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The Future of Grandparenthood in South Asia: The role of population aging and educational expansion

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The Future of Grandparenthood in South Asia: The role of population aging and educational expansion

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Abstract

Grandparents are a key source of care and support in South Asia, where formal welfare systems remain limited. Yet we know little about how many grandparents are alive for each grandchild, and how their age, sex, and educational compositions are changing as populations age and access to education improves. This study fills this gap by using demographic kinship models with national projections of fertility, mortality, and education to estimate the number and characteristics of living grandparents from 2020 to 2100 in eight South Asian countries. We show how demographic change is reshaping grandparenthood in uneven ways across the region. In 2020-2024, more than half of grandparents in Nepal and Pakistan had no education, compared with roughly one-fifth in Sri Lanka. By 2080, the share of grandparents with post-secondary education rises to nearly 20% in Nepal and over 30% in Sri Lanka and Iran, while progress remains slower in Bhutan and the Maldives. Across all countries, grandchildren have the most living grandparents early in life. This number declines with age, but most grandparents who remain alive tend to have a higher level of education. Sex-specific differences persist: grandmothers outnumber grandfathers at all ages due to sex differences in survival. These results

indicate that future grandchildren in South Asia will grow up with more highly educated grandparents. Understanding these shifts is essential for anticipating how family support systems may evolve in a region where grandparents remain a central pillar of care.

Keywords: Grandparents, Education, Caregiving, Population Ageing, Delayed Reproduction,

1. Introduction

Grandparents play a central role in intergenerational support systems. They provide instrumental and financial help, emotional support, and transfer social and cultural resources to younger generations (Coall & Hertwig, 2010) . They often step in as primary caregivers when parents are absent or in employment (Martin et al., 2021; Zhao et al., 2018) . In later life, however, they depend on adult children for physical, emotional, and financial support (Silverstein et al., 2006). These relationships mean that the number of grandparents alive and their age, sex, and education shape both their caregiving capacity and their later-life support needs.

In South Asia, these relationships are especially pronounced because formal care systems are limited. Weak social welfare, scarce formal childcare, and gendered norms place the burden of care within households (Chung et al., 2021). Multigenerational households remain widespread, with more than 30% being three-generational in 2020 (Chung et al., 2021). Women, including grandmothers, shoulder much of the routine childcare and domestic work (Babu et al., 2017; Das Gupta, 2010). These patterns reflect Family Systems theory, which views the family as an interdependent unit where roles and obligations shift across generations (Bowen, 1993), and the Linked Lives perspective, which emphasises that life trajectories are interconnected and shaped by the timing of kin roles (Elder, 1998). Together, these frameworks help explain why shifts in fertility, mortality, and education in one generation alter caregiving demands and support exchanges in another.

These shifts are already underway. Early childbearing has declined in Bangladesh, Nepal, and India but remains higher than in Sri Lanka and has fallen rapidly in the Maldives (ICF, 2025;

Schoumaker, 2019) . Survival at later ages has increased across the region, but is highest in Sri Lanka and Iran, has improved steadily in Bangladesh and Bhutan, and remains lower in Pakistan (UN, 2024). Educational attainment is rising, especially among women, but progress varies sharply, with Sri Lanka and Iran far ahead of Bangladesh, Nepal, and Pakistan (ICF, 2025; K. C. et al., 2024). Because education is strongly associated with health, labour market participation, and resource accumulation (Behrman et al., 2010; Lutz et al., 2018), these differences imply substantial variation in the future support grandparents can provide or require in later life. These current socio-demographic trends shift the age, sex, and education levels of future grandparents. Age, sex, and education shape both grandparents' capacity to provide care and their own need for support. Age influences health and labour force participation. Younger grandparents are more likely to be healthy and able to offer hands-on childcare, but many remain employed and have limited time, while grandparents at more advanced ages may face declining health and become care recipients themselves (Chen & Liu, 2012; Silverstein et al., 2006). Sex also matters because caregiving is strongly gendered in South Asia. Grandmothers provide most routine childcare and domestic support. In contrast, grandfathers tend to contribute supervision, advice, or financial help, and their higher mortality at older ages reduces the pool of potential carers over the life course (Compton & Pollak, 2014; Das Gupta et al., 2003). Education adds a further and often overlooked dimension. Grandparents with higher education tend to have better health and financial security, are more able to support grandchildren through educational guidance and economic resources, and may have greater autonomy in negotiating care roles, while those with less education are more likely to provide intensive, daily care but face higher risks of economic vulnerability and ill-health (Aassve et al., 2012; Arpino & Bordone, 2014; Di Gessa et al., 2022). As a result, changes in the characteristics of grandparents can alter the balance between care

supply and demand within families, shaping when grandparents can support parents and grandchildren and when they themselves rely on upward support.

Despite the central role of grandparents in South Asia, empirical research remains limited. Most studies focus on co-resident grandparents and examine effects on child outcomes or grandparent wellbeing (Arif et al., 2023; Barman & Sahoo, 2024). Many rely on small qualitative samples or cross-sectional surveys, capturing only a subset of kin relationships. Only one global study projects the number of grandparents by age and sex in South Asia (Alburez-Gutierrez et al., 2023), but none incorporate education. As a result, we lack systematic evidence on how many grandparents are alive, their socio-demographic characteristics, and how these characteristics vary across the life course of grandchildren. This limits our ability to understand the future capacity of grandparents to act as informal caregivers and their potential demand for support in later life.

This study addresses these gaps by applying formal demographic kinship models to national population and education projections for eight South Asian countries to estimate the number of living grandparents per grandchild and their socio-demographic characteristics from 2020 to 2100. We ask the following research question:

(1) How will socio-demographic change shape the age, sex, and education structure of future grandparents?

(2) How will grandparent availability and characteristics vary across the life course of grandchildren?

Demographic kinship models allow us to estimate grandparents' demographics regardless of co-residence, overcoming data limitations in the region and linking macro-level demographic and education trajectories to micro-level family structures. This provides the first regional evidence on the future supply of grandparents as a reservoir of informal care, and on potential support needs in later life, in a context where family rather than the state remains the main provider of care.

Data and Methods

We estimate the number of living grandparents per grandchild, by applying formal demographic kinship models to national population and education projections for eight South Asian countries. Using time-variant two-sex kinship models (Caswell, 2022) as implemented in the DemoKin package (Williams et al., 2023), we derive the expected grandparents of an average member of the population (“Focal”) at each age, accounting for fertility timing and survival patterns. This approach allows us to estimate grandparents regardless of co-residence and to trace how their characteristics evolve as Focal ages. A detailed explanation of the methodology is given in (Alburez-Gutierrez et al., 2023; Caswell, 2022). The model's core formula is:

$$K(x + 5, t + 5) = U_t K(x, t) + \beta(x, t)$$

Here, the vector $K(x, t)$ represents the age distribution of grandparents for a Focal aged x at time t . U_t is the survival matrix that determines the number and characteristics of the grandparents that survive from age x to $x + 5$. $\beta(x, t)$ represents the recruitment of new kin. Since no new biological grandparents can appear after the birth of a grandchild (this model does not account for step-kin), the recruitment term is:

$$\beta(x, t) = 0$$

Therefore, the expected number of grandparents for a Focal aged $x + 5$ is the number of Focal's grandparents that survived from Focal's age x (at time t) to Focal's age $x + 5$ (at time $t + 5$).

This modelling approach is especially suitable in South Asia, where nationally representative microdata on kin networks are limited, co-residence records capture only part of family ties, and surveys of older populations cover only selected countries and ages. Kinship models thus provide

a practical and transparent method to generate comparable estimates across countries in a data-constrained region. While they cannot capture partnership instability or step-kin, such omissions are less consequential in contexts where divorce and non-marital fertility remain uncommon.

We project the number of grandparents for a Focal from 1950 to 2100 using the median fertility and survival estimates from the 2024 World Population Prospects (UN, 2024). Estimating grandparents on both maternal and paternal sides requires sex-specific fertility and survival rates. Because WPP does not report male fertility, we derive male age-specific rates from female rates by adjusting for the observed gap between the mean age at fatherhood and motherhood in each country, following Schlüter et al., (2024). The mean ages at childbearing and fatherhood are sourced from (Schoumaker, 2019). For each country, the difference between the mean age at fatherhood and childbearing age is calculated. Male age-specific fertility rates are then derived by adding this difference to the female age-specific fertility rates.

$$Fx(m) = Fx(f) + \Delta$$

Δ represents the difference in the mean age at fatherhood and the mean age at childbearing.

We estimate grandparental education with the help of the 2023 revision of the Wittgenstein Centre for Demography and Global Human Capital (WIC) (K. C. et al., 2024). These data provide the population proportion across six educational groups: no education, some primary education, primary education, lower secondary education, upper secondary education, and higher secondary education. We apply these distributions under three Shared Socioeconomic Pathways: SSP1, SSP2, and SSP3 to capture uncertainty in future education trends. The SSP1 scenario assumes a future where countries prioritize sustainable development and strive for greater equality. In this scenario, education is expected to expand rapidly, with significant investments

being made to ensure broad access to education for all. SSP2, known as the "Middle of the Road" scenario, reflects a future that continues current global trends in education expansion. Educational progress proceeds steadily, as it has in recent decades. Most of the results in the results section are presented under the SSP2 scenario, as it represents the most likely future trajectory. SSP3, or the "Regional Rivalry" scenario, assumes a world where countries and regions become more isolated and inward-focused. Under this scenario, progress in education is limited and stalled (O'Neill et al., 2017).

Crucially, our estimates assume that the education distribution of grandparents follows the same distribution as the general population, adjusted for age and sex at each period. To test this assumption, we compare the education distribution applied to grandparents with the education distribution of co-residing grandparents derived from household-level data from the Demographic and Health Surveys (DHS) for 2020-2024. The result, in Figure 1 below, shows a high concordance between the educational distribution of grandparents and the general population in Bangladesh, India, and Nepal (the countries in which the DHS data is available around 2020). The close alignment of data points along the diagonal line in the figure indicates a strong correspondence between the education distribution of grandparents and that of the general population in the same age and sex groups. This is consistent with our assumption that grandparents are a subset of the population whose education distribution closely mirrors that of the population of their respective age and sex.

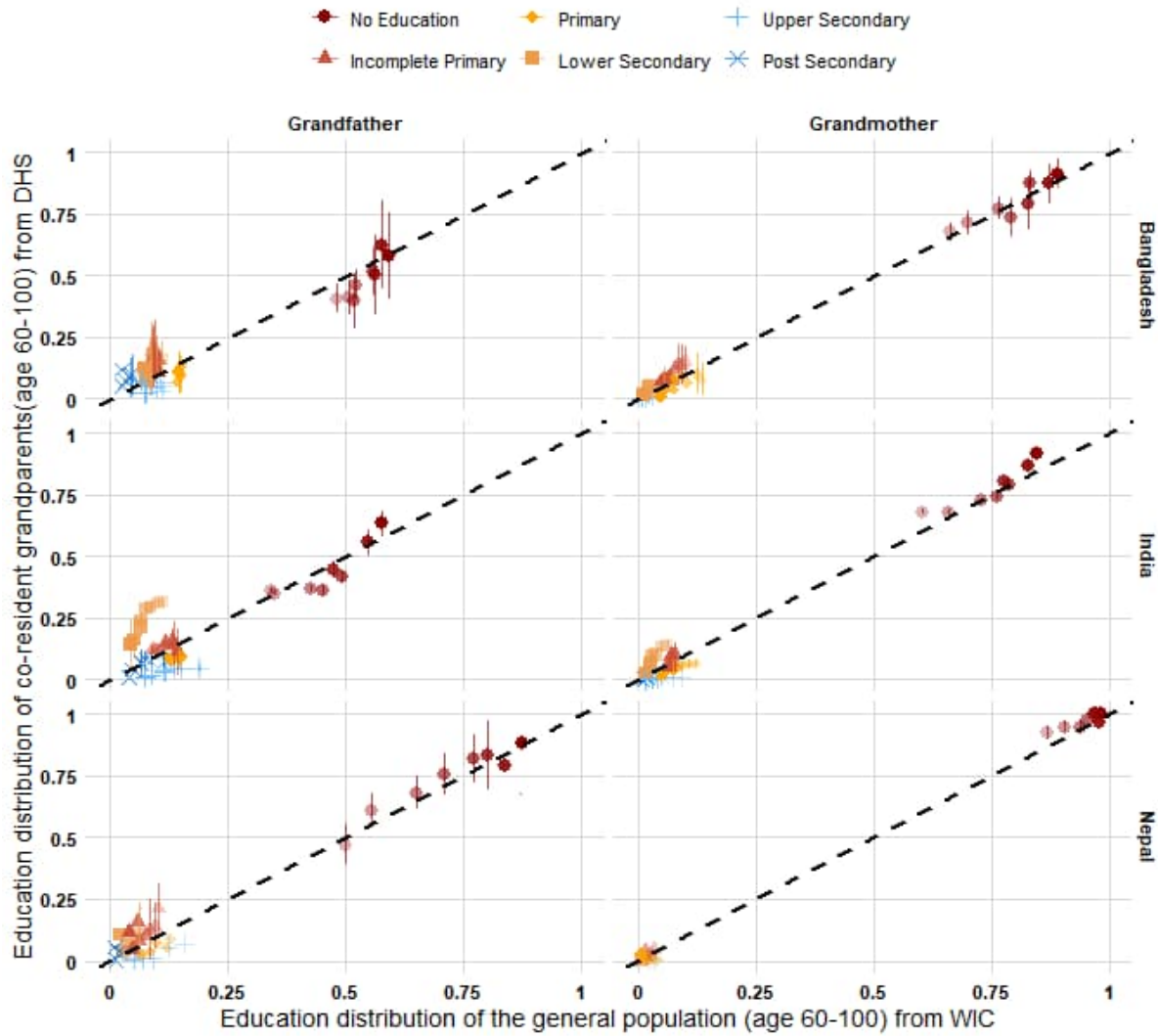


Figure 1: Comparison of the education distribution of the population aged 60 to 100 years from WIC and the education distribution of grandparents observed from the DHS data in Bangladesh, India, and Nepal for the baseline year 2020-2024.

Further, all data used in this study are publicly available. See Appendix 3 for the sources and the link to access the data. The code to reproduce the analysis will be made available upon request.

2. Results

Figure 2 illustrates the increasing trend of the average number of living grandparents for a Focal aged 0-4 years from 1950 to 2100, disaggregated by sex and age group (<60, 60-69, 70+) of the grandparent. The black line indicates the total number of grandparents over time, while colored bands distinguish age groups of grandparents. The figure shows a consistent increase in the average number of living grandparents (both grandmothers and grandfathers) across all countries. In the 1950s, Focal had fewer than one living grandmother or grandfather on average. By 2020, this number had increased to approximately 1.4 to 1.7 for each, and projections suggest that by 2080, Focal could have nearly two living grandparents of each sex.

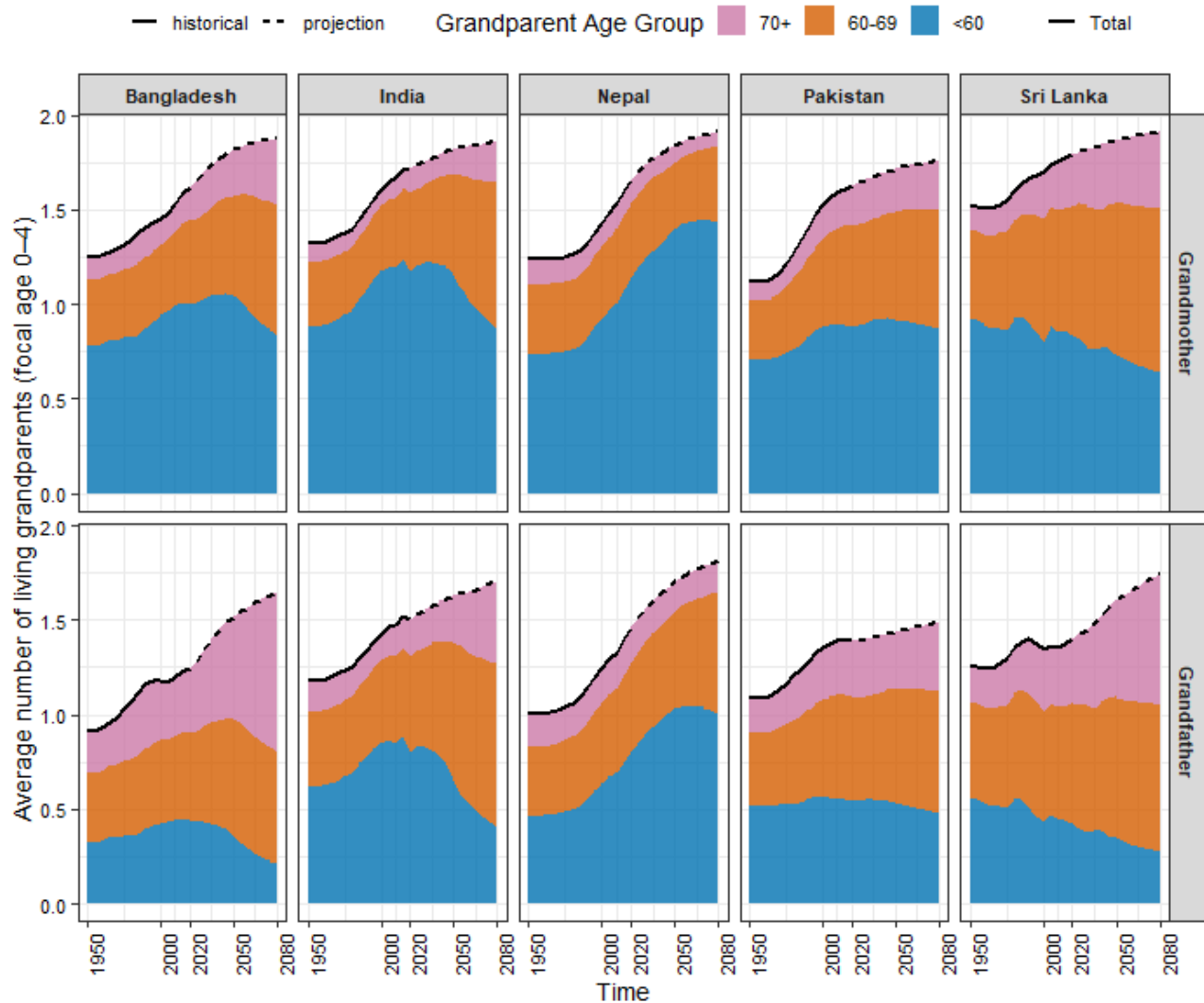


Figure 2: Increasing trend of the average number of living grandparents for a Focal age of 0-4 years from 1950 to 2100. Colors show the different age groups of grandparents.

Figure 2 shows a clear shift in the age composition of grandparents over time. In earlier decades, most grandparents were under age 60. Over time, however, the proportion of grandparents in older age groups, especially those aged 70 and above, has increased substantially. By the end of the projection period, countries such as Bhutan and the Maldives are projected to have more than double the number of grandparents (both grandfathers and grandmothers) aged 70+ compared to

2020. This shift is more pronounced among grandfathers. Most grandmothers are expected to be in the 60-69 age group. In Bangladesh, the notably large proportion of grandfathers aged 70 and above is partly attributable to larger spousal age gaps, where women are married to men nearly a decade older. Overall, while the total number of living grandparents per grandchild is increasing, the rise is primarily due to a growing share of older grandparents (70+ years). Because of early childbearing, the share of grandparents under age 60 is expected to rise in Nepal until 2060, after which it will start to decline.

Figure 3 shows the relative change (in percentage) in the number of grandmothers and grandfathers between the base period 2020-2024 and the end period of projection 2020-2084 under three scenarios in India. The pyramid shows that in the future, both the number of grandfathers and grandmothers is expected to increase in the Upper and post-secondary education categories considerably. In India, the proportion of grandparents with post-secondary education was 9.3% during 2020-2024. By 2050-2054, this share is projected to increase to 26.8%, 19.4%, and 18.6% under SSP1, SSP2, and SSP3, respectively. By the end of the projection period, these proportions are expected to rise further to 67.2% under SSP1, 34% under SSP2, and 21.05% under SSP3 (see Appendix 2).

The figure shows that under SSP1, the number of grandmothers with post-secondary education is expected to increase more than tenfold between 2020-2024 and 2080-2084. Grandfathers are expected to increase by over 3 times in the same period. In SSP2, this share is projected to increase by about 7 times for grandmothers and 1.5 times for grandfathers. Even in the pessimistic scenario, SSP3, there will still be an increase in the share of grandmothers (nearly 4

times) and grandfathers (0.7 times) in post-secondary education. On the other hand, under all scenarios, we expect to see a dramatic decline in the number of grandparents with lower secondary education or less, especially in the number of grandparents with no education, which decreases massively (over 90%).

The increase in the share of grandparents with higher education, even under the pessimistic scenario (SSP3), is mainly because they completed their education many years ago. For example, grandparents who are around 70 years old in 2080-2084 would have finished their schooling about 45 to 50 years earlier, around 2030 or before. Since most people complete their education long before becoming grandparents, changes in education policies after 2020-2024 (as reflected in the different SSP scenarios) do not have a strong impact on their educational levels. These future scenarios have a greater impact on younger grandparents, typically those in their 50s or early 60s. But over time, the number of younger grandparents is expected to decline. Therefore, the overall education composition of grandparents in 2080-2084 is shaped primarily by the educational attainment people had decades earlier, rather than by future policies.

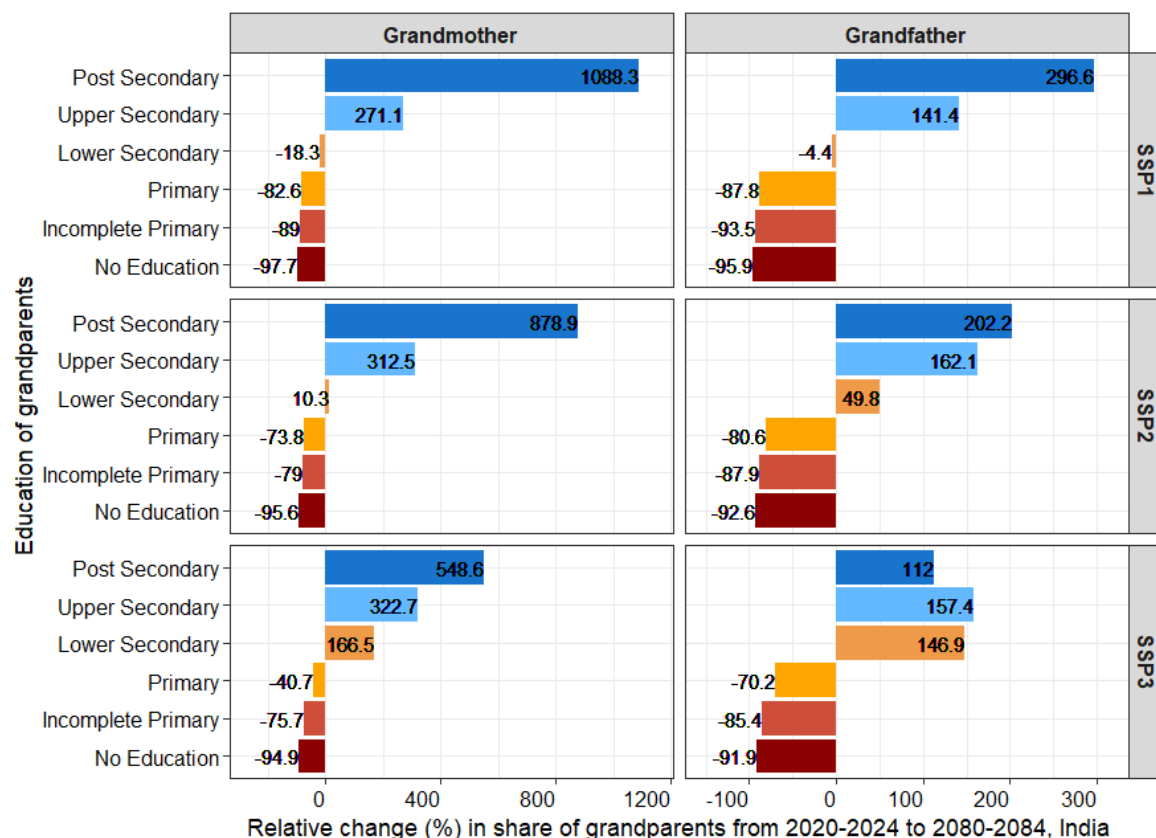


Figure 3: Relative change (%) in the share of grandparents by education level in India (2080-2084 vs 2020-2024) for the Focal age group 0-4 under SSP1, SSP2, and SSP3 scenarios.

Figure 4 shows the age, sex, and education distribution of grandparents in 2020-2024, 2050-2054, and 2080-2084 under the SSP2 scenario. Large cross-country differences are evident. In 2020-2024, Nepal, India, and Pakistan have the highest shares of grandparents with no education: 57.2% in Nepal and 64.5% in Pakistan, with only 3.6% and 4.0% having post-secondary education. Bangladesh has few highly educated grandparents as well, but most fall into primary or lower secondary rather than no education. Bhutan shows the lowest attainment overall, with nearly 86% having less than primary education.

Sri Lanka and Iran contrast sharply. In Sri Lanka, 23% of grandparents have upper secondary and 16% have post-secondary education, compared with 20% with none. Iran shows a similar pattern, with 18.2% upper secondary and 11.4% post-secondary. These differences reflect earlier educational expansion and higher survival at older ages.

Educational attainment increases everywhere, but at different speeds. Nepal experiences the fastest shift: by 2050-2054, 41.6% of grandparents reach upper secondary education and by 2080-2084 this rises to 57.5%, with 19.6% attaining post-secondary. Early childbearing and strong cohort replacement accelerate this transition. Bhutan and the Maldives change more slowly. Grandparents remain concentrated in primary and lower secondary schooling even by 2080, with only about 23% reaching post-secondary. Bangladesh, India, and Pakistan show steady but slower increases due to later childbearing and more gradual cohort replacement.

The figure also shows persistent gender and age gradients. In 2020-2024, grandfathers are more educated than grandmothers in most countries, especially in Bangladesh, Nepal, and Pakistan. This gap narrows over time as gender differences in schooling decline among younger cohorts. Across all settings, grandmothers tend to be younger than grandfathers, reflecting age differences at parenthood and contributing to faster educational replacement on the maternal side.

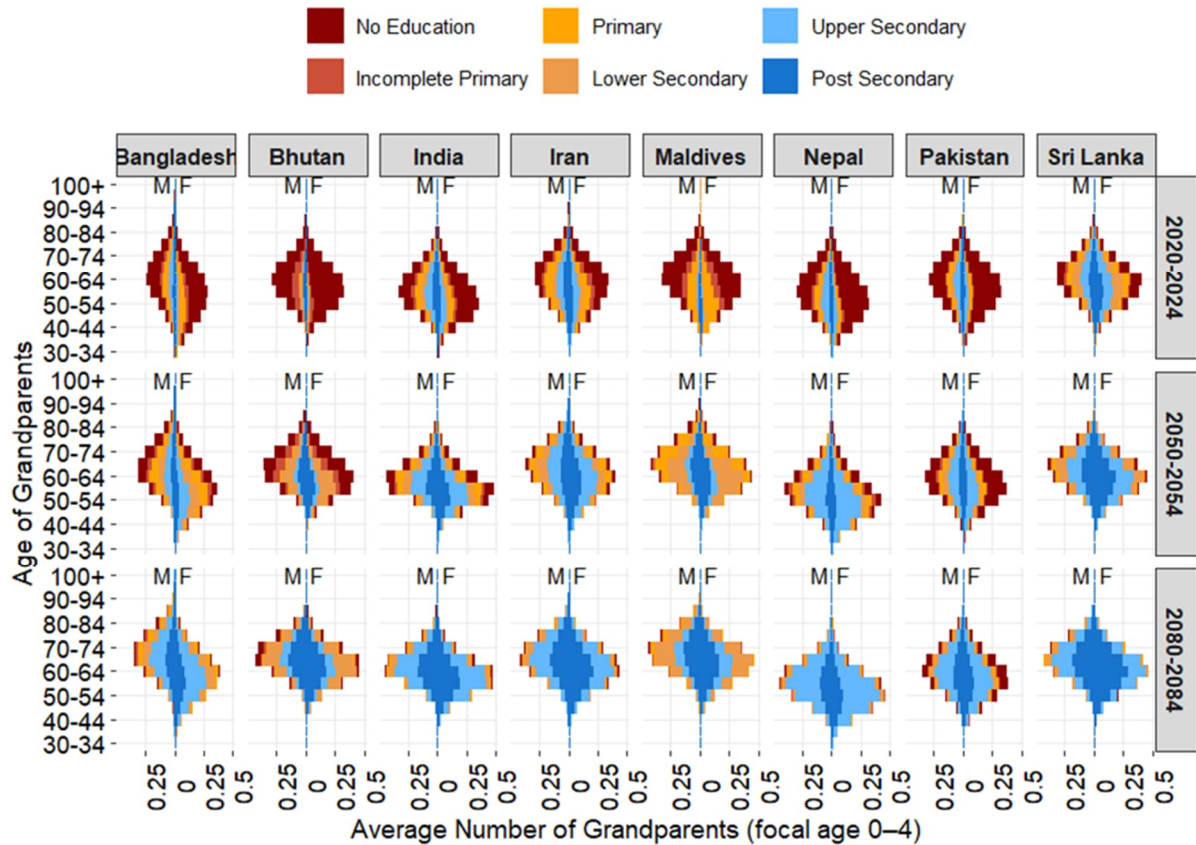


Figure 4: Age, sex, and educational composition (under SSP2 scenario) of grandparents for Focal age 0-4 years in all South Asian countries at different periods.

Figure 5 shows substantial changes in the availability of grandparents and the educational composition of grandmothers across the life course of Focal in India and Sri Lanka, for focal birth cohorts 2020-2024, 2030-2034, and 2050-2054. To save space, only grandmothers' education is shown. Grandfathers' education is provided in the supplementary file A. Across all ages and cohorts, grandfathers have a higher share of upper-secondary and post-secondary education than grandmothers. The stacked areas show the proportional distribution of

grandmothers by education, while the solid and dashed black lines indicate the average number of living grandmothers and grandfathers, respectively.

Grandparental availability is highest in early childhood and declines with age. In India, Focal born in 2020-2024 have about 3.3 living grandparents at ages 0-4, falling to around 2.2 by ages 15-19, and to 1.56 by ages 25-29, and only about 0.27 are still alive by ages 45-49. Sri Lanka shows a broadly similar pattern, although the number of surviving grandmothers is slightly higher than in India, and the number of surviving grandfathers is lower than in India. Younger cohorts have more living grandparents at every age. At ages 25-29, the 2030-2034 cohort in India has 1.72 surviving grandparents, compared with about 1.56 for the 2020-2024 cohort; by 2050-2054, this increases to about 1.8. The same pattern holds in Sri Lanka.

At young Focal ages, most grandparents are themselves relatively young, but grandfathers tend to be older than grandmothers due to the typical age gap between spouses. As the focal ages, this difference becomes more pronounced, and because men have lower survival probabilities at older ages, grandfathers die earlier and faster than grandmothers. This widens the gap between the number of surviving grandmothers and grandfathers during young and mid-adult Focal ages. In India, this gap is smaller than in Sri Lanka because India's lower mean age at childbearing and lower survival at older ages mean that many grandparents enter grandparenthood earlier and die sooner. In Sri Lanka, later childbearing and higher survival allow grandparents, especially grandmothers, to remain alive longer, which increases the gap between surviving grandmothers and grandfathers at mid-adult Focal ages. By the time the Focal reaches their early 30s and beyond, grandmothers also enter ages with higher mortality, and the number of surviving grandmothers declines. As a result, the gap between surviving grandmothers and grandfathers narrows again when the focal reaches middle and late adulthood.

Dramatic shifts in educational composition accompany these changes. In India, among children aged 0-4 in the 2020-2024 cohort, roughly two-thirds of grandmothers have no formal education, and fewer than 10% have post-secondary education. By ages 25-29, the share with no education falls 50%, and the share with upper-secondary or higher rises to around 20%. By ages 45-49, survivors are highly selected: nearly one fourth have upper-secondary or post-secondary education. In Sri Lanka, these changes occur from a much higher educational baseline. Even among focal aged 0-4 in 2020-2024, roughly 40% of grandmothers have upper-secondary or higher education, and the share with no education is small. This share of highly educated grandmothers increases with the Focal's age. The pattern is similar for grandfathers.

Educational shifts are even more pronounced for Focal individuals in younger cohorts. For the 2030-2034 cohort, the proportion of highly educated (upper and post-secondary education) grandmothers exceed 30% at ages 0-4 of Focal in India and almost 50% in Sri Lanka. For the 2050-2054 cohort, upper-secondary and post-secondary education dominate: in India, they account for over half of grandmothers for Focal aged 0-4 years and more than 70% of grandmothers for Focal aged 45-49. In Sri Lanka, highly educated grandmothers account for nearly 70% for Focal aged 0-4 and nearly one fourth of all survivors for Focal aged 45-49. Thus, although few grandparents remain alive at older ages, those who do are overwhelmingly highly educated.

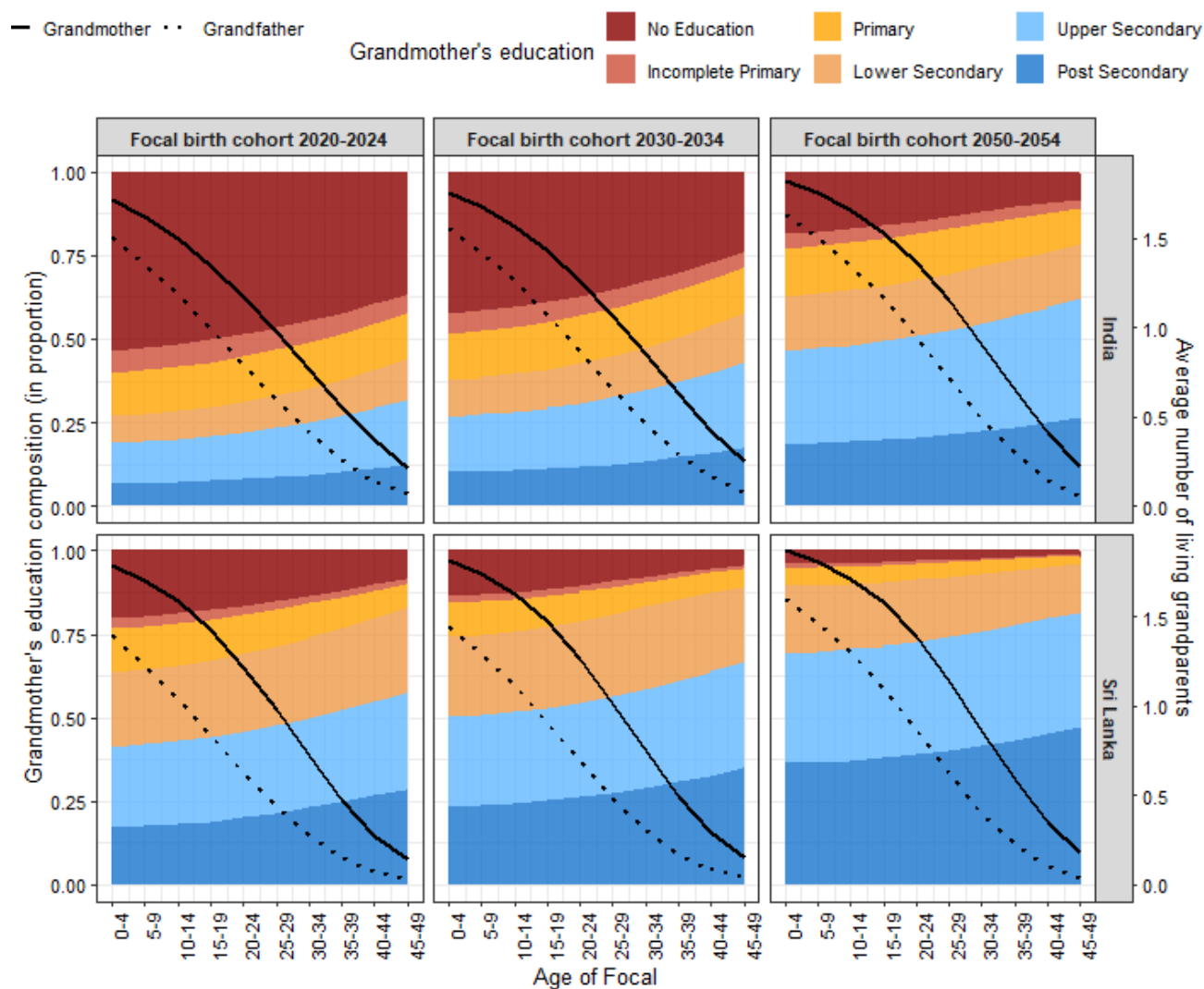


Figure 5: Number of living grandparents and educational composition of grandmother (under SSP2) across the life course of Focal born in 2020-2024, 2030-2034, 2050-2054 in selected South Asian countries.

Full results on the number of grandparents from 2020 to 2080, disaggregated by age, sex, and education, for Focal aged 0 to 50 under all three projection scenarios, are provided in Supplementary file A.

3. Discussion

3.1 Key Findings

This study offers the first comprehensive demographic description of grandparents by age, sex, and educational attainment in South Asia. We found that the average number and average age of surviving grandparents in the future is expected to increase across all countries, confirming previous studies(Alburez-Gutierrez et al., 2023). We identify four key findings that provide insight into the characteristics of future grandparents in terms of education and have implications for both informal and formal caregiving systems.

First, the majority of future grandparents will have attained upper secondary or post-secondary education. At the same time, the number of Grandparents with no education will reduce dramatically.

Second, the educational composition of future grandparents will be dominated by higher education, but this may differ markedly depending on current and future educational attainment and progression, which we operationalized using SSP scenarios. For example in India , the share of grandmothers (for a Focal aged 0-4 years) with post-secondary education is expected to increase by more than a 10 times by 2080-2084 under SSP1, by 5 times under SSP2 and , and by three times Under SSP3. Still, across all scenarios, a majority of future grandparents are expected to have upper secondary and above education.

Third, the number and characteristics of grandparents change as grandchildren move from childhood to young adulthood and later adulthood. As children, they have the most grandparents alive, the difference in the surviving numbers between grandmothers and grandfathers is small,

and many grandparents are younger and have a lower level of education. For young adults, the number of surviving grandparents declines, grandmothers outnumber grandfathers by a wider margin, and the remaining grandparents are older and a larger share of grandparents are expected to have upper secondary or higher education. For adults, only a few grandparents remain alive, most of them grandmothers, and they are concentrated in the highest education groups.

Fourth, the number, age, sex, and education of surviving grandparents vary widely across South Asian countries. Sri Lanka and Iran stand out with the highest number of living grandmothers and the greatest concentration of older and highly educated grandparents, although the number of living grandfathers is lower than in many other countries due to male mortality at older ages. India, Bangladesh, and Pakistan show a similar pattern, with a moderate number of surviving grandparents and a growing but still smaller share with upper-secondary and post-secondary education. Bhutan and Pakistan have the fewest surviving grandparents overall, and these grandparents are younger and predominantly lower educated. The Maldives differs again: most grandparents are educated to the secondary level, but the share with upper-secondary and post-secondary education remains lower than in other countries with comparable demographic indicators.

3.2 Implications of findings

Our findings show how demographic change will reshape grandparenthood in South Asia. In early childhood, grandchildren are projected to have the most grandparents alive, and grandmothers are likely to be younger than grandfathers. This may reinforce the gendered division of caregiving noted in prior research, in which grandmothers provide intensive routine and hands-on childcare and grandfathers perform supervisory or financial roles (Coall &

Hertwig, 2010; Compton & Pollak, 2014). However, the age gap between younger grandmothers and older grandfathers also raises the risk of a “double burden” on women. Grandmothers may expect to provide childcare for grandchildren while also caring for frail husbands. This could intensify the strain on unpaid care that women shoulder across South Asia (Chung et al., 2021) .

Across young adulthood, grandchildren will have fewer but more highly educated grandparents. Higher education is associated with better health, financial preparedness, and longer working lives (Behrman et al., 2010; Lutz et al., 2018). Prior research shows that highly educated grandparents may be less available for routine childcare but more able to contribute financially or educationally (Arpino & Bordone, 2014; Di Gessa et al., 2022). This shift may enhance grandchildren’s educational and social opportunities but reduce the supply of hands-on care. However, most of this evidence comes from European countries, so we cannot assume the same patterns hold in South Asia. Because the region has weaker welfare systems and stronger expectations of family support, education may influence grandparenting in different ways, but we currently lack evidence to show how.

Later in life, few grandparents survive, and those who do are disproportionately highly educated but very old. At this point, the direction of support may reverse. Adult grandchildren who may be forming families and entering the labor force could face overlapping responsibilities. They may have to support grandparents at later life, aging parents, and young children simultaneously. Even though educated grandparents are expected to prepare financially for their later life, health-related challenges that come with old age still demand physical support. These overlapping demands may intensify pressures on families.

These implications will not be uniform across South Asia. The differences we project stem from distinct demographic pathways in fertility timing, survival, and education. Countries where

childbearing remains early, such as Bangladesh and Pakistan, will continue to have relatively young grandparents, sustaining hands-on childcare for longer. In contrast, countries with delayed fertility and high survival, such as Sri Lanka and Iran, will have grandparents who are older at the time of a grandchild's birth and survive to very advanced ages, increasing potential later life care needs. Rapid education expansion in Nepal, India, and Bangladesh will lead to more highly educated grandparents in the future, who may be better placed to provide financial and advisory support but less available for routine care. Slower educational progress in Bhutan and Pakistan suggests continued reliance on low-educated grandparents, who may have fewer resources and greater vulnerability in old age. These differences indicate that the balance between childcare and later life care, and the roles grandmothers and grandfathers play, will vary across countries rather than follow a single regional pattern.

Although our study does not measure caregiving directly, these demographic shifts identify when and where grandparental support may be available, and when grandparents themselves may need care. Childcare expansion could support families when grandchildren are young and grandparents are relatively younger, while basic long-term care and pension reforms could reduce later-life dependency. Rising education may ease some burdens through better health and resources, but it cannot replace formal care in ageing societies.

Future research should examine whether education changes the type and intensity of grandparental support in South Asia, and whether these patterns differ from those in European contexts, where education reduces intensive caregiving ((Arpino & Bordone, 2014; Di Gessa et al., 2022). Future research is also needed to investigate how changes in grandparent characteristics affect women's labour force participation and unpaid care time use at the national and subnational levels.

In conclusion, our findings indicate that grandchildren in South Asia will grow up with more grandparents in the future. However, the number, as well as the grandparents' age, sex, and education, changes over their lives. The changing demographics of grandparents over the life-course of grandchildren have different implications for care and resource exchange. Recognising these shifts is crucial for designing policies that complement family support rather than assuming it will remain constant into the future. Our analysis provides a demographic foundation for anticipating how intergenerational care may evolve as South Asia ages and education expands.

5.3 Limitations

We acknowledge some limitations of our approach, which relies on demographic models and data due to the lack of empirical microdata. The kinship models make a set of standard assumptions. They include assuming independence between mortality and fertility, ignoring intergenerational correlations in demographic rates (Ruggles, 1993), assuming stable demographic rates before 1950, and approximating male from female fertility (Schlüter et al., 2024). These limitations are likely to have a small effect on the final estimates, as shown by Alburez-Gutierrez et al. (2023). Second, our education projections rely on deterministic SSP scenarios, which limits the ability to quantify uncertainty but allows us to examine how grandparents' educational composition may differ across plausible futures. Third, due to the lack of historical data on education-specific fertility and mortality, education is not modelled as an input but applied using age-, sex-, and time-specific population distributions. Comparisons with DHS data from India, Bangladesh, and Nepal show that this approach closely matches observed education levels among grandparents

4. Acknowledgement

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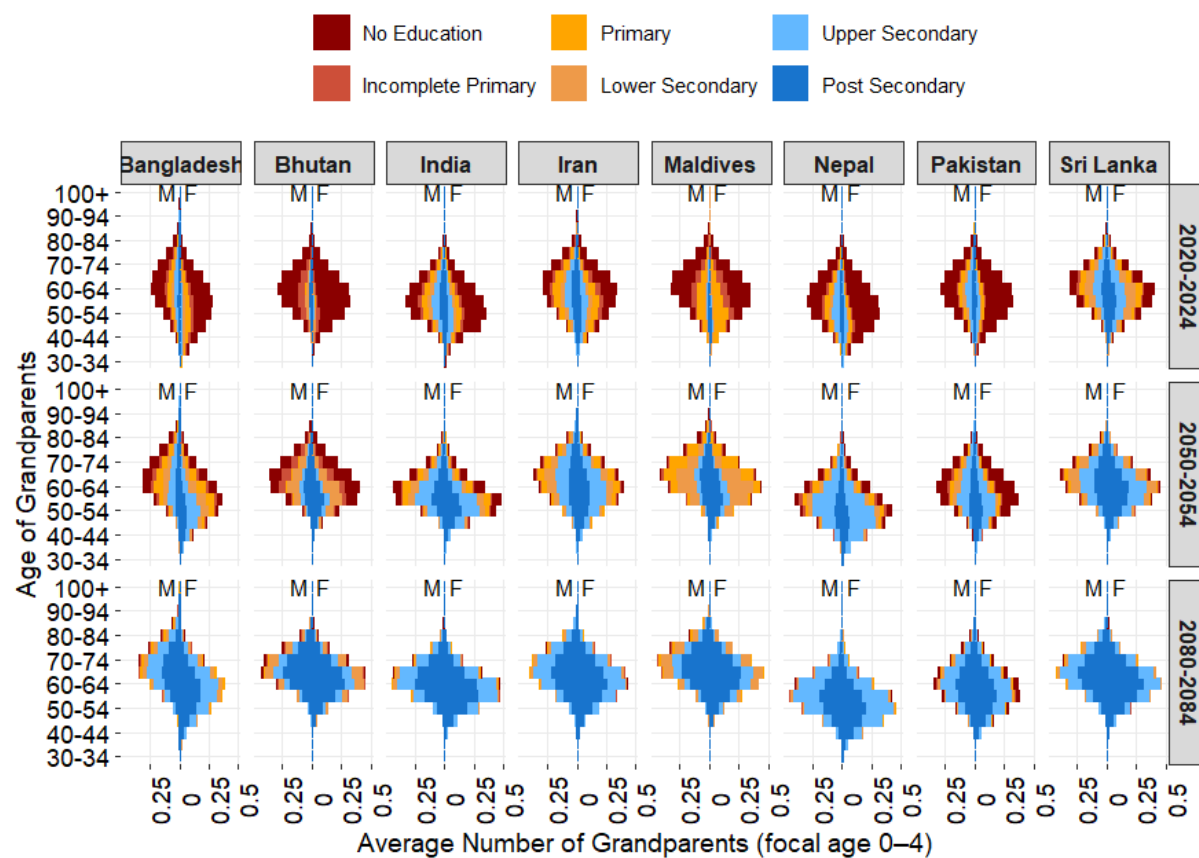
Appendix

Appendix 1: Average number of grandparents and distribution (in %) of grandparents by age, sex and education (SSP2) for a Focal aged 0-4 years in 2020-2024, 2050-2054 and 2080-2084

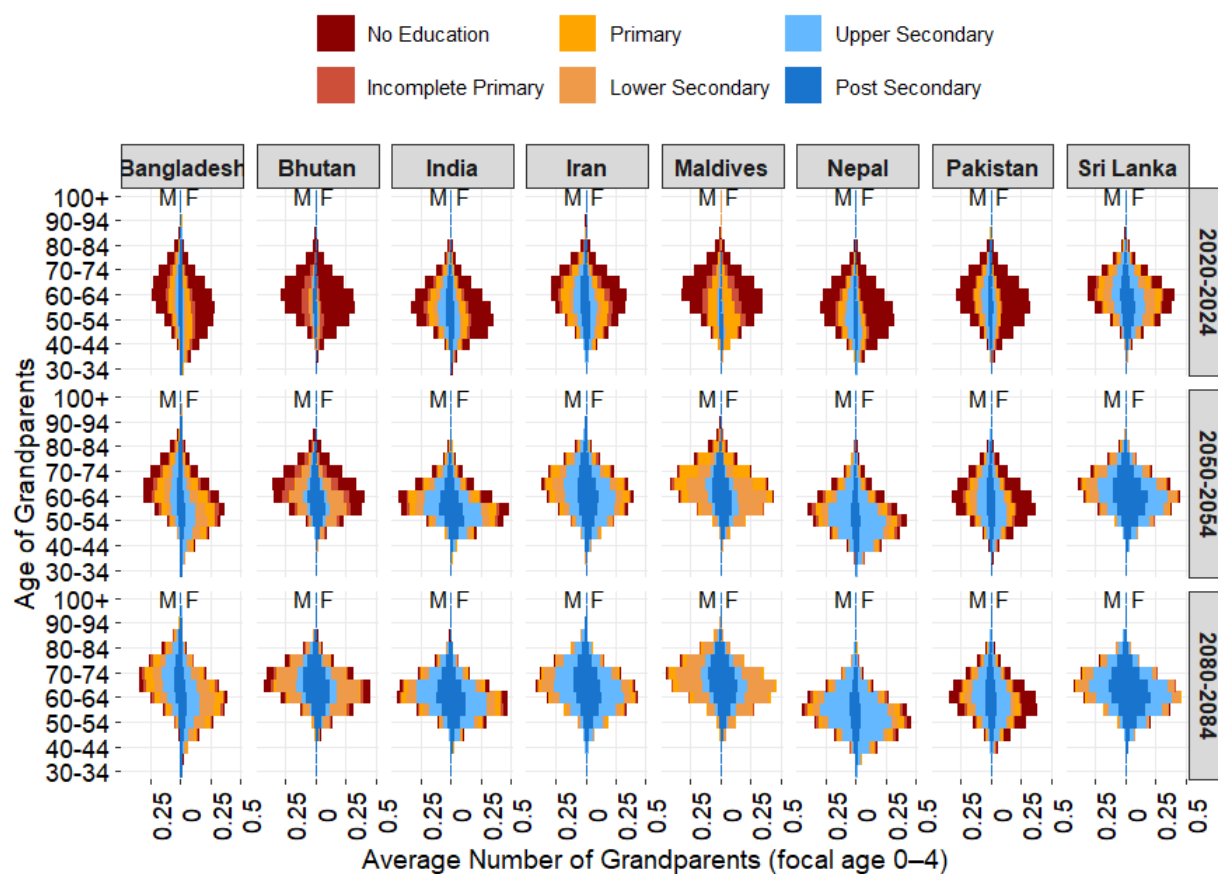
Characteristics	Label	Bangladesh	Bhutan	India	Iran	Maldives	Nepal	Pakistan	Sri Lanka
2020-2024									
Total		2.87	2.87	3.22	3.24	3.27	3.12	3.02	3.19
Sex	Grandmothers	56.5	54	53.3	54	52.7	53.2	53.9	56.2
	Grandfathers	43.5	46	46.7	46	47.3	46.8	46.1	43.8
Age group	<60	50.3	46.3	61.6	43.1	42.1	62.4	47.3	39.6
	60-69	31.3	37	28.5	36.5	37.6	27.5	35.8	41.2
	70+	18.4	16.7	9.84	20.4	20.3	10.1	16.9	19.2
Education	No Education	51.7	73.8	43.1	28.8	32.3	57.3	64.5	20.2
	Incomplete Primary	10.1	13.4	7.48	10.2	32.7	7.14	4.68	3.78
	Primary	16.1	0.548	13.9	19.8	25.3	10.5	8.85	13.8
	Lower Secondary	9.67	6.87	10	11.6	5.72	6.24	7.58	22.5
	Upper Secondary	8.73	1.39	16.1	18.2	0.715	15.3	10.4	23.8
	Post-Secondary	3.69	3.97	9.34	11.4	3.18	3.6	4.01	16
2050-2054									
Total		3.34	3.29	3.45	3.53	3.66	3.54	3.16	3.47
Sex	Grandmothers	54.5	53.7	52.8	52.5	51.7	52	54.4	53.9
	Grandfathers	45.5	46.3	47.2	47.5	48.3	48	45.6	46.1
Age group	<60	42.3	30.4	52.8	32.3	24.8	68.5	46.1	31.1
	60-69	34.3	43.8	36.2	40.1	43.2	24.3	37.1	44.7

Characteristics	Label	Bangladesh	Bhutan	India	Iran	Maldives	Nepal	Pakistan	Sri Lanka
	70+	23.4	25.8	11	27.6	32	7.2	16.8	24.2
Education	No Education	19.8	32.1	16	3.93	3.49	12.3	33.6	4.98
	Incomplete Primary	9	16.3	4.48	3.2	10.2	7.04	5.02	1.41
	Primary	21.5	8.79	14.4	15	35.8	16.3	11	6.58
	Lower Secondary	20	22.7	16.6	18.7	32.8	14	14.6	22.6
	Upper Secondary	20.6	8.76	29.2	35.7	6.63	41.6	25.5	32.3
	Post-Secondary	9.03	11.4	19.4	23.4	11	8.75	10.2	32.1
2080-2084									
Total		3.53	3.53	3.58	3.71	3.76	3.73	3.26	3.66
Sex	Grandmothers	53.2	52.5	52.2	51.4	51.2	51.3	54.2	52.3
	Grandfathers	46.8	47.5	47.8	48.6	48.8	48.7	45.8	47.7
Age group	<60	29.6	18.2	35.7	23.4	15.3	65.4	41.3	25
	60-69	36.5	45.5	45.8	41.8	41	28.1	39.3	45
	70+	33.9	36.3	18.5	34.8	43.7	6.54	19.3	30
Education	No Education	6.88	9.34	4.12	0.393	0.993	2.08	9.09	0.712
	Incomplete Primary	4.51	11.2	1.5	0.507	2.94	1.69	2.62	0.325
	Primary	13	8.88	7.1	4.49	23.7	6.69	7.97	1.71
	Lower Secondary	21.1	29.1	13.6	11.7	31.1	12.3	17.4	12
	Upper Secondary	35.8	18.4	39.7	42.8	18	57.5	41.1	35.1
	Post-Secondary	18.7	23.1	34	40.2	23.2	19.7	21.9	50.1

Appendix 2 A: Age, sex and educational composition (under SSP1 scenario) of grandparents for Focal of age 0-4 years at different time periods.



Appendix 2B: Age, sex and educational composition (under SSP3 scenario) of grandparents for Focal of age 0-4 years at different time periods.



Appendix 3: Data sources and availability

All data are publicly available and can be accessed from the given sources.

Age-specific fertility rates:

[https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20\(Standard\)/CSV_FILES/WP_P2024_Fertility_by_Age5.csv.gz](https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20(Standard)/CSV_FILES/WP_P2024_Fertility_by_Age5.csv.gz)

Mean age at childbearing and Mean age at fatherhood:

<https://perso.uclouvain.be/bruno.schoumaker/data/A.%20Estimates%20of%20male%20and%20female%20fertility.xlsx>

Age-sex-specific survival rates for female:

[https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20\(Standard\)/CSV_FILES/WP2024_Life_Table_Complete_Medium_Female_1950-2023.csv.gz](https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20(Standard)/CSV_FILES/WP2024_Life_Table_Complete_Medium_Female_1950-2023.csv.gz)

Age-sex-specific survival rates for male:

[https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20\(Standard\)/CSV_FILES/WP2024_Life_Table_Complete_Medium_Male_1950-2023.csv.gz](https://population.un.org/wpp/assets/Excel%20Files/1_Indicator%20(Standard)/CSV_FILES/WP2024_Life_Table_Complete_Medium_Male_1950-2023.csv.gz)

Age-sex-education distribution of population:

<https://dataexplorer.wittgensteincentre.org/wcde-v3/>