physical well-being. In this context, we review a wide body of theoretical and empirical literature on the subject: our paper, structured as a systematic review, builds upon the material collected.

The remainder of the paper is organized as follows. Section 2 provides the method used to review the empirical studies. Section 3 discusses the empirical determinants of elderlies' well-being, as well as the indirect links between the three main dimensions. Section 4 examines the policy implications derived from the systematic review. Finally, Section 5 offers concluding remarks and provides suggestions for future research.

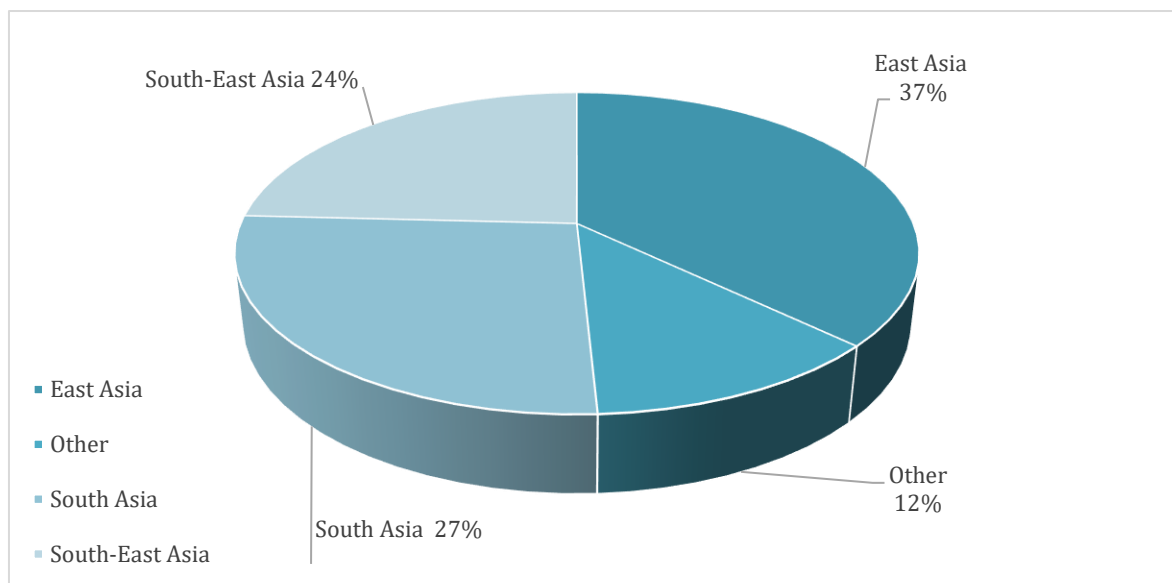
2. Methods

Aiming to map the key concepts and results of research areas, a systematic review is an ideal method to identify the relevant features of a subject, as well as the degree of coverage of a body of literature, especially when it is complex or has not been properly reviewed yet (Munn et al., 2018). Instead of answering structured questions of causality through econometric methods, a systematic review aims at identifying, selecting and critically analysing all relevant research related to a specific topic. In this paper, data sources were randomly selected through an online search, using the content analysis method illustrated by Downe-Wamboldt (1992), where a range of relevant keywords are employed as a selection criterion. Two main databases were used to search for relevant literature, namely Google Scholar and JSTOR; the selected time span of the empirical articles is between 1990 and 2021, in order to filter the available material and collect only the most recent publications; yet, three papers published before 1990 were included, due to their relevance in the field (i.e., Markides and Martin, 1979; Cain, 1986; Kaufman, 1988). At the end, a total of 97 empirical and theoretical studies on senior citizens'

well-being were read and reviewed, with a specific focus on the Asian continent; subsequently, the information collected were analysed to fulfil the aim of the paper.

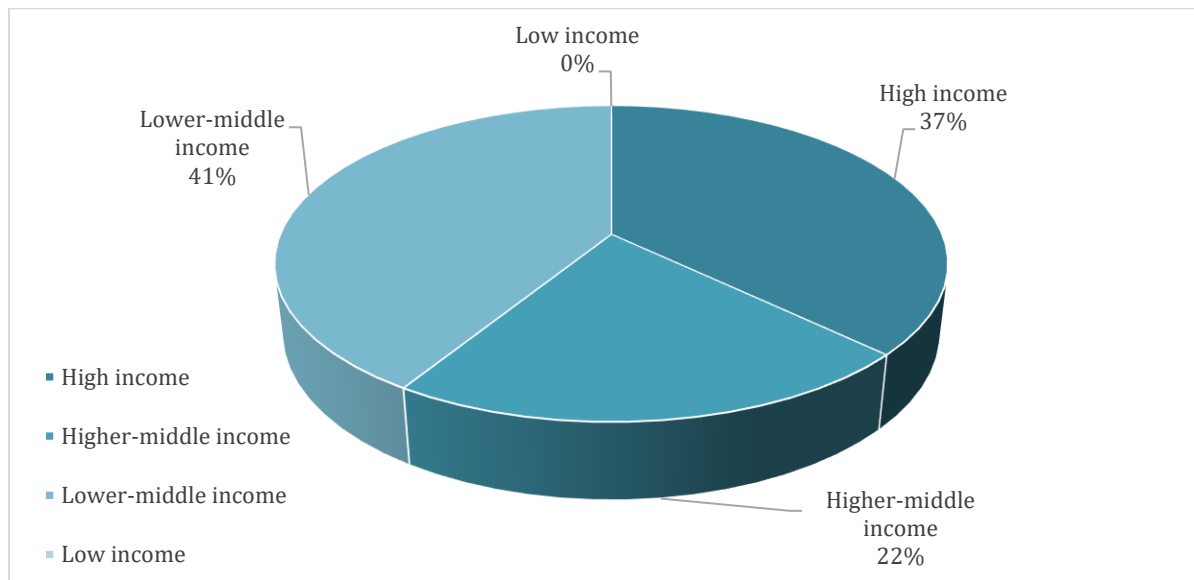
Microsoft Excel 2011 software was used to gather the papers and to summarize the collected information, as the table in Appendix A.2 displays: this table lists each empirical paper reviewed, by specifying the study's country, the quantitative method used and the most common statistically significant factors influencing one dimension of elderlies' well-being. As can be seen in Figure 2, of the academic studies analysed, 37% papers were related to East Asia, 27% to South Asia, 24% to South-East Asia and the remaining 12% to other regions of the world. Among those countries, 0% (n=0) were low-income countries, 41% (n=51) were lower-middle income, 22% (n=27) higher-middle income and 37% (n=46) high income, as is displayed in Figure 3. Academic studies took place in both rural and urban contexts, and were undertaken at localized, national, regional, and inter-regional scales. In fact, papers such as the one by Das et al. (2018), highlight the strong heterogeneity in between countries and regions, and how different factors might or might not be significantly impacting the level of well-being. Nonetheless, our systematic review aims at providing a broad and detailed overview on the living conditions of millions of Asian elderlies.

Figure 2: Empirical and theoretical papers by regional shares



Source: Authors, based on papers retrieved for systematic review.

Figure 3: Countries from empirical and theoretical papers, by income classification.



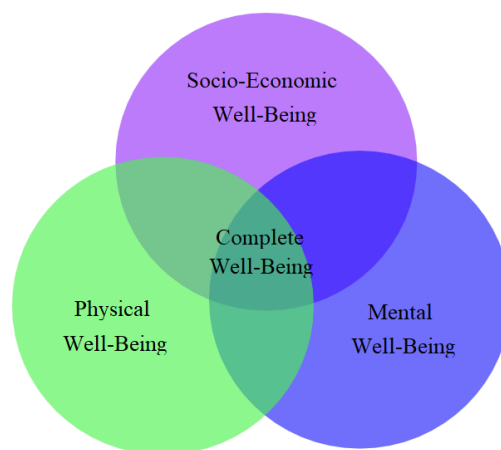
Source: Authors. Chart based on papers retrieved for systematic review and country classification done by World Bank (2020).

3. Well-being: a multidimensional concept

Despite the several criticisms by scholars and NGOs, gross domestic product (GDP) has remained the pivotal indicator used to determine a countries' degree of success. Nonetheless, there has been an impressive production of alternative indicators of social welfare, aimed at better understanding the degree of national development and the living conditions of citizens: among those, subjective and objective well-being indexes have recently gained the attention of several institutions (Fleurbaey and Blanchet, 2013). Particularly, it has been widely recognised that well-being is a multidimensional phenomenon that builds upon various factors, strictly interlinked with each other. For instance, in 1990 the Pakistani economist Mahbub ul Haq developed the first successful composite index to measure the extent of well-being, namely the Human Development Index (HDI) currently adopted by the United Nations (Stanton, 2007). Few years later, the European Commission's *"Going beyond GDP initiative"* (2007) claimed that the well-being indicators should not only rely on standards of living, but should include other dimensions such as health, education, political voice, and environmental factors. Although the HDI is already offering a composite statistical index of life expectancy, education, and per capita income (Malik, 2013), in 2011 the OECD created the Better Life Index (BLI) by aggregating the achievements in 11 indicators through preferences of individuals on different

well-being aspects (Durand, 2015). Since then, many more composite indices have been developed to provide a more holistic measure of well-being, through the inclusion of several dimensions that interlinks with each other.

In the following sub-chapters, we will review the empirical studies which analyse the major determinants of a hypothetical multidimensional index of elderlies' well-being in developing Asia. Particularly, attention will be focused on the three main dimensions of elderlies' well-being displayed in the diagram below³, namely the socio-economic, mental, and physical ones. Several granular determinants will be also considered, in order to allow different substitutability and complementarity levels between well-being dimensions (Pinar, 2019).



3.1 Socio-Economic well-being

Economic well-being is broadly defined as having present and future financial security. Present financial security includes the ability of individuals and their household to consistently meet their basic needs (i.e., food, housing, utilities, healthcare, transportation, education, childcare, clothing, paying taxes), and have control over their day-to-day finances. Besides this, it also accounts for more specific features, such as the ability to make personal economic choices and to feel a sense of security, satisfaction, and fulfilment with one's personal finances. However, financial security also relies on a long-term vision, based on the ability to absorb future financial shocks, meet financial goals, and maintain an adequate income throughout the whole lifespan (Council on Social Work Education, 2016).

³ Graphical representation made by the authors.

Economic well-being may be achieved by individuals and their households through the help of public policies aimed at ensuring the ability to build financial knowledge and skills, to access affordable financial products and economic resources, and to find safe opportunities for generating income. In any case, self-recognized economic well-being occurs only within a context of economic justice, where the local labour market provides opportunities for secure employment, which are adequately compensated. Therefore, in order to determine and evaluate the economic well-being of Asian elders, Clark (1989) aimed to create a conceptual framework of well-being, by analysing micro-economic theory. In particular, the utility maximisation model subjected to a budget constraint had been applied to both income and consumption levels of older persons. However, current data available in Asian countries were not sufficient to properly infer the economic status of the senior citizens and to derive a comprehensive measure of the real levels of economic well-being among their households. As a matter of fact, lack of detailed quantitative income data keeps mining the reliability of any findings in this field: in many cases, the numerical values related to income do not seem reliable and some sources of income are ambiguous.

3.1.1 Lifelong gender inequalities: Why are elderly women worse off?

Although specific data on economic well-being are challenging to be found (Clark, 1989), the “relative terms” of the subject have allowed us to further investigate more granular issues. Therefore, we will now analyse the impact of gender on the economic conditions of Asian senior citizens, as well as the related inequalities. Although gender differences in individual income have been complicated to track (given the ambiguous inflows that might characterize them), empirics shows that, in many Asian societies, elderly men enjoy a higher degree of economic well-being, if compared to women of the same age. Besides the sense of fulfilment of having a source of income, access to finances is fundamental for wider contentment, as it allows individuals to improve their living conditions.

According to the OECD and WHO (2020), “ageing wears mainly a woman’s face”, as, on average, women tend to outlive men. This results in an imbalance in the sex ratio among older persons in almost all countries (Gist and Velkoff, 1997), as is highlighted by the population pyramids (see Appendix, Figure D.1, D.2, D.3). As a matter of fact, having a longer life might not have a positive impact on women’s lives in developing areas. Older women are

more vulnerable to poverty than older men, due to a combination of relative disadvantages throughout their lives; among those, we can mention the lower educational levels and the continued reliance on women to provide unpaid family work or caregiving. Furthermore, inequalities have been arising from the fact that, more than for men, women's productive activities are carried out outside the formal economic sector and allow for a lower degree of financial independence (Rahman et al., 2009). By way of explanation, old age is characterized by the same gender differences that have been marking individuals' lives since childhood. In most of the cases, these differences find their roots in the pervasive inequalities on which both family and community life build upon. In terms of economic well-being, women are way more disadvantaged, as they need to depend on their sons, husband, or male relatives. With more than half of the elderly females not owning a personal income in Bangladesh (Rahman et al., 2009), the percentage of older women at different income levels varies significantly in relation to the financial conditions of the household's adult males. In fact, despite ill health and fatigue, men usually keep working in the formal or informal economy, while women tend to stay at home. This division of labour has in turn an impact on the management of resources, as men have access to household finances more easily since they have been the ones covering the role of "bread takers" for a longer time (Rudkin, 1993). However, the gender differences with respect to families-monthly-income are far less consistent, especially in the case of widowhood, given that women are substantially more likely to outlive their husbands. One possible explanation to this inconsistency is that widowed women tend to cohabitate with married children, who may sustain them but not allow for financial independence. This is the reason why Vlassoff (1990) found that widows on their own are still relatively better off than those with married sons, at least in terms of personal income. Therefore, the difference in daily income between those who lived alone and those residing with married sons contradicts the contention that sons are necessary for old-age security and access to finances.

3.1.2 Accommodation conditions and housing

Housing abandonment poses one of the most serious problems in East Asian shrinking cities, especially in the inner-metropolitan areas (Ronald and Doling, 2014). Urban shrinkage and housing abandonment have been found to form a vicious cycle of mutual influence, with negative effects on local areas, which threaten in turn the existence of intergenerational communities. In Korean, Japanese and Chinese shrinking cities, a socio-demographic change predicts the inevitable increase of vacant houses in the future: after the death of an aged owner,

if an appropriate heir is not found or if property ownership problem is revealed, the building is likely to be a long-term vacant house (Jeon and Kim, 2020). On the other hand, East-Asian cities are also characterized by a high rate of homeless elderly individuals, who might have had to sell their house or farmland to pay back previous debts or to pay for medicines. Despite this, family circumstances and crises such as breakdowns in relationships, domestic violence, abandonment, and rifts over inheritance are the major causes of vagabondage (Pham, 2020). Hence, homelessness is not only common among elders belonging to the lowest wealth quintile, but it affects all those who end up having no financial sources to afford paying a rent on their own.

Interestingly, besides homelessness, there are other factors that directly relate to the living conditions of elderly individuals. Tran and Vu Van (2017) found that housing features have a strong impact on the overall life satisfaction of elderlies, confirming that the accommodation is an important life domain which influences individual well-being. Building upon the standard economic theory in which individuals are assumed to be rational agents who allocate their resources to maximize their individual wealth, data highlighted how people make rational choices when investing many financial resources in their houses. Consequently, economic background plays once more a pivotal role in defining contentment: it is indeed observed by Tran and Vu Van (2017) that life satisfaction tends to be higher for those living in middle or high-income households, than for those living in low-income households. Furthermore, individuals that belong to middle-income households are more satisfied with housing than those belonging to low-income households; surprisingly, there is no statistically significant difference in housing satisfaction between those belonging to high-income households and those belonging to low-income ones. This is probably not related to the housing conditions themselves, as richer individuals tend to own well-equipped houses (i.e., indoor toilets and kitchens) located in wealthy neighbourhoods. In this case, dissatisfaction might be explained by the fact that rich individuals tend to have higher aspirations relative to their current housing conditions, which in turn can reduce their satisfaction with housing.

Gender inequalities tend to arise also in this context, since traditions want elderly males to own most of the household dwelling. Surprisingly, Rahman et al. (2009) found that 34.6 % of the houses in their sample legally belong to Bangladeshi women. Their paper also

emphasized how the housing conditions of both male and female elderlies are quite similar in the rural Naogaon district, given that there is no strong variation by gender in case of latrine or the sources of drinking water (i.e., tube well). However, it is important to underline that household characteristics might not reflect any kind of gender inequality, but simply correspond to the economic development levels of a country. What is for sure is that ownership of a house and the features of the accommodation are among the pivotal determinants of elderlies' well-being.

3.1.3 Socio-economic status: inequalities and dissatisfaction, but also sense of community

Even if owning physical dwellings is a signal of economic ease, the degree of socio-economic well-being of elderly people strongly depends on their overall living conditions and on the social environment they belong to. For instance, empirical evidence has been found for the presence of inequalities among members of the same society, which have a negative effect on the quality of life of the elderlies. The findings of Tran et al. (2018) showed that individuals who live in the rural communes with high expenditure inequality tend to self-report themselves as being less happy, even after controlling for various individual and household attributes. Older people in rural areas who are farmers or poor are even more sensitive to socio-economic inequalities: by comparing their own income to the mean income of the reference group, unwealthy elderlies suffer from negative consequences on their quality of life. It is clear that this situation triggers a vicious cycle, where an ageing population has the overall effect of aggravating the perception of inequality. More specifically, Wang et al. (2017) found that the age effect is larger for consumption inequality than for income inequality, and that the age effect on inequality is larger in urban areas than in rural areas. At the same time, it is interesting to notice that inequality in income increase with age throughout the whole life cycle, whereas inequality in durables' consumption increase with age only during young periods and then remains stable (Wang et al., 2017). Similar results have also been found by Chen et al. (2017), who focused on the impacts on inequality, both theoretically and empirically. First, for the theoretical analysis, the authors build a two-period overlapping-generation (OLG) model with an uncertain lifetime to assess the impacts of population ageing on income and consumption inequality: findings highlighted that population ageing has the overall effect of aggravating inequality, with consumption inequality being higher than income inequality within the young elderly cohort. Then, for the empirical analysis, the authors used household data to assess the

age effect on income and consumption inequality in China. Besides confirming that the empirical results are the same as the ones predicted by the theoretical model, data showed that the age effect is larger for consumption inequality than for income inequality, and that the age effect on inequality is larger in urban areas than in rural areas.

These inequalities tend to develop ambiguous market driven forces, which might not be the optimal method to stimulate the economies of developing regions. One of the most striking outcomes is linked with the high elderly labour force participation in South and Southeast Asia. Many unprivileged workers who belong to the informal sector end up being obliged to participate in economic activities even during old age, given that their social status and lack of finances do not allow them to retire. A paper by Ghosh et al. (2017) attempted to find the drivers of choice of various occupations during old age and to dig into the related earning dissatisfaction. Using a multinomial logit, the author found that most disadvantaged elderlies rely only on daily self-employment and on the “casual wage” earnings of the informal sector: working in such conditions imply that the elderlies are paid low, aggravating in turn their economic vulnerabilities. Results also showed that old workers from poor socio-economic backgrounds are more likely perceive the presence of inequalities and to be dissatisfied with their earnings. Nonetheless, regional variations are significant and play an important role in the contentment of unorganized workers; this mainly depends on the variation in participation in formal economic activities, while the related satisfaction across geographical regions could be attributed to unequal economic growth and lack of integrity in employment among all age groups. More specifically, areas with comparatively lower economic development also have limited opportunity for labour market participation of elderlies and compel them to adopt vulnerable economic activities.

Hopefully, this dimension of well-being is not only negatively impacted by socio-economic inequalities and income dissatisfaction, but also relies on the broader feelings of belonging to a community and contributing to society (Econation, 2020). The purely social facet of elderly individuals’ well-being depends mainly on their ability to maintain good relationships, social stability and peace. Life satisfaction and subjective quality of life is strongly affected by their role and engagement in networks of communities of elderlies. Policy measures such as the creation of the Wonderful Life Program in South Korea could help senior

citizens to maintain their leadership and communication skill, thanks to the help of staff who enhance senior citizens in being aware of their own disposition, in fostering skills necessary for maintaining interpersonal relationships and in building better relationships. By using a non-equivalent control group pre-test-post-test, Mi-kyeong et al. (2019) verified the effectiveness and usefulness of the Korean program. Their findings illustrate that better awareness of well-being behaviours leads in turn to better social conditions. Therefore, educational programs that deal with a new image of elderly people as leaders of local community or volunteers, positively impact their role in society and help them developing new skills; among them, they authors mention self-management, relationship building, effective communication, problem solving, conflict management and successful ageing. Nonetheless, Thanakwang et al. (2012) highlighted how large family and friendship networks play a crucial role in this field, given the significant direct effect they have on the social relations of older people. However, the size of these networks did not have a significant direct effect on psychological contentment: the effect is only indirect and depend on the amount of social support provided. Consequently, both family and friendship support have been proven to be significantly related to socio-economic and mental well-being, with family support having a stronger impact (Thanakwang et al., 2012).

3.2 Mental Well-Being

In general terms, mental well-being is related to individuals' thoughts and feelings, as well as their ability to cope with the ups and downs of daily life (WHO, 2018). In particular, the feelings of happiness and gratefulness of elders depend to a certain extent on the quality of their family relations and their living arrangements (Miao and Wu, 2021). The Asian traditional living patterns are characterized by intergenerational co-residence, where family members of different generations live under one roof in order to provide mutual support and take care of both children and older members. Nonetheless, since the 1990s, household composition has started deviating from its historic path: from 1990 to 2010, the number of households consisting only of elderly couples has increased by 72.3% (Hu and Peng, 2015). Most recent data from China also show that three-person households constituted the largest percentage share in both 2000 and 2010 (27%), whereas the two-person household became the second largest group of households in 2010 (23%). Large households are no longer popular, as the six-or-more-person households constituted 15.4% in 1990, decreasing to only 8.1% in 2000, and going further down to 6.6% in 2010 (Zeng and Wang, 2018).

For centuries, families have played a crucial role in providing informal support to elderly household members, especially for those who are sick, weak and could not work anymore. Although adult children tend to keep making financial transfers to elderly people with poor health, nowadays emotional support is no longer provided to the same extent as before (Huda, 2020). As in both urban and rural areas the number of families cohabiting has decreased, old individuals started dealing with these new and unexpected living conditions, which have, in turn, an impact on their psychological health. Still, the probability of co-residence is generally lower among the better off elderlies, among female elderlies without a spouse and among those with poor health. Seen as a mutually advantageous arrangement, adult children seem to choose to live with their elderly parents if they can get benefits out of it (Pal, 2007). Despite this, by analysing three Southeast Asian kinship systems, Teerawichitchainan et al. (2015) found that co-residence with a child of “culturally preferred gender” significantly improves the emotional health of Vietnamese and Thai elders, whereas Kochar, A. (2000) listed all the parental benefits from intergenerational co-residence in rural Pakistan. On the other hand, Teerawichitchainan et al. (2015) did not find evidence in support of using network family arrangements as a complete substitute for co-residence in Thailand or Vietnam: after controlling for filial support, the results are not statistically significant. Surprisingly, the empirical results found by Wei and Tsay (2019) indicated that those who have experienced living in a nuclear family have developed a nonlinear relationship between the geographic proximity of their adult children and their own mental well-being. Compared to the choice of co-residence, elderlies enjoy higher life satisfaction if they live separately from their adult children, but only with them residing close by. Co-residence turns out to have a positive impact on elderlies’ well-being if set side by side with a situation in which adult children are living far away.

3.2.1 Family support and frequency of interaction

The combination of modernisation processes and migration to urban areas has led to a change in traditional values and to the evolution of the concept of filial piety (Ichimura et al., 2017). Therefore, other types of psychological support from both family and friends have been developed to improve older individuals’ well-being. Based on the findings of Sudnongbua et al. (2010), older adults appreciate visits and frequent phone calls, as these do not make them

feel abandoned or left on their own. Their study also found that most of elderlies sampled in Thai rural regions have regular contact with their children and receive some sort of psychological support from them. About two-thirds stated that they have at least weekly contact with at least one of their children, and the majority of those said they have daily contact (i.e., more than 50% of the sample). Moreover, while most have had children emigrating abroad (at least 77%), more still have at least one child living in proximity (82%) who frequently visit them in person. Although Sun (2002) revealed that living away from children does not affect whether elderly Chinese parents receive economic help, the author highlighted how distance does constrain them in dealing with negative feeling and on being supported in daily activities. While children with older, physically weaker, currently unmarried parents are more likely to provide psychological support and help on daily activities, children with lower educated parents are more likely to provide only monetary transfers (Sun, 2002). However, more than financial aid, many old parents need to feel their children close to them. For instance, in China and Indonesia elderly mothers' well-being is strongly linked to the psychological help that they provided to their adult daughters: these positive feelings can be enhanced by constant support, preferably in person (Schwarz et al., 2010). Notwithstanding, more frequent visits do not necessarily mean increased support for parents, as adult children might solicit parental help for caring for grandchildren. In any case, the situation seems to be more complex in urban areas, where long working hours in offices appear to be one of the main sources of work-family conflict. Doing long work shifts has significant implications for workers' interactions with their elderly parents: the results of a study by Kim et al. (2019) showed that working one additional hour a week lowers by 6.5% the frequency of visits from male adult children, increasing in turn the feeling of negligence among elderlies.

Now more than ever, frequent interactions with family's oldest members are necessary to improve their mental well-being. In fact, common age-related mental health illnesses are currently being worsened by both the Covid-19 restrictions and safety measures aimed at reducing in-person contacts. Combined with the already existing lack of independence and the fear of death (Cassum et al., 2020), the new sentiment of frailty, loneliness and anxiety triggered by the pandemic have led to a stronger sense of dissatisfaction with life. By reducing in-person social interactions to respect physical distancing, the Covid-19 crisis has undoubtedly increased the cases of depression among older citizens all around the world. Given that all the negative feelings associated with perceived social isolation have induced a reduction in happiness and

well-being, constant intergenerational communication with elderly parents can be seen as the only tool to relieve their precarious conditions. If not tackled in advance, these pessimistic feelings may end up leading to severe mental illness that will not be able to be cured even after the end of the pandemic (Subramaniam et al., 2016).

3.2.2 Depression and mental illness

Although mental well-being is not the same concept as mental health, the two can strongly influence each other. Long periods of low mental well-being can lead to the development of diagnosable mental health conditions such as anxiety or depression. In other words, living with a mental health condition may lead an individual to experience situations of lower mental well-being more often. Therefore, studies have started focusing on understanding which factors trigger depression and how the disease impacts well-being. While Subramaniam et al. (2016) highlighted the negative impact of factors such as high degree of mental disability, poorer life satisfaction and medical comorbidity, Ichimura et al. (2017) focused on demographic, economic, family-social and health features. The more recent study concluded that variables such as education, labour force participation, contact with children, social interaction and health are highly correlated with the depression condition of elderlies in Korea, China, and Japan; the magnitude of these effects varied across countries, together with the significance of factors such as age, marriage, and wealth. On the other hand, Sengupta and Benjamin (2015) found that, in the Indian context, the prevalence is significantly higher in the urban residents (10.1%), females (10.8%), elderlies above 80 years old (24.5%), those living alone without a spouse (12.8%), nuclear families (18.2%), illiterates (10.7%), those not working (10.2%) and in the poor (14%). Surprisingly, access to pensions does not appear to be a key factor triggering depression (Ichimura et al., 2017). However, one must consider that recognizing depression is not a straightforward task and that traditional diagnosis may fail in recognizing more subtle characteristics of this mental disease. For instance, several senior Singaporean citizens (13.4%) seem to suffer from subsyndromal depression, a disease not medically identified as the patient continued to present depressive symptoms that still did not satisfy any rigorous diagnosis (Subramaniam et al., 2016). In accordance with the same dataset, elderlies suffering from subsyndromal depression are found to share many of the psychosocial correlates and risk factors of depression. In particular, the negative impact of subsyndromal depression on elderlies' general health and well-being is significant, but lower than clinically diagnosed depression.

Several studies have shown that, among various mental disorders faced by the elders, depression accounts for the greatest burden, decreasing their quality of life and increasing dependence on others (Bhamani et al., 2015; Cong et al., 2015; Grover and Malhotra, 2015; Singh et al., 2017). Given that depression is an important parameter for cognitive impairment among elderlies (i.e., 44.5% of elderly people with depression have low cognitive ability), there is a highly significant association between quality of life and mental health. In other words, due to bad cognitive and depression, quality of life is seen to decline by 7% (Singh et al., 2017). As it has been estimated that globally more than 20% of older adults aged 60+ years suffer from mental and neurological disorders (Kadariya et al., 2019), solutions need to be found to prevent negative impacts on subjective living conditions. In countries where well-developed public social safety net systems are lacking and where intergenerational interactions are decreasing, social integration and activities have been shown to exhibit important relationships with measures of well-being, life satisfaction and depression (Zimmer et Lin, 1996).

3.2.3 Leisure: impact of physical, creative, contemplative, and social activities

As a domain of time occupation, leisure includes the phases of finding, planning and implementing appropriate stimulating activities (American Occupational Therapy Association, 2008). Throughout the years, research has generally demonstrated that frequent participation in leisure activity is an essential determinant of successful ageing. For instance, DeCarlo (1974) found that a life-long active participation in recreation activities has an overall beneficial influence on well-being in old age. Later, Markides and Martin (1979) argued that recreation is the most important predictor of life satisfaction, while Kaufman (1988) showed that leisure is inversely related to levels of anxiety. More recently, Cheung et al. (2009) concluded that participation in meaningful leisure activities not only reduces a sense of loneliness and depression, but also strengthens the power to cope with physical and emotional changes resulting from ageing. Particularly, this kind of activity provides a positive self-concept, by allowing an individual to keep developing through the feeling of role-continuity⁴ and the sense of self. As a matter of fact, all these studies build upon the *Activity Theory of Aging* (Cavan et

⁴The feeling of role continuity is derived by the *Continuity Theory of Normal Aging*. This theory states that older adults usually try to maintain the same activities, behaviours, and relationships as they did in their earlier years of life (Atchley, 2008).

al., 1949), which claims that successful ageing occurs when older adults stay active and maintain constant social interactions.

Given the relevance of this theory, Zimmer and Lin (1996) decided to fill in the gap in the literature and to dig into the conditions of Asian senior citizens. Therefore, the authors analysed the relationship between leisure activity and well-being among older Taiwanese adults, building upon the findings in Western countries. Firstly, the authors divided elderlies' recreation time in four main categories, namely *physical activities* (sport, walking and gardening), *creative activities* (game, reading, hobbies and handicrafts), *contemplative activities* (thinking and worshipping), and *social activities* (socializing). Although these broad categories might be overlapping, data showed an overall positive association between the frequency of leisure activity and level of mental well-being. The relation has been maintained also in more recent studies, but the preferred leisure activities for Asian seniors have changed (Lee et al., 2014). Given a participation in leisure activity of 1034.01 ± 412.43 minutes (around 17 ± 7 hours), across a 2-day period most of elderly people spent much of their time using media, particularly by watching TV. The second most appreciated leisure options are instead hobbies and peculiar activities, such as calligraphy, craft and playing musical instruments. Then, the participation in sport and outdoor leisure activity is also relatively high, but frequency changes significantly based on household, personal and location characteristics. Out of the different sport choices, most time is spent walking; this is consistent with the findings of Choo et al. (2016), who claimed that the percentage of walk trips is the highest amongst elderlies, in comparison to other generations. However, as age increases among the elderlies, mobility tends to decline naturally, due to age-related health issues.

In terms of the psychological domain, Lee et al. (2014) found that mental well-being of South Korean elderlies is positively correlated with use of media ($r = 0.24$), as well as the practice of hobbies ($r = 0.26$) and sports/outdoor leisure activities ($r = 0.20$). Also, the domain of social relationships is positively correlated with use of media ($r = 0.19$) and hobbies ($r = 0.18$). Similar results are also found in Malaysia by Minhat and Amin (2012), who claimed that social interactions involved in doing leisure activity are associated with a positive impact on the general well-being and mental health of elderlies; even a simple interaction such as shaking hands or exchanging greetings may be beneficial to them. However, the most common daily

leisure activities are not the most social ones: based on data gathered in four Malay districts in Selangor, having conversations while relaxing (78.7%), watching television (74.6%), and reading (63.4%) are the most widespread choices; these activities are also weakly correlated to each other, reflecting the lack of diversity of leisure activities among respondents. In line with this, Lee et al. (2014) found that the sampled Taiwanese participants spent least of their time engaging in activities that involved volunteering or social organizations: within those, the most disliked category is watching or attending cultural events. A possible explanation had already been provided by Hsu (2007), who stated that the participation in social groups does not only depend on the nature of the activity, but also on the person's opportunities to participate in it. For instance, data showed that doing unpaid work is more physically demanding but less intellectually stimulating, meaning that unpaid work could not protect one's cognitive function. Therefore, although doing unpaid work is related to lower risk of morbidity and mortality, the higher risk of impaired cognitive function does not allow an individual to actively participate in social events, negatively impacting the benefits on his mental well-being.

Participating in some types of social activities may increase mental well-being by reducing cognitive function impairment among elders, especially if they involve nature (Sia et al., 2018). However, gender roles tend to impact the activities practiced, providing in turn uneven opportunities for leisure and social group participation. Gender seems in fact to be strongly impacting activities' choices and frequency of recreation in Taiwan, as the proportion of participation in any social group for elderly men (49.5%) is greater than that for elderly women (28.7%). Few women participate in occupational groups (4%) and political groups (0.7%), while participation by men in these types of activities is far greater, 13.1% and 12.9%, respectively (Hsu, 2007). However, the most significant difference appears within the contemplative category, the only one where women out-participate men; unfortunately, meditation and worshipping do not have a positive impact on the well-being scores of women (Zimmer and Lin; 1996). Interestingly, participating in religious groups lowered the risk of mortality for women (Hsu, 2007).

3.2.4 Affiliation and participation: the role of religion

In traditional Asian societies, most of elderly women are not allowed to participate in paid work, as they are supposed to dedicate their time to help in the family business, farm work,

taking care of children or doing housework (Hsu, 2007). Accordingly, they are not encouraged to participate in social group meetings other than the religious ones. Hence, the only way to have a social life is through religious activities, namely those regular meetings in which members of the community interact with each other through the attendance of religious services (Chou and Hofer, 2013). Religious interactions gain importance through the discussions about stressful personal situations, which tend to be relieved through the support of a less-distressing religious frame (Myers et al., 2013). Under these circumstances, religious group activities have seemed to improve the mental well-being of the participants and to benefit their longevity. Especially for elderly women, being part of a religious group has proven to have a positive impact on their life span, through the promotion of both spiritual and emotional health. However, classifying the specific effects across different religions is not an easy task, as most creeds contain peculiar characteristics (Riddoch, 2000).

Hence, different religions have been compared in a study by Tran et al. (2017), aiming to infer whether religiosity is associated with subjective well-being among elderlies in Vietnam. The country choice had been made ad-hoc, since Vietnam is among Asian transitional countries in which religion has been making a comeback and it is expected to be highly linked with subjective well-being (Inglehart, 2010). As the six major religions present in the countries are Buddhism, Catholicism, Caodaism, Protestantism, Hoa Hao Buddhism and Muslim, Tran et al. (2017) selected the three most widespread ones. In a sample where Buddhism accounts for the largest share (72.30%), followed by Christianity (25.2%), Caodaism⁵ (2.5%) and other minor religions/nonreligious (0.03%), results are interesting. A regression analysis showed that the coefficient on religious participation is negative but not statistically significant at the 0.1 level, meaning that there is no difference in happiness between religious and their nonreligious counterparts. However, the specific coefficients on Buddhism and Caodaism turned out to be negative and highly statistically significant: holding all other variables constant, elderly Buddhists and Caodaists have, on average, life satisfaction scores⁶ that are respectively 0.18 points and 0.44 points lower than non-religious individuals. Still, the coefficient in Christianity is not statistically significant. These findings support the hypothesis stating that, in transitional

⁵ Caodaism is an indigenous and syncretistic religion that combines the “gods of Europe” and the “gods of Asia” to heal the wounds of colonialism and establish a basis for mutual respect and dialogue (Hoskins, 2011). This indigenous religion worships three Supreme Beings namely Buddha, Jesus Christ, and Cao Dai God.

⁶ For this analysis, happiness/life satisfactions are a proxy of subjective well-being and are constructed with a value ranging from 1 to 5 (Tran et al., 2017).

countries, local religion has been coming back, but is often consisting disproportionately of new, relatively unhappy recruits. As those individuals are the ones that, in general terms, feel the greatest demand for a sense of meaning, reassurance, predictability, and social support, their well-being seems to be even worsened by religion (regardless of their age).

As could be easily expected, results also hugely vary across countries, in relation with the traditional values and the weight given to religion by both government and citizens. For instance, a cross-country study by Inglehart (2010) found that, while there is a positive correlation between happiness and religion for the whole sample, a negative relationship is emphasized for a subsample of some ex-communist countries. Consequently, the author tried to find an explanation to his findings, concluding the ex-communist trend reflects a recent flow of unhappy elderly people who have turned to religion after the loss of faith in Communist ideology. As these individuals are still looking for the lost sense of meaning and certainty, they currently report themselves as unhappy. A strongly negative association between religious participation and happiness is also found by Brown and Tierney (2009) in a sample of elderlies in China. According to the authors, this negative association could be explained by past (and current) religious controls or persecutions: those episodes might have negatively affected the survey respondents. On the other hand, the religiosity theme has emerged as a positive source of well-being when the Pakistani participants in the study of Cassum et al. (2020) were asked to describe how they managed to cope with the challenges and stressful life situations. Almost every elderly participant reported that they have been praying in tough times, as prayer provided a source of spiritual support and relaxation. Recitations of specific prayer and verses from holy books (e.g., the Quran and the Bible) provided them a sense of inner peace and serenity. Most of the Pakistani elderlies surveyed had in fact an immense faith in religion: this conviction has been a major source of strength while tackling with their life plights.

3.2.5 Physical activities and mental health

Although leisure and contemplative practices are important stimuli, physical activities and physical exercises are the functions that seem to be better providing a holistic impact on elderlies' well-being. Specifically, physical activity involves all the bodily movements produced by the skeleton and muscles, including thus many daily actions such as playing, cleaning, commuting, participating in sports; however, as individuals get older, physical

exercise turns out to be mainly identified as the leisure-time activities that rely on walking, doing mild exercise and joining recreational physical tasks (Li et al., 2018; Kadariya et al., 2019). Regardless of the typology and the age of the individual, physical activities allow several body functions to be enhanced contemporaneously, by positively impacting mental health through factors such as frequency, regularity, and duration. Hence, the indirect characteristics of muscular movements lead to improvements in body coordination, flexibility, sleep quality, as well as a decrease in depression and anxiety. Consequently, findings that regular participation in exercise boosts body functions and improves the overall psychological sense of well-being are not infrequent in the literature (Garatachea et al., 2009; Guderian et al., 2013; Lee and Hung, 2011).

Interestingly, senior citizens in Asia have been found to be physically much more active in comparison to those living in Western countries. For instance, according to the U.S. Census Bureau (2010), exercise participation is around 13.3% for people aged 65-74 years in the United States, and about 6.4% for those over 75 years old; on the other hand, the participation rate in Taiwan is over 65% among elderlies aged 65 or older (Department of Health ROC, 2010). Given that for centuries Southeast and South Asian countries have been characterized by inadequate mental health services aimed at dealing with elderlies' psychological plight (Maramis et al., 2011), policies aimed at promoting exercising might be widely accepted by the society, becoming in turn pivotal for success. Through a positive stimulation of both the mind and body of senior citizens, frequent exercising could in fact decrease the risks of mortality and boost a sense of appeasement, improving in turn the quality of life. In line with this idea, scholars have started better analysing the relation between physical activity and the self-perceived mental health status among senior Asians. According to Lee and Hung (2011), the sampled Taiwanese elderlies analysed spent an average of 11.05 hours per week in exercise, approximately 1 hour and 34.7 minutes every day. Results also revealed that walking is the most popular exercise among the interviewed elderlies, with a participation rate of 63.4%, followed by hiking (22.6%) and stretching exercise (20.5%). In general terms, the participation frequency has been very high and included both light exercise such as walking to more vigorous ones, such as playing tennis and doing aerobics. The results from the regression showed that exercise frequency has a statistically significant positive impact on well-being ($\beta = 0.13$) and on three other related dimensions, namely depression ($\beta = 0.12$), positive well-being ($\beta = 0.18$) and vitality ($\beta = 0.18$). On the other hand, a negative correlation is found between exercise

intensity and well-being ($\beta = -0.22$). Aside from this, the same study also suggested that elderlies feel more comfortable and gain more psychological pleasure while participating in less intensive regular physical exercises. Likewise, Wang et al. (2011) showed that the mental health status of older Taiwanese adults either improved or, at least, showed less deterioration among regular exercisers compared to irregular exercisers.

More recently, an experimental study done by using silver yoga as an interventional exercise measure highlighted how all the mental health indicators in the experimental group are found to be better than in the control group; particularly, the higher the frequency, the lower the levels of depression (Chan and Chen, 2017). Furthermore, Lee and Hung (2011), inspired by Taboonpong et al. (2008), found that Thai Chi exercise frequency is positively associated with well-being of Thai senior citizens, through improved quality of sleep and physical performances. However, once more, the authors emphasized that slightly intense exercise could be good for the psychological well-being of older adults when done frequently, while the outcomes might become negative when physical activities get more intense. This finding is particularly evaluated by Kadariya et al. (2019), who claimed that this U-shaped association is intuitive, given that older adults taking part in physical activity should not engage to demonstrate their endurance but, instead, should exercise to keep themselves healthy and to reinforce their sense of well-being. Data also showed that longer exercise duration (which is naturally more tiring compared to exercise involving smaller shorter bouts), appears to be less beneficial for the well-being of senior adults. As a conclusion to their paper, Kadariya et al. (2019) recognised that more active people have a positive contribution to their mental health and well-being, but only if the activity is within a reasonable intensity and length of time.

As the concept of well-being has multiple components strictly interlinked with each other, a range of factors impacting mental well-being might also be expected to influence an individual's state of physical health. As could be easily expected, evidence has been found that physical activities and engagement in exercise exert influence on several aspects of well-being. Penedo and Dahn (2005) demonstrated that exercise and physical activities have positive effects on mental as well as physical well-being, with individuals engaged gaining desirable health outcomes. At the same time, adherence to recommended levels of physical activity has been associated with improved health-related quality of life (HRQL), underlining that physical

well-being is positively influenced by participation in physical activity. More specifically, literature highlights how community-based physical activity and exercise programs have been found useful to enhance well-being, especially for older adults (Aranceta et al., 2001).

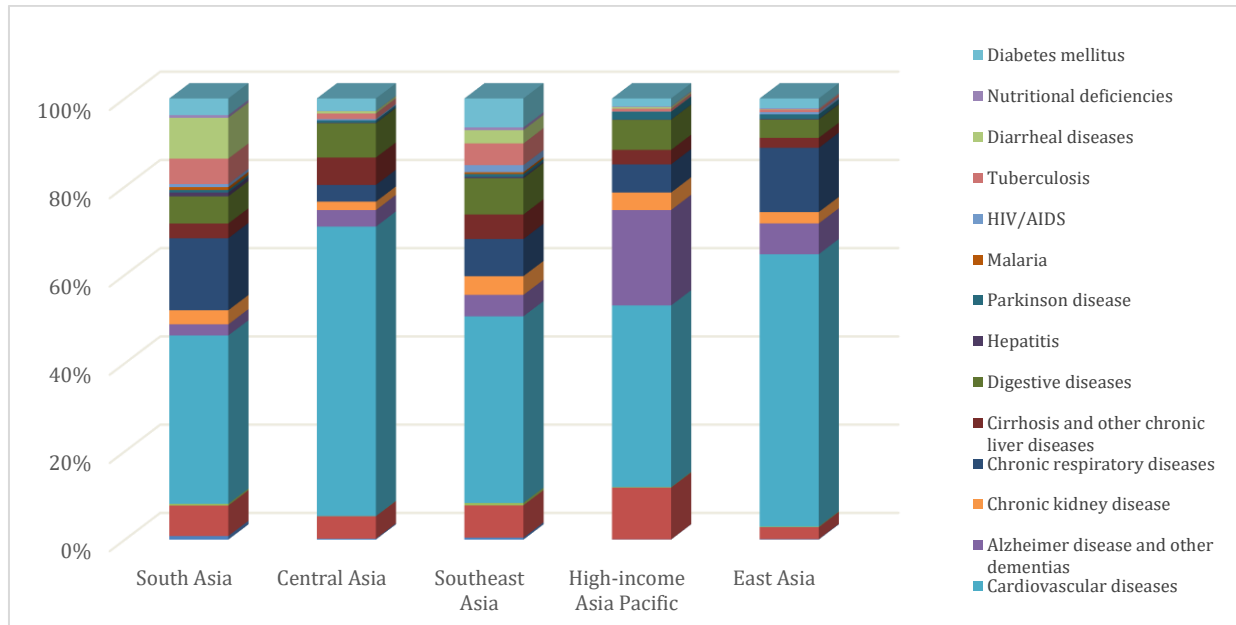
3.3 Physical well-being

Physical wellness accounts for the last dimension of elderlies' well-being analysed in this systematic review. Defined as the ability to maintain a healthy quality of life, physical well-being allows individuals to complete most of their daily activities without extraordinary fatigue or physical stress (Australian National University, 2020). Strictly speaking, physical well-being consists of the ability to perform activities and engage social roles without being restricted by physical limitations and experiences of bodily pain (Capio et al., 2014). However, a positive physical status does not just depend on the absence of disease or the presence of good biological health indicators: it relies on lifestyle behaviour choices that aim at ensuring health, avoiding preventable diseases, and living in a balanced state of body and mind.

Yet, the personal perception of one's health also strongly impacts the degree of well-being, especially among older individuals. By using a 2010 Longitudinal Aging Study in India, Cramm et al. (2015) analysed the degree of correlation between subjective and objective health indicators. Based on the results, older Indians tend to report more positive perception of health than the objective measures of health indicate. The lack of a significant relation between objective and subjective health measures is a striking result, as it suggests that they each provide unique contributions to the evaluation of health status. In fact, self-report can provide information about a person's own perceptions regarding their health, namely something that cannot be measured using an objective assessment tool. On the other hand, objective health measures are usually task oriented and are rated along several physical and/or cognitive dimensions. Therefore, the unexpected disparity between the relatively small percentages of the population classified as "at risk" according to subjective measures and huge percentages of individuals determined to be at risk according to objective indicators, suggests that they reflect different dimensions of mortality and morbidity. Aside from this, ageing is the stage in the life cycle mostly marked by an overall decrease in physical wellness, driven by a gradual decline in physical and mental capacity, increased risk of disease and, finally, death (Zimmer and Lin, 1996). Despite the facts that health worsens while getting older and that death is driven by

several factors (as displayed in Figure 4), some optimal behaviours have been found to be preventing new subjective and objective chronic diseases, as well as to be decreasing the risk of death.

Figure 4: Annual number of elderlies' deaths by cause in Asia by region, 2017.



Source: Institute for Health Metrics and Evaluation. (2018).

3.3.1 The impact of physical exercise on bodily conditions

In these times of upheaval, elderly women and men are among the most vulnerable groups in terms of health conditions. However, more common health issues such as chronic musculoskeletal pain (simply known as back pain) keep being the most challenging health issues encountered by the elderly population all over the world. For instance, as back pain usually results in bearings on overall health and functional mobility, it does not have a positive impact on overall well-being. In fact, besides health-related issues, chronic back pain is associated with increased medical expenditure, workplace absenteeism and early retirement, which can have in turn also serious impacts on socio economic well-being at individual and community level (Bishwajit et al., 2017). Data gathered among the population aged 50 years and above in Bangladesh, India, Nepal, Pakistan, and Sri Lanka show that no significant association between back pain and vigorous physical activity is observed among men in any of the countries; also walking is almost never associated with it. Despite finding the basic results expected, the authors indicate that inadequate or non-participation to any physical activity can

substantially increase the likelihood of suffering from back pain among an elderly population in the regions analysed. Interestingly, results also differ among sex and countries. For instance, the prevalence of back pain in Nepal is more than threefold than that of India; this might be because the current rate of employment is higher in Nepal, being in turn associated with higher likelihood of elderly labour and back pain (Bishwajit et al., 2017).

The literature has been highlighting the conspicuous medical benefits of physical activity for the elderly population in ageing economies. In particular, the specific type of physical exercise frequently done by elderlies has been described as leisure-time physical activity (LTPA). However, for decades the studies focused on understanding the impact of LTPA on mortality among Asian individuals with existing chronic diseases has been relatively scarcer. This is the reason why Liu et al. (2018) decided to conduct the first large pooled analysis of middle-aged and elderly Asian adults, including both healthy individuals and those with various baseline comorbidity conditions. The findings provide strong evidence that regular LTPA is associated with reduced all-cause and cause-specific mortality among East Asians. As a matter of facts, the reduction in mortality is observed among healthy individuals as well as those who had severe and often life-threatening diseases including cancer, coronary heart disease and stroke and those who reported having either diabetes or hypertension. In fact, except for the Seoul Male Cancer Cohort, for which high LTPA is associated with an elevated risk of death, an inverse association between LTPA and mortality is observed for all cohorts included in the sample. Yet, numerous factors affect the degree of the participation in physical activities, including physiological conditions, socioeconomic status, and social interactions, as well as the psychological, cognitive, cultural, and environmental factors. Among others, the presence of specific environments (i.e., amenities) dedicated to outdoor activities has been recognized as an important determinant of frequent physical activity for senior citizens. Results from an instrumented regression analysis by Yeh et al. (2018) showed that parks are one of the most important environmental amenities: elderlies who exercise in parks have significantly higher physical activity levels (in METs) than those who exercise at other locations, and the proximity to parks does enhance the convenience for park exercisers. Therefore, building age-friendly environments should be a priority, and policies aiming to promote health for the elderlies in metropolitan areas could focus on increasing park access to encourage physical activity participation. As a matter of fact, providing sufficient and accessible parks in

neighbourhoods could be one of the most cost-effective ways to alleviate the health, economic, and social burdens of ageing economies.

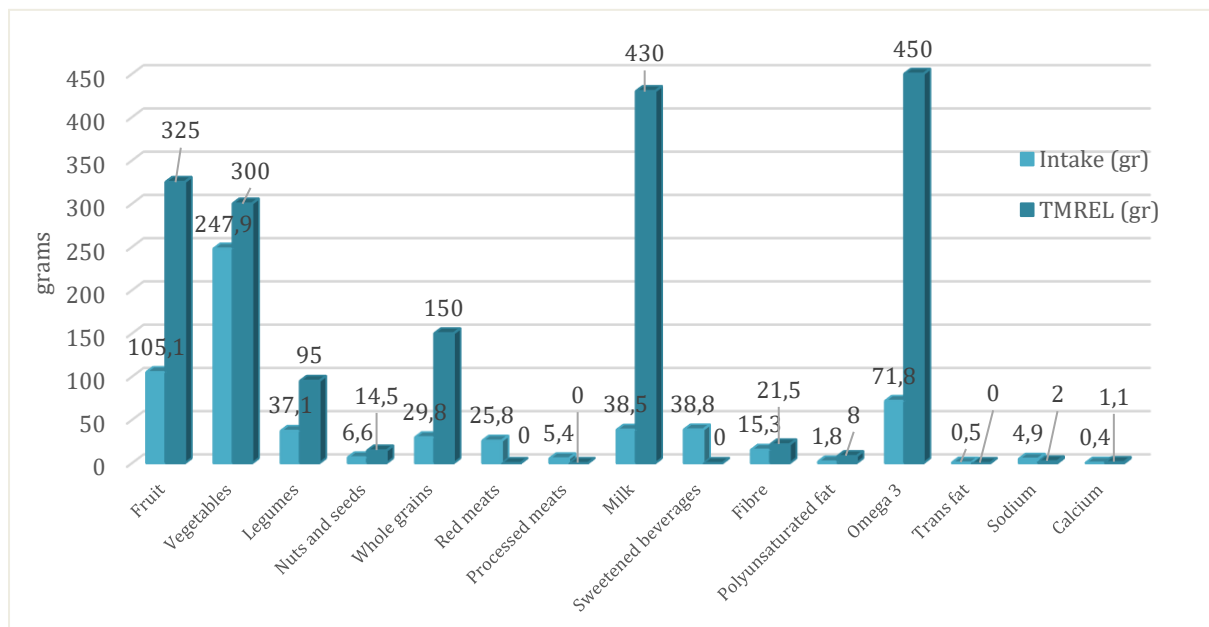
3.3.2 Malnutrition and its two faces

Since centuries, developing Asia has been characterized by a high degree of poverty in both urban and rural areas, increasing mortality risks for both adult men and women. In this miserable context, living conditions are further worsened by malnutrition, which, among others, impacts the probability of facing reproductive failure: given their insufficient calories intake, the poor are slightly less fertile than the wealthy, with their children facing higher mortality risks. More specifically, deficient food consumption, inadequate alimentary regimes and a general lack of nutrients result in loss of both body weight and physical performance, delayed puberty, alterations in the female physiological ovarian cyclicity and, finally, decreased fertility (Cain, 1986). According to Jokela et al. (2008) it is the meagre intake of proteins, minerals and vitamins to trigger the reduction in reproductive performance, due to an altered energy balance. This is also confirmed by the fact that malnutrition diseases, such as bulimia nervosa and anorexia (i.e., two pathologic conditions affecting 5% of women in childbearing age) are evident causes of amenorrhea, infertility and miscarriages (Crosignani, 2006). Although poor undernourished adults tend to be infertile, malnutrition problems also affect new-borns, who might have been lacking the key nutritional intakes during gestation. Inability to produce a child who survives boosts the reproductive failure and impacts the demographic structure of countries that are already ageing.

Malnutrition and insufficient nutritional intake are a plague that affects all the members of a society, especially in developing Asia (as can be seen in Figure 5). However, since they stop working, individuals tend to approach a more sedentary life and to neglect the choice of a healthy diet, becoming even more vulnerable to malnutrition issues. These new health conditions are driven by all those physiological and functional changes that occur with age, combined with the lack of financial support, the decrease in social interactions and the inadequate access to food. Lately, an analysis of the so-called “functional status” has been frequently adopted, given that it allows experts to identify the ability of elderlies to carry out specific day-to-day activities autonomously, such as preparing their own food and intaking it. Thanks to this analysis, evidence has been gathered that, in developing Asia, malnutrition

(particularly undernutrition) is a common problem among elderly generations, as their nutritional health is often neglected. Firstly, lonely elderlies might not be able to take care of themselves alone, to understand what an adequate portion of food is to be assumed, or to have adequate financial means to pay for healthy aliments. Secondly, families might prefer to give larger portions of food to those household members who are working actively and “deserve it more”. Thirdly, most public and private nutritional intervention programs are rarely directed to senior citizens, being focused on infants, young children and adolescents, not to mention pregnant and lactating mothers. However, healthy diets and ad-hoc nutritional interventions could be pivotal tools in the prevention of degenerative conditions of elderlies, improving their quality of life; a timely intervention providing key nutrients can stop further weight loss in those at risk of malnutrition and can allow them to restore their physical conditions. In fact, individuals with acute and chronic conditions are even at a higher risk of malnutrition, creating a situation that decreases even further the well-being of the patient and increases the related healthcare costs: it may seem that malnutrition and morbidity create a vicious cycle that keeps deteriorating health throughout the years (Agarwalla et al. 2015; Chern and Lee, 2015).

Figure 5: Average dietary intakes of foods and nutrients by Asian adults (25 years and older).



Source: Institute for Health Metrics and Evaluation. (2020). | TMREL (theoretical minimum risk level) is the level of risk exposure that minimises nutritional risk at the population level, or the level of risk that captures the maximum attributable burden. | Intake refers to average daily intake |

Unfortunately, not many tools have been developed to provide a precise estimate of undernutrition in this age group; however, Agarwalla et al. (2015) highlighted the role of the Mini Nutritional Assessment (MNA), a well-validated instrument used for assessing the malnutrition of elderlies in developing areas. After having participants undergo an anthropometric examination for height, weight, mid upper arm circumference and calf circumference⁷, Agarwalla et al. (2015) decided to make their sample of Indian elders follow a 24-hours dietary recall. In this way, it has been possible to assess the calorie-intake of everyone and to compare the value with a calorie-requirement calculated by using Recommended Dietary Allowances (RDA) 2010 guidelines. Of the 360 elderlies sampled, 15% are found to be malnourished, 55% at risk of malnutrition and 30% well nourished. Statistically significant associations are emerging between the nutritional status and the older age groups, females, and the status of being financially and functionally dependent. Subsequently, attention has been focused on the significant relationship between nutritional status and calorie intake: out of the 360 elderly persons, 52.7% has inadequate calorie intake. Interestingly, several reasons are linked with the discovered undernourishment and inadequate calorie intake, such as having problems when chewing and swallowing (59.5%), loss of appetite (54.2%), financial problems (48.4%) and negligence of caretakers (47.8%). Out of the whole sample, 38.4% elderlies are unaware of their worrying nutritional conditions (Agarwalla et al., 2015).

Although many sick elderlies in developing Asia suffer from malnutrition, other several changes take place regularly in ageing bodies, even if the individual does not suffer from any disease and lives in high-income areas. In fact, the process of physiological ageing affects the body mass and impacts its composition regardless of where the individual lives (Buffa et al., 2010). More specifically, the ageing process always involves physiological and nutritional changes that manifest themselves through changes in height and weight: muscle mass decreases, while fat mass starts accumulating in specific areas, modifying the adipose tissue redistribution (Dey et al., 1999). Besides this, the ageing process results in poor energy regulation, as well as changed hormonal levels and metabolic rates, which in turn affect their anthropometric measurements (Goh et al., 2014). According to Fauziana et al. (2016), among

⁷ Calf circumference provides information about normal muscle mass. It can reflect a decrease in muscle mass with limited physical activity; a result of more than 31 cm is considered normal (Tsai and Chang, 2011).

senior Singaporeans the prevalence of normal BMI⁸ is 52.5 %; the overall prevalence of obesity and overweight is 8.7 % and 33.4 % respectively, while underweight is only 5.5 %. Besides the impact of age, participants who are not married are less likely to be overweight compared to those who were married, while participants with tertiary education or higher are more apt to have lower WHR⁹. Based on their study, to (Fauziana et al., 2016), identified that those who are overweight are more likely to have hypertension and heart conditions, while those who are obese have higher chances of having diabetes. At the same time, those with a higher WHR are more likely to have hypertension and diabetes. Interestingly, other chronic conditions such as stroke and transient ischemic attacks (TIAs) are not significantly related to the BMI and WHR. It must be said that the use of the two measures allowed for a better overview on the topic, through a more comprehensive and accurate association of risk factors.

3.3.3 Precarious health and access to healthcare

The growing elderly population increases the likelihood that a larger share of citizens undergoes diseases or illnesses, given that elderlies usually suffer from multiple chronic conditions and have complex medical -as well as nonmedical- needs (Chen et al., 2018). At the same time, the epidemiological transition from infectious to non-communicable degenerative diseases (NCDDs) and the presence of mental illness have intensified the burden on the curative systems, since many of these chronic conditions require long-term medical and social care (WHO, 2015). Furthermore, in a scenario where vulnerable groups face the inability to buy medicines and to access healthcare, curing the simplest issues might not be perceived as a necessity by the most indigent: wrong health choices tend to create a vicious cycle that negatively impacts other physical dimensions of an individual's well-being. In fact, despite the extensively promoted role of preventive and promotive care, most health systems in developing Asia remain largely dominated by the patients' lack of medical knowledge and preference for traditional curative medicine. However, even within more traditional curative systems, there remains a remarkable fragmentation in basic healthcare provision, hampering the efficiency of a centred care for elderlies (WHO, 2002). These are the reasons why the rapid ageing of the Asian population has led to increasing pressure on a reform in the healthcare systems and the

⁸ Body mass index (BMI) is a value derived from the mass (weight) and height of an individual. Specifically, the BMI is defined as the body mass divided by the square of the body height and is expressed in units of kg/m² (WHO, 2019).

⁹ The waist-hip ratio or waist-to-hip ratio (WHR) is the dimensionless ratio of the circumference of the waist to that of the hips of an individual (WHO, 2008).

related service delivery arrangements. In particular, there is a widely recognized need to integrate various health services for elderlies, meaning that public systems should provide more coordinated care, especially in light of the rate of demographic change (He and Tang, 2021). Thus, a system based on more integrated health services would be optimal: in this way, sick patients “[...] get the care they need, when they need it, in ways that are user-friendly, achieve the desired results and provide value for money” (Waddington and Egger, 2008).

Before implementing any change, it is important to know the health conditions and the medication/hospitalisation preferences of senior citizens, as well as their determinants. Therefore, in a context in which societal and family setups are changing, Sanitha et al. (2019) decided to work on a comparative analysis of the Indian elderlies in Kerala, both those living with family members and at old-age homes (OAHs). In fact, among the states of India, Kerala is likely to become the first ageing society as it has already had the highest proportion of elderly population. In such a context, the sample gathered has proven ideal for the aims of the analysis, given that only 4% reported good health condition, about 44% of them reported suffering from illness once in the last month, about 35% reported illness twice a month and about 18% reported illness more than twice a month. Considering this distribution, regarding the type of medicines elderlies often prefer Ayurveda and Homeopathy to Allopathy medicines¹⁰. However, it is important to note that elderlies belonging to poor economic quintiles normally chose Allopathic treatment methods; the same is true in the case of most of elderlies living in OAHs. Moreover, it is noted that Ayurveda medicine preference is high among those who normally suffer from diseases such as rheumatism and psychological diseases, whereas those who suffer from either cardiovascular disease or cancer mainly depend on Allopathic medicines. At the same time, those who are married and have children to take care of them revealed their preference towards Ayurvedic and Homeopathic treatments. Besides this, it is observed that among elderlies living with family, about 34% of them finance themselves their health expenditures: these are the individuals who are either receiving a retirement pension or belonging to upper economic classes. Then, the vast majority (47%) have reported that their healthcare expenditure is financed by their adult children. Finally, about 8% (mainly women) have reported that their spouse supports their healthcare expenditure financially. Interestingly, out of the total 78

¹⁰ Whereas in Allopath disease are treated with the help of drugs, in Ayurveda healing is facilitated with the amalgamation of five elements of nature and in Homeopathy the objective is to bring about a change in human body to make it responds in a better way to get the system right in place (Ani, 2017).

individuals sampled within the OAHs, about 77% have reported that they are living in the OAHs free of cost. Then, about 5% are paying the OAHs fee partially, whereas the remaining 18% have reported that they are among the paying members. Contrary with common results and real-life stories collected by newspapers (e.g., Joshi, 2019; Ng et al., 2020; Pham, 2020), 67% of the inmates are not willing to go back to their family in the future, while only 33% still miss their family and want to go back to their children and grandchildren. In line with these results, it is found that most of the OAHs are philanthropic institutions aiming at hosting sick abandoned elderlies with poor economic backgrounds are finding no difficulty in approaching and availing of a residency in OAHs. In conclusion, in the absence of public provision of effective healthcare services in Kerala, elderlies spend out-of-pocket on health expenses and choose private hospitals for effective and better treatment.

Access to healthcare and proper integrated cure does not depend only on the government and charity nets, but also on the degree of inequalities present in a society. Although the modernisation process has changed some traditional values, the Asian ideologies about strong family values and the family care of elders are a resistive narrative (Cohen, 1998). Therefore, in societies where ageing is “anchored in the household” (Croll, 2005), variation in old age support is underpinned on welfare, as well as the social and gender relations. In line with these expected health discrepancies, Qureshi (2017) examined the Pakistani context, which is ageing rapidly. Gender and social class appeared to be among the most important factors differentiating the health of the Pakistani elders: considering that the country is based upon strict patriarchal-gender relations, data showed that women's health on average is worse than that of men. Among other unrelated issues, Pakistani women have lower advantage in survival, higher rates of disability, as well as higher degree of communicable (e.g., heart diseases) and NCD diseases. Aside from this, the amount of care provided to elders, regardless of the sex, depended on the economic condition of the family. In conditions of poverty, inputs to health may be directed away from elderlies towards the young, who are perceived to be more economically productive, and in greater need (Qureshi, 2017).

Yet, higher inequalities seem to be faced by those with the lowest status in society: widows. Since the past decades, evidence has suggested that women enjoy higher life expectancies, having thus more chances to face widowhood. Nevertheless, they are at greater

risk of suffering from more financial issues, abandonment, depression and poor health conditions than widowers (Dhak, 2009; Park et al., 2010). Contemporaneously, among individuals reporting multiple morbidities or severe impairments, the likelihood of widows seeking healthcare services is lower than the one of men (Agrawal and Arokiasamy, 2010). However, Qureshi (2017) claimed that women appear to be in a preferable situation when widowed, compared to when married. As a matter of fact, in Pakistan women's entitlements to care can be negotiable with younger household members, depending on the availability of kin and the socio-economic circumstances of the family. Thus, if the old woman has generated a large family and established a net of close relationships with her children, she has chances of securing the respect and benevolence of her in-laws. This, in turns, might allow the woman to live in better financial and physical conditions, compared to when her husband was alive. Interestingly, results are the opposite in India, based on the sample gathered by Agrawal and Keshri (2014). Compared to men with the same marital situation, widows suffered with greater rates of self-reported morbidities and are less able to access healthcare services; in particular, NCDDs are more widely prevalent among widows than widowers. Substantial disparities in disease prevalence patterns and treatment seeking behaviour are noticed of course by gender, but also by age, residence, education, and other socio-economic conditions; for instance, oldest-old widows reported greater prevalence of morbidities due to weakening resistance power in old ages.

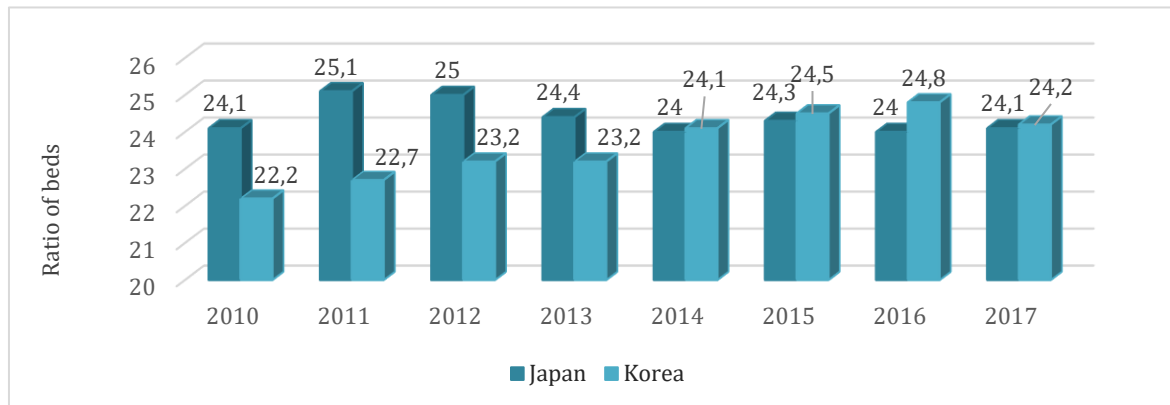
In order to mitigate healthcare inequalities and improve the quality of life of the low-income families, some public assistance programs have been developed in the wealthiest regions of Asia. This has led Jeon et al. (2017) to evaluate the impact of the South Korean National Basic Livelihood Security System (NBLSS) on health services utilization and to examine the differential effect of the NBLSS by disability status among the elderlies. First, the participants of the study were divided into three groups, based on their level of disability according to the Korean disability registration system (i.e., mild disability, severe disability, and no disability). Results from a regression analysis implied that low-income disabled elderlies without adequate social security are the most disadvantaged: they did not suffer only from unstable income or ill health, but also from high direct payments for healthcare. In fact, within the same disability status, the low-income without NBLSS group used the least amount of inpatient care, but their financial burden of health expenditure was the highest among the three income groups (Jeon et al., 2017). In other words, this study aimed at demonstrating that

elderlies with disabilities are still not well protected, as adequate pension and health systems are still lacking even in the most developed Asian countries.

3.3.4 Subjective physical status and life satisfaction

According to the analysis done in the previous chapter, it has emerged that successful ageing is not uniform across the different groups and that it differs from individual to individual. While some achieve a sense of fulfilment, contentment and satisfaction when getting older, others do not accept the changes linked to old age and cannot help to complain about the decline of their physical activities (Jauhiainen, 2009). Therefore, the subjective level of life satisfaction (LS) is an important predictor of successful ageing. More specifically, the level of LS indicates the subjective (physical) well-being which is associated with the health and mortality status among individuals aged 65+. In other words, older people who undergo bad health conditions tend to express low levels of subjective LS; however, other granular aspects might affect LS through health conditions. This is the reason why Banjare et al. (2015) focused on the various factors associated with the LS index among the rural elderlies in Odisha, India: as expected, the authors identified cognitive and morbidity status as the main areas of concern. Relying on a hierarchical regression analysis, Banjare et al. (2015) found that cognitive health is the most influential factor in determining the degree of LS among elders, regardless of gender. More specifically, elderlies who are living alone, have any kind of disability and have a low score of activities of daily living are the ones who reported significantly lower perceived LS for both the genders; among rural elderlies, individuals' social support also plays an influential role on determining contentment. This analysis concluded that better understanding of triggering factors can help in enhancing subjective life conditions, by removing the superfluous anxiety of old age. However, as cognitive status strictly depends on health status and on (unseen) individuals' characteristics, Banjare et al. (2015) argued that there should be well trained staff and infrastructure in the geriatric units to cater the needs of the rural elderlies; as a matter of facts, according to the authors, this point is almost fully ignored in developing regions (as can also be seen in Figure 6 also for Asian developed countries).

Figure 6: Ratio of beds in residential long-term care facilities in developed Asia, per 1,000 population aged 65+.



Source: OECD. Stat (2021). *Heath*.

The paper mentioned above by Banjare et al. (2015) clearly highlights how subjective life satisfaction of Asian elderlies depends on interlinked factors that belong to each of the three dimensions of well-being we have analysed until now. Higher levels of overall life satisfaction are correlated with one's health conditions, socio-economic status, adequacy of family support, living environment and condition. Once more we can realize how well-being is a multidimensional concept and how mutually important factors play a crucial role in achieving successful ageing. Therefore, Pinar (2019) emphasizes why considering the type of interactions between well-being dimensions is particularly important, since it would give different signals to developing regions to improve the multidimensional well-being of their senior citizens. For instance, if the three dimensions are perfect substitutes and a “multidimensional well-being index” is obtained with arithmetic mean aggregation, then local policymakers can choose to ameliorate the dimensions that are the easiest to be manipulated and ones that are less expensive, in order to improve overall level of well-being without much effort. However, in most of the cases, two or more dimensions tend to be seen as complements. Hence, policymakers should prioritize balanced improvement in all the aspects impacting life contentment: uneven achievements would not improve the overall well-being as much as the balanced ones. Consequently, identifying and considering these interactions would help governments to prioritise different policies and improve the aggregate well-being outcomes. In line with this, the next chapter is dedicated to an overview of the barriers currently present in developing Asia, as well as the challenges that those ageing economies are facing.

4. Current barriers and future challenges

Sociologists and social demographers describe the trend of ageing societies as the shift to the “fourth stage” of demographic transition, in which birth and death rates stabilise at a low level, while longevity increases (Cardwell, 2006). However, these processes require some changes in the current social structure, health and pension systems, economic cycles, culture and politics. Consequently, governments are constantly challenged to devise strategies of adaptation and modification, in order to face the existing barriers and solves issues posed by rapid ageing; in particular, attention should be focused on the rapid proliferation of “common ageing problems”, on the shrinking labour force, on the escalating costs of pensions and aged-care services, as well as on the social-political conservatism that might be given by the larger share of elderly voters (Pakulski, 2016). Therefore, according to the Australian strategic policy for ageing society (Commonwealth of Australia, 2015), governments around the world could deal with the unexpected issues risen by ageing societies by first focusing their attention on four points, namely:

- *A systematic monitoring of “old age problems”,* such as poor health, loneliness, social isolation, dependency and impoverishment.
- *A systematic monitoring of “ageing society problems”,* such as economic dynamism, shrinking of working populations, increasing old age dependency ratios (dependent/working), and the related generational burdens, rising costs of welfare and aged care, rapidly increasing health costs, formation and mobilisation of grey lobbies¹¹ and its rising conservatism.
- *A selective and rejuvenating immigration,* combined with integrative multiculturalism that boost incentives for employment and promotes social engagement.
- *A systematic monitoring and promotion of productivity* combined with reforms that support an improvement in productivity, through productivity agreements and productivity enhancement that include -among others- education, skilling and investment in technologies.

According to Pakulski (2016), the implementation of similar policies will be possible if governments start actively boosting high labour force participation, especially among women

¹¹ Elderlies are by far the most likely to vote in elections: this gives immense political power to the lobby of citizens aged 65 and over, usually known as the “grey lobby” due to the colour of hair characterizing this demographic group (Nolan, 2011).

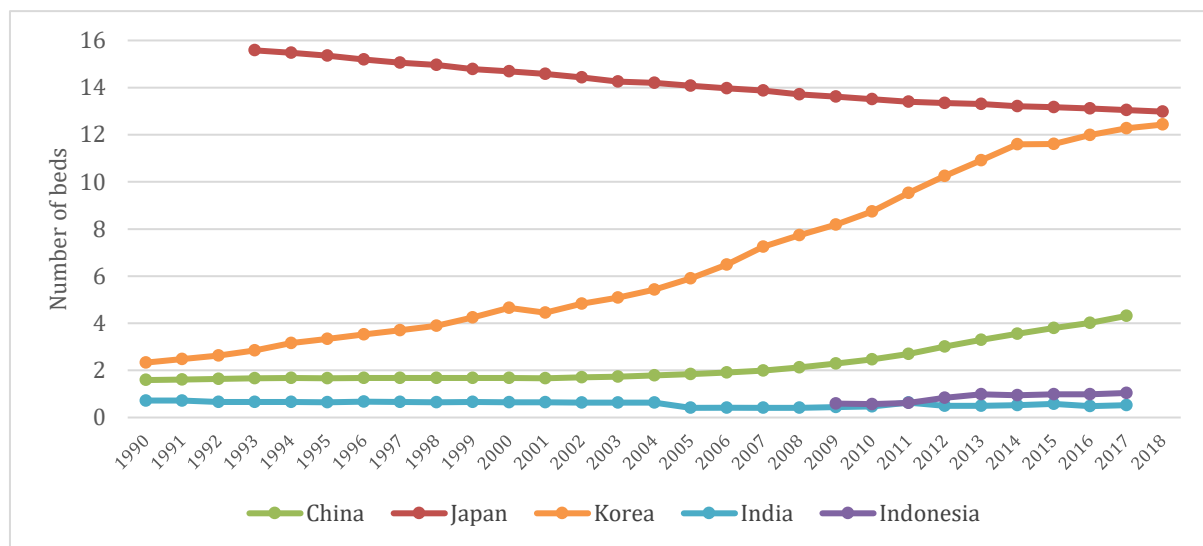
and older workers, as well as boosting employment among highly skilled workers and professionals. As soon as unemployment has been reduced, it will be necessary to ameliorate the current pension system, by encouraging individuals to save for old age and by strengthening superannuation, namely the regular payment made into a fund by an employee towards a future pension. Besides this, governments should aim at a containment of welfare and old-age care costs, through the expanding use of partnerships between families, volunteers, communities and private service providers, including of course also philanthropic organisations and government bodies. However, provision and rationalisation of old-age care depends also on the environment and the type of infrastructures where elderlies live or are hosted. In any case, Pakulski (2016) emphasised how the successful implementation of all these strategies depends first on the ability of linking all the elements together. Secondly, policymakers should be able to adapt the strategic model to the specific conditions of place and time; in other words, developed and developing countries should shape their policies differently, based on the needs of their citizens. Lastly, political presentation and promotion should play an important role, as they allow for secure systematic implementation. This is particularly dependent to a large extent on the degree of public information, education, political transparency and good will. Based on these points, the following sub-chapters contain the four major challenges that governments and policymakers will be facing in Asian developing countries, as well as the barriers that are currently slowing down any process of improvement.

4.1 Fragile and inappropriate healthcare systems

Asian healthcare systems are particularly difficult to be categorized. Before the market reforms of the 1980s, China and other communist countries provided universal medical care. This system collapsed with the introduction of the market economy, the breakdown of the rural communes, the growing importance of private enterprises, and the weakened status of many state-owned enterprises. Hence, the cost, availability and system of financing of medical care now varies dramatically among Chinese citizens, based on their socio-economic conditions (Heller, 2006). In the meanwhile, countries such as Korea, Thailand, and the Philippines have tried to adopt a more comprehensive social health insurance system, albeit only the former two offer relatively universal coverage (Jowett, 2005; Kim, 2005; Tangcharoensathien et al., 2007). Other countries such as Malaysia, Hong Kong and Indonesia rely on budget-financed systems, which should offer universal access to care. Unfortunately, the quality of services provided varies substantially according to the household's income and place of residence (Wagstaff,

2007). Therefore, even where facilities for care are available, the cost of care must be mainly borne out-of-pocket, limiting effective access to quality healthcare. This is the reason why, in most of the countries, the private sector is a key provider. Richer countries like Singapore completely rely on the private financing of medical care (either directly by the household on a direct basis or from employer-financed insurance) but guarantee several public schemes that address the medical care for those in need. Nonetheless, the prevalence of private healthcare in developing areas may reflect the inadequacies of the public healthcare system (see Figure 7), as in India, or it may be seen as an intrinsic element in the design of the system, as in Thailand (Asher and Nandy, 2006).

Figure 7: Number of public hospital beds per 1.000 inhabitants.



Source: OECD. (2021). *Health spending indicator*.

In both the urban and rural regions all over the Asian continent, government medical units aim to provide care, but most of the costs end up being borne by households. In other words, access to essential healthcare remains entirely dependent on out-of-pocket payments. Yet, before underlining how better healthcare systems should be implemented in developing Asia, it is worth understanding the relationships between healthcare expenditures (HCE), real GDP and share of government spending in HCE. (HCE). Since the seminal work by Newhouse (1977), numerous scholars have decided to estimate the size of the income elasticity of HCE: while some reported income elasticity of HCE above one and implied that healthcare is a luxury good (Newhouse, 1977; Mehrara et al., 2012; Liu et al., 2011), others found income elasticity to be below one, meaning that healthcare is a necessity good (Sen, 2005; Lago-Penas et al., 2013; Hooda, 2016). Determining the income elasticity has relevant policy implications for

planning and financing the right healthcare resources. In fact, if healthcare is a luxury good, the government should not intervene directly in managing HCE, but its demand should be left to market forces. Hence, for a luxury good, a growth in income will generate a higher demand for healthcare services, driving up HCE at a faster rate (Moscone and Tosetti, 2010; Farag et al., 2012). Differently, if healthcare shares the same features of a necessity good, active government involvement is needed to redistribute healthcare resources according to the exigencies of various socioeconomic groups (Di Matteo, 2003; Baltagi and Moscone, 2010). Given the different results found by scholars, Khan and Husnain (2019) conduct their own research in Asia, relying on a panel data of 15 countries over the period 1995-2014. Deviating from the existing empirical literature that focuses on HCE on developed countries, their study aimed at providing indications on how to design policies in developing and low-income Asian countries. By considering heterogeneity, cross-section dependence and unobserved common shocks, the authors revealed that HCE has the features of a necessity good in fourteen of the Asian countries examined (i.e., the estimated panel income elasticity is less than unity). However, when countries are divided into SAARC¹² and ASEAN¹³ groups, the elasticity changes slightly. Whereas for SAARC countries -the lower income region- HCE still remains as a necessity good, the estimated income elasticity is insignificantly different from zero in case of ASEAN. This result does not surprise Khan and Husnain (2019): the higher income elasticity in poorer geographic regions is driven by the fact that public healthcare is regarded as “essential” to survive, compared to the wealthier ASEAN countries (Baltagi et al., 2017). Therefore, the empirical findings for developing Asia emphasize once more the role of government in the healthcare sector. With healthcare being classified as a necessity good (at least in the poorest regions), more redistribution of health resources should be required, as well as more active health policy. In any case, the presence of regional variation in HCE and its determinants should be carefully considered when formulating any policy.

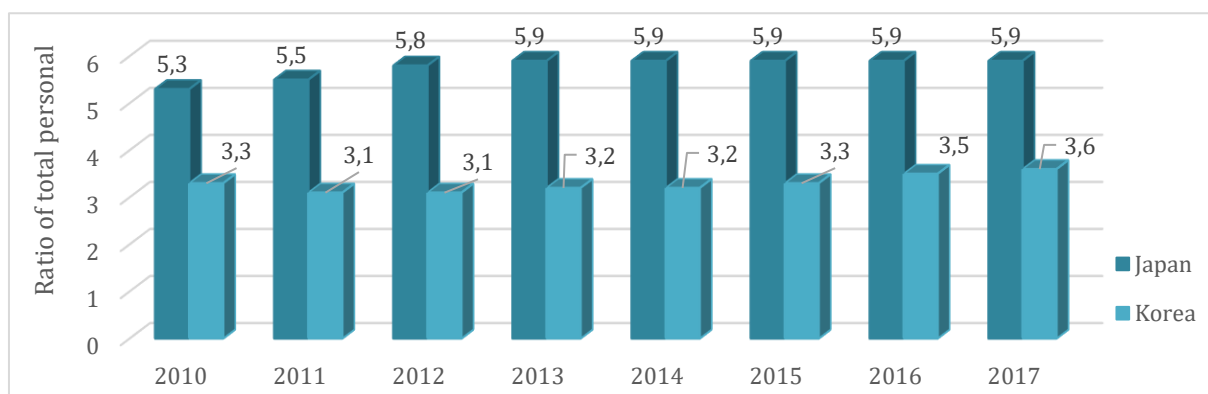
Proven that healthcare is a necessity good and that governments should intervene to increase the well-being of citizens, we will now focus on the ways policymakers could suggest

¹² The South Asian Association for Regional Cooperation (SAARC) is the regional intergovernmental organization and geopolitical union of states in South Asia. Its member states are 8, namely Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka.

¹³ The Association of Southeast Asian Nations (ASEAN) is an economic union comprising 10 member states in Southeast Asia, which promotes intergovernmental cooperation and facilitates integration. Its members are Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

changes in the meagre Asian public healthcare systems: this will improve the conditions of the baby-boomers, as well as the future elderly generations. This subchapter of the systematic review brings thus into focus the issues of current healthcare systems that must be urgently tackled. As a matter of fact, proper designing of healthcare programmes, policies and regulations for elderlies need a continuous understanding of the changing perceptions of the care systems and their use. Hence, a satisfactory number of well-trained staff and healthcare infrastructures should be present (see Appendix, Figure E), allowing to cater and analyse the needs of the Asian elderlies. By now, unlike most European countries, geriatric medicine and the related studies have not been well established in the Asian continent (Chen, 2020). However, the unexpected ageing speed of Asian countries -which has been much faster than that of European ones- might have partly driven the current relative shortage of geriatric medicine programs. Hence, although ageing societies have been established in most Eastern and South-Eastern Asian countries, geriatric training programs (including undergraduate programs) remain underdeveloped. It is thus essential to incorporate geriatric medicine in the undergraduate curriculum, to promote better care for older people in the future. Aside from this, staff should be equipped with key knowledge and skills in geriatric medicine, while specific areas of study should be developed to provide optimal care to the elderlies (Chen, 2020). It is still important to underline that the shortage in geriatric services does not only depend on inadequacy and negligence, but also on the presence of a stigma towards elderly care (as can also be seen in Figure 8, which displays the numbers related to formal geriatric personal carers in Asian developed countries). Consequently, policymakers should focus on crating programs aimed at removing this persistent shame in curing senior citizens, by building intergenerational solidarity among the generations. It is in fact imperative that physicians from all specialties are willing to help senior citizens without being ashamed of their job.

Figure 8: Ratio of total personal (at home and in institutions) per 100 individuals aged 65+.



Source: OECD. Stat (2021). *Health*.

In line with this, He and Tang (2021) recognised how the trends of ageing populations led to an increasing recognition of the need to integrate among various curative services dedicated to the elderlies. Although public hospitals do cure senior citizens and provide discharge plans, there are no coordinated referral mechanisms that take place when the patient exits a curative infrastructure. Hence, the current system does not ensure that elderlies are provided with necessary care after being sent back home, highlighting the lack of effective coordination among senior “cure” and “care” service providers for elderlies (Lau et al., 2018). Even though strategic frameworks dedicated to elderlies seem to exist in most developed Asian nations (Hong Kong Hospital Authority, 2012), the overall region is characterized by the increasing irrelevance of the expensive, hospital-based, and fragmented provision of health services. Policymakers should not only provide more coordinated care but should also be able to contain the rapid cost inflation driven by the healthcare sector. Fortunately, the cases of Hong Kong and Singapore illustrate that the right policy changes can ameliorate the way social care is being provided.

In many developing countries, the weak provision of both preventive and holistic care in the primary system has hardly impacted the whole system and its operation. Moreover, fragmentation has been frequently noted within the primary care system, hampering the possible synergy between providers and decreasing the possibilities of working in a collaborative care management system (Woo et al., 2013). Thereupon, a paradigm shift towards fully integrated geriatric health services must be prioritized. Starting from the idea that primary care is not only expected to serve the curative needs of elderlies but also to play an active role in prevention and promotion, it should be supported by a collaborative mindset characterized by strong internal and collective capabilities among organizations and practitioners. A vertical approach to integration must therefore be reformed to encourage consultation, participation, and co-production with the elderly. Contemporaneously, a horizontal integration could help primary care professionals to deal with the complex multiple morbidity issues of older adults (Woo et al., 2013). The realization of this ambitious -but necessary- goal rests on the simultaneous efforts of policymakers, health service funders, practitioners and health educators, as well as service users. In fact, some studies in this review suggest that the unsatisfactory outcomes seen in many existing integration models often result from a poor appreciation of the needs and preferences of elderly users themselves. Moreover, as most elderly people face varying degrees of financial constraints, the affordability of integrated

services thus becomes an important policy issue. In societies where public systems are overwhelmed, underdeveloped or almost non-existent, the planning of healthcare services must pay particular attention to financing issues from the government. Without substantial financial resources and willingness to invest in healthcare, the development of integrated and affordable LTC services will continue to be delayed (Ansah, 2014). Hence, policymakers should focus on initiatives aimed at nurturing the growth of the elderlies' healthcare systems, while keeping the cost of the services fair. At the same time, governments should actively pursue provider payment reforms to move away from fee-for-service models and adopt alternative payment methods based on progressive taxation, such as capitation or bundled payment. In fact, in health financing systems that are dominated by social health insurance and security nets, there is evidence for better mental and physical conditions among the citizens, given the presence of incentives encouraging the use of curative care. Financial incentives and instruments should be used to induce behavioural change among elderly users and should be aligned to encourage cost-effective preventive, promotive, and community care.

Prevention and promotion are the starting points through which governments across Asia could establish social protection programs that can be sustained over the long-term: in this way, the State will not only provide better health, but could prevent poverty, reduce inequality, and promote social inclusion among older persons. Elderlies' health diseases are significantly affected by the factors related to health promotion behaviours (HPB). Because of this, Iddrisu et al. (2020) verified the impact of increasing participation or involvement in the factors of HPB on the related health diseases among elderlies in Malaysia. Focus had been put on healthy eating, exercising, stress management, health responsibility, interpersonal relationship, spiritual growth, individual personal factors, and elderly perception in terms of HPB; diabetes Mellitus, hypertension, hypercholesterolemia, minor stroke, kidney failure and heart problems are instead the diseases analysed (Iddrisu et al., 2020). Their findings prove that HPB reduces the related health disease, improving the life of individuals. For instance, the coefficients obtained from a logistic regression indicate that, with an increasing score of elderlies eating in a healthy way, the probability that elderlies will be diagnosed with diabetes Mellitus and hypertension decrease by 0.046 and 0.059, respectively. Also exercise and health diseases are statistically significant in terms of p-value, and their coefficients show that with an increasing score of elderly exercise, the probability that the elderlies will be diagnosed with diabetes Mellitus, hypertension, minor stroke, kidney failure and heart problem decrease by coefficients

of 0.117, 0.043, 0.108 and 0.079 accordingly (Iddrisu et al., 2020). This paper emphasizes how health ministries should consider providing intensive and extensive guidelines -as well as useful training modules- to help in preventing and controlling the diseases. Furthermore, it is vital to develop and implement effective strategies aimed at preventing and controlling the unnecessary consumption of avoidable food (such as sugar and fat) and promoting healthy lifestyles in the meantime (Newby et al., 2016). Besides this, policymakers should adopt more advanced healthcare practices, providing technical and policy advice, advocacy, and capacity-building in health specialized areas. Consequently, the health industry should consider intensifying its internal technical capacity to deal with geriatric problems (Lonn et al., 2016).

4.2 Pension systems: a current dilemma

Asian public pension schemes are characterized by their relatively low degree of coverage. Furthermore, the meagre systems are usually hampered by the common practice of withdrawal of pension savings before retirement (often taken as lump sums), preventing people from adequate levels of income over their lifetime. In many developing countries, these insurance systems are a complete failure, since they have not been designed to be adequate, affordable, robust, sustainable, and equitable; one could simply think about the fact payments are not automatically adjusted to reflect changes in the cost of living (OECD, 2009). The field of health and pension social insurance, as well as the one of labour market policies, require much effort to create policy frameworks that can accommodate the current challenges of an ageing population. Except for Singapore, there is little evidence of policies to provide incentives for a longer participation in the labour force. For instance, in China the overwhelming priority to address widespread youth unemployment has led to pressures for early retirement at age 55 for women and age 60 for men (Heller, 2006; Park and Estrada, 2012). However, Asian countries cannot be blamed for this neglect, since Western industrial countries have started slowly to remove the disincentives for a longer professional life. Moreover, postponing the retirement age for the current generation of Asian elderlies will cause difficulties, given that their health status may suffer from more arduous earlier working lives. Nonetheless, the policy imperative should ensure that, as more comprehensive social insurance systems are created in the future, existing systems are reformed in some key policy provisions. These future reforms should start to be designed now, in order to be implemented as soon as a generation is ready for it. They should be built upon a reorganization of the system should include a gradual deferral in the age of eligibility for retirement benefits, a neutrality in linking

benefit levels to the length of the prospective retirement period, an adequate incorporation (in benefit calculations) of the prospective longevity of cohorts at the time of retirement, a move towards pay-out methods that provide for income pay-outs rather than lump-sum payments, and restrictions on the use of funds before retirement (Heller, 2006). At the same time, addressing the current healthcare challenges could have a positive impact on the labour market structure; increasing access to medical care and changing unhealthy behaviour related to diet, tobacco consumption and exercise may be critical to successfully improve the quality and capacity of an ageing labour force.

However, before reforming the labour market and the pension system, more drastic interventions should be planned to deal with the plights of the current generation. Recent data show that only about 30% of the older population in the Asia-Pacific region receives some form of pension (UNFPA, 2020). Consequently, due to a lack of adequate social protection and the inability to accumulate assets, many elderlies must deal with income insecurity, to cope with deprivation of basic services and to experience high incidence of poverty (Jeyalakshmi et al., 2011). Older women are more vulnerable to poverty than older men, given a combination of relative disadvantages throughout their lives, such as lower educational levels and inability to manage finances directly. According to the local tradition, elderly people are taken care of by their children or grandchildren. Such living arrangements are mutually beneficial, with the elderlies providing childcare and support in domestic work in exchange for emotional and economic support. Therefore, public pensions had been modest or non-existent for centuries (Rajan, 2007). Still nowadays, development programs in low- and medium-income Asian countries mostly focus on poor non-elderly populations, whereas programs for the elderlies, where they exist, are often meagre and scant (Lloyd-Sherlock, 2002). Although there is still a strong tradition of family, changing family structures combined with migration are resulting in the gradual weakening of informal support systems. Hence, the goal in many developing countries is to build programs that support the elderlies financially and permit them to retire if they wish (Barrientos et al., 2003). In India, for instance, only workers in the formal sector, including those working for the State or the federal Government, receive a sort of pension from their employers. Yet only 7% of the working-age population in the country is employed in the formal sector; the remaining 93% works in the informal sector, where no decent income or social security are provided (Kaushal, 2014). Thus, as part of a larger initiative to develop social protection for informal workers, in 2006 the Indian federal Government raised the basic pension

amount to Rs. 200 per month. Furthermore, India's National Old Age Pension Scheme (NOAPs) also extended federal pension to all persons aged 65 or above living in households with incomes below the federal poverty line: this reform elevated the number of beneficiaries from 8 million in 2004-2005 to 14 million in 2007-2008. Unfortunately, the NOAPs public pension program has had only a modest effect on elderly employment. Estimates done by Kaushal (2014) suggest that a Rs. 100 increase (US\$11 in purchasing power parity) in pension is associated with a 1-2 percentage points decline in the employment of men aged between 55 and 70, with primary or less education; interestingly, the same rise in pension has no effect on the employment of similar women. These results are much smaller than those estimated in rich and middle-income countries (e.g., de Carvalho Filho, 2008; Gruber and Wise, 2009). One possible explanation for these relatively modest findings might be given by the fact that the pension benefits provided by the NOAPs are not large enough to encourage large-scale retirement. The pension amount would have to be raised to at least Rs. 1000 (or \$108 in PPP) for the desired employment effect to be close to what has been observed in middle- and high-income countries, namely between 23% and 36% as per Gruber and Wise (2002) and 38% as per de Carvalho Filho (2008). Different -and more worrying- results have been encountered by Ning et al. (2016) while assessing the impacts of the 2009 New Rural Pension Scheme (NRPS) program on the Chinese elderly labour supply behaviour. Estimates indicate that the NRPS program does not significantly reduce the likelihood of being part of the labour force market but, on the contrary, it may dramatically contribute to increasing the total hours of work for the old age pension recipients. Additionally, the heterogeneous effects by health conditions might hypothesize that the NRPS program decreases the negative features of labour force participation for those elderlies in bad health condition; yet the coefficient found is not statistically significant.

The results highlighted in the papers of Kaushal (2014) and Ning et al. (2016) have important policy implications related to the pension systems in developing Asia. Firstly, the findings suggest that extensive coverage of pension programs may not have the desired redistribution effect: from the perspective of elderly labour supply, a public old age pension program does not improve the well-being of its recipients, especially those with ill health. In fact, implementing this kind of public transfers without considering the health status of the beneficiary may simply impoverish them. Secondly, the effect of labour market outcomes on the elderlies could be confused with the behaviour response of adult children, who may reduce

the private transfers to their parents. In any case, the results suggest that those heterogeneous labour market effects should be taken into consideration in the design of welfare programs in developing countries. Although increasing labour force participation rates among older workers is positive in the developed world (as it improves the fiscal stability of pension systems), in developing areas the effects of later retirement on individual well-being might be utterly negative. Keeping working in old age might harm the already-precarious health conditions of the most indigent, directly affecting healthcare costs the State must bear. Therefore, the social security policies related to public pensions schemes may be formulated to focus on the older elderlies and those with bad health. Policymakers should plan reforms focused on institutions and tools that minimize distortion on labour supply for the working-age adults. Only in this way the labour market will not be negatively impacted, and the well-being of senior citizens will be improved.

Besides the ambiguous impact on employment, the NOAPs is found to be associated with an increase in household expenditure, especially on medical care and education. This indicates that most of the income received in pensions is directly invested in human capital, in order to improve the health conditions of the elderlies and the level of education of their family members. As reported by Kaushal (2014), an overall Rs. 100 increase in pension is associated with a Rs. 37-40 increase in expenditure in those families where the household-head has primary or lower education. However, adjusting for the fact that only 40% of the sample of low-educated households with an elderly member is poor, this suggests that a Rs. 100 increases in pension leads to an actual Rs. 92-100 increase in expenditures. Although these estimates are positive, the estimated effects of pension are lower and sometimes not even statistically significant for households with an illiterate head. This implies that the most disadvantaged households suffer from errors of exclusion more than others, given that requisite paperwork might be too difficult to be understood (Dutta, 2008). A similar paper by Jung et al. (2016) found that receipt of a public pension in 2006 in South Korea did not allow the elderlies to increase total expenditures or food expenditures, since the amount received is largely crowded out through financial transfers to adult children and/or their own siblings. Interestingly, increased pension participation led to a reduction in financial contributions from adult children, while non-financial help (i.e., informational help or emotional support) increased, suggesting a bargain by family members of non-financial for financial help. The analysis also suggests that the crowding-out effects are stronger for elderly individuals with more education (high school

or more), for those living alone or with a spouse but not in an extended living arrangement. Although this might mean that children do not use the money of their parents if they are poor, it might also imply that the poorest and illiterate benefit from a lower number of transfers -or do not benefit from nothing at all. If so, rationalization and simplification in procedures for obtaining pension should be implemented. In the meanwhile, a more comprehensive approach to elderly care is likely to be necessary. Future pension reforms with informative financial education are highly required, in order to encourage those disadvantaged workers to contribute more out of their current income and to work longer to receive more generous benefits at retirement.

Although modernisation processes have changed the traditional intergenerational relationships, in both urban and rural areas children's financial transfers to their elderly parents are still frequent. Mainly based on the parents' need, financial transfers and familial support compensates for inequalities in elderly persons' access to public resources. Elderly support is an outcome of short- and long-term arrangements between generations, strictly linked to a system of repayment of previous parental investment (Lee and Xiao, 1998). Yet, the papers reviewed in this subchapter highlight how a well-developed public pension scheme could help many households to exit from poverty traps and could improve the features of the labour market. In other words, the establishment of formal pension systems has become a key social and economic goal for Asian developing countries. Now, Asian countries should prepare for the coming demographic challenge: establishing and institutionalizing advanced pension systems is a necessity. In general terms, the main objectives of any pension system are to smooth consumption over lifetime, to provide insurance against longevity, inflation, and other risks, to redistribute income, and to alleviate poverty (Park, 2009). However, the Asian reform should mainly focus on widening institutional and administrative capacity, on improving governance and regulation for efficiency and transparency, on expanding insurance coverage to provide pension benefits to the less fortunate, on enhancing financial sustainability, on improving the returns from the assets managed, and on granting protection for the elderly poor. Besides this, policymakers should consider the weakening of informal family-based, old-age support mechanisms among Asian societies, which emphasises the greater role that formal pension systems will play in the upcoming decades.

4.3 Elderlies' infrastructure and housing facilities

Filial piety has historically played an important role in East and South-East Asia, particularly when households were large, pension schemes were unavailable and life expectancy was around 50 years old. Today, however, families have become much smaller and intergenerational co-residence is not widely spread anymore. Combined with ageing trends, these factors have impacted elderlies' quality of life. Governments in most developed Asia countries have already recognized the gravity of the problem and have started acting consequently. Usually, the frameworks developed promote people-centred and integrated health services for older persons via a consistent network of families, communities, and healthcare institutions. In its optimal form, such integrated care systems allow older people to "age in place", namely in their own homes. Older people can have their health and social care needs satisfied without having to be institutionalised, decreasing the need for public spending on institutional aged care. Besides this, there is evidence that older adults who "age in place" are happier and have a higher quality of life than those in institutions (Chan and Matchar, 2015). In order to achieve a successful integrated care system, an alignment of goals across players in the health and social care systems is needed. For instance, this has been possible in Singapore through the creation of a central repository of information for older adults, which provides them with referrals and placements with health and social services (Chin and Phua, 2016). In this case, the long-term vision is to provide older people with medical and social support when they need it, but not to take them out of their homes and communities (Chan, 2020). Hence, ageing at home is only desirable if conditions are met to optimize function to enable coping with common chronic disabling diseases, physical function, and psychosocial needs. However, some desirable goals with respect to ageing in place include optimizing function by manipulating home design, furniture, and aids. Reduction in isolation and sense of loneliness with the help of social networks support and technology should also be considered. Although the importance of these kinds of community health and social care services has also been recognised by governments in developing countries, its fruitful implementation might be more challenging given the difficulty to bring medical cure in the poorest areas. The rising number of elderly dementia patients could only rely on the emergence of retirement infrastructures and assisted living centres. However, in South Asian culture, it is considered morally wrong to put parents or grandparents in a care home. Therefore, it is fundamental to eliminate the local stigma on elderlies' health and public care, especially towards retirement houses. In other words, as it may allow to reduce the burden of busy adult children and reduce severe hospitalisations, senior

Asian citizens should be prepared to live in retirement houses. This could happen only through ad-hoc promotion policies, as the idea of sending elderly parents nursing homes is still a conservative thought. As a matter of fact, a nursing home becomes a necessary option when a loved one requires more medical attention and care that family caregivers can fulfil. A nursing home should not only provide elder care services, but it should offer proper nursing facilities and equipment to help residents with their medical healthcare needs. Furthermore, nursing homes are meant to aid their residents with daily activities such as bathing, eating and administering medicine. Such elderly care facilities would bring value to the whole society, thanks to the skilled healthcare professionals dedicated to looking after residents with any kind of mental or health conditions. Besides caregiving, nursing homes also act as a social environment, where many senior citizens could find social support and network when they may feel isolated or depressed at home.

A key policy implication emerging from the previous paragraph is the crucial necessity of building healthcare and elderly housing capacity in middle- and low-income societies. Aside from setting up new infrastructures or maintaining existing ones in both urban and rural areas, the real asset of these facilities consists of human capital. Training a large team of professionals who are not only clinically competent in medical care but also adept at social care is a critical success factor. Medical education programs should be reoriented to train a growing number of skilled nurses, geriatricians, dieticians, occupational therapists, pharmacists, psychologists, and other allied health personnel able to manage the chronic conditions of elderly people with complex needs (see current ratio of doctors per 1000 inhabitants in Appendix, Figure F). Furthermore, clinical guidelines and community care standards should be proactively developed and be regularly updated with reference to patients' feedback (Chan, 2020). At the same time, the living environment should be framed in such a way that elderlies keep having frequent contact with family and friends, and do not feel a cultural shock. This could be implemented through various considerations, starting from the respect of tradition and local behavioural norms to more material features such as room decor and the type of food proposed. At the same time, green spaces, and designs of healing environments for nursing homes are important to allow elderlies to remain active: an age-friendly accommodation will improve walkability, create supportive neighbourhoods, and develop a sense of community (Bodeker et al., 2020).

4.4 The double burden of malnutrition (and unhealthy lifestyles)

Malnutrition is a common problem among older people in individual homes, in elderly communities and even in hospitals. The overall prevalence of malnutrition due to inadequate intake is found to be 15%, but the alarming notion is that the proportion of elderlies at risk of malnutrition is relatively very high, reaching 55% of the sample (Agarwalla et al., 2015). In line with the changes in diets and food environments, there have been improvements in undernutrition prevalence, but there is evidence of the double burden of malnutrition at the household, community, and national levels across the region. Obesity rates are increasing in all countries, while undernutrition remains pervasive. On one hand, food has become less expensive and more readily available, resulting in unhealthy eating, namely too much calorie intake, sugar, salt, and fat. At the same time, increased openness to trade has made food supply chains more resilient and enabled access to similar foods all year around. On the other hand, undernutrition among elderlies has proved to be one of the most growing concerns on this demographic shift. During the biological change into old age, nutrition priorities often change towards meeting and minimizing increased nutrient needs. Yet, some elderlies do not even meet the protein-energy intake needed to make their bodies function correctly. In both scenarios, negligence is playing a key role, as elderlies and their caretakers do not pay enough attention to nutritional care (Chern and Lee, 2015). Nonetheless, the reasons why older people are vulnerable to malnutrition are several, including physiological and functional changes that occur with age, inability to prepare food, lack of financial support and inadequate access to suppliers. The type and quantity of food intake is mainly determined by the individual purchasing power and the degree of financial independence; in general terms, not having an income and not receiving regular financial support tend to be associated with poorer nutritional status (Agarwalla et al., 2015). However, a healthy diet is essential to improve the well-being of older people and contain future healthcare costs. Poor nutritional status tends to be associated with an increased risk of death, as well as osteoporosis, diabetes, cardiovascular disease (CVD), and some cancers, including colon, pancreatic, and breast cancers (Grosso et al., 2017; Jannasch et al., 2017). Therefore, it is necessary to raise awareness of both elderlies and their caregivers about the quality, quantity, and frequency of food intake of older persons. A multidimensional approach is surely required at this moment to deal with these issues: efforts should be initiated to help the elderlies to adopt healthy lifestyle practices to maintain or improve their functional status. Still, promoting healthy life is more challenging than it might seem.

Many of the diseases suffered by older persons are the result of dietary factors, some of which have been operating since infancy. Dietary patterns high in fruit, vegetables, whole grains, legumes, seeds, nuts, fish, and dairy, and low in processed meat, sweets, and salty foods have been shown to reduce the risk of NCDDs (Maghsoudi et al. 2016; Ndanuko et al. 2016). Hopefully, traditional Asian diets have much to offer that can reduce the risk of malnutrition - and are culturally more acceptable than the widely recommended Mediterranean diet. For instance, the Japanese diet has been well studied, and has shown to have commonalities with the Mediterranean one: both share high intake of unrefined carbohydrates, moderate intake of protein, healthy fat profile, low glycaemic load, less inflammation and oxidative stress, and potential modulation of ageing-related pathways (Willcox et al., 2014). However, the point of difference is that Asian diets typically include pharmacologically potent ingredients, such as turmeric in South Asia and Southeast Asia, umeboshi plums¹⁴ and reishi mushrooms¹⁵ in Japan; goji berry¹⁶, ginkgo¹⁷, and licorice root¹⁸ in China; ginseng¹⁹ in Korea; the brain tonic centella Asiatica²⁰ in most of the region. Food, agriculture, and trade policies have been originally devised to ensure quantity rather than quality of food. Nowadays, governments must increase incentives to produce more healthy, diverse and nutritious foods: this could be done by using sustainable practices and taking action to create healthy food environments, supported by nutrition education from a young age (Bodeker et al., 2020). Yet, a healthy lifestyle cannot be achieved only through improvements in elderly diets. Policies should consider physical exercise as one “health promotion and prevention approach” that could have excellent potential to support elderly populations to age well. As mentioned in the previous chapters, health

¹⁴ **Umeboshi** are fermented or pickled plums made from the young sour Japanese ume fruit, which is a mix between an apricot and a plum. After being pickled and dried, ume plums are then soaked in vinegar and then aged.

¹⁵ **Reishi mushrooms** are used to help enhance the immune system, reduce stress, improve sleep, and lessen fatigue. People also take them to improve their health conditions such as high blood pressure and cardiovascular diseases, high cholesterol, liver or kidney diseases, respiratory diseases, and viral infections (such as the flu).

¹⁶ **Goji berries** are tiny red fruits rich in antioxidants and powerful medicinal properties. They are said to slow signs of ageing, maintain eye health, and improve the conditions of liver, kidneys, and lungs.

¹⁷ **Ginkgo leaves** are often taken by mouth for memory and thought problems, anxiety, and vision problems. They seem to improve blood circulation, which might help the brain, eyes, ears, and legs function better. It may act as an antioxidant to slow down Alzheimer disease and interfere with changes in the brain that might cause problems with thinking.

¹⁸ **Licorice root** may have potent antioxidant, anti-inflammatory, and antimicrobial effects. Early research suggests that, as a result, it may ease upper respiratory infections, treat ulcers, and aid digestion, among other benefits.

¹⁹ **Ginseng** is commonly known for its antioxidant and anti-inflammatory effects. It could also help regulate blood sugar levels and have benefits for some cancers, by strengthening the immune system, enhancing brain function, and fighting fatigue.

²⁰ **Centella Asiatica** is used to treat various disorders and minor wounds.

benefits of exercise for older people are almost countless and include reduction in risk of coronary and cardiac disease, diabetes, obesity and even some cancers. In addition to reducing the risk of many health conditions and chronic disease, exercise can result in improved physical performance, mental health and overall quality of life. Developing countries should adopt health policies in line with the Japanese ones aimed at mitigating the rising rates of NCDs. Policies such as “Active 80 health Plan” (1988) focus on the initiation of basic targets, such as diet, physical activity, rest, no smoking or drinking, medical screening, hypertension, and dental health. What is central in these Japanese policies is that they ensure that elderly people significantly practice these health promotion activities (Watanabe et al., 2018).

Establishing policies to support supply and demand for healthy foods will help to ensure that consumers take an informed decision and minimize negative externalities for the public healthcare system. Efforts to improve policy for the double burden of malnutrition should focus on integrated nutrition interventions for preventing undernutrition and obesity/diet-related NCDDs, nutrition-sensitive social welfare, agriculture and supply chains for healthy foods, food environment policies, and innovation (Thow et al., 2020). Higher malnutrition rates among the elderlies, may it be because of over- or under-nutrition, increase healthcare system costs and hamper productivity at different levels, leading to significant economic costs which decrease the well-being of several generations.

5. Conclusion

The findings of this systematic review led to the conclusion that several Asian developing countries are not ready to face the challenges driven by the demographic transition. This inadequacy has strong consequences on the life of citizens and on the overall degree of well-being of elderlies; nonetheless, the most striking effects will be seen in the long run, if the situation does not promptly change. More specifically, the wellness of senior citizens has proven to be dependent on three major dimensions, as well as on the relative intra-dimensional links. First, the presence of inequalities, may they be at the gender, social or economic levels, has been shown to be significantly impacting the socio-economic facet. Disparities in income and expenditures, in dwelling ownerships and housing conditions, in the role played within society and relative attributed status constantly aggravate individual's thoughts, triggering in turn precarious mental health conditions. Hence, starting from this indirect link, the mental

dimension of well-being has been analysed, revealing how living conditions can boost deathly diseases such as depression. Hopefully, feelings of anxiety, loneliness and fears of death can be decreased thanks to the help of frequent interactions with family members and surrounding communities. In fact, although intragenerational co-residence is not the most widespread type of accommodation anymore, elderlies' mental status heavily relies on their relationships with adult children. Aside from this, mental health can also be improved through constant participation in leisure activities, including religious celebrations and outdoor physical exercise. Once more, the link between two facets of well-being has emerged, highlighting the physical wellness of elderly people, which is also reinforced by an active lifestyle. Moreover, the presence of a healthy diet has shown to be necessary to boost this last dimension of well-being.

Although there has been considerable improvement in policies aimed at supporting individuals in Asian developing countries, there remain areas where amelioration is needed. Precarious access to public healthcare due to different socio-economic conditions is seen to be one of the major barriers to progress; at the same time, the scarcity of infrastructures, skilled doctors and geriatric departments is also impacting the living conditions of a large share of the Asian population. Then, if one considers the almost non-existent pension systems, the shortage of infrastructures dedicated to elderlies and the effects of the double burden of malnutrition, it is clear that local policymakers should start identifying and considering the main issues present in their countries. This will allow them to prioritise policies at the local, regional, and national levels, and improve the aggregate well-being outcomes of senior citizens.

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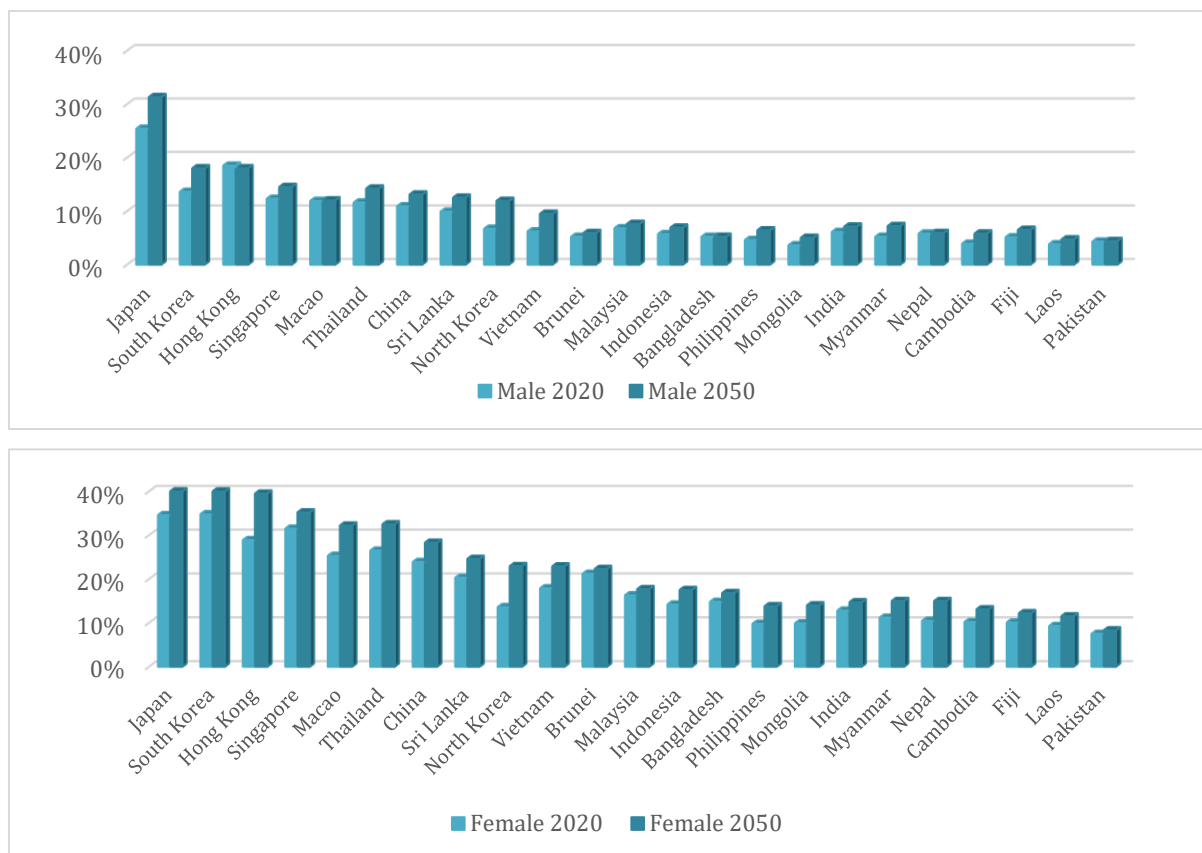
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Appendix

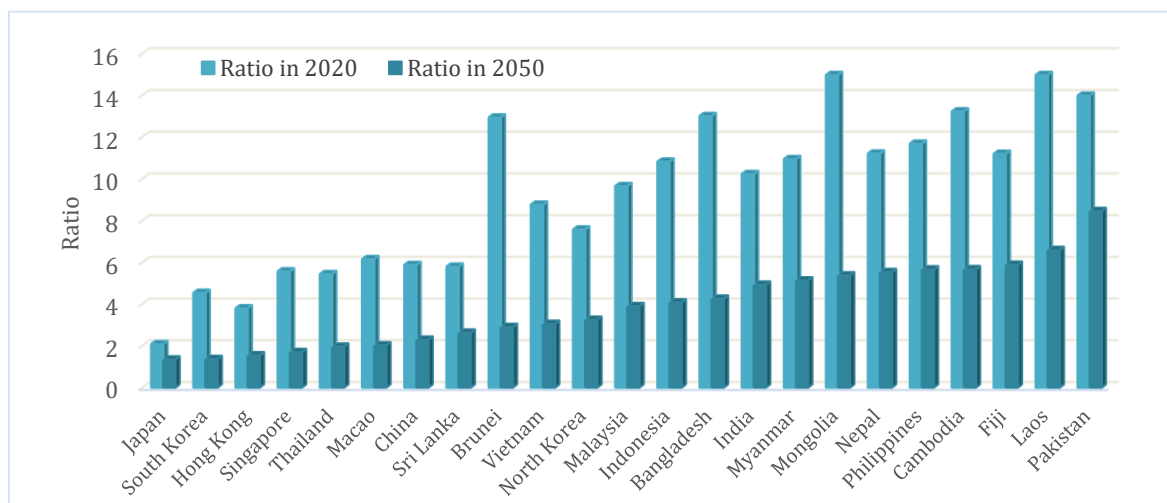
A.1 List of figures

Figure A: Share of the population aged over 65 years (females and males in 2020 and 2050) in main Asian countries.



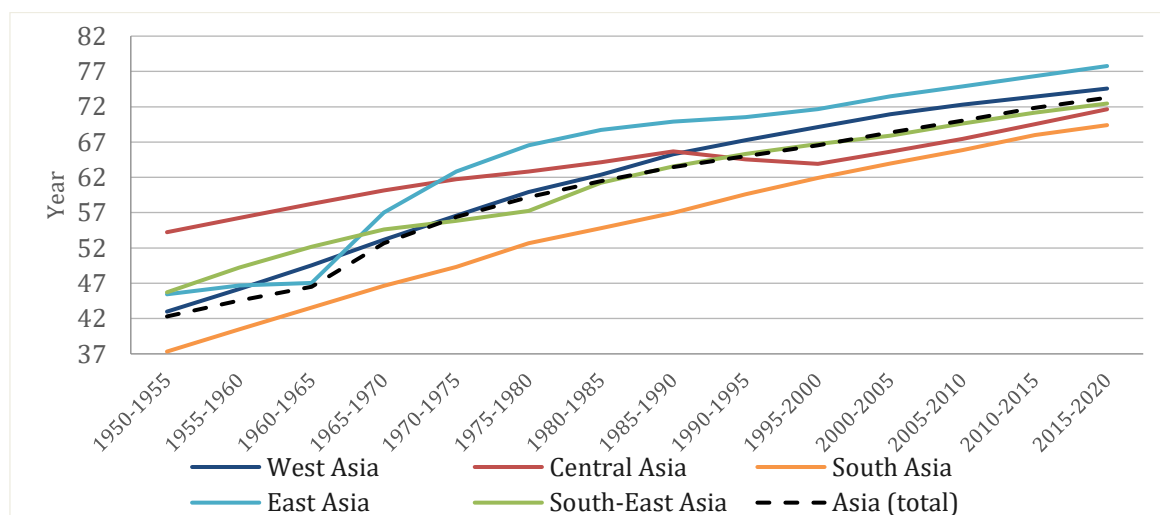
Source: OECD Asia/Pacific. (2020).

Figure B: Ratio of people aged 15-64 to people aged over 65 years.



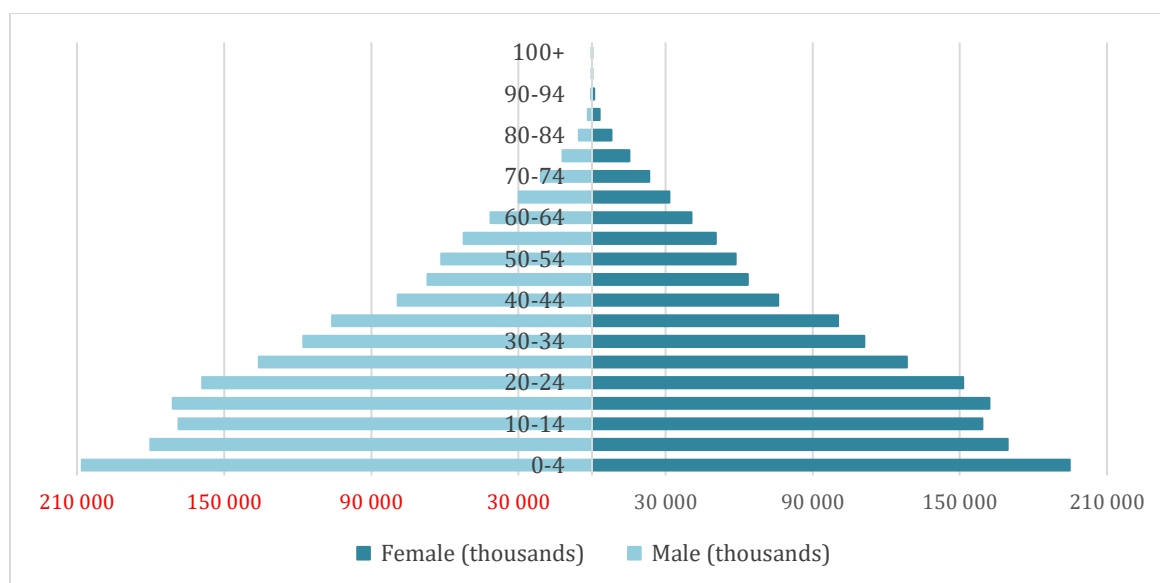
Source: OECD Asia/Pacific. (2020).

Figure C: Life expectancy at birth (both sexes combined) by region and subregions, 1950-2020.



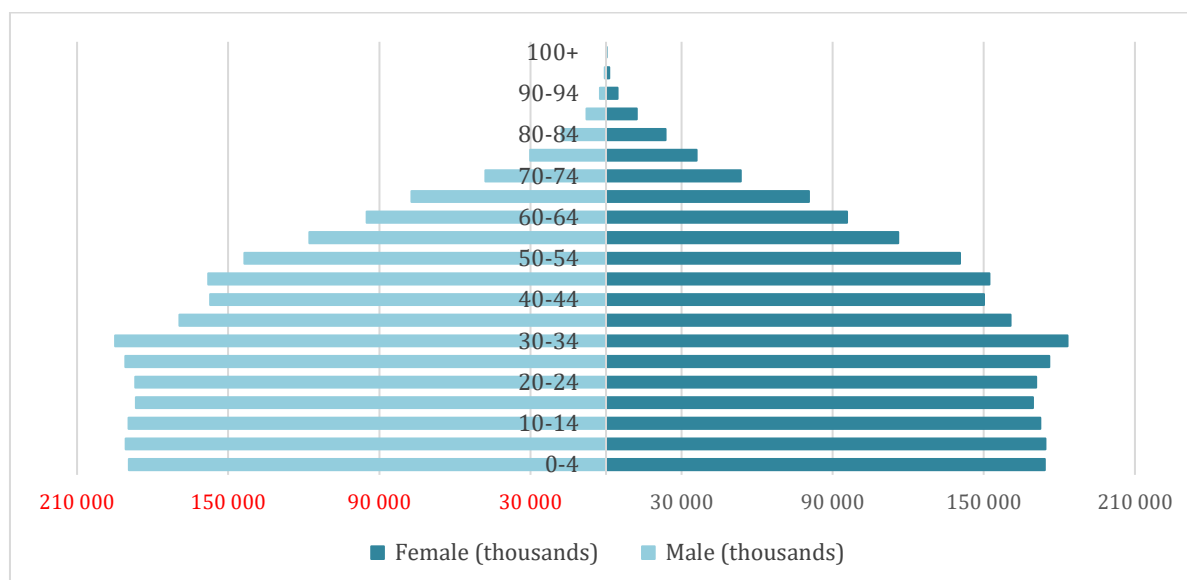
Source: United Nations. (2019).

Figure D.1: Population pyramid of the Asian continent in 1989 (in thousands of individuals).



Source: United Nations. (2019).

Figure D.2: Figure: Population pyramid of the Asian continent in 2019 (in thousands of individuals)



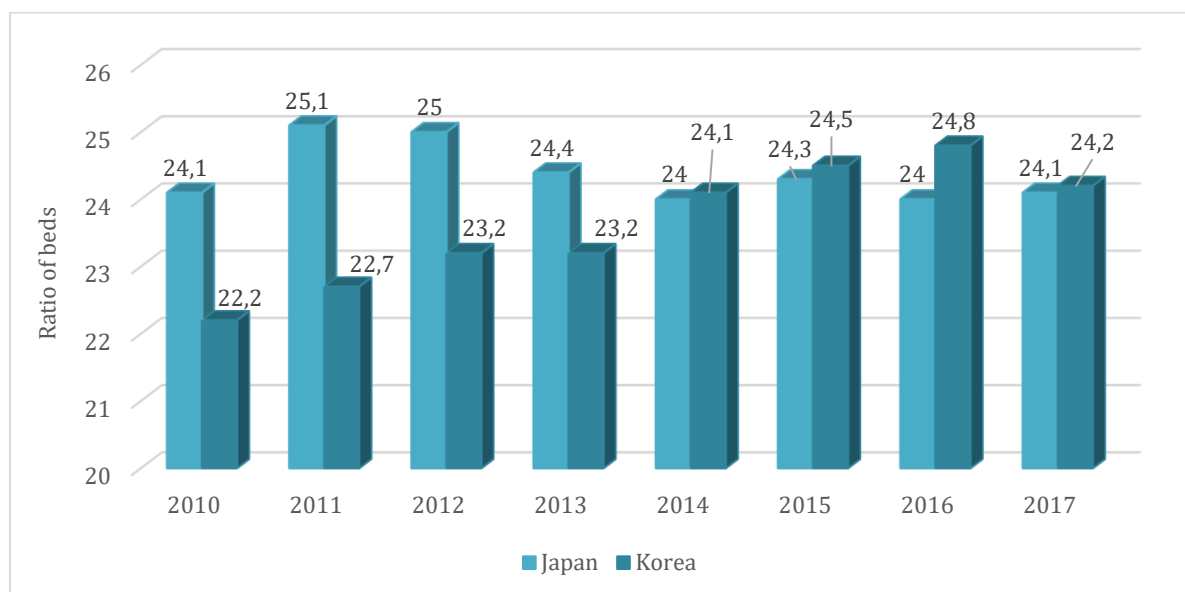
Source: United Nations. (2019).

Figure D.3: Figure: Population pyramid of the Asian continent in 2049 (in thousands of individuals)



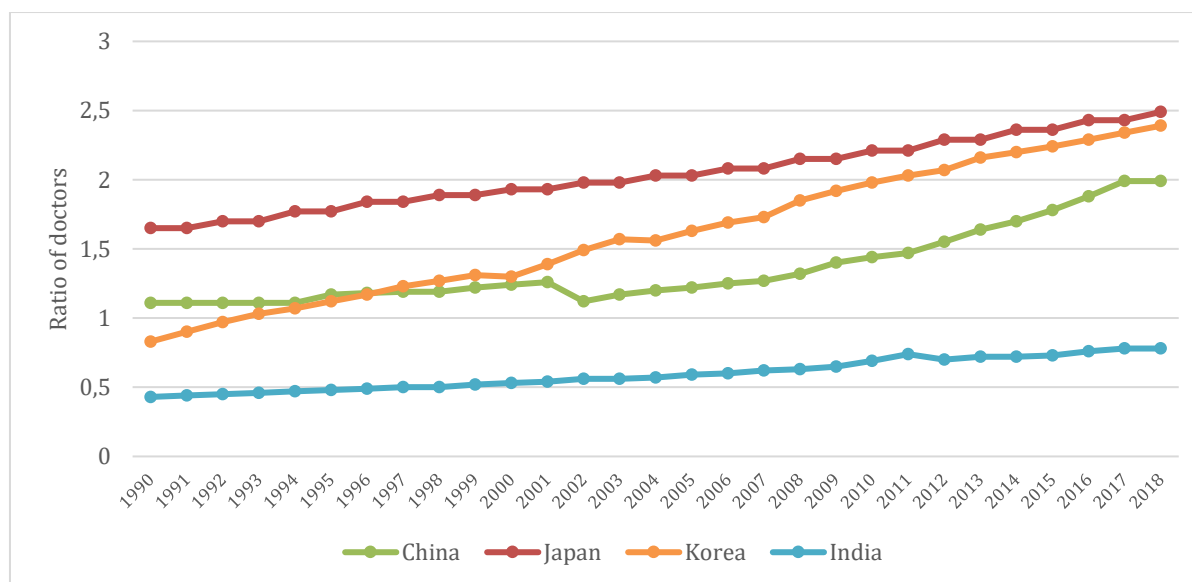
Source: United Nations. (2019).

Figure E: Ratio of beds in residential long-term care facilities in developed Asia per 1000 inhabitants aged 65+.



Source: OECD. Stat (2021). *Heath*.

Figure F: Ratio of doctors per 1000 inhabitants in four Asian countries.



Source: OECD. (2021). *Doctors' indicator*.

A.2 Reviewed papers' classification table

Paper n°	APA citation	Title	Author and Year	Geographic area	Dependent variable (main variable of interest)	Independent variable	Data source	Quantitative or Qualitative method	Control variables	Results
1	Agarwalla, R., Saikia, A. M., and Baruah, R. (2015). Assessment of the nutritional status of the elderly and its correlates. <i>Journal of family and community medicine</i> , 22(1), 39.	Assessment of the nutritional status of the elderly and its correlates.	Agarwalla et al. (2015)	India	Mini nutritional assessment (MNA)	Age group, gender, living status, financial status, functional status (ADL)	360 elderly (60+), withdrawn from 30 clusters	Cross-sectional study	\\	- Participants from older age group, female gender, dependent functional and financial status, and with inadequate calorie intake are positively associated with the malnutritional status
2	Agrawal, G., and Arokiasamy, P. (2010). Morbidity prevalence and health care utilization among older adults in India. <i>Journal of Applied Gerontology</i> , 29(2), 155-179.	Morbidity prevalence and health care utilization among older adults in India.	Agrawal and Arokiasamy (2010)	India	(Non communicable) disease burden, health care utilization	Demographic factors, socio-economic factors	60th round of National Sample Survey (NSSO)	Multivariate logistic regression	\\	- Both morbidity and health care utilization rates are increasing among older adults - Demographic and socioeconomic factors impact pattern of morbidity prevalence and health care utilization
3	Agrawal, G., and Keshri, K. (2014). Morbidity patterns and health care seeking behavior among older widows in India. <i>PLoS one</i> , 9(4), e94295.	Morbidity patterns and health care seeking behavior among older widows in India.	Agrawal and Keshri (2014)	India	Morbidity prevalence (%) among older widows	Age, place of residence, social group (caste), religion, educational level, living arrangement, economic independence, monthly per capita expenditure	Latest 60th round of National Sample Survey (NSS), 2004	Multivariate logistic regression models	\\	- Morbidity prevalence is 13% greater among older widows compared to older widowers - Likelihood of seeking health care services for reported morbidities is substantially lower among older widows
4	Ansah, J. P., Eberlein, R. L., Love, S. R., Bautista, M. A., Thompson, J. P., Malhotra, R., and Matchar, D. B. (2014). Implications of long-term care capacity response policies for an aging population: A simulation analysis. <i>Health Policy</i> , 116(1), 105-113.	Implications of long-term care capacity response policies for an aging population: A simulation analysis.	Ansah et al. (2014)	Singapore	Capacity of the healthcare system (i.e., acute and LTC services, including community-based and institutional care)	Features of persons with LTC needs	Computer simulation	System Dynamics (SD)	\\	- Slower adjustment LTC capacity response policies tend to shift care demands to the acute care sector and increase total care needs
5	Aranceta, J., Perez-Rodrigo, C., Gondra, J., and Orduña, J. (2001). Community-based programme to promote physical activity among elderly people: The GeroBilbo study. <i>The Journal of Nutrition, Health and Aging</i> , 5(4), 238-242.	Community-based programme to promote physical activity among elderly people: The GeroBilbo study.	Aranceta et al. (2001)	Spain	Objective and perceived health	Physical activity	1500 Spanish elderly surveyed, plus 596 subsample	Community-based cross-sectional study		Age, gender, perceived health, remarkable facts in personal and family disease history, consumption of pharmaceutical drugs, tobacco, alcohol
6	Baltagi, B. H., and Moscone, F. (2010). Health care expenditure and income in the OECD reconsidered: Evidence from panel data. <i>Economic Modelling</i> , 27, 804-811.	Health care expenditure and income in the OECD reconsidered: Evidence from panel data.	Baltagi and Moscone (2010)	20 OECD countries	Real per-capita health care expenditure	Per-capita GDP % government expenditure, dependency rate (old people), dependency rate (young people)	Data on 20 OECD countries from 1971 to 2004, gathered from the OECD Health Data Set 2007	Linear heterogeneous panel regression model, controlling for both cross-section dependence and unobserved heterogeneity	\\	- Health care is a necessity rather than a luxury, with an elasticity much smaller than that estimated in previous studies
7	Banjare, P., Dwivedi, R., and Pradhan, J. (2015). Factors associated with the life satisfaction amongst the rural elderly in Odisha, India. <i>Health and quality of life outcomes</i> , 13(1), 1-13.	Factors associated with the life satisfaction amongst the rural elderly in Odisha, India.	Banjare et al. (2015)	India	Life Satisfaction (LS), as indicator of subjective well-being (SWB)	Age, marital status, caste, education, wealth quintile, state of economic independence, living arrangements, risk behaviour, disability status, functionality or ADL, cognitive health status, social supports, morbidity status	310 respondents from elderly (60+ years) in Bargarh District of Odisha	Cross-sectional survey using multi-stage random sampling procedure, with hierarchical regression analysis	\\	- Cognitive health is the most influential factor in determining LS (both genders) - Elderly who are living alone, have any sort of disability and had low score of activities of daily living (ADL) have also reported significantly lower perceived LS (both genders)
8	Barrientos, A., Gorman, M., and Heslop, A. (2003). Old age poverty in developing countries: contributions and dependence in later life. <i>World development</i> , 31(3), 555-570.	Old age poverty in developing countries: contributions and dependence in later life.	Barrientos et al. (2003)	Developing areas (global)	Old age poverty, access to markets, basic services, and social networks	Age	Available information on old age poverty in developing countries, based on quantitative, qualitative, and participatory studies	Reviews the available evidence on the incidence of old age poverty emerging from survey data analysis and from qualitative participatory studies	\\	- Old age poverty is a significant issue in developing countries - Relation between age and poverty is “U” shaped, with the incidence of poverty being higher among younger and older groups - Understanding poverty in later life, and developing appropriate policy, requires acknowledging the contribution of older people to their households, communities, and the development process
9	Bhamani, M. A., Khan, M. M., Karim, M. S., and Mir, M. U. (2015). Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan. <i>Asian journal of psychiatry</i> , 14, 46-51.	Depression and its association with functional status and physical activity in the elderly in Karachi, Pakistan.	Bhamani et al. (2015)	Pakistan	Depression (evaluated using the 15-item geriatric depression scale)	Functional status and physical activity: Total minutes spent per week in activity, total score for activities of daily living (ADL)	Multi-stage cluster sampling technique, with questionnaire-based interviews conducted from July to September 2008	Cross-sectional study		Level of education, marital status, perception of health status and children as future security, n. of adult male children
10	Bishwajit, G., Tang, S., Yaya, S., and Feng, Z. (2017). Participation in physical activity and back pain among an elderly population in South Asia. <i>Journal of pain research</i> , 10, 905.	Participation in physical activity and back pain among an elderly population in South Asia.	Bishwajit et al. (2017)	Bangladesh, India, Nepal, Pakistan, and Sri Lanka	Self-reported status of back pain	Vigorous physical activity (VPA), moderate physical activity (MPA), walking	8502 participants (50+) from the World Health Survey (2002)	OLS multivariable analysis		Nationality, age, gender, current marital status, educational attainment, current job, currently smoke, ever drank alcohol
11	Bloom, D. E., Canning, D., Finlay, J. E., Mariano, R. S., and Shin, K. (2010). Population Aging and Economic Growth in Asia. <i>The economic consequences of demographic change in east Asia</i> . University of Chicago Press. 2, 61-92.	Population Aging and Economic Growth in Asia	Bloom, D. E., et al.	Asia	Growth of income per capita	Log real GDP per capita	World Population Prospects (United Nations 2007), Penn World Tables 6.2 (Heston, Summers and Aten 2006) for GDP per capita, Penn World Tables 5.6 for capital stock, and demographic data	Different OLS models (based on IV), Country fixed effects (with time invariant country-specific geographic variables)		Steady state level of GDP per worker: Capital stock, average years of secondary schooling, trade openness, Freedom House Polity Index, life expectancy, youth-age/old-age share, youth-age/old-age share change Location: Tropical location, landlocked, developing area, year
12	Bodeker, G., Pandit, M., Quising, P., and Tian, S. (2020). Ageing and Wellness in Asia. <i>Asian Development Outlook 2020 Update: Wellness in Worrying Times</i> .	Ageing and Wellness in Asia.	Bodeker et al. (2020)	Asia	Global aggregate figure of wellness economy (log): number of hot springs, number of SPA, number of wellness tourist arrivals, revenue of hot spring, revenue of SPA, revenue of wellness tourist arrivals	GDP growth (annual %), log GDP per capita, log Final consumption expenditure per capita, ratio of old 65 and up to total population, life expectancy, socio-economic condition, urban population %	Global Wellness Institute (GWI), World Bank's World Development Indicators	Cross-sectional regression (OLS)	\\	- Global Burden of Disease Study: impact depends on experiencing the negative health effects of ageing - Establish social protection programs may prevent poverty, reduce inequality, and promote social inclusion among older persons - Both economic and social factors are relevant in the development of the wellness industry worldwide
13	Brown, P. H., and Tierney, B. (2009). Religion and subjective well-being among the elderly in China. <i>The Journal of Socio-Economics</i> , 38(2), 310-319.	Religion and subjective well-being among the elderly in China.	Brown and Tierney (2009)	China	Satisfaction with life	Participates in religious activities	Chinese Longitudinal Healthy Longevity Survey (2000)	Multivariate logistic framework		Demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, and location
14	Buffa, R., Floris, G., Lodde, M., Cotza, M., and Marini, E. (2010). Nutritional status in the healthy longeval population from Sardinia (Italy). <i>The journal of nutrition, health and aging</i> , 14(2), 97-102.	Nutritional status in the healthy longeval population from Sardinia (Italy).	Buffa et al. (2010)	Italy	Nutritional status and body composition: Mini nutritional assessment (MNA) and bioelectrical impedance vector analysis (BIVA)	MNA score, stature (cm), weight (kg), BMI (kg/m2), circumferences of several areas of body (for anthropometric and bioelectrical measures), age, gender	Sample consisted of 200 subjects over 70 years of age	Complete model of two factors with fixed effects analysis of variance		Socio-economic and lifestyle characteristics: marital status, living conditions, number of sons, work activity, smoking habits, alcohol consumption, reading and television, educational level, daily activity
15	Cain, M. (1986). The consequences of reproductive failure: dependence, mobility, and mortality among the elderly of rural South Asia. <i>Population Studies</i> , 40(3), 375-388.	The consequences of reproductive failure: dependence, mobility, and mortality among the elderly of rural South Asia.	Cain (1986)	India, and Bangladesh	Living arrangements, other aspects of material well-being	\\	Fieldwork conducted in: a village in Mymensingh District (Char Gopalpur, Bangladesh 1976-1978), several villages in Maharashtra and Andhra Pradesh (India 1980), two villages in Raisen District (Madhya Pradesh, India 1983)	Anticipation and inferences are largely based on theory rather than to empirical observation	\\	- Persistence of the joint family system, associated with an authority-structured and family-based approach to welfare provision. - Elderly people are expected to continue to rely on their sons

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16	Cassum, L. A., Cash, K., Qidwai, W., and Verteeje, S. (2020). Exploring the experiences of the older adults who are brought to live in shelter homes in Karachi, Pakistan: a qualitative study. <i>BMC geriatrics</i> , 20(1), 1-12.	Exploring the experiences of the older adults who are brought to live in shelter homes in Karachi, Pakistan: a qualitative study.	Cassum (2020)	Pakistan	Circumstances of leaving home, experiences before entering the care facility, challenges to wellbeing before entering the care facility, coping with challenges, decision to live in a shelter home (no econometrics)	Age, gender, marital status, family structure, number of children, number of boys and girls, education	4 elderly males and females, from two different shelter homes	Qualitative methodology (with a descriptive exploratory design), Content analysis to extract the themes and comprehend the data	\	- Migration of children for better career and employment opportunities, entrance of women into the workforce, and insensitive behaviour of children impacted well-being of the elderly - Unemployment and family disputes had a negative impact on elderly, who feel dependent, distressed, helpless, and lonely
17	Chan, S. Y., and Chen, K. M. (2017). Self-perceived health status and sleep quality of older adults living in community after elastic band exercises. <i>Journal of clinical nursing</i> , 26(13-14), 2064-2072.	Self-perceived health status and sleep quality of older adults living in community after elastic band exercises.	Chan and Chen (2017)	Taiwan	Self-perceived health status and sleep quality (sleep quality, sleep latency and sleep duration)	Senior Elastic Band exercise programme dummy (experimental group)	Convenience sample of older adults is drawn from six senior-citizen activity centres in southern Taiwan	Quasi-experimental design	\	- The experimental group had greater improvements in self-perceived physical health and all sleep qualities - Health promotion activities, such as the Senior Elastic Band exercise programme, have positive impacts on the quality of life of senior adults living in community settings
18	Chen, C. Y., Gan, P., and How, C. H. (2018). Approach to frailty in the elderly in primary care and the community. <i>Singapore medical journal</i> , 59(5), 240.	Approach to frailty in the elderly in primary care and the community.	Chen et al. (2018)	Singapore	Frailty among elders	Health status, early identification and intervention, role of specialists and social networks	Singapore medical Council, Category 3B CME programme	Medical analysis	\	- Frailty is a distinct clinical syndrome wherein the individual has low reserves and is highly vulnerable to internal and external stressors - Although it is associated with disability and multiple comorbidities, it can also be present in individuals who seem healthy (multidimensional complexity) - Appropriate interventions, including a targeted medical review for reversible medical causes of frailty, medication appropriateness, nutritional advice and exercise prescription have positive effects
19	Chen, X., Huang, B., and Li, S. (2017). Population aging and inequality: Evidence from the People's Republic of China. <i>Asian Development Bank Institute</i> .	Population aging and inequality: Evidence from the People's Republic of China.	Chen et al. (2017)	China	Variances of log consumption and log income (main measures of inequality)	Loan to GDP, deposit to GDP, summation of deposit and loan to GDP, number of financial institutions per 1,000 people	Data set of household income and consumption expenditure from open-cohort, longitudinal study: - China Health and Nutrition Survey (CHNS).	Deaton and Paxson (1994) cohort-level model fixed-year effects	Age, gender of the household head, size of the household	- Consumption inequality is higher than income inequality within the cohort of young worker - An aging population has an overall impact of increasing inequality within the society - Financial inclusion helps to attenuate the age effect on inequality
20	Cheung, M. C., Ting, W., Chan, L. Y., Ho, K. S., and Chan, W.M. (2009). Leisure participation and health-related quality of life of community dwelling elders in Hong Kong. <i>Asian Journal of Gerontology and Geriatrics</i> , 4(1), 15-23.	Leisure participation and health-related quality of life of community dwelling elders in Hong Kong	Cheung et al. (2009)	Hong Kong	Leisure participation and health-related quality of life (HrQOL)	Participation and frequency in 18 types of leisure activities, grouped in 4 categories (recreational, cognitive, social, and productive)	Persons aged 65 years or older are randomly selected from elderly health centres	Cross-sectional study	Sociodemographic variables	- Most common daily leisure activities are watching television, listening to the radio/music and reading - Cognitive, social and leisure activities is positively associated with the physical and mental domains of HrQOL, while productive activity is negatively associated with general health
21	Choo, S., Sohn, D., and Park, M. (2016). Mobility characteristics of the elderly: A case for Seoul Metropolitan Area. <i>Ksce Journal of Civil Engineering</i> , 20(3), 1023-1031.	Mobility characteristics of the elderly: A case for Seoul Metropolitan Area.	Choo et al. (2016)	South Korea	Number of trips (as the trip frequency), for both work and non-work trips	<i>Household level:</i> Car ownership, household size, income, household structure, housing type <i>Individual level:</i> Age, gender, ethnicity, driver's license, employment status, education level	2010 Household Travel Survey	Ordered probit models	<i>Land use characteristics:</i> Population density (person/ha), employment density, area of parks, area of social welfare facilities, area of culture facilities, area of sport facilities, area of medical facilities	- Socio-demographic variables affect total trips, work trips, and non-work trips between the elderly and non-elderly groups - Social welfare facilities, sports facilities, and medical facilities are positively related to non-work trips of the elderly
22	Clark, R. L. (1989). Economic well-being of the elderly: Theory and measurement. <i>Journal of cross-cultural gerontology</i> , 4(1), 19-34.	Economic well-being of the elderly: Theory and measurement.	Clark (1998)	Asia, and Philippines	Consumption, income	\	WHO, ASEAN, ILO	Microeconomic analysis, through utility maximization with constraints	\	- Lack of specific income data mines the reliability of any finding - Need for specific questions about all important sources of income, to have quantitative data
23	Cong, L., Dou, P., Chen, D., and Cai, L. (2015). Depression and associated factors in the elderly cadres in Fuzhou, China: a community-based study. <i>International Journal of Gerontology</i> , 9(1), 29-33.	Depression and associated factors in the elderly cadres in Fuzhou, China: a community-based study.	Cong et al. (2015)	China	Depression (depressive symptoms)	Age, social activities, participate in meetings, concern about country and people, family help, caring for family and friends, worrying about illness, bedridden, persistent chest discomfort, trouble staying asleep, tiredness after a regular night of sleep, irritability, feeling down	Cross sectional study starting from 1910 community-dwelling elderly cadres aged 60 years and over	Multivariate logistic regression model	\	- Depression is common among Chinese elderly cadres, as the overall prevalence of depressive symptoms is found to be 10.5% - The highest risk factors are lack of social engagement, low family support, chronic disease, and disturbed sleep
24	Cramm, J. M., Bomscheuer, L., Selivanova, A., and Lee, J. (2015). The health of India's elderly population: a comparative assessment using subjective and objective health outcomes. <i>Journal of population ageing</i> , 8(4), 245-259.	The health of India's elderly population: a comparative assessment using subjective and objective health outcomes.	Cramm et al. (2015)	India	Poor health SRH (subjective), grip strength (objective), dependence in ADL (subjective), abnormal spirometry value (objective)	<i>Pearson correlations:</i> Poor health SRH (subjective), grip strength (objective), dependence in ADL (subjective), abnormal spirometry value (objective)	2010 pilot wave of the Longitudinal Aging Study in India (LASI)	Multivariate logistic regression analyses, accounting for sample design	Age, education level, income quintiles, background (caste and tribes)	- Older Indians tend to report more negative perception of health than the objective measures of health indicates - Subjective and objective health indicators capture different aspects of health and only weakly correlated
25	Das, B., Sengupta, R., & Paul, K. (2018). Regional variation and determinants of well-being of the elderly in India. <i>Journal of Population and Social Studies</i> , 26(3), 219-234.	Regional variation and determinants of well-being of the elderly in India.	Das et al. (2018)	India	<i>Index of well-being:</i> physical, social and emotional well-being	Place of residence, gender, present marital status, educational status, occupational sector, recent work status, annual income, addictions, availing social security schemes, health status, region	Building a Knowledge Base on Population Ageing in India (BKPAI-2011), Sample Registration System, Census of India, National Crime Records Bureau	Multinomial logistic regression	\	- Marital status, educational level, employment status, annual income, health status and regional factors emerged as strong determinants of elderly well-being - The states varied in rank in the components of well-being revealing paradoxes
26	Desai, V., and Tye, M. (2009). Critically understanding Asian perspectives on ageing. <i>Third World Quarterly</i> , 30 (5), 1007-1025.	Critically Understanding Asian Perspectives on Ageing	Desai and Tye (2009)	Asia	\	\	UN Population Division, United Nations Population Fund	\	\	- Population poverty trap: rapid elderly population expansion continues to increase the absolute numbers of poor - Vulnerability to multidimensional poverty, ill health and social exclusion
27	Dey, D. K., Rothenberg, E., Sundh, V., Bosaeus, I., and Steen, B. (1999). Height and body weight in the elderly. I. A 25-year longitudinal study of a population aged 70 to 95 years. <i>European Journal of Clinical Nutrition</i> , 53(12), 905-914.	Height and body weight in the elderly. I. A 25-year longitudinal study of a population aged 70 to 95 years.	Dey et al. (1999)	Sweden	Anthropometric data (height, body weight and BMI), and average change in anthropometric measurements per unit of time	Date of examination	Representative sample of 70 years old, living in Goteborg	Longitudinal cohort study regression, relying on (1) simple significance tests (one-sample and two-sample t-test), as well as (2) a non-parametric permutation test	Gender, age	- Height, body weight and BMI decreased significantly in both sexes after age 70; yet, a gender difference is present - Results can be used as reference data for Swedish elderly, as well as a source for understanding of anthropometry with the ageing process (globally)
28	Dhak, B. (2009). Gender difference in health and its determinants in the old-aged population in India. <i>Journal of biosocial science</i> , 41(5), 625.	Gender difference in health and its determinants in the old-aged population in India.	Dhak (2009)	India	Gender differential in health	Socioeconomic and demographic determinants, especially gender, age, marital status	National Sample Survey 60th round data (2004)	Stepwise logistic regression analysis	\	- Older women report poorer self-reported health and experience greater immobility compared with men - Gender differential in health is linked to various socioeconomic and demographic variables - Need for appropriate policy intervention, focus on improving status of widowed/separated women
29	Dutta, P. V. (2008). The performance of social pensions in India: The case of Rajasthan.	The performance of social pensions in India: The case of Rajasthan.	Dutta (2008)	India	Performance of pension system	<i>Pension systems features:</i> Awareness, coverage, targeting, participation, usage of pension benefits	Empirical analysis draws on the Rajasthan Social Pensions Survey (RSPS)	Empirical analysis, and review of the experience with respect to pension program	\	- Overall assessment and impacts are positive, holding broader lessons for social assistance - Transaction costs once pensions are sanctioned are low, disbursements are largely as per schedule, leakage in the form of shortfalls in benefits is generally low and satisfaction levels with the social pension scheme are high
30	Fauziana, R., Jeyagurunathan, A., Abdin, E., Vaingankar, J., Sagayadevan, V., Shafie, S., ... and Subramaniam, M. (2016). Body mass index, waist-hip ratio and risk of chronic medical condition in the elderly population: results from the Well-being of the Singapore Elderly (WiSE) Study. <i>BMC geriatrics</i> , 16(1), 1-9.	Body mass index, waist-hip ratio and risk of chronic medical condition in the elderly population: results from the Well-being of the Singapore Elderly (WiSE) Study	Fauziana et al.(2016)	Singapore	Body Mass Index (BMI), Waist to Hip Ratio (WHR)	Age group, gender, ethnicity, marital status, education, employment status, living circumstances, socio-economic status, medical history (chronical illness), physical and neurological examination	Well-being of the Singapore Elderly (WiSE) study	Multinomial and multiple logistic regressions in multivariate analysis	\	- Importance of socio-demographic measurements and its association with certain chronic physical conditions - Participants who are never married (or single) are less likely to be overweight compared to those who are married, while participants with tertiary education or higher are more likely to have lower WHR

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31	Garatachea, N., Molinero, O., Martínez-García, R., Jiménez-Jimenez, R., Gonzalez-Gallego, J., and Marquez, S. (2009). Feelings of well being in elderly people: relationship to physical activity and physical function. <i>Archives of gerontology and geriatrics</i> , 48(3), 306-312.	Feelings of well being in elderly people: relationship to physical activity and physical function.	Garatachea et al. (2009)	Spain	Material and subjective well-being	<i>Physical function and activity:</i> Total time in activity, estimated weekly energy expenditure, vigorous activity index, leisurely walking index, moving index, standing index, sitting index	Cohort of 151 elderly people, aged 60–98 years	Correlation analysis, two-factor ANOVA test, Bonferroni post hoc test	Age, gender	- All components of physical function are significantly impaired in dependent subjects when compared to independent individuals of the same sex and physical activity category - Significant differences in subjective well-being among less active dependent or independent individuals - Physical function and physical activity are related to feelings of well-being
32	Ghosh, D. (2017). Heterogeneity and Earning Dissatisfaction of Elderly Labourforce in India. <i>Thiagarajar School Of Management</i> .	Heterogeneity and Earning Dissatisfaction of Elderly Labourforce in India.	Ghosh (2017)	India	Earning dissatisfaction	<i>Household level:</i> Geographical region, sector of residence (rural/urban), social group, religion group, household size, n. of young working hh members, quantile of MPCE <i>Individual characteristics:</i> Gender, marital status, general education, industry, age group	61st and 68th rounds of Employment and Unemployment Surveys of the National Sample Survey (NSS) of Government of India	Multinomial Logit (MNL)	\\	- Participation of elderly from poorest class has increased overtime in organised sector, self-employment and casual wage employment - Significant gender difference is present in favour to male elderly - Household size, social group, age group and expenditure group are significantly related with income dissatisfaction
33	Grover, S., and Malhotra, N. (2015). Depression in elderly: a review of Indian research. <i>Journal of Geriatric Mental Health</i> , 2 (1), 4.	Depression in elderly: a review of Indian research.	Grover and Malhotra (2015)	India	Depression	<i>Demographic factors</i> , such as: gender, age, marital status, area of residence, education, socio-economic status, unemployment <i>Psychosocial factors</i> such as: lifestyle and dietary factors, presence of chronic physical illness	PubMed, Google Scholar, Google, and Medknow search engines used to identify the relevant studies	Review of the the existing literature on depression among elderly arising from India	\\	- Depression among Indian elderly is high, and policy decisions should be taken - Demographic factors associated with depression among elderly include female, being without a spouse, residing in rural locality, being illiterate, increasing age, lower socioeconomic status, and unemployment - Depression is associated also with various psychosocial factors, lifestyle and dietary factors, and presence of chronic physical illness
34	Guderian, B., Johnson, A., and Mathiowetz, V. (2013). Impact of exercise frequency on hand strength of the elderly. <i>Physical and Occupational Therapy In Geriatrics</i> , 31(3), 268-279.	Impact of exercise frequency on hand strength of the elderly.	Guderian et al. (2013)	United States	Grip and pinch therapy putty exercises dummy	Hand strength	36 independent living individuals age 55 and older	Randomized controlled trial (RCT)	\\	- Elderly participate in a wide range of sports and their participation frequency is very high - Exercise frequency and well-being are positively correlated, but a negative correlation is found between exercise intensity and well-being
35	He, A. J., and Tang, V. F. (2021). Integration of health services for the elderly in Asia: A scoping review of Hong Kong, Singapore, Malaysia, Indonesia. <i>Health Policy</i> .	Integration of health services for the elderly in Asia: A scoping review of Hong Kong, Singapore, Malaysia, Indonesia.	He and Tang (2021)	Hong Kong, Singapore, Malaysia, and Indonesia	Health services	\\	Well-being of the Singapore Elderly (WISE) study	Scoping review of English-language literature published between 2009 and 2019	\\	- Current common goals: integrate long-term elderly care with curative and preventive services, both horizontally and vertically - Both research and practice regarding health service integration are at a preliminary stage of development
36	Heller, P. S. (2006). Is Asia prepared for an aging population?. <i>IMF Working Papers</i> , 2006 (272).	Is Asia Prepared for An Aging Population?	Heller (2006)	Asia (South-East mainly)	\\	\\	UN Population Division (2005)	\\	\\	- Microeconomic and Macroeconomic facets of Ageing economies - Postponing the retirement age of current generation may prove difficult - More comprehensive social insurance systems need to be put in place
37	Hooda, S. K. (2016). Determinants of public expenditure on health in India: A panel data analysis at subnational level. <i>Journal of Quantitative Economics</i> , 14, 257-282.	Determinants of public expenditure on health in India: A panel data analysis at subnational level.	Hooda (2016)	India	Growth and variation in health expenditure	Political factors (political participation and representation of diverse population groups in politics), fiscal capacity, State's income	Government of India datasets	Panel data analysis, using PCA technique	\\	- Widening of political participation leads to a rise in government expenditure on health, indicating State interventionism in health sector for political reasons - Government's desire to increase health spending depends on the availability of financial resources - Income elasticity of health expenditure is found to be less than unity
38	Hsu, H. C. (2007). Does social participation by the elderly reduce mortality and cognitive impairment?. <i>Aging and mental health</i> , 11 (6), 699-707.	Does social participation by the elderly reduce mortality and cognitive impairment?	Hsu (2007)	Taiwan	Mortality and cognitive impairment	<i>Social participation:</i> paid/unpaid job, participating in volunteer groups, social group (e.g. religious, political)	The Survey of Health and Living Status of the Elderly (1993–1999)	Longitudinal study with Logistic regression analysis	Demographic status, socio-economic status and health-related variables	- Working could lower the risk of mortality 6 years later, especially for men; however, having unpaid work is associated with a higher risk of impaired cognitive function compared to that of non-workers - Participating in a religious group reduced the risk of mortality for women, while participating in political groups reduced the risk of impaired cognitive function for men
39	Hu, Z., and Peng, X. (2015). Household changes in contemporary China: an analysis based on the four recent censuses. <i>The Journal of Chinese Sociology</i> , 2(1), 1-20.	Household changes in contemporary China: an analysis based on the four recent censuses.	Hu and Peng (2015)	China	China's household composition changes	Factors impacting demographic change, such as fertility rates, population mobility, aging, improvement of housing conditions	China State Department Office of National Census & Population and Employment Statistics Office, National Statistics Bureau (1982, 1990, 2000, and 2010)	All-encompassing analysis of family transformation (focus on relative numbers instead of absolute numbers)	\\	- Rapid increase in the number of family households, a continued shrinking in household size, and a trend of simplification in household structure - While the proportion of the elderly-only family households increased, the share of coresidence of old people living with children declined - Elderly are adopting two major forms of living arrangements: living alone or in multigenerational families
40	Huda, C. E. (2020). Family transfers, coresidency, elderly labor supply and welfare perspective: Evidence from Indonesia. <i>Jurnal BPPK: Badan Pendidikan dan Pelatihan Keuangan</i> , 13(1), 47-63.	Family transfers, coresidency, elderly labor supply and welfare perspective: Evidence from Indonesia.	Huda (2020)	Indonesia	Family transfer, coresidency	<i>Children Characteristics (of children who have income):</i> marital status, gender, educational achievements <i>Parent Characteristics:</i> Age, health conditions, gender, marital status	Indonesian Family Life Survey (IFLS)	LPM, Logit, LPM with fixed effect method	\\	- Impact of health, age, marital status, gender, and education level, with illiterate elderly people with poor health gaining more family transfer - If the child who has income is married, then the family transfer given to parents will decrease - Parental characteristics that influence coresidency are age, gender and marital status of parents
41	Ichimura, H., Lei, X., Lee, C., Lee, J., Park, A., and Sawada, Y. (2017). Wellbeing of the Elderly in East Asia: China, Korea, and Japan. <i>RIETI</i> .	Wellbeing of the Elderly in East Asia: China, Korea, and Japan.	Ichimura et al. (2017)	China, Japan, and South Korea	Elevated depressive symptoms	1) Demographic variables 2) Economic variables 3) Family and social variables 4) Health variables	China Health and Retirement Longitudinal Study (CHARLS), Korean Longitudinal Study on Aging (KLoSA), Japanese Study of Aging and Retirement (JSTAR)	Country-specific linear probability model, Matching analysis (through common support)	Examine what accounts for the association between the key demographic characteristics and depression, by presenting the results from the base models together with the models <u>controlling for each set of covariates</u>	- Difference in mean depression rates among countries depends on differences in national characteristics of the elderly - Significant differences across countries cannot be explained: elderly in Korea are more likely to be depressed than in China or Japan
42	Iddrisu, M. A., Senadiki, A., Mohd, S., Yip, C. Y., and Lau, L. S. (2020). The impact of HBP on elderly diseases (diabetes mellitus, hypertension, hypercholesterolemia, minor stroke, kidney failure and heart problem): A logistic analysis. <i>Ageing International</i> , 1-32.	The impact of HBP on elderly diseases: A logistic analysis.	Iddrisu et al. (2020)	Malaysia	<i>Probability of diseases:</i> diabetes Mellitus, hypertension, hypercholesterolemia, minor stroke, kidney failure, heart problem	<i>Health promotion behaviour (HPB):</i> Healthy eating, exercise, interpersonal relationship, health responsibility, spiritual growth, individual personnel factors, elderly perception, self-efficacy, stress management	400 questionnaires for a random sample of elders in 4 Malay cities	Logistic regression mode	Age, gender, ethnicity, education, household income, household size	- Elderly health diseases is significantly affected by the factors of HPB, diabetes Mellitus and hypertension are most common - Significant relationship between the demographic characteristics and health diseases
43	Jannasch, F., Kröger, J., and Schulze, M. B. (2017). Dietary patterns and type 2 diabetes: a systematic literature review and meta-analysis of prospective studies. <i>The Journal of nutrition</i> , 147(6), 1174-1182.	Dietary patterns and type 2 diabetes: a systematic literature review and meta-analysis of prospective studies.	Jannasch et al. (2017)	United States, Europe, Asia, and Australia	Risk of type 2 diabetes	Different dietary approaches, "healthy" and "unhealthy" food	Literature search through MEDLINE and Web of Science (48 papers)	Summarized evidence from prospective studies, by considering a meta-analysis and other methodological approaches	\\	- Mediterranean diet, Dietary Approaches to Stop Hypertension (DASH), and Alternative Healthy Eating Index (AHEI) are associated with significant risk reductions of incident diabetes - Red and processed meat, refined grains, high-fat dairy, eggs, and fried products are positively associated with diabetes, while vegetables, legumes, fruits, poultry, and fish are inversely associated with diabetes

Paper n°	APA citation	Title	Author and Year	Geographic area	Dependent variable (main variable of interest)	Independent variable	Data source	Quantitative or Qualitative method	Control variables	Results
44	Jeon, B., Noguchi, H., Kwon, S., Ito, T., and Tamiya, N. (2017). Disability, poverty, and role of the basic livelihood security system on health services utilization among the elderly in South Korea. <i>Social Science and Medicine</i> , 178, 175-183.	Disability, poverty, and role of the basic livelihood security system on health services utilization among the elderly in South Korea.	Jeon et al. (2017)	South Korea	Number of outpatient physician visits, number of inpatient days, experience of home care services under long-term care insurance, total household healthcare expenditure, financial burden due to healthcare expenditure	Three disability status, three income-levels combined with NBLSS	Korea Welfare Panel Study data 2005-2014	Generalized Estimating Equations population-averaged model (using the ten years of panel data)	Gender, age, family type, place of residence, education, economic activity, beneficiary of basic old-age pension, beneficiary of public pension, intensified chronic diseases, lagged dependent variable	- Within the same disability status, the low-income without NBLSS group used the least amount of inpatient care - If the elderly with severe disability are in the low-income without NBLSS, they reduced the outpatient and inpatient days; but their financial burden of healthcare became intensified - The low-income elderly with disability (but without adequate social protection) are the most disadvantaged group
45	Jeon, Y., and Kim, S. (2020). Housing abandonment in shrinking cities of East Asia: Case study in Incheon, South Korea. <i>Urban Studies</i> , 57 (8), 1749-1767.	Housing abandonment in shrinking cities of East Asia: Case study in Incheon, South Korea.	Jeon and Kim (2020)	South Korea, China, and Japan	Abandonment of houses	Features of houses and owners	Sample in Incheon, South Korea	Empirical observations using a field survey and the city's newly generated GIS platform linked to vacancy data	\\	- If an appropriate heir is not found or there is a land and property ownership problem, the building is likely to be a long-term vacant house - Vacant houses resulting from the deaths of their elderly owners are mostly located away from the central parts of the major cities: their children had little desire to inherit them
46	Johar, M., and Maruyama, S. (2011). Intergenerational cohabitation in modern Indonesia: filial support and dependence. <i>Health Economics</i> , 20(S1), 87-104.	Intergenerational cohabitation in modern Indonesia: filial support and dependence	Johar and Maruyama (2011)	Indonesia	Cohabitation	<i>Explanatory variables: shock</i> - Lost spouse - Health shock (new chronic conditions) - Economic shock	Longitudinal Indonesian Family Life Survey (IFLS)	Heckman and Singer (1984) -type mixture logit model	1) Characteristics of the elderly parent controls 2) Characteristics of children controls 3) Community characteristics controls	- Cohabitation is more likely among healthy parents with more non-market time and wealth - Loss of a spouse and economic shocks to elderly mothers tend to initiate cohabitation with their adult children - The elderly facing health and economic challenges are at higher risk of not receiving filial support than other elderly individuals
47	Jokela, M., Elovainio, M., and Kivimäki, M. (2008). Lower fertility associated with obesity and underweight: the US National Longitudinal Survey of Youth. <i>The American journal of clinical nutrition</i> , 88(4), 886-893.	Lower fertility associated with obesity and underweight: the US National Longitudinal Survey of Youth.	Jokela et al. (2008)	United States	<i>Achieved fertility in later life:</i> n. children born during the follow-up, children born outside of marriage (%)	<i>Body weight in young adulthood:</i> body-weight group through BMI (underweight, normal-weight, overweight, obese)	19 survey waves of the National Longitudinal Survey of Youth	Discrete-time survival analysis, Poisson regression analysis	Age, race-ethnicity, gender, marital status, index of marital status indicating the years of marriage	- Obese young women and men are less likely to have their first child by the age of 47 - Obesity predicts a lower probability of having more than one child, particularly for women - Underweight men are less likely to have the first, second, third, and fourth child than are normal-weight men - Obese women and men and underweight men are less likely to have as many children in adulthood as they had desired as young adults.
48	Jung, H., Pirog, M., and Lee, S. K. (2016). Do public pensions crowd out private transfers to the elderly? Evidence from South Korea. <i>Journal of Pension Economics and Finance</i> , 15 (4), 455-477.	Do public pensions crowd out private transfers to the elderly? Evidence from South Korea.	Jung et al. (2016)	South Korea	Total expenditures, food expenditures, and private transfers of the elderly	OLS: Receiving a public pension IV: natural experiment that occurred in 1999 allows to explore the impacts of a large public pension program expansion which newly incorporated people who had been self-employed, unemployed, and out of the labor force	2006 KOWEPS survey	OLS based on IV (natural experiment)	<i>Family and individual-level socioeconomic data:</i> age, birth year, sex, education, marital status, emotional and behavioral health status, social service needs and utilization	- Receipt of a public pension does not allow the elderly to increase total expenditures or food expenditures because the expansion of public pensions largely crowded-out financial transfers from adult children and/or own siblings
49	Kadariya, S., Gautam, R., and Aro, A. R. (2019). Physical activity, mental health, and wellbeing among older adults in South and Southeast Asia: a scoping review. <i>BioMed research international</i> , 2019.	Physical activity, mental health, and wellbeing among older adults in South and Southeast Asia: a scoping review.	Kadariya et al. (2019)	Taiwan, Pakistan, and Thailand	Mental health, physical health, overall well-being	Physical activities	From papers analyzed	Scoping review of articles published between 2008 and 2018 are selected with participants aged 60 years and above	\\	- Depression and sleep quality are the commonest outcome variables, with physical activity protecting against those - Exercise frequency, regularity, and duration positively impact mental wellbeing
50	Kaufman, J. E. (1988). Leisure and anxiety: A study of retirees. <i>Activities, Adaptation and Aging</i> , 11 (1), 1-10.	Leisure and anxiety: A study of retirees.	Kaufman (1988)	United States	Anxiety level in retirees	Leisure satisfaction, leisure participation	Mail questionnaire sent to randomly selected members of the American Association of Retired Persons	Pearson product-moment correlations and stepwise multiple regression	\\	- Greater leisure satisfaction and leisure participation are associated with lower levels of anxiety - Plan activities which not only promote participation, but also provide retirees with satisfaction from leisure
51	Kaushal, N. (2014). How public pension affects elderly labor supply and well-being: Evidence from India. <i>World Development</i> , 56, 214-225.	How public pension affects elderly labor supply and well-being: Evidence from India.	Kaushal (2014)	India	Elderly (55-70) well-being: Employment status, monthly expenditure, household per capita expenditure,	Expansion in India's National Old Age Pension Scheme	National Sample Surveys (NSS): the 61st (2004-2005) and the 64th round (2007-2008)	Longitudinal study with baseline regression analysis	Age, education, marital status, urban residence, household-size and social caste, and state and year effects	- Public pension has a modestly negative effect on the employment of elderly men with a primary or lower education, but no effect of the employment of similar women - Pension raised family expenditures, lowering poverty; most of the pension income on medical care and education - Weak evidence that pension raised longevity
52	Khan, M. A., and Husnain, M. I. U. (2019). Is healthcare a luxury or necessity good? Evidence from Asian countries. <i>International journal of health economics and management</i> , 19(2), 213-233.	Is healthcare a luxury or necessity good? Evidence from Asian countries.	Khan and Husnain (2019)	ASEAN and SAARC	Per capita HCE	Real GDP per capita	Panel data over the period 1995-2014, in 15 Asian countries: WHO, WDI	Mean Group (MG), Common Correlated Effects Mean Group (CCEMG)	Labour force, share of government spending in total health care expenditure, maternal mortality rate, n. population of age 65 years and above	- Long run income elasticity of health care is less than unity (necessity good) - For low income region (SAARC), the status of HCE still remains as a necessity, while it becomes non-responsive in case of middle income region (ASEAN)
53	Kim, E. H. W., Lee, C., and Do, Y. K. (2019). The effect of adult children's working hours on visits to elderly parents: A natural experiment in Korea. <i>Population Research and Policy Review</i> , 38(1), 53-72.	The effect of adult children's working hours on visits to elderly parents: A natural experiment in Korea.	Kim et al. (2019)	South Korea	IV: Actual work-week (hours) FE: Log of Number of visits to parents a year	IV: Legal work-week (hours) FE: Actual work-week (hours)	2005-2014 Korea Labor and Income Panel Study	Instrumental variable (IV) fixed-effects (FE) regression model	Age, educational attainment, establishment size, occupation, employment status, non-coresident parent's survival, marital status <i>Among married people only, covariates on partner:</i> Age, parent's survival and living arrangement, educational attainment, n. of children	- Working one additional hour a week lowers the frequency of visits by 6.5%: negative effect of working long hours on interactions with elderly parents - More frequent visits to parents do not necessarily mean increased support for parents (e.g. soliciting parental help for caring for grandchildren)
54	Kochar, A. (2000). Parental benefits from intergenerational coresidence: empirical evidence from rural Pakistan. <i>Journal of Political Economy</i> , 108(6), 1184-1209.	Parental benefits from intergenerational coresidence: empirical evidence from rural Pakistan.	Kochar (2000)	Pakistan	Incomes earned by their coresident adult sons	Days of work reported by fathers in rural Pakistani households	\\	Empirical tests	\\	- Decline in fathers' days of work accompanies increases in sons' incomes primarily results - The income gained is used to finance expenditures on household public goods, such as consumer durables and ceremonies - Empirical tests reject most alternative explanations of the benefits of coresidence, including the belief that sons contribute to fathers' wealth
55	Lee, J. H., Lee, J. H., and Park, S. H. (2014). Leisure activity participation as a predictor of quality of life in Korean urban-dwelling elderly. <i>Occupational therapy international</i> , 21 (3), 124-132.	Leisure activity participation as predictor of quality of life in Korean urban-dwelling elderly.	Lee et al. (2014)	South Korea	Quality of life	Participation in leisure activities in leisure (degree of participation in several domains of leisure activity)	Time Use Survey	Correlational analysis, Multiple regression analysis	Gender, age, religion, education, region	- Quality of life showed a positive correlation with "use of media", "sports and outdoor leisure activity" and "hobby and other leisure activity", "religious activity"
56	Lee, Y. J., and Hung, W. L. (2011). The relationship between exercise participation and well-being of the retired elderly. <i>Aging and mental health</i> , 15(7), 873-881.	The relationship between exercise participation and well-being of the retired elderly.	Lee and Hung (2011)	Taiwan	Feelings of well-being of the retired elderly	<i>Physical exercise:</i> participation and frequency in several activities (from light exercise such as walking, to vigorous exercise such as tennis and aerobics)	Face-to-face questionnaire survey, with a total of 352 valid questionnaires collected in selected parks in Taipei	Empirical regression analysis	\\	- Elderly participate in a wide range of sports and their participation frequency is very high - Exercise frequency and well-being are positively correlated, but a negative correlation is found between exercise intensity and well-being
57	Lee, Y. J., and Xiao, Z. (1998). Children's support for elderly parents in urban and rural China: Results from a national survey. <i>Journal of cross-cultural gerontology</i> , 13(1), 39-62.	Children's support for elderly parents in urban and rural China: Results from a national survey	Lee and Xiao (1998)	China	Receiving support, net amount received	Age, gender x marital status, n. children surviving, living arrangement, help with children's housework, difficulty in activities of daily living	China Survey on Support Systems for the Elderly	OLS multivariate analyses	Ever had a job with retirement system, occupation, own income, spouse's income, years of education	- Children's financial transfers to their elderly parents are based on the parents' need, in both urban and rural areas - Familial support compensates for inequalities in elderly persons' access to public resources

Paper n°	APA citation	Title	Author and Year	Geographic area	Dependent variable (main variable of interest)	Independent variable	Data source	Quantitative or Qualitative method	Control variables	Results
58	Li, J., Yang, B., Varrasse, M., Ji, X., Wu, M., Li, M., and Li, K. (2018). Physical activity in relation to sleep among community-dwelling older adults in China. <i>Journal of aging and physical activity</i> , 26(4), 647-654.	Physical activity in relation to sleep among community-dwelling older adults in China.	Li et al. (2018)	China	<i>Sleep quality</i> , based on: Subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, daytime sleepiness & dysfunction, sleep medication use	<i>Physical activity</i> : PASE domains, leisure time exercise, household activity, work-related activity	Convenience sample of community dwelling older adults in Changchun City	Cross-sectional study	Age, gender, status of spouse, n. of children, religious belief, monthly household income, education, smoking, drinking, sleep hygiene, n. of chronic diseases, hypertension, heart disease, diabetes, arthritis	- A greater level of overall physical activity, leisure-time exercise, and household activity are associated with reduced likelihood of being poor sleepers
59	Liu, Y., Shu, X. O., Wen, W., Saito, E., Rahman, M. S., Tsugane, S., ... and Zheng, W. (2018). Association of leisure-time physical activity with total and cause-specific mortality: a pooled analysis of nearly a half million adults in the Asia Cohort Consortium. <i>International journal of epidemiology</i> , 47 (3), 771-779.	Association of leisure-time physical activity with total and cause-specific mortality: a pooled analysis of nearly a half million adults in the Asia Cohort Consortium.	Liu et al. (2018)	Mainland China, Japan, Singapore and Taiwan	Risk of death (from all causes, CVD, cancer and other causes)	Leisure-time physical activity (LTPA)	467 729 East Asian individuals recruited in nine prospective cohorts included in the Asia Cohort Consortium	Cox proportional hazards regressions	Demographics, lifestyle factors, BMI, smoking status, previous diagnosis of cancer or CHD or stroke, current chronic type 2 diabetes or hypertension	- An inverse association is observed between the amount of LTPA and all-cause and cause-specific mortality - The inverse association is stronger for death, due to cardiovascular diseases and causes other than cancer deaths - An inverse association of LTPA with total mortality is observed among individuals with a severe and often life-threatening disease
60	Maghsoudi, Z., Ghiasvand, R., and Salehi-Abarogoei, A. (2016). Empirically derived dietary patterns and incident type 2 diabetes mellitus: a systematic review and meta-analysis on prospective observational studies. <i>Public health nutrition</i> , 19(2), 230-241.	Empirically derived dietary patterns and incident type 2 diabetes mellitus: a systematic review and meta-analysis on prospective observational studies.	Maghsoudi et al. (2016)	Japan, China, United States, the Netherlands, Finland, Australia	Type 2 diabetes mellitus (T2DM) incidence	Dietary patterns and type of food intake	Databases such as PubMed, ISI Web of Science, SCOPUS and Google Scholar are searched up to 15 January 2015	Systematically review prospective cohort studies, and to quantify the effects using a meta-analysis	Country, gender, age	- "Healthy" dietary patterns (vegetables, fruits and whole grains) can lower T2DM risk by 14% - "Unhealthy" dietary patterns (red and processed meats, high-fat dairy and refined grains) can increase T2DM risk by 30%
61	Markides, K. S., and Martin, H. W. (1979). A causal model of life satisfaction among the elderly. <i>Journal of gerontology</i> , 34(1), 86-93.	A causal model of life satisfaction among the elderly.	Markides and Martin (1979)	United States	Life satisfaction	Self-reported health, income, education, activity index	Interviews with 141 persons aged 60 years and over	Path analysis model	Gender	- Health and activity emerge as strong predictors of life satisfaction, while income influences life satisfaction indirectly via activity - Importance of investigating direct and indirect effects of variables via path analysis
62	Mi-kyeong, B., Sun-jung, P., and Eun-young, C. (2019). Effects of a Wonderful Life Program on the Wellbeing Behaviors, Life Satisfaction and Subjective Quality of Life of Community Elderly People in Korea. <i>International journal of crisis and safety</i> , 4, 1-7.	Effects of a Wonderful Life Program on the Wellbeing Behaviors, Life Satisfaction and Subjective Quality of Life of Community Elderly People in Korea.	Mi-kyeong et al. (2019)	South Korea	1) <i>Well-being behaviors scores</i> : Well-being orientation, food characteristics, characteristics of exercise and leisure, characteristics of health considerations, clothing characteristics, housing characteristics, environmental characteristics 2) <i>Life Satisfaction</i> 3) <i>Subjective quality of life</i> : Cognitive and emotional evaluations	Participating to the <i>Wonderful Life Program</i>	Sample of senior citizens (65+) selected from a social welfare center in an urban community	Quasi-experimental research, with nonequivalent control group pretest and posttest design. Mann Whitney U test is used to test hypothesis.	see features of this quasi-experimental research (similar to RCT)	- No statistically significant differences in the prior well-being behaviors - The <i>Wonderful Life Program</i> has effects on the well-being of the experimental group, no changes in the well-being behaviors of the control
63	Miao, J., and Wu, X. (2021). Subjective well-being of Chinese elderly: a comparative analysis among Hong Kong, Urban China and Taiwan. <i>Ageing and Society</i> , 41(3), 686-707.	Subjective well being of Chinese elderly: a comparative analysis among Hong Kong, Urban China and Taiwan	Miao and Wu (2021)	Hong Kong, China, and Taiwan	Subjective well being, measured by happiness	Living arrangement, social participation	2011 Hong Kong Panel Study of Social Dynamics, 2010 China Family Panel Studies in mainland China, 2010 Taiwan Social Change Survey	OLS	Gender, age, married, education, standardised income, active in labour market, standardised self-assessed social class, standardised self-reported health	- Elderly benefit more psychologically from social participation and less from living with children (due to change in family value of society) - Social participation is positively associated with subjective well being (Hong Kong, but not China and Taiwan)
64	Minhat, H. S., and Amin, R. M. (2012). Sociodemographic determinants of leisure participation among elderly in Malaysia. <i>Journal of community health</i> , 37(4), 840-847.	Sociodemographic determinants of leisure participation among elderly in Malaysia.	Minhat and Amin (2012)	Malaysia	Leisure participation	Leisure type and frequency (consisting of 25 activities, categorized into 4 categories, namely recreational/physical, cognitive, social and productive)	Persons aged 60 years and above, purposively selected from eight health clinics in the state of Selangor	Cross-sectional study	Age, gender, ethnicity, religion, marital status, education level, income, living arrangement, locality/environment	- The most common daily leisure activities are having conversations while relaxing, watching television and reading, while the least frequently done are from the recreational and cognitive categories - Education level, marital status and locality are important determinants of leisure participation among elderly, with education being the main predictor
65	Ndamuko, R. N., Tapsell, L. C., Charlton, K. E., Neale, E. P., and Batterham, M. J. (2016). Dietary patterns and blood pressure in adults: a systematic review and meta-analysis of randomized controlled trials. <i>Advances in Nutrition</i> , 7(1), 76-89.	Dietary patterns and blood pressure in adults: a systematic review and meta-analysis of randomized controlled trials.	Ndamuko et al. (2016)	Iran, United States, Brazil, Iceland, Australia, Italy, France, Spain, Sweden, Denmark, Germany	Blood pressure (BP)	Dietary patterns	Studies published between January 1999 and June 2014 are retrieved using Scopus, Web of Science, and the MEDLINE database	Systematic review, meta-analysis	\\	- Healthy dietary patterns rich in fruit, vegetables, whole grains, legumes, seeds, nuts, fish, and dairy and low in meat, sweets, and alcohol significantly lowered systolic BP - Lifestyle factors (exercise and weight loss) in combination with dietary changes may also reduce BP
66	Nguyen, H. T., Liu, A. Y., and Booth, A. L. (2012). Monetary transfers from children and the labour supply of elderly parents: evidence from Vietnam. <i>Journal of Development Studies</i> , 48(8), 1177-1191.	Monetary transfers from children and the labour supply of elderly parents: evidence from Vietnam.	Nguyen et al. (2012)	Vietnam	Elderly parents' financial need to work	Monetary transfers from children	Vietnam Living Standards Survey (VLSS)	Maximum likelihood methods (considering the possible endogeneity of children's transfers in the parents' labour supply)	\\	- Monetary transfers help the elderly cope with risks associated with old age or illness - However, monetary transfers are not sufficient to fully substitute for parents' labour supply
67	Ning, M., Gong, J., Zheng, X., and Zhuang, J. (2016). Does new rural pension scheme decrease elderly labor supply? Evidence from CHARLS. <i>China Economic Review</i> , 41, 315-330.	Does New Rural Pension Scheme decrease elderly labor supply? Evidence from CHARLS	Ning et al. (2016)	China	Labor force participation, total hours of work	OAP (elderly received old age pension payment), NRPS (elderly participated in the NRPS program)	China Health and Retirement Longitudinal Survey (CHARLS)	Combination of regression discontinuity design and difference in difference method (RD-Did)	Labor market participation and total work hours (hours in one year), age, gender, marital status, education level, chronic disease, hypertension and other chronic diseases, n. of adult children, present market value of owned house, total land area distributed by collective (acre), region, year	- No evidence that pension receipt from the NRPS program does significantly induce the elderly to withdraw from the labor market - Pension recipient does decrease significantly the probability of labor force participation for individuals with chronic diseases, but does not improve their welfare
68	Otsu, K., and Shibayama, K. (2016). Population aging and potential growth in Asia. <i>Asian Development Review</i> , 33(2), 56-73.	Population Aging and Potential Growth in Asia	Otsu and Shibayama (2016)	Asia	Baseline projection of total factor productivity, aged population share, population growth rate, spillover effects of demographics	Productivity gap, dependency	World Bank's Health, Nutrition, and Population Statistics	Quantitative analysis builds on the model of Otsu and Shibayama (2016), Project the time paths of the exogenous variables over the period 2011-2050	\\	- An increase in the share of Asian elderly population will significantly lower output growth, through decreased labor participation - Population aging can also reduce economic growth through increased labor income taxes and dampened productivity growth
69	Pal, S. (2007). Effects of intergenerational transfers on elderly coresidence with adult children: evidence from rural India.	Effects of intergenerational transfers on elderly coresidence with adult children: evidence from rural India.	Pal (2007)	India	1) Coresidence (dummy) 2) <i>Contribution of the elderly</i> : Wealth, Support to others, participation in household chores 3) <i>Contribution of adult children towards elderly parents</i> : financial transfer to elderly parents, home care or intensity of elderly health	Age, gender, marital status, agricultural labour, education, daughters, scheduled caste/scheduled tribe, once economically active, young grandchildren, per capita expenditure, toilet facilities, elderly wealth/financial transfer to family, elderly participation in daily household chores, health problem/home care, financial dependence on children, regional dummies	52nd round National Sample Survey (NSS) data collected from the rural sectors of the Indian states (1995-96)	Correlated recursive system of equations (corresponding to various transfers and coresidency equations)	\\	- The probability of coresidence is generally lower among the better off elderly, it is also lower for the older and female elderly without a spouse and also those with poor health - Coresidency is a mutually advantageous arrangement
70	Park, S. M., Jang, S. N., and Kim, D. H. (2010). Gender differences as factors in successful ageing: a focus on socioeconomic status. <i>Journal of biosocial science</i> , 42(1), 99-111.	Gender differences as factors in successful ageing: a focus on socioeconomic status.	Park et al. (2010)	South Korea	<i>Successful ageing among elderly</i> , defined as: 1) Having high levels of <i>physical functioning</i> : no difficulties with activities of daily living (ADL) or instrumental activities of daily living (IADL) 2) Having high levels of <i>social functioning</i> : paid work, religious gatherings or volunteer service	Gender	Elderly interviewed face-to-face, as part of the third wave of the Hallym Ageing Study (2007)	Cross-sectional regression	Socio-economic variables, such as residency area, educatio, monthly individual income, age	- Socioeconomic status appears to have a greater gender-specific effect on physical functioning than on social functioning - Especially for elderly men, a higher monthly individual income is significantly related to a higher level of physical functioning - Among elderly women, a higher level of education is associated with a higher level of physical functioning

Paper n°	APA citation	Title	Author and Year	Geographic area	Dependent variable (main variable of interest)	Independent variable	Data source	Quantitative or Qualitative method	Control variables	Results
71	Qureshi, K. (2017). <i>Ageing: Gender, social class and health in Pakistan</i> .	Ageing: Gender, Social class and Health in Pakistan.	Qureshi (2017)	Pakistan	Chronic health conditions, heart diseases	Urban-rural residence, monthly family income, marital status, economic dependence, family type, literacy, currently working	1998 Census of Pakistan + yearly Pakistan Demographic Surveys (PDS) + 1999-01 Survey on the Health and Living Conditions of Elderly Population (SHLCEP) + 2001 Pakistan Socio-Economic Survey Round 2 (PSES2) Micro-demographic analysis with data from February-March 2005	Simple cross tabulations, Z-tests, X2 analysis, Analysis of variance	Gender	- Gender and social class impact health of the elderly and management of health - Patriarchal gender relations has no advantage for women in terms of survival over men - Women have higher rates of disability, communicable and non-communicable disease, and report a lower quality of life
72	Rahman, M. K., Tareque, M. I., and Rahman, M. M. (2009). Gender differences in economic support, wellbeing and satisfaction of the rural elderly in Naogaon District, Bangladesh. <i>Indian Journal of Gerontology</i> , 23(3), 343-357.	Gender differences in economic support, wellbeing and satisfaction of the rural elderly in Naogaon District, Bangladesh.	Rahman (2009)	Bangladesh	Economic satisfaction	Marital status, family type, living with married children, work status, family's monthly income	Data collected from 7 villages of rural areas	Logistic regression analysis	\\	- Substantial variation in gender differences across indicators: globally disadvantaged position of older women - Men tend to report higher levels of income than women, but there is a gender difference also in housing characteristics, dwelling ownership or income satisfaction
73	Rudkin, L. (1993). Gender differences in economic well-being among the elderly of Java. <i>Demography</i> , 30(2), 209-226.	Gender differences in economic well-being among the elderly of Java.	Rudkin (1993)	Indonesia	Well-being, through four indicators of economic resources	Gross and net effects of gender	1986 survey of the elderly conducted on Java (sponsored by ASEAN in cooperation with Indonesia's Central Bureau of Statistics)	Cumulative logistic regression	Age group, residence rural, health status, marital status, household type, skills, work roles, domestic roles (daily contact with children, gives marriage advice)	- Older women have fewer resources than older men, due to differences in household structure and in levels of skills - Women have lower levels of well-being, even within categories of support (work income and remittances)
74	Sanitha, V. P., Parida, J. K., and Awasthi, I. C. (2019). Health Conditions, Medication and Hospitalisation Preferences of Elderly in Kerala. <i>Indian Journal of Human Development</i> , 13(3), 308-324.	Health Conditions, Medication and Hospitalisation Preferences of Elderly in Kerala.	Sanitha et al. (2020)	India	Ayurveda, Homeopathy, Allopathy	Age, log monthly per capita expenditure (MPCE), MPCE quintile, log income, caste and tribes, gender, education, marital status, pension, health insurance, dependency, labour force participation (LFP)	Primary data collected from a sample of 801 households and three old-age homes (OAHs)	Multinomial logit regression	\\	- Private care for effective and better treatments - Government hospitals are preferred by those who belong to poor and marginalised group - Differences among Ayurveda, Homeopathy and Allopathy depend on accommodation, labour force participation, gravity of disease
75	Schwarz, B., Albert, I., Trommsdorff, G., Zheng, G., Shi, S., and Nelwan, P. R. (2010). Intergenerational support and life satisfaction: A comparison of Chinese, Indonesian, and German elderly mothers. <i>Journal of Cross-Cultural Psychology</i> , 41(5-6), 706-722.	Intergenerational Support and Life Satisfaction: A Comparison of Chinese, Indonesian, and German Elderly Mothers	Schwarz et al. (2010)	China, Indonesia, and Germany	Elderly mothers' life satisfaction	Urban-rural residence, emotional support, instrumental support, financial support, daughter's admiration	Face-to-face interviews at the home of the women	One-way analyses of variance with post hoc Bonferroni tests, Hierarchical regression analysis	\\	- Elderly mothers' well-being is related differently to help that they provided to their adult daughters - Controlling for admiration, emotional support given is negatively related to life satisfaction, while instrumental support and financial support have positive effects - Importance of cultural background (value orientations and traditions)
76	Sengupta, P., and Benjamin, A. I. (2015). Prevalence of depression and associated risk factors among the elderly in urban and rural field practice areas of a tertiary care institution in Ludhiana. <i>Indian journal of public health</i> , 59(1), 3.	Prevalence of depression and associated risk factors among the elderly in urban and rural field practice areas of a tertiary care institution in Ludhiana.	Sengupta and Benjamin (2015)	India	Depression	Urban-rural residence, gender, age, family assessment, poverty, education (illiteracy), marital status, employment status, functional impairment, cognitive impairment (MMSE)	3038 consenting elderly (60+), rural and urban residents of both sexes	Cross-section analysis, Multiple logistic regression	\\	- Almost 1/10 of the sample suffered depression (8.9%) - The depression rate is significantly higher in urban residents, females, older elderly, nuclear families, in those living alone, those not working, illiterates, poor, functionally and cognitively impaired - After changing the econometric model (i.e. multiple logistic), being unmarried/widowed, unemployed, and illiterate do not emerge as risk factors
77	Sia, A., Ng, K. S. T., Ng, M. K., Chan, H. Y., Tan, C. H., Rawtaer, I., ... and Ho, R. C. (2018). The effect of therapeutic horticulture on the psychological wellbeing of elderly in Singapore: A randomised controlled trial. <i>Journal of Therapeutic Horticulture</i> , 28(1), 1-10.	The effect of therapeutic horticulture on the psychological wellbeing of elderly in Singapore: A randomised controlled trial.	Sia et al. (2018)	Singapore	<i>Ryff Scales of Psychological Well-Being (SPWB):</i> Autonomy, growth, positive relations with others, purpose in life, self-acceptance	Participation to therapeutic horticulture	59 elderly between the ages of 60 to 85, recruited from a community in Singapore's western district (ClinicalTrials.gov database of the U.S. National Institutes of Health)	Randomised controlled trial (RCT) with a cross-over design	see RCT features	- Positive association between interactions with nature and psychological, social and physical health outcomes - Therapeutic horticulture intervention might be effective in promoting the psychological wellbeing, through improving positive relations with others
78	Silverstein, M., Cong, Z., and Li, S. (2006). Intergenerational transfers and living arrangements of older people in rural China: Consequences for psychological well-being. <i>The Journals of Gerontology Series B: Psychological Sciences and Social Sciences</i> , 61(5), S256-S266.	Intergenerational transfers and living arrangements of older people in rural China: Consequences for psychological well-being.	Silverstein, M., Cong, Z., and Li, S.	China	<i>Psychological well-being:</i> Depression, life satisfaction	1) Living arrangement variables 2) Intergenerational support variables	Data from a random sample of adults aged 60 and older living in rural townships	OLS	<i>Sociodemographic:</i> Age, gender, marital status, education, occupation, functional health difficulties, n. of children, income	- Older parents living in three-generation households had better psychological well-being than those living in single-generation households - Receiving greater remittances from adult children increased well-being - Stronger emotional cohesion with children also improved well-being
79	Singh, P., Govil, D., Kumar, V., and Kumar, J. (2017). Cognitive impairment and quality of life among elderly in India. <i>Applied Research in Quality of Life</i> , 12(4), 963-979.	Cognitive impairment and quality of life among elderly in India.	Singh et al. (2017)	India	Quality of life index	Cognitive Score Index: - Verbal Fluency (VF) - Verbal Recall (VR) - Digit Span (forward and backward)	Study of Global Aging and Adult Health (SAGE) wave-I, 2007-10	Principal component analysis (PCA), Structural equation modeling (SEM)	Age group, gender, residence area, marital status, degree of schooling, wealth quintile, ADL (Activities of daily living), IADL (Instrumental activities of daily living), depression, n. of morbidities, social cohesion	- Cognitive scores for all four variables (verbal fluency, verbal recall, and digit span- backward and forward) are very low - With presences of low cognitive scores, the quality of life will reduce by 7% - Cognitive impairment significantly and directly affected the quality of life of Indian elderly
80	Subramaniam, M., Abdin, E., Sambasivam, R., Vaingankar, J. A., Picco, L., Pang, S., ... and Chong, S. A. (2016). Prevalence of depression among older adults-results from the well-being of the Singapore elderly study. <i>Ann Acad Med Singapore</i> , 45(4), 123-133.	Prevalence of depression among older adults-results from the well-being of the Singapore elderly study.	Subramaniam et al. (2016)	Singapore	Depression (through AGECAT)	Age group, gender, ethnicity, marital status, education, employment status, doctor-diagnosed depression	Well-being of the Singapore Elderly (WiSE) study	A series of multivariate regression models	Age group, gender, ethnicity, marital status, education, employment status, doctor-diagnosed depression	- The prevalence of depression seems to have slightly decreased as compared to a decade ago - Those with depression and subsyndromal depression are associated with more disability, poorer life satisfaction, and medical comorbidities
81	Sudnongbua, S., LaGrow, S., and Bodky, J. (2010). Feelings of abandonment and quality of life among older persons in rural northeast Thailand. <i>Journal of Cross-Cultural Gerontology</i> , 25(3), 257-269.	Feelings of abandonment and quality of life among older persons in rural northeast Thailand.	Sudnongbua et al. (2010)	Thailand	Quality of life (combination of various factors)	Dummy for "feel abandoned or not"	Sample drawn from all those over the age of 60 registered with the regional health care centre in Amphoe Bungkla (sample 212 participants)	Independent samples t-test or Chi-square	Age group, gender, marital status, years of formal education, employment status, degree of economic hardship, n. of chronic health conditions	- While only 9% are found to live alone, 20% stated that they felt abandoned to some degree - A widespread and functioning familial system of intergenerational support and care still operates in Thailand - About two-thirds have at least weekly contact with at least one of their children and the majority of those have daily contact (more than 50%)
82	Sun, R. (2002). Old age support in contemporary urban China from both parents' and children's perspectives. <i>Research on Aging</i> , 24(3), 337-359.	Old age support in contemporary urban China from both parents' and children's perspectives.	Sun (2002)	China	<i>Children providing help:</i> Money, in-kind gifts, services for daily activities	<i>Children's characteristics:</i> - Age - Gender - Marital status - Education - Income relative to parents' - Geographic distance to parents - Whether received help on housing	Survey on Aging and Intergenerational Relations in Baoding City	Logistic regressions, with generalized linear mixed model	<i>Parents' characteristics:</i> Age, marital status, education, n. of children, physical status index, home ownership	- Although living away from children does not affect whether elderly parents receive economic help, it does constrain their receiving help on daily activities - While children with older, physically weaker, currently unmarried parents are more likely to provide help on daily activities, children with lower educated parents are more likely to provide monetary transfers
83	Taboongpong, S., Puthsri, N., Kong-In, W., and Saiejew, A. (2008). The effects of Tai Chi on sleep quality, well-being and physical performances among older adults. <i>Pacific Rim International Journal of Nursing Research</i> , 12(1), 1-13.	The effects of Tai Chi on sleep quality, well-being and physical performances among older adults.	Taboongpong et al. (2008)	Thailand	Sleep quality (Pittsburg Sleep Quality Index), general well-being (General Well-Being Scale) and physical performance	Low intensity and short term Tai Chi practice	50 elders who lived in residential care facilities in accordance with the study inclusion criteria	Pre-post test with control group design	\\	- The experimental group showed significantly greater change score of sleep quality and step test (i.e. physical performance on balance and flexibility of legs) - The change scores of the general well-being, lung capacity, and sit-and-reach test between the two groups showed no differences

Paper n°	APA citation	Title	Author and Year	Geographic area	Dependent variable (main variable of interest)	Independent variable	Data source	Quantitative or Qualitative method	Control variables	Results
84	Teerawichitchainan, B., Pothisiri, W., and Long, G. T. (2015). How do living arrangements and intergenerational support matter for psychological health of elderly parents? Evidence from Myanmar, Vietnam, and Thailand. <i>Social science and medicine</i> , 136, 106-116.	How do living arrangements and intergenerational support matter for psychological health of elderly parents? Evidence from Myanmar, Vietnam, and Thailand.	Teerawichitchainan et al. (2015)	Myanmar, Vietnam, and Thailand	Psychological wellbeing index	<i>Living arrangements:</i> Isolated family arrangement, network family arrangement, coresidence with child of culturally non-preferred gender, coresidence with child of culturally preferred gender <i>Intergenerational support:</i> Provided money to children, total value of money received from children, frequency of visits from non-coresident children, frequency of phone calls from non-coresident child	Nationally representative aging surveys: 2012 Myanmar Aging Survey (MAS), 2011 Vietnam Aging Survey (VNAS), 2011 Survey of Older Persons in Thailand (SOPT)	OLS (appropriate to model the wellbeing index across all three settings)	<i>Socio demographic characteristics:</i> Gender, age, marital status, n. of children, education, pension, worked last year, urban, household wealth index (percentile), functional limitation index (percentile)	- Cultural nuances impact living arrangements and old-age psychological health - Differences among countries (normative filial expectations and gender role expectations) - No evidence in support of network family arrangements as a complete substitute for coresidence
85	Thanakwang, K., Ingersoll-Dayton, B., and Soonthornhdhada, K. (2012). The relationships among family, friends, and psychological well-being for Thai elderly. <i>Aging and Mental Health</i> , 16(8), 993-1003.	The relationships among family, friends, and psychological well-being for Thai elderly.	Thanakwang et al. (2012)	Thailand	Family networks, friendship networks, family support, friendship support, psychological well-being		Interviews conducted with 469 participants aged 60 and older	Structural equation modeling (SEM)	Age, gender, education, income, marital status, health status, physical functioning (ADL)	
86	Tran, T. Q., Nguyen, C. V., and Van Vu, H. (2018). Does economic inequality affect the quality of life of older people in rural Vietnam? <i>Journal of Happiness Studies</i> , 19(3), 781-799.	Does economic inequality affect the quality of life of older people in rural Vietnam?	Tran et al. (2018)	Vietnam	<i>Happiness Indicator:</i> subjective satisfaction through life satisfaction and happiness	<i>Measures of Economic Inequality:</i> Household consumption expenditure, commune-level expenditure inequality (Gini), log-transformed commune per capita expenditure	Combining data from the 2011 Vietnam National Aging Survey (VNAS) and the 2011 Rural, Agricultural and Fishery Census (RAFC)	Conventional OLS regression, by treating happiness as a cardinal variable	Age, gender, ethnicity, farmer, education, family status, social activities, religion and religiosity, health status, household income, relative income, location of residence	- Individuals who live in the communes with high inequality tend to self-report as being less happy - Older rural people, who are farmers or poor, are more sensitive to inequality
87	Tran, T. Q., Nguyen, T. Q., Van Vu, H., and Doan, T. T. (2017). Religiosity and subjective well-being among old people: Evidence from a transitional country. <i>Applied Research in Quality of Life</i> , 12(4), 947-962.	Religiosity and subjective well-being among old people: Evidence from a transitional country.	Tran et al. (2017)	Vietnam	<i>Happiness Indicator:</i> subjective satisfaction through life satisfaction and happiness	<i>Measures of Religiosity:</i> frequency of worship and religious affiliation, categories of religious affiliation	2011 Vietnam National Aging Survey	Conventional OLS regression, by treating happiness as a cardinal variable	Age, gender, marital status, ethnicity, social activities, health status, economic conditions, education, employment, household location, household income	- Religious affiliations are related to happiness - Christian faith is positively related to well-being, while Buddhists and Caoists are less happy than their nonreligious counterparts
88	Tran, T., and Vu Van, H. (2017). <i>Housing and Well-being among the Vietnamese Elderly</i> (No. 2).	Housing and Well-being among the Vietnamese Elderly.	Tran and Vu Van (2017)	Vietnam	IV: 1) Self-reported housing satisfaction 2) Subjective well-being	IV: 1) Set of variables reflecting the physical housing characteristics, measured by the size of living area, length of residency, type of house and type of toilet 2) Housing conditions and satisfaction	2011 Vietnam Ageing Survey (VNAS 2011)	OLS and IV methods, by using housing satisfaction and life satisfaction as cardinal variables	- <i>Vector of individual characteristics:</i> Age, gender, ethnicity, education, religion, social activities, employment status, marital status, living arrangement - <i>Vector of household characteristics:</i> total number of members and household income, living in rural areas, living in the North and the South.	- Permanent housing and better amenities contribute to housing satisfaction and life satisfaction - Housing satisfaction has a strongly positive impact on life satisfaction: it is an important life domain
89	Tsai, A. C., and Chang, T. L. (2011). The effectiveness of BMI, calf circumference and mid-arm circumference in predicting subsequent mortality risk in elderly Taiwanese. <i>British Journal of Nutrition</i> , 105(2), 275-281.	The effectiveness of BMI, calf circumference and mid-arm circumference in predicting subsequent mortality risk in elderly Taiwanese.	Tsai and Chang (2011)	Taiwan	Long-term mortality risk (4 years)	Anthropometric indicators: BMI, mid-arm circumference (MAC) and calf circumference (CC)	Population-representative sample of 4191 men and women, in the Survey of Health and Living Status of the Elderly in Taiwan	Cox regression analyses	Age, gender	- Low CC and MAC are more effective than low BMI in predicting mortality risk in elderly aged 65-74 - Low CC and BMI are more effective than low MAC for elderly aged 75+ - High BMI is not effective in predicting mortality risk in any age ranges
90	Vlassoff, C. (1990). The value of sons in an Indian village: How widows see it. <i>Population studies</i> , 44(1), 5-20.	The value of sons in an Indian village: How widows see it.	Vlassoff (1990)	India	Support to widows	Living arrangements	Questionnaire interviews and qualitative techniques are used to collect data	Simple quantitative analysis, based on the analysis of the variance	Income (yearly and daily), n. household facilities, age, self-evaluation of happiness, land ownership	- The happiest widows are those who lived with sons, but who also had daughters who visited them regularly - Widows who lived with their sons are not necessarily supported by them - In the sample, widows who lived alone (or with married daughters or brothers) are better off than those dependent on sons
91	Wang, C. Y., Yeh, C. J., Wang, C. W., Wang, C. F., and Lin, Y. L. (2011). The health benefits following regular ongoing exercise lifestyle in independent community-dwelling older Taiwanese adults. <i>Australasian Journal on Ageing</i> , 30(1), 22-26.	The health benefits following regular ongoing exercise lifestyle in independent community-dwelling older Taiwanese adults.	Wang et al. (2011)	Taiwan	Mental and physical health (face-to-face interview and a battery of performance tests)	Regular ongoing exercise lifestyle dummy	197 older adults who are independent in walking, instrumental and basic activities of daily living	Cross-sectional regression with independent dummy	\\	- Regular exercise group showed significantly less depression and tended to regress less on the performance tests - Regular exercise is important for maintaining or even improving mental and functional health
92	Wang, X., Chen, K. Z., Robinson, S., and Huang, Z. (2017). Will China's demographic transition exacerbate its income inequality? CGE modeling with top-down microsimulation. <i>Journal of the Asia Pacific Economy</i> , 22(2), 227-252.	Will China's demographic transition exacerbate its income inequality? CGE modeling with top-down microsimulation.	Wang et al. (2017)	China	Distributional effects in the context of demographic transition	Ageing population effects	Economic Policy (PEP) Network provided data for running the model across countries	Integrated recursive dynamic computable general equilibrium model, with top-down behavioral microsimulation	\\	- Population aging has a negative impact on the reduction of poverty, while its impact is positive with regard to equality - Elderly rural households are experiencing the most serious poverty, and their inequality problems
93	Wei, Y., and Tsay, W. J. (2019). <i>Does Distance Make Happiness?</i> Endogenous Geographic Proximity of Adult Children and the Well-being of Older Persons.	Does Distance Make Happiness? Endogenous Geographic Proximity of Adult Children and the Well-being of Older Persons.	Wei and Tsay (2019)	China	IV: 1) Adult children's living arrangements 2) Life satisfaction	1) Instruments: - 1st child is a son who remains alive up to date - ratio of girls to the total number of children alive 2) Endogenous intergenerational geographic proximity (5 choices)	China Longitudinal Aging Social Survey in 2014, for persons aged 60-74	Bivariate ordered probit (BOP) model combined with IV	<i>Demographic variables:</i> Gender, age, education, ethnicity, marriage status <i>Financial capacity variables:</i> Amount of owned houses or apartments, covered by endowment insurance, health conditions of the aged people (ADL)	- Non-linear relationship between the geographic proximity of adult children and the well-being of the elderly - The elderly who live independently, but with adult children living close by, have significantly higher life satisfaction than those who coreside - The elderly feel lower life satisfaction if their children live really far away from them
94	Yeh, C. Y., Chang, C. K., and Yang, F. A. (2018). Applying a treatment effects model to investigate public amenity effect on physical activity of the elderly. <i>Journal of aging and social policy</i> , 30(1), 72-86.	Applying a Treatment Effects Model to Investigate Public Amenity Effect on Physical Activity of the Elderly	Yeh et al. (2018)	Taiwan	METs: Total amount of physical activity	<i>Amenities:</i> Park, school, stadium + satisfaction, sufficiency <i>IV for park:</i> Park distance, park number	Data are collected from 274 participants by face-to-face interviews	Treatment effects model, OLS with IV	Body mass index (BMI), health condition, hospital visit, chronic disease, smoking, gender, age, education, living together, preschool child, club partner, volunteer, monthly expense, income sufficiency, financial support, financial asset	- Parks are one of the most important environmental amenities for physical activity among the elderly - Elderly who exercise in parks have significantly higher physical activity levels than those who exercise at other locations - Proximity to parks does enhance the convenience for park exercisers
95	Zeng, Y., and Wang, Z. (2018). Dynamics of family households and elderly living arrangements in China, 1990-2010. <i>China Population and Development Studies</i> , 2(2), 129-157.	Dynamics of family households and elderly living arrangements in China, 1990-2010.	Zeng and Wang (2018)	China	China's household composition changes and dynamics	Factors impacting demographic change, such as fertility rates, population mobility, aging, improvement of housing conditions	China State Department Office of National Census & Population and Employment Statistics Office, National Statistics Bureau (1982, 1990, 2000, and 2010)	Comparative analyses across different periods as well as rural and urban areas	\\	- Increase in number of households is much larger than population growth, due to shrinking of the household size and decomposition of larger families - Increases in numbers of elderly who live alone or with spouse only are dramatically larger than the increase in the corresponding proportions, due to the effects of rapid population aging
96	Zimmer, Z., and Lin, H. S. (1996). Leisure activity and well-being among the elderly in Taiwan: Testing hypotheses in an Asian setting. <i>Journal of cross-cultural gerontology</i> , 11(2), 167-186.	Leisure activity and well-being among the elderly in Taiwan: Testing hypotheses in an Asian setting.	Zimmer and Lin (1996)	Taiwan	Well-being scores (life satisfaction)	<i>Social activities variables:</i> Physical activities, creative activities, contemplative activities <i>Social network variables:</i> Satisfaction with contact (Subjective social integration), household size (Objective social network) <i>Health status variables:</i> Number of conditions, ADL difficulties index, self-assessed health	1989 Survey of Health and Living Status of the Elderly in Taiwan	One way analysis of variance to test for significance	<i>Demographic variables:</i> Age, years of education, marital status, income	- Men participate in most leisure activities with greater frequency than women - Physical activity has the strongest positive influence on emotional well-being, while contemplative activity (women out-participate men) displays a negative effect for women - The impact of different activity types vary by gender (due to expectations and self-concept development)