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Depression and Loneliness among the Elderly in Low- and Middle-Income Countries

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The elderly population is growing rapidly in low- and middle-income countries—it is projected to increase from about 500 million in 2019 to over 1.2 billion in 2050 (UN DESA Population Division 2019)—yet the well-being and mental health of this population are not a policy or research priority.

This situation has arisen for two main reasons. First, issues facing older people are not a general policy or research priority in low- and middle-income countries, perhaps because populations tend to skew younger. For instance, of the 528 studies used by the Global Burden of Disease, only 17 (covering just six countries) were designed to study the elderly in low- and middle-income countries. Second, mental health issues are generally underemphasized in low- and middle-income countries. High-income countries allocate about 3.4 percent of their total government health expenditure to mental health, compared to 0.3 percent in low- and middle-income countries—and only 0.09 percent in the nine low-income countries covered by the WHO Mental Health Atlas (Ridley et al. 2020). This lack of spending results in very limited availability of trained staff and treatment: there are 1.4 mental health workers per 100,000 population in poor countries, compared to 62 per 100,000 in

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rich countries, and over 90 percent of cases of major depressive disorder are untreated in low- and middle-income countries (Thornicroft et al. 2017).

Similarly, research and data are sparse: less than 2.7 percent of published research on public health focuses on mental health in low- and middle-income countries, compared to 8 percent in rich countries (World Health Organization 2021). In the Global Burden of Disease database, no data on mental health exists for 88 of the 134 low- and middle-income countries. For the countries with data, the sample sizes of the underlying studies are typically small, with measurements of mental health coming from short screening instruments.

In this essay, we begin by shining a spotlight on an unseen epidemic of poor mental health among the elderly in developing countries. We use a set of existing, high-quality surveys with well-validated survey tools for measuring depression. We create comparable estimates of the prevalence of depression among people aged 55 and up across seven low- and middle-income countries and compare those to the United States.

Our first key finding is that the prevalence of symptoms of depression among the elderly is much higher in poorer countries than it is in the United States. For both men and women, in every age range, the rates of depression symptoms are lower in the United States than nearly all our comparison countries. For example, in India, 26 percent of men and 31 percent of women aged 61–70 have symptoms indicating high likelihood of depression, compared to 11 percent of men and 14 percent of women aged 61–70 in the United States.

Second, many of the elderly in low-income countries feel lonely, despite the common presumption that most elderly in these countries live with their family. In several of the countries in our data sets, the fraction of elderly who report feeling lonely is largely in line with that of the United States: between 10 and 25 percent, varying slightly with age. In other countries, the loneliness rate is much higher than in the United States, reaching over 50 percent in Mexico among those over 80 years old. Importantly, loneliness is a strong predictor of depression.

Our third key finding is that poor mental health is also associated with poor physical health and an elevated risk of death within the next two years. If these associations are causal, it would imply that treating and preventing mental health diseases could be an important policy instrument to facilitate healthy aging more broadly. The effects would be especially substantial in countries where the share of the older population is poised to increase substantially in the next few decades.

Prior research highlights a few key factors associated with poor mental health among older people. To explore these patterns in more detail in one middle-income country, we then turn to a new panel survey on the mental health of the elderly we conducted in Tamil Nadu, India, where we collected detailed measurements on the correlates of depression. One advantage of the survey is that it deliberately oversamples the elderly living alone, an often-ignored group that we show to be especially at risk for depression and functional limitations. We show that physical health challenges, poverty, and social isolation (as measured by living alone) are strongly correlated with depression.

Finally, we draw on these findings, results from our field experiments in Tamil Nadu, and the existing literature on mental health among the elderly and in the general population to propose some promising policy interventions to address elderly mental health in poor countries. We suggest some priorities for future research and policy action on the topic.

Measuring Mental Health in Low- and Middle-Income Countries

Creating Internationally Comparable Mental Health Measures

To construct robust and comparable data on mental health of the elderly in low- and middle-income countries, we combine data from publicly available surveys of six countries: Brazil (Lima-Costa et al. 2018), China (Zhao et al. 2014), Costa Rica (Rosero-Bixby, Fernández, and Dow), India (Bloom, Sekher, and Lee 2021), Mexico (Wong, Michaels-Obregon, and Palloni 2017), and South Africa (Berkman 2023).[1] These surveys are part of a family of surveys modeled after the US Health and Retirement Study (Bugliari et al. 2022), an ongoing, decades-long longitudinal study that has become the template for a growing network of longitudinal aging studies around the world. With support from the National Institute of Aging in the United States, the different research organizations that collected these data have made explicit efforts to harmonize survey instruments and collection procedures, all part of the "Health and Retirement Family of Surveys."[2] We use this data to make cross-country comparisons, while including data from the 2014 and 2016 wave of this study in the United States as an additional benchmark. To have more data for Africa, we also include data from one other survey that followed a similar template and asked detailed questions pertaining to mental health: the Malawi Longitudinal Study of Families and Health (Kohler et al. 2013).

The Diagnostic and Statistical Manual of Mental Disorders describes depression as a family of disorders characterized by "the presence of sad, empty, or irritable mood, accompanied by related changes that significantly affect the individual's capacity to function" (American Psychiatric Association 2022). Within this family, Major Depressive Disorder is often referred to as "clinical depression." Major Depressive Disorder consists of nine symptoms; to be diagnosed, one must show at least five of those symptoms within the past two weeks. Of those five, at least one must be "a depressed mood" or "loss of interest or pleasure in all, or almost all, activities" for most of the day, nearly every day.

Measuring depression prevalence among the elderly is particularly challenging, as older adults who experience depression tend to show different symptoms than

[1] The studies are documented by the Program on Global Aging, Health, and Policy at the University of Southern California and instructions for accessing the data can be found at https://g2aging.org/survey-overview.

[2] In the online Appendix, we provide detailed information on how the data is constructed to ensure comparability of the measures in the different datasets.

younger adults. For example, older adults may report a lack of emotions rather than a depressed mood (Blazer and Hybels 2014). In light of this, surveys of older adults often use adapted versions of questions about symptoms to screen for depression, which we discuss in more detail below.

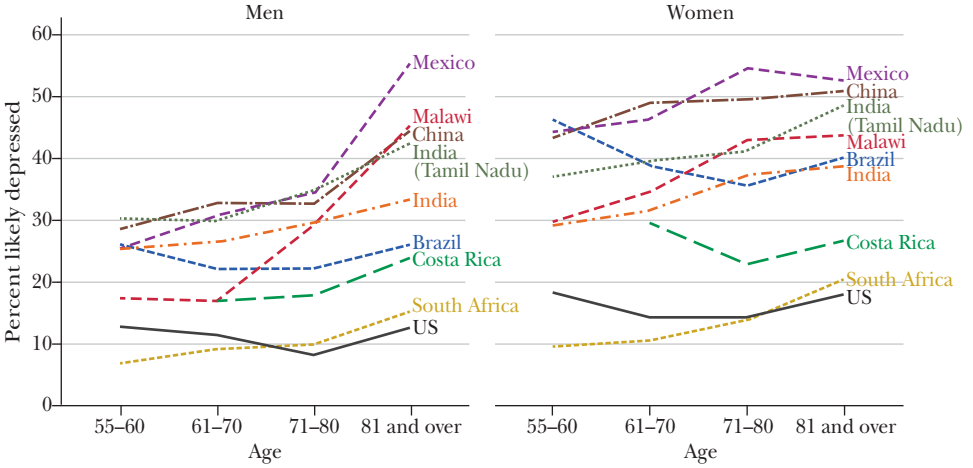
The gold standard for diagnosis of depression is a face-to-face interview with a trained psychiatrist, but this is not feasible at scale in low-income settings. Instead, the mental health portion of the questionnaires in the Health and Retirement Family of Surveys includes between 8 and 15 questions about recent experience of depression symptoms, such as, "How often during the past week did you enjoy life?" or "How often during the past week did you feel that everything you did was an effort?" This reflects a compromise between a lengthy interview, which may elicit low response rates or low response quality, and the very short screening surveys used by the Gallup Polls or the World Health Organization, which may be a bit too coarse to reliably capture the true prevalence of depression. The questionnaires used in our analysis have been validated for studying depression among the elderly in studies that compared their prediction to an evaluation performed by a trained psychiatrist (Vilagut et al. 2016).

A difficulty that arises in this kind of work, especially in low- and middle-income countries where mental health is not commonly discussed, is that mental health questionnaires are by nature sensitive to issues of translation, interpretation, and cultural norms. Thus, comparing depression levels across countries, even when using the same (translated and validated) questionnaire, can be difficult. An individual is considered to likely be depressed if they report a number of depression symptoms above the questionnaire's cutoff point. To select a cutoff point, validation studies balance the sensitivity (the rate of false negatives) and the specificity (the rate of false positives) of the measurement, but they often find different optimal cutoff points in different settings. To compare depression prevalence across countries, we select cutoff scores for each country based on existing literature, with the aim of identifying people who, in each context, would be described as likely depressed.

We acknowledge that the choice of medium-length survey instrument for measuring depression in these datasets is driven by what is feasible to use on large sample sizes rather than a belief that these measures are without flaws. Compared to clinical diagnosis or even to lengthier survey instruments, these surveys are prone to measurement error and may lead to an overestimate of clinical depression. This is particularly true when using an imperfect screening test for a condition that has low prevalence in the population—and therefore produces many more chances to produce false positives than false negatives (Maxim, Niebo, and Utell 2014). Conversely, persons who are reluctant to introspect may not engage with the survey, which would lead to false negatives.

Fortunately, these classification errors are perhaps not critical for the purpose of this essay. In our analysis, we report the fraction of individuals who are "likely to be depressed" because it is an easily interpretable, comparable summary measure. However, regardless of whether a tag of being "depressed" translates precisely into formal clinical depression or not, there is no doubt that depression *symptoms* are associated with low well-being.

Figure 1
Prevalence of Depression Symptoms by Gender, Age, and Country



Source: The data for the United States uses sample averages from the Health and Retirement Study in 2014. The data for Malawi comes from another independent study (Malawi Longitudinal Study of Families and Health) of the health and well-being of older adults. Data for Tamil Nadu comes from our own study that was conducted in the state of Tamil Nadu. The data for the other countries comes from nationally representative studies modeled after the US Health and Retirement Survey (Brazil, China, Costa Rica, Mexico, India, and South Africa). When available, survey weights are used to calculate averages that are nationally representative of older adults in each country or area.
Notes: This figure shows the share of the population that is likely to be depressed (as determined by whether the depression index scores surpass the specified thresholds) for each age group and gender across the countries in our sample.

Prevalence of Depression among the Elderly

Figure 1 shows the fraction of the elderly who are likely to be depressed, as determined by whether the number of symptoms reported on a standard depression screening questionnaire falls above the country-specific threshold.[3] The figure illustrates two important patterns.

First, the prevalence of depression symptoms among the elderly in poorer countries is typically high relative to the United States. For example, for all low- and middle-income countries in our dataset except for South Africa, about 20–35 percent of men between the ages of 71 and 80 show symptoms indicative of depression—more than double the US rates. China and Mexico have the highest prevalence of depressive symptoms, and Costa Rica and South Africa have the lowest. India is in the middle. For almost every combination of country and age category, depression rates are higher for women than for men, consistent with higher prevalence

[3]The supplementary Appendix includes additional figures and tables with further empirical results. Throughout the remainder of our text, we mention and discuss these results without explicitly referring to the corresponding Appendix figures and tables.

of anxiety and depression among women in many other contexts (Salk, Hyde, and Abramson 2017).

Second, the prevalence of depression symptoms increases with age in low- and middle-income countries, with particularly pronounced depressive symptoms at age 70 and above. This result appears to contrast with previous work, mostly in high-income countries, that documents a U-shaped pattern of well-being (and/or an inverse U-shape for mental distress) in age (for example, Blanchflower 2021; Giuntella et al. 2023). In line with this literature, we find depression does not increase with age in the United States.[4] We can only speculate as to why we see depression rise with age in low- and middle-income countries but not in the United States. Perhaps greater access to healthcare in the United States allows individuals to age with relatively fewer health issues and pain. These patterns could also reflect greater ability to save for retirement in the United States, or pensions that are more generous or widespread relative to our comparison countries.

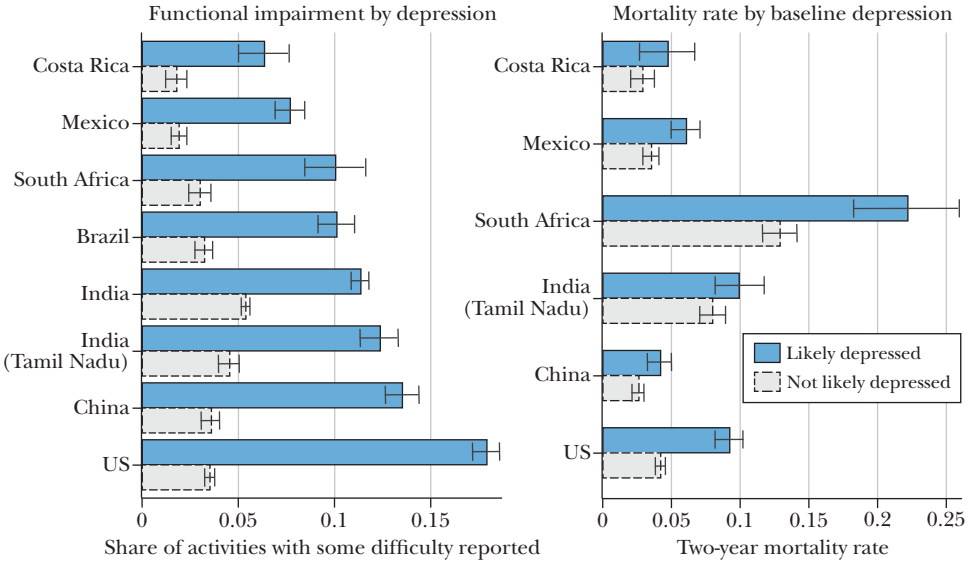
The data also suggest that elderly depression remains largely undiagnosed and untreated in low-income settings, consistent with enormous treatment gaps for depression that have been documented for the general population (Thornicroft et al. 2017). In China, for example, among the approximately 35 percent of respondents who show signs of depression, only 2 percent have ever been diagnosed by a doctor with any psychological condition, 1 percent are taking any medication for psychological conditions, and 0.3 percent are receiving any other type of treatment.

Depression, Functional Abilities, and Death

Depression is a key predictor and aspect of poor well-being and low life satisfaction (Kahneman and Krueger 2006). In addition, it is associated with a host of other adverse outcomes. We focus on the relationship between depression and functional impairment because aging is associated with a slow deterioration in the ability to carry out basic "activities of daily living," which can lead to a considerable loss in life quality and autonomy. The surveys in our analysis typically cover six activities of daily living: dressing, eating, bathing, getting out of bed, using the toilet, and controlling urination and defecation. Respondents are asked whether they can do a particular activity easily, with difficulty, or not at all. To construct a summary

[4]Much of the psychiatric literature, based on evidence mostly from rich countries, finds depression decreasing into old age (Eaton et al. 1989), but this is the topic of an active debate (Yang 2007). In the economics literature, Giuntella el al. (2023) examine depression, anxiety, and other measures of well-being in rich countries and find a "midlife crisis" around age 50. Blanchflower (2021) comes to a similar conclusion using datasets that cover the majority of countries in the world. The latter findings are not necessarily inconsistent with our results for three reasons. First, Blanchflower primarily focuses on people aged 70 or younger, whereas we include all those over the age of 55. Thus, it is possible that well-being declines in middle age, improves in late adulthood, and then declines again in the oldest age ranges. Second, our data features validated surveys specifically designed for the elderly as opposed to single-item surveys asking about overall well-being or *lifetime* prevalence of depression. Finally, Blanchflower's results are especially strong upon inclusion of controls such as job status and marital status; we omit these controls because we contend that widowhood and unemployment are integral aspects of aging, and a channel through which mental well-being may decline.

Figure 2
Correlates of Depression: Functional Impairment and Mortality by Country



Source: Same as Figure 1. In addition, the mortality figure uses one additional wave of the data than what is used in Figure 1. For each country, we use information on respondent status in the subsequent wave. The years and details for each country are listed in Appendix Table 1.
Note: The left panel of the figure shows the average share of Activities of Daily Living for which respondents reported having some difficulty, for those who were likely to be depressed versus those who were not. The right panel shows the rate of mortality in a two-year follow-up survey, separately for the group of individuals who were likely depressed versus those who were not at baseline. Except for the United States, the two waves used for comparison consist of the first (baseline) and second waves of each study. Displayed are 95 percent confidence intervals.

measure of functional impairment, we calculate the share of activities with which the respondents reported having at least some difficulty.

The depression indicator based on the screening questionnaires is strongly associated with impairments in activities of daily living. Panel A of Figure 2 compares the average of the share of activities for which the respondent had difficulty between those who show symptoms of depression and those who do not, controlling for age and gender.[5] In all countries, those who are likely depressed report having difficulty with at least twice as many activities, consistent with a literature documenting the

[5]We use linear regression to construct group averages for those who are predicted to be depressed versus those who are not (where an individual is predicted to be depressed if their score on the depression questionnaire surpasses the specified threshold). For the group that is not predicted to be depressed, we take the weighted average of the outcome (a measure of functional impairment) among all respondents who were not predicted to be depressed. For the group that is predicted to be depressed, we add to this average the coefficient on an indicator for predicted depression from a regression of the outcome on predicted depression, age bins, gender, and age bins interacted with gender. We use the

correlation between depression and functional disability in high-income contexts (Bruce 2001). For example, in China, the average respondent who shows symptoms of depression has difficulties with about 13 percent of the activities of daily living, compared to only 3 percent for the average respondent who does not exceed our depression score cutoff. Interestingly, the difference is largest in the United States. This correlation likely reflects a two-way causal relationship: restrictions in activities of daily living likely cause depression, while at the same time, depression may lower the ability and will to perform these activities.

Perhaps even more striking, depression symptoms are also associated with a higher likelihood of future death. We have panel data for older respondents at a two-year interval in several countries. Panel B of Figure 2 shows that elders who exhibited signs of depression in the earlier survey were more likely to have died two years later than nondepressed elders, after controlling for age and gender. For example, in Mexico, the two-year mortality rate for those not depressed at baseline was 3 percent, while the mortality rate for the depressed is significantly higher at 6 percent. The excess mortality among people with depression appears even more pronounced in the United States. These findings echo a literature on excess mortality among those with depressive symptoms, both among the elderly in rich countries (Adamson et al. 2005) and the elderly in low- and middle-income countries (Brandão et al. 2018). Once again, several factors could explain this relationship. Depression could be caused by poor health, which itself causes mortality. Alternatively, depression may accelerate death by leading to withdrawal from day-to-day activities that promote mobility and longevity, or by increasing the risk of suicide (World Health Organization 2018).

It is notable that, while old-age depression is more prevalent in low- and middle-income countries, the association of depression with poor outcomes (worse physical decline and increased risk of future death) appears in all countries in our sample, including the United States.

What Factors Are Associated with Depression in Old Age?

The literature has identified a number of factors associated with depression in old age (Blazer and Hybels 2014). Many of them could be both causes and effects.

Physical decline. As we document in Figure 2, the physical decline common to aging—falling, weight loss, frailty, or the inability to carry out daily activities such as bathing, walking, and household chores—is tightly linked to depression. This likely reflects a two-way causal relationship: poor physical health might be a cause of depression by reducing mobility and independence, or by causing physical pain or insomnia. Similarly, poor mental health could prevent one from maintaining physical fitness.

Lack of resources. Poverty and depression are often correlated (Ridley et al. 2020). Poverty can be an exacerbating factor for mental distress by exposing people to risk factors of depression, such as pollution, violence, low social status, poor sleeping

same methodology to control for age and gender when making other comparisons between subgroups in subsequent analyses.

conditions, and the inability to plan for economic shocks. Poverty also increases the risk of the physical health challenges described above by reducing healthcare expenditure. Finally, depression itself may be a risk factor for poverty through reduced labor supply and productivity, impaired decision-making, or discrimination by employers.

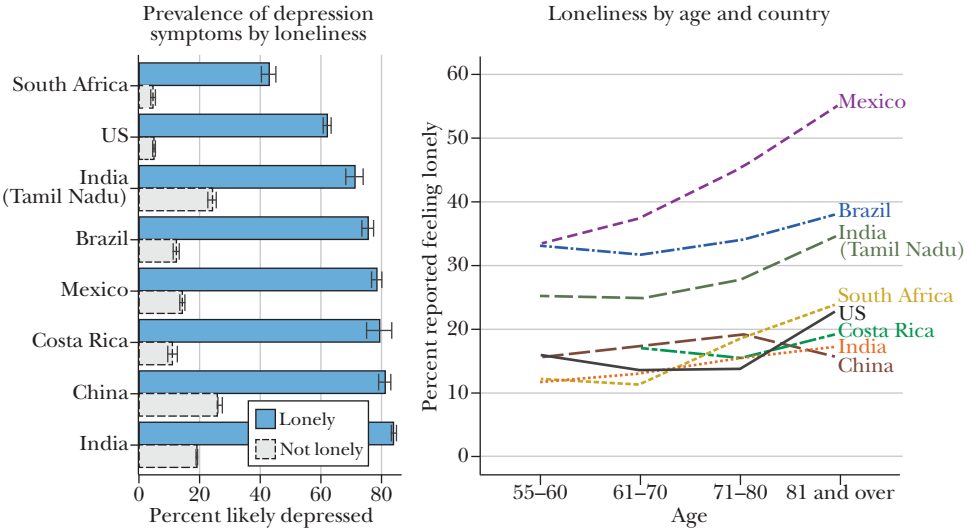
Lack of social support. Lack of social interactions and resulting feelings of loneliness are strong predictors of depression (Hawkley and Cacioppo 2010). One interpretation of this correlation is that loneliness and depression are two distinct but overlapping measures that capture different components of people's mental health. Alternatively, loneliness might cause depression, or vice versa. For instance, lack of social interactions can make people feel unsafe, generating a persistent fight-or-flight response which has myriad negative consequences: higher blood pressure, poor sleep quality, more negative social interactions, and a tendency to interpret social experiences negatively. Lack of companionship might lower one's sense of purpose and make it harder to enjoy life and deal with adverse shocks. For the elderly, lack of social support might be a particularly important cause of depression. As people age, their set of potential companions shrinks considerably due to untimely deaths of their loved ones, especially their spouses.

Panel A of Figure 3 shows a tight link between loneliness and depression. Elderly who report feeling lonely are much more likely to show symptoms of depression than those who do not: around 70 percent among the lonely versus 15 percent among the nonlonely.[6] One might assume that lack of social support is less of a problem in low- and middle-income countries because of differences in extended family living arrangements. While the fraction of elderly living alone in these countries still lags well behind Europe and the United States, it is rising as fertility drops and rural-to-urban migration increases (UN DESA Population Division 2017). However, feelings of loneliness appear to be at least as common in low- and middle-income countries as in the United States, as shown in panel B of Figure 3. The elderly report the highest rates of loneliness in Mexico, where 35 percent of people aged 61–70 reported feeling lonely a majority of the time—more than double the rate for the same age group in the United States. In most countries, loneliness is increasing with age and is around 10–30 percent for people aged 55–60, and 15–50 percent for those 80 or older.

The data described above provide evidence that the elderly living alone are particularly susceptible to loneliness and depression. However, these surveys are not particularly suitable to study the issues of the elderly living alone. While the demographic transition has increased the number of elderly living alone, the proportion

[6] Our main measure of loneliness is the answer to the question, "During the past week, did you feel lonely the majority of the time?" A downside of this measure is that it is subjective (as opposed to objective measures of social interactions) and thus may be vulnerable to social desirability bias due to stigma around the world "lonely." However, alternative measures of loneliness such as the UCLA Loneliness Scale may be less valid, particularly in low-income contexts (Mund et al. 2022). For example, questions such as "How often do you feel 'in tune' with the people around you?" may be interpreted very differently in different contexts.

Figure 3
Loneliness and Depression by Country



Source: Same as Figure 1.
Notes: The left panel shows the rate of depression among respondents separately by those who expressed feeling lonely most or all of the time in the past week and for those who did not, controlling for age and gender. For surveys in which self-reported loneliness is part of the depression index calculation (United States, China, India, Mexico, South Africa), we re-calculate depression scores excluding the response to the loneliness question and rescale accordingly. The right panel shows the percentage of respondents who expressed feeling lonely across each age group. For each country in our data except Malawi, we obtain a measure of loneliness from one direct survey question on loneliness. In some countries, the question asks respondents whether they felt lonely for the majority of the past week. We consider respondents who said "Yes" to be lonely. In other countries, the question asks how often they felt lonely. We consider respondents who expressed feeling lonely "Most or all of the time" to be lonely. For the Tamil Nadu data, the question was worded slightly differently and asked in reference to the previous week: "Do you often feel lonely?" Displayed are 95 percent confidence intervals.

remains low enough that their number is very small in any survey that does not focus on them. To get a glimpse of what the next decades may entail for elderly mental and physical health as the demographic transition increases the rate of elderly living entirely on their own, our Tamil Nadu survey focused explicitly on this very group of people.

The Tamil Nadu Aging Panel

To study the lives of the elderly with a particular focus on those living alone, we began conducting a large panel survey in the Indian state of Tamil Nadu in 2014. With a population of 76 million, Tamil Nadu lies in the southernmost part of the country. The Tamil Nadu Aging Panel is the result of a cooperation between the

Abdul Latif Jameel Poverty Action Lab (J-PAL) and the government of Tamil Nadu, cofunded by the United States National Institute of Health and the government of Tamil Nadu. The interviews are conducted by government surveyors, and the survey instruments are provided by the J-PAL team of researchers. The data is publicly available (Duflo et al. 2022).

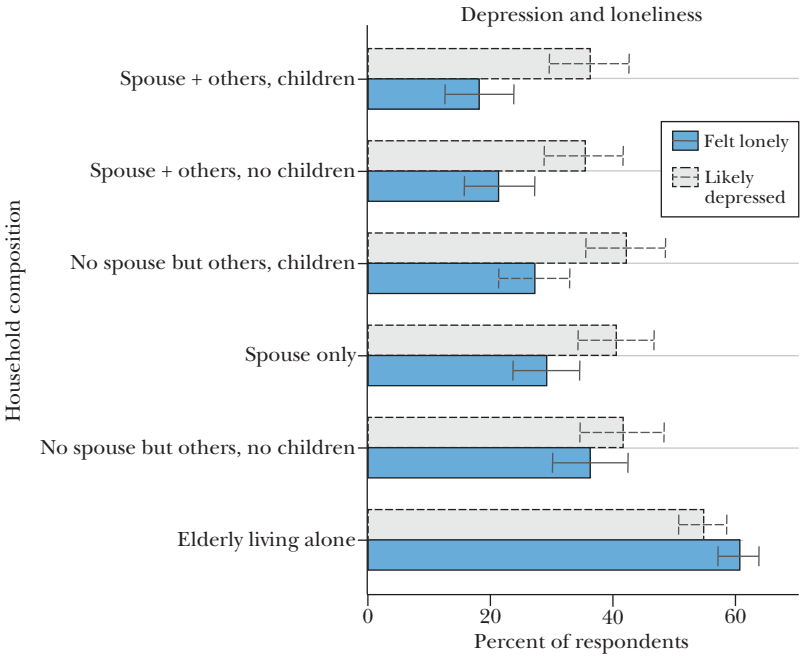
Compared to the previously available surveys, the Tamil Nadu Aging Panel has a wealth of additional information that allows us to look at a wider range of factors that can possibly explain elderly mental health. Additionally, it has a sufficient sample size for us to specifically focus on the issue of elderly living alone, which is poised to be a growing policy challenge around the world in the years ahead. Tamil Nadu, a fast-growing state, is a good bellwether for these trends: it has experienced a rapid demographic transition (the total fertility rate is currently only 1.8 children per woman), life expectancy growth (increasing from 66 years in 2002 to 74 years in 2019), and urbanization (48.5 percent of the population lives in an urban area, compared to a national average of 31 percent)—three factors likely to give rise to a rapid growth in the number of elderly living alone.

To obtain a sample frame for the Tamil Nadu Aging Panel, we first conducted a census of all households in each "enumeration area" (for example, a village hamlet). One key finding of the census was that 9 percent of those above 55 (and nearly 14 percent of women of that age) lived entirely alone. Those living alone tend to be older than those living with others. Furthermore, most people living alone are female and are often widows. The gender pattern may arise because women tend to be younger than their spouses and have a longer life expectancy, leading to a much higher fraction of females who are widows compared to the fraction among males. In our sample, for example, 54 percent of women above age 60 had a spouse who is now deceased compared to only 9 percent of men.

The high fraction of elderly living alone came as a surprise to our government partners: the expectation in India is that widows should live with relatives, usually their sons and daughters-in-law. Despite the demographic transition, most of the widows living alone (81 percent) in our sample had at least one child. But social norms seem to be changing. When we asked those with children who were still living alone, the most common reason for not living with their children was that they could not live with their son-in-law (50 percent), they did not want to be a burden on anyone (40 percent), and/or did not want to leave home (20 percent). Consistent with this finding, an earlier 2011 survey in Tamil Nadu found that approximately half of the elderly report a preference for living alone or with their spouse over living with their children or other relatives (Sathyanarayana et al. 2014). This shift in preferred living arrangement is proceeding rapidly in the developing world: the proportion of elderly living alone or with their spouse in India increased from 9 percent to 19 percent in just over a decade (Jadhav et al. 2013).

In light of this new policy concern, we decided to oversample the population of elderly living alone for our panel survey. The goal was to better understand the implications of living alone for physical and mental health, as well as to develop and test interventions that could be helpful to elderly living alone.

Figure 4
Social Interaction and Loneliness for the Elderly Living Alone in Tamil Nadu



Source: Data for Tamil Nadu come from the first wave of our own study that was conducted in the state of Tamil Nadu in 2019.
Notes: This figure shows the percentage of elderly in Tamil Nadu who report often feeling lonely as well as the percentage of the elderly who are likely to be depressed (as determined by whether their score on the depression index surpassed the specified threshold for at least mild depression), separately by household composition. We include controls for age and gender, following a similar methodology to the construction for Figures 2 and 3. First, we set the reference group to be Elderly Living with Others and calculate the weighted average of the outcome for that group. Then we obtain the coefficient of an indicator for Elderly Living Alone from a regression which includes controls for age and gender interacted. Displayed are 95 percent confidence intervals.

Elderly Living Alone, Isolation, and Mental Health

The elderly as a group in Tamil Nadu are quite likely to be depressed, as shown in Figure 1. Among elderly men, the share of likely depressed individuals increases from 30 percent for those 55–60 years of age to 43 percent for those over 80 years of age. Among elderly women, the shares are even higher: 37 percent for those 55–60 years of age and 49 percent for those over 80.

The elderly living alone are more likely to report feeling lonely, and the magnitude of this difference is striking. Figure 4 shows the percent of elders with various living arrangements who report often feeling lonely, controlling for age and gender. The elderly whose households include their spouse have the lowest loneliness rates: around 20–30 percent report feeling lonely. In contrast, this figure is 27–36 percent

for the elderly who do not live with their spouses but do live with others, and 60 percent for the elderly living alone.

Figure 4 also shows higher rates of depression among the elderly living alone than for the elderly in other living arrangements. The elderly living alone are worse off on several other dimensions: controlling for age and gender, the elderly living alone have lower asset ownership, lower food security, and more cognitive impairment.

These findings are reminiscent of Chen and Drèze (1992), who 30 years ago examined the marginalization, poor health, and low well-being of widows in North India and made the point that this was an overlooked population. More recently, Srivastava et al. (2021) also find that living alone and widowhood are two highly significant predictors of poor mental health in the Longitudinal Aging Study in India dataset.

Poverty and Mental Health

We also use our panel data to document the link between lack of resources and depression among the elderly, consistent with evidence from other settings that poverty and depression are positively correlated (Ridley et al. 2020).

As seen in Figure 5, rates of depression fall steeply with expenditure. We estimate daily expenditure per person in a household using our survey data. Nearly 50 percent of elderly individuals in the lowest quintile of expenditure are likely to be depressed. By contrast, the rate is about 27 percent in the highest quintile. We also asked the elderly to assess their own financial status. Again, we find rates of depression fall steeply with financial well-being.

Of course, the underlying causal relationships are likely complex. However, the correlational evidence suggests that cash transfers and other financial support could help reduce depression rates among the elderly.

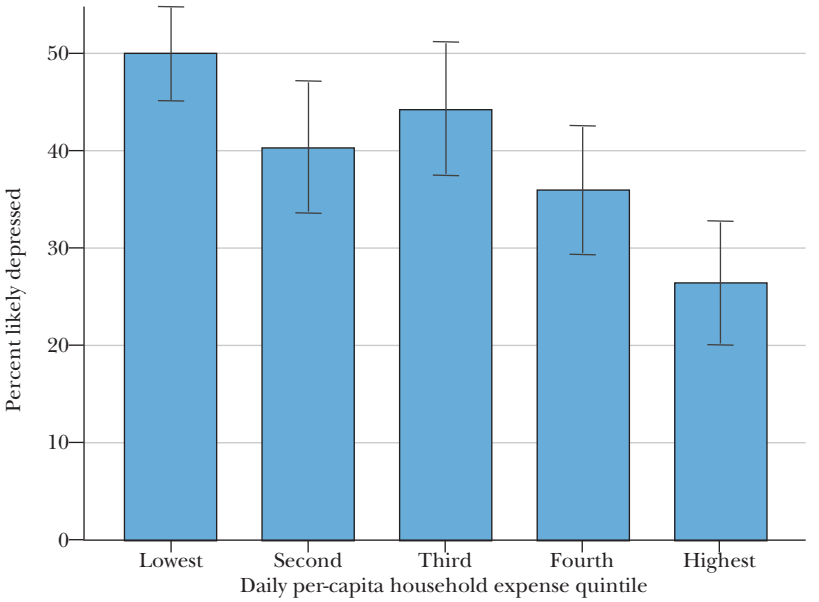
What Might Be Done about Elderly Mental Health in Low- and Middle-Income Countries?

Research on the economic and psychological lives of the elderly poor has hardly scratched the surface so far. The high levels of psychological distress for this group warrants urgent attention from researchers, but given the largely descriptive and correlational evidence, it is too early to make strong policy prescriptions. Rather, our evidence at this stage, as well as past experiments in the general population, generates ideas for policies that might help improve the psychological well-being among the elderly. This section outlines some of these ideas in three areas: (1) poverty alleviation programs; (2) psychosocial interventions to reduce depression; and (3) interventions to improve physical health.

Cash Transfers and Old-Age Pensions

Cash transfers have been found to improve mental health in many settings with working-age adults (Ridley et al. 2020), and alleviating financial hardship could also improve mental health among elderly adults. Noncontributory old-age pensions

Figure 5
Depression Rates by Household Expenses and Financial Health



Source: Same as Figure 4.
Notes: This figure shows the prevalence of depression symptoms for respondents in Tamil Nadu, as a function of household expenses. We show the fraction likely depressed for each quintile of financial well-being, as measured by daily per-capita household expenses. An individual is tagged as likely depressed using the methodology described in Figure 1. The per-capita household expenses that correspond to each of the five quintiles are: [0, 29.7), [29.7, 44.3), [44.3, 60.2), [60.2, 93.4), [93.4, 328] Rs per day. All statistics are weighted by the inverse sampling probability. 95 percent confidence intervals are shown. Displayed are 95 percent confidence intervals.

(that is, regular cash transfers to the elderly), which are becoming increasingly popular across the world, offer a promising policy approach.

A growing body of evidence suggests that these pensions are effective at reducing symptoms of depression, including evaluations of such programs using quasi-experimental variation in China, Mexico, and Peru (Chen, Wang, and Busch 2019; Galiani, Gertler, and Bando 2016; Bando, Galiani, and Gertler 2020) and a randomized trial in Paraguay (Bando, Galiani, and Gertler 2022). A randomized trial of a year-long cash transfer program for older people in Nigeria found reductions in symptoms of depression after six months, though not after twelve (Alzua et al. 2020).

In preliminary results from on-going work in collaboration with the government of Tamil-Nadu (Banerjee et al. 2022), we find no significant effect on mental health of a government effort to deliver pensions to a random subset of elderly eligible for the Tamil Nadu Old Age pension but not receiving it. The Tamil Nadu Old Age pension is a noncontributory transfer of ₹1,000 per month (US$12 at market

exchange rates, or $43 at purchasing power parity), reserved to individuals over age 60 who can demonstrate that they are "destitute" and cannot be supported by their family. Using data from our initial census, we identified households with elders who were not getting the pension but were likely eligible for it (data from our census suggest that over half of those likely eligible for the pension were not receiving it). We randomly divided the list in two and gave the lists to the government's Department of Economics and Statistics, which then transmitted the treatment group to the Department of Revenue for review. Not everybody was deemed eligible: by July 2022, 51 percent of the treatment list had received the pension while 18 percent of the comparable households in the control list had, which gives us a source of exogenous variation in pension receipt. We find no significant difference in mental health between the two groups, even when focusing on elderly living alone.

More work is needed on this topic: to our knowledge, the Paraguay study and ours are the only two randomized evaluations of a permanent government pension program, and they come to different conclusions. While the nonexperimental evidence to date argues that noncontributory cash transfer programs could help to improve mental health for the elderly, additional evidence on the mental health impact of pensions is needed.

Psychosocial Interventions to Reduce Depression

In recent decades, considerable progress has been made in effectively treating symptoms of depression by means of psychotherapy and pharmacotherapy. In addition, interventions to reduce social isolation and loneliness might help reduce depression among the elderly, though evidence in this area is just beginning to accumulate.

Therapy. A large body of evidence has shown that various forms of treatment—for example, cognitive behavioral therapy or the prescription of antidepression medication—effectively reduce symptoms of depression in many settings, including among the elderly. However, these treatments are typically unavailable in low-income contexts due to lack of resources: most notably, trained psychiatrists. To fill this void, simplified forms of therapy that can be administered by laypeople at a low cost have been developed and found often to be effective in the general population (Barbui et al. 2020). For instance, in Goa, India, a randomized trial found that delivering up to eight nonspecialist therapy sessions led to a reduction of 11 percentage points in symptoms of depression five years later (Bhat et al. 2022). Research on the elderly is much sparser. But also in Goa, a smaller-scale study of a similar intervention among the elderly was found to be effective in preventing depression (Dias et al. 2019).

When developing programs for scale, trade-offs in effectiveness may arise. In Tamil Nadu, light-touch, phone-delivered cognitive behavioral therapy that focused on problem solving and behavioral activation reduced functional impairment among women living alone three weeks after the conclusion of therapy (particularly the ability to carry out activities in social contexts). However, the effect had disappeared by three months, there were no effects on depressive symptoms at any time horizon, and men living alone did not benefit (and may have been made

worse off) (McKelway et al. 2022). Compared to a one-time cash transfer of ₹1,000, this therapy program—even delivered by phone—was more expensive and less effective.

Therefore, a key question for the cost-effectiveness of therapy is whether it can be designed and implemented to yield sustained, long-term effects, and whether it can be embedded in existing government programs to reduce its costs. In nonelderly populations, some interventions have shown persistent effects for up to seven years (Baranov et al. 2020; Bhat et al. 2022). Among the elderly, the effects appear to fade faster, perhaps due to impaired memory, suggesting the importance of regular booster sessions as in Dias et al. (2019). One promising avenue of research is to train support persons (like family and neighbors) to provide simple therapy booster sessions, or by integrating therapy and boosters into regular health care or social welfare checks. For example, the Tamil Nadu government recently launched a program targeted at adults at risk for diseases like hypertension and diabetes: village health volunteers visit eligible adults' homes to conduct health tests and deliver medication. Such a program could expand to include training for the village health workers to provide some cognitive behavioral therapy as part of their visits. Another government organization, the Tamil Nadu Corporation for the Development of Women, hires community resource persons from women's self-help groups to initiate programs in communities on a range of issues, including food, sanitation, and health. These women could be trained to provide community members with therapy, both initial sessions and boosters, as part of their work.

Beyond treating the currently depressed, interventions that help to prevent future episodes of depression could be valuable. Barker et al. (2022) find that group therapy in Ghana reduced future symptoms of depression even for people who were not depressed at baseline, but who were likely to become depressed based on baseline information. The idea is that therapy teaches people how to deal with future shocks or other triggers by understanding which activities might help improve their mood. Evidence from high-income countries shows promise in preventative interventions and suggests targeting at-risk individuals (like elderly living alone, or widows). This evidence also suggests that encouraging the elderly to engage in social and physical activities might be effective in preventing depression (Park, Han, and Kang 2014).

Fostering social interactions. If social isolation and loneliness are key drivers of poor mental health for the elderly, it may be difficult for intermittent therapy to overcome such ongoing conditions. Even nonlonely individuals tend to underestimate the benefits of social interactions (Epley and Schroeder 2014); loneliness can be self-reinforcing by changing the way people think about and value social interactions and by changing people's mood, perceptions, and behavior toward others (Cacioppo and Patrick 2009). As a result, demand for social interactions might be inefficiently low, thus providing scope for interventions that foster social interactions.

At present, there is little evidence on well-powered interventions to tackle social isolation and loneliness among the elderly in any context, and especially in

low-income countries (Masi et al. 2011). Some possibilities should be explored. For example, many of the elderly have family members or friends with whom they could connect more frequently (even if they do not live together). However, family providers—in particular, young women, on whom the burden of caring for the elderly often falls—also need to be supported to avoid harmful effects on their labor supply or mental health.

Opportunities for connections outside of the family should also be explored. In India, women typically leave their natal villages upon marriage and face restrictions on their physical mobility once they are married, leading to substantial risk of loneliness. Indeed, research on the social networks of young married women in India reveals high amounts of isolation (Andrew et al. 2020). Socializing outside of the immediate family can improve mental health. For example, senior citizen clubs and activities may encourage socialization and reduce loneliness but are mostly absent in villages in low- and middle-income countries. Some evidence from high-income countries suggests that these types of opportunities can improve physical and mental health, including randomized control trials involving activities such as dancing, walking, and tai chi (Rogers et al. 2009).

Even relatively light-touch interventions can improve psychological well-being, such as providing phones (and teaching people how to use them) or phone credit to enable increased communication (for an experiment in Ghana, see Annan and Archibong 2022). Similarly, employing laypeople to call the elderly regularly during the pandemic reduced depression among the elderly in Texas (Kahlon et al. 2021). To conduct our randomized evaluation of phone-based therapy in Tamil Nadu, where all activities had to happen in a socially distanced way due to COVID-19, we delivered cell phones and trained older people in their use. Even though many recipients had never had a phone before, the participants used their phones extensively and continued to do so after the experiment ended. Making phones available to the elderly might be a promising intervention to test at scale.

It may also be productive to combine interventions that both increase the demand for social interactions, such as cognitive behavioral therapy, and those that increase the supply; simply increasing the supply of social interactions might not be enough to improve outcomes, because without other support, a lonely person might not be in the right mindset to take advantage of these opportunities.

Restoring dignity and sense of purpose. Finally, interventions to restore dignity and a sense of purpose could be important. An elderly person who was once a respected member of the community—whether as someone who was in charge of raising children, the lead decision-maker in the household, or the family breadwinner—may feel a loss of purpose or dignity as they lose those responsibilities with aging. Providing opportunities for elders to maintain or rebuild their (perceived) ability to contribute to their communities could strengthen purpose, dignity, and thus mental health. Offering work to nonelderly refugees has meaningful benefits beyond the cash value of this work, including reduced depression (Hussam et al. 2022). Similar benefits could be achieved for the elderly in low-income contexts through

interventions that involve them in childcare or work opportunities. Even if the productivity of the elderly is low, significant mental health benefits can arise from remaining active and engaged and from feeling a sense of purpose.

Improving Mental Health by Improving Physical Health

Physical and mental health are positively correlated, and it seems plausible that the causality between them runs in both directions. Here, we focus on possible steps for improving physical health, as a possible driver of mental health.[7]

Reducing physical pain. Significant physical pain is nearly universal for the elderly, and the experience of physical pain is strongly associated with poor mental health (Bair et al. 2003). Pain can often be addressed through the treatment of underlying health conditions (like arthritis or dental decay) or through psychological interventions. In high-income countries, cognitive behavioral therapy for chronic pain has shown some promise (Ehde, Dillworth, and Turner 2014).

Improving functional abilities. Loss of hearing, vision, or mobility impedes people's ability to communicate and socialize, as well as to carry out activities of daily living. Correlational evidence suggests that this may increase their sense of isolation and deteriorate mental health (Marmamula et al. 2021). However, in low-income settings, where access to healthcare is limited, the elderly are often unaware that they have functional limitations—and that these limitations can be treated. In our Tamil Nadu data, nearly 50 percent of elders were evaluated as hearing impaired, but under 30 percent of elders actually report experiencing hearing loss. Similarly, about 45 percent are diagnosed with visual impairment due to cataracts, but under 30 percent report having this condition. It should be a priority to provide widespread access to affordable, high-quality devices to mitigate specific functional impairment—such as hearing aids, eyeglasses, and walkers—for the elderly in low-income settings. Providing eyeglasses has been shown to increase work productivity for nonelderly populations (Reddy et al. 2018), and providing the elderly in China with hearing aids has been found to improve life satisfaction (Ye et al. 2022). For the elderly, such benefits could involve being able to leave their homes again on their own, visit their friends, or just to enjoy sight itself, all of which may improve their mental health.

Better management of chronic conditions. While chronic health conditions are on the rise, many remain undetected: in our Tamil Nadu data, for example, over 40 percent of the elderly were diagnosed with diabetes but less than half of those knew they had the condition; similarly, over 60 percent had hypertension but less than one-third of those knew about it. Regular check-ups may be particularly valuable—whether carried out through "health camps" organized close to people's homes or through

[7]Even though cognitive impairment (for example, in the form of dementia) is strongly associated with depression, we do not focus on it here because of lack of evidence on effective interventions to combat cognitive decline. However, dementia of the elderly is also correlated with depression in their caregiver in the family, suggesting potentially benefits from identifying and supporting families with an elderly person who experiences dementia (Dias et al. 2008).

at-home visits for the immobile elderly, who may also be among the most impaired and vulnerable. Tamil Nadu has recently launched a "health care at your doorstep" scheme, where frontline health workers visit households to diagnose chronic health conditions and then follow up with those diagnosed to get them medication. While such schemes seem promising, there is little work evaluating their impact on physical and mental health, and none in developing countries.[8] Perhaps mobile phones and cheap diagnostic tools along with machine learning techniques could be used both for current diagnoses and to influence future testing. Adhering to medication schedules can also be a challenge for the elderly. Thus, developing and using technologies to aid, encourage, and remind elderly adults in managing their medications, such as daily reminders and specially designed pill bottles that help keep count of medications, could complement traditional approaches like regular home visits to supply drugs.

Increase physical activity. Randomized control trials find exercise to be moderately effective at reducing depression among the elderly (Bigarella et al. 2022). In nonelderly populations, small incentives to walk have been shown to be effective at increasing exercise and mental health (Aggarwal, Dizon-Ross, and Zucker 2022), but it is not clear that they would be appropriate in a population with low mobility. Group activities, perhaps in the form of exercise classes, could both increase socialization and lead to some exercise. These types of activities and their benefits for the elderly in poor countries are highly promising and merit more careful research.

Improve sleep. Physical exercise could also help with poor sleep, another potential driver of cognitive decline and depression. The ability to sleep soundly declines substantially with age, which has been linked to cognitive decline (Mander, Winer, and Walker 2017). Helping older poor people sleep better could improve their well-being and mental health. But very little research exists on how to do this, especially in low- and middle-income countries. Cognitive behavioral therapy for insomnia has been shown to be effective in improving sleep quality in high-income nonelderly samples (Trauer et al. 2015).

Many of these steps could potentially build on each other: for example, efforts to improve physical health can help sleep, as well as management of chronic diseases like diabetes. Better health diagnoses might benefit people in many ways not mentioned here. Importantly, estimates of the gains from improving physical health should be expanded to include the corresponding gains to mental health as well.

Conclusion

More than 500 million people over 60 years of age live in low- and middle-income countries (UN DESA Population Division 2019), but the issues of their

[8] Liimatta et al. (2019) find positive impacts of home visits for adults above 75 on physical health and depression in Finland.

mental health and well-being are largely left unaddressed and unstudied. In the Sustainable Development Goals promulgated by the United Nations, across the 17 goals and 169 targets, the elderly are specifically mentioned only three times, and always as part of a list including many others—as in "those in vulnerable situations, women, children, persons with disabilities and older persons." As the share of older people in low- and middle-income countries continues to rise, efforts to improve social welfare will require paying more explicit attention to this group.

The elderly in low- and middle-income countries appear to be particularly vulnerable to poor mental health. The decline in capacities that comes with aging need not entail a directly corresponding decline in well-being and mental health: indeed, in the United States, we find that prevalence of symptoms of depression does not increase with age and is relatively low overall. In contrast, we find stark increases in depressive symptoms at older ages in several low- and middle-income countries. Interventions to improve mental health may well turn out to be very cost-effective ways to improve quality years of life, both because mental health is a key component of well-being and because improving mental health might have additional benefits for physical health and even survival. Although we have directed some attention in this paper to the elderly living alone, it is still the case that most elderly in low- and middle-income countries do not live alone; therefore, interventions to improve the mental health of the elderly may also have positive spillovers on the well-being of those charged with caring for them.

In this essay, we discussed potential avenues to improve the mental health of the elderly. Some seek to lower depression directly (for example, via therapy), while others target the physical, economic, or social root causes of depression. Much work remains to be done: most of these ideas have not been tested, and almost none have been implemented at scale. Finally, we acknowledge that this is just a small part of a much larger agenda on mental health in low- and middle-income countries, which should encompass other demographic groups, such as women or adolescents, and other mental health conditions, such as anxiety or post-traumatic stress disorder.

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