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Impact evaluation of the non-contributory social pension programme *70 y más* in Mexico

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About this report

Impact evaluation of the non-contributory social pension programme *70 y más* in Mexico

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Executive summary

One of the most important demographic challenges expected for Latin America and the Caribbean in the 21st century will be the increase in the number of elderly people and the pressure this will have on social security systems, available medical assistance and demand for elderly care services. The rapidly ageing population creates a huge challenge for healthcare and social assistance providers, since the demand for these services is expected to increase. There is special concern in the case of Latin America, since ageing occurs in an imbalanced context. This inequality is reflected in a significant amount of socioeconomic dimensions, including access to social protection systems, in which Latin America's largest concern is low coverage.

The rapid growth of the elderly population and low social security coverage in developing countries both reinforce the need to adapt social protection systems at a faster rate than in developed countries. One example is the implementation of social pensions for the elderly in order to reduce poverty. There is documented experience in some countries, such as Nepal, Lesotho, Brazil, Mexico and South Africa. These are among 80 countries that have established non-contributory social pensions. Of these 80 countries, 47 are low- and middle-income countries.

Implemented throughout Mexico, the *70 y más* (70 and above) programme was aimed at improving the living conditions of adults aged 70 and older. The programme was centred on two components: (1) raising the income of elderly people by providing a direct, unconditional cash transfer of 500 Mexican pesos (approximately US$40) a month, to be collected every two months and (2) to improve social protection for elderly people.

At the start of the programme in 2007, the established eligibility criteria included being 70 or older and living in a locality with 2,500 or less inhabitants (rural localities). Our evaluation is based on these two eligibility criteria; it does not account for the fact that the programme was later expanded to those living in a locality with 30,000 or less inhabitants after 2011. The second programme objective (related to health-oriented social participation and social protection actions) was late to start, and had enrolled a very small percentage of beneficiaries by the end of the evaluation period. For that reason, this report will focus on evaluating the impact of the programme's cash transfer feature only.

The results of previous evaluation studies suggest that non-contributory social pension programmes have had a major impact in reducing poverty in old age as well as the incidence of extreme poverty, and a positive effect on reducing indigence. There is also evidence that some non-contributory social pension programmes targeted at the elderly have an impact on on living arrangements, food household consumption and children's nutrition.

There is currently a gap in the evaluation literature regarding the impact of economic transfer programmes on individual outcomes such as nutrition and mental health. Thus, the purpose of this evaluation was to quantify the impact of the *70 y más* programme on nutrition and mental health conditions.

Methods

We implemented a quasi-experimental design for the evaluation. The programme and evaluation design identified the group exposed to the programme (those aged 70–74 in localities with 2,500 or fewer inhabitants) and established three control groups:

- group 1: aged 65–69 in localities with 2,500 or less inhabitants
- group 2: aged 70–74 in localities with 2,501–2,700 inhabitants
- group 3: aged 65–69 in localities with 2,501–2,700 inhabitants.

Baseline data was collected by interviewing 5,465 elderly people in 516 localities in seven Mexican states between October and December 2007. The follow-up survey took place during November and December 2008. It was possible to locate and interview 5,270 of the elderly participants – in other words, 96 per cent of those interviewed at baseline. It should be noted that the control groups did not receive pensions either at baseline or at follow up; the programme enrolment process did not start in these localities until after follow up was complete.

The team used a series of differences-in-differences models with fixed effects to estimate the programme's impact on elderly people's nutritional status. This was measured through body mass index (BMI), total energy and macronutrient intakes and percentage of adequacy of intake. It also examined the programme's effects on depressive symptoms and empowerment in household decision making. Finally, it explored any possible heterogeneous effects by sex, ethnicity and household socioeconomic status (SES), measured at baseline through total monthly household expenditure.

In 2009, the team implemented the qualitative component of the study to assess the mechanisms at the environmental and household-level that may be involved for the programme to have a visible effect on nutrition and mental health conditions. The qualitative research methods used in this study consisted of ethnographic data composed of selected excerpts from the transcripts of semi-structured interviews, non-participant observations and fieldwork diaries.

The validity of the final inferences of the qualitative analysis was confirmed through two types of methodological triangulation of data: (1) data triangulation, or different voices and tools, and (2) analytical triangulation, or different social scientists independently analysing the same ethnographic data.

Results

After 11 months of exposure to the programme, results indicate a significant impact on protein (3.1g/d, $P < 0.05$) and carbohydrate intake (15.1g/d, $P < 0.1$). An increase attributed to the programme was also observed in the *adequacy* of the intake of protein (5.9 per cent, $P < 0.05$) and carbohydrate (8.3 per cent, $P < 0.1$).

There were also heterogeneous effects. The pension's impact on energy, macronutrient intake and the adequacy of intake were significantly higher among women, indigenous groups and those in the lowest SES. Overall, the programme had no effect on BMI. In general and as a central finding of the qualitative component of the study, the elderly in the sample alluded to perceiving the programme's effects in physical terms, which can be explained by increased

spending on food and food consumption. Receiving the pension enabled beneficiaries to buy groceries that appeared to improve their diets.

Findings for the depressive symptom indicators show that the programme had a significant overall effect on the presence of both mild ($p < 0.10$) and severe ($p < 0.05$) symptoms. The analysis of the effects of heterogeneity shows that the programme's impacts for these indicators are particularly prominent among women, the non-indigenous and the poorest elderly. The programme's overall effect on empowerment was significant, for participation in household decision making ($p < 0.01$) and household spending ($p < 0.01$) decision making. The qualitative component found that the elderly experienced a reduction of, or relief from, poverty and the stress related to having little or no income at all. They also reported an increased sense of security and wellbeing from receiving a regular income that they consider their own and which they decide how to spend.

The programme exerted a significant impact on the empowerment level of *70 y más* beneficiaries. Receiving the pension boosted participation in decision making at home by 9 per cent in absolute terms and 15 per cent in relative terms (compared with the percentage observed in the control group at follow-up). The study's qualitative component found a strong trend in reduced sadness and increased empowerment related to the programme and shared by the vast majority of participants.

Discussion

Using an integrated evaluation design for rigorously measuring changes in beneficiary wellbeing that are attributable to the programme, the evaluation found evidence that the *70 y más* cash transfer programme is associated with significant effects that improve dietary and mental health conditions. This impact is more remarkable among women, indigenous people and the very poorest, all groups that have been traditionally excluded from social protection.

In light of the results presented in this document, as well as of a review of the global context, this paper recommends that the Mexican government invest efforts towards universalising the *70 y más* programme, to ensure basic non-contributory pensions for the elderly. This universalisation could be gradual, since it is important to ensure the programme's operating systems and infrastructure are strengthened. It is important to mention that the government expanded the eligibility criteria to those residing in a locality of up to 30,000 inhabitants after 2011. With a new government, the programme has now expanded to some poor urban localities (>2,500 inhabitants). The age for eligibility has been reduced (≥65 years) for beneficiaries and the name of the programme is now *65 y más*.

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Abbreviations and acronyms

BMI	body mass index
CCT	conditional cash transfer
CE	cost-effectiveness
CEPAL	United Nations Economic Commission for Latin America and the Caribbean
CONAPO	Consejo Nacional de Población (National Population Council)
CTR	cost-transfer ratio
DD	differences-in-differences
DS	depressive symptoms
EER	estimated energy requirement
FCT	food composition tables
FFQ	food frequency questionnaire
GDP	gross domestic product
GDS	geriatric depression scale
INEGI	Instituto Nacional de Estadística y Geografía (Nactional Institute of Statistics and Geography)
INSP	Instituto Nacional de Salud Pública (National Institute of Public Health)
PAHO	Pan American Health Organization
PAI	percentage of adequacy intake
SEDESOL	Secretary of Social Development
SES	household socio-economic status
SSA	Secretaría de Salud (Secretary of Health)
WHO	World Health Organization

1. Literature review

According to estimates from the United Nations, in 2002 there were 629 million individuals who were 60 years of age or older in the world. This represented 10 per cent of the total population. In 2050, it is estimated that the population of this age group will be 1.964 billion, and it will make up 21 per cent of the total population. Currently, the highest proportion of elderly is found in developed countries; however, the growth rate of this age group is higher in developing countries (United Nations 2002). Ageing in Latin America does not resemble ageing in European countries, where the process is much more gradual and is accompanied by economic growth.

One of the most important demographic challenges expected for Latin America and the Caribbean in the 21st century will be the increase in the number of elderly people and the pressure this will have on social security systems, available medical assistance and demand for services for elderly care. Moreover, estimates of health problems and disability suggest that elderly people in the region are ageing with more functional limitations and worse health conditions than their counterparts in developed countries. Additionally, family networks are changing rapidly and are less able to compensate for the lack of social security (Albala *et al*. 2005).

The rapidly ageing population also creates a huge challenge for healthcare and social assistance providers, since the demand for these services is expected to increase as the number of elderly people grows. Today's issues concerning the elderly are related to their increasing population, their geographical dispersion, the conditions of poverty, inequality and social protection, their health profiles, their complex demands on medical services and assistance, as well as their emergence as a group with social and political pressures.

1.1 Poverty and inequality in low-income countries

Poverty among the elderly (aged 60 years and over) is higher than that for the entire population (Bertranou 2006). Old age is a stage of life characterised by the reduction of formal work activities that leads to a decrease in income and, consequentially, economic insecurity. Income insecurity in old age may have a negative effect on the welfare of the elderly and can often cause the impoverishment of the household. This distinguishes this age group as a vulnerable group.

Poverty in old age is an important problem in developing countries. Studies in 15 low-income countries in Sub-Saharan Africa report problems that elderly people encounter, especially when they have been taken under the care of family members or caregivers. In 11 of the 15 countries studied, households with an elderly individual had higher levels of poverty, and poverty was found more in rural areas than in urban areas (Kakwani and Subbarao 2005).

Barrientos reported that, in the particular case of Latin America, rates of poverty among the elderly range from 9.8 per cent in Chile to 69.9 per cent in Honduras (Barrientos, Gormanand Heslop 2003). More recent data from a study by CEPAL in 2008 reveals that in nine out of 15 countries surveyed, more than 30 per cent of the elderly are poor. In Mexico, the incidence of poverty among the elderly population is about 30 per cent (CEPAL 2010).

Likewise, results of qualitative studies conducted in Africa, the Caribbean and the Asia-Pacific region indicate different perceptions of poverty among the elderly. For them, poverty is associated with the inability to meet commitments and social and economic roles and to fulfil responsibilities. Extreme poverty was associated with the lack of income security, lack of family or social support, and a combination of poor health and inadequate care of one's own health (Barrientos, Gorman and Heslop 2003).

A common element among various factors that determine the levels of inequality in societies has been reported to be the ethnicity and race of its people. It is widely documented that indigenous people live in greater poverty and higher levels of marginalisation (Partridge and Uquillas 1998; Plant 1998), and they tend to have worse health conditions than non-indigenous populations (PAHO 1997; Montenegro and Stephens 2006; Mayer-Foulkes and Larrea 2007).

1.2 Social security

In terms of income distribution, Latin America is considered the world's most imbalanced region (Bertranou 2006). Inequality is reflected in a significant amount of socio-economic dimensions, including access to social protection systems, in which Latin America's largest concern is its low coverage (Bertranou 2006). Economic insecurity affects the elderly living in poverty, but especially those who formerly worked in the informal sector or were unpaid workers, particularly in the case of women. Globally, it is estimated that four out of five elderly individuals have no pension or retirement, which forces the elderly to continue working and/or to depend on informal social support networks to subsist (HelpAge International 2011).

The majority of uninsured and retired individuals live and work in developing countries. In Latin America, over 30 per cent of the elderly do not report receiving retirement, pension, or employment income (CEPAL 2010). Many of them also do not participate in pension plans since they are unpaid caregivers, unemployed, or are employees in agriculture or in the informal work sector (Willmore 2007).

According to data from the CEPAL 2010 survey in Mexico, only about a quarter of elderly people receive benefits from the social security system through a social or retirement pension. In the richest quintile of the population, the coverage reaches 50 per cent; however, in the poorest quintile, the rate does not even reach 3 per cent (Rubio and Garfias 2010). In the rural population, 14 per cent social security coverage has been reported (INSP 2006). This low level of social security coverage is compensated by labour market tenure, where a little over 20 per cent of elderly people, mostly employed in the informal sector or the unsalaried, have income only from this source (Barrientos, Gorman and Heslop 2003). This situation sharpens with age, since paid employment is less frequent among the elderly and tends to decrease over the years (Bertranou 2006).

In general, the elderly who do access benefits have worked in the formal labour market, since the pension systems they access have tended to be of the contributory type (Bertranou 2006). In terms of inequality, it has been observed that among people with higher income, social protection is much greater than among those with lower income, or residents of rural areas and those who did not participate in the formal labour market when younger (Bertranou 2006).

The case of women is a particular issue. Traditionally, the main sources of income for women have been from informal social support networks, which have been changing in the past

decades. This kind of income is unstable and is dependent on the income and mechanisms of the solidarity of the social network, made up principally of their children (Bertranou 2006).

1.3 Non-contributory social pensions

The rapid growth of the elderly population in developing countries – where the elderly in Latin America are highlighted – and the low coverage of social security reinforce the need to adapt social protection systems at a faster rate than the developed countries did (Bertranou 2006). One example is the implementation of social pensions for the elderly in order to reduce poverty. Currently, there is documented experience in countries like Nepal, Lesotho, Brazil and South Africa, which are among the 80 countries that have established social pensions in the world. Of these, 47 are low- and middle-income countries, such as Mexico (HelpAge International 2011).

The most distinctive characteristics of non-contributory social pensions are that they are designed to be accessible as a right to all those who meet the requirements of the programme and that the grant conditions are unrelated to work experience or the history of the market (Grushka 2004). Non-contributory pension programmes provide cash benefits relatively uniformly in a targeted or categorical manner to reduce the risks of old age and disability. In some countries, these programmes also focus on reducing the risks of disease, as well as on providing a way to access other benefits of the social protection system (for example, family allocations).

Another issue closely related to the topics of coverage and funding is that of benefits. In general, these programmes provide modest and relatively uniform benefits (Bertranou, Solorio and Ginnken 2002). It is considered that these programmes are useful tools for women and individuals from the informal sector of the economy, who have benefited less by the contributory retirement system (Willmore 2007).

The urgent need to provide social protection to the disadvantaged population is reflected in the increase of non-contributory and assistance programmes in Latin America. Currently, experience is documented in Argentina, Bolivia, Brazil, Chile, Costa Rica, El Salvador, Uruguay and Mexico, all of whose coverage is of relevance (Bertranou 2006; HelpAge International 2011). Brazil, for instance, invests 1 per cent of its gross domestic product (GDP) in welfare and non-contributory programmes while obtaining wide coverage. In rural areas, there are approximately 7 million persons who receive benefits that are for the elderly, widowed and disabled, as well as for women who are pregnant and individuals who have had accidents at work. Additionally, 2.1 million social welfare pensions are directed to the indigent and disabled elderly. In contrast, Argentina covers about 350,000 beneficiaries and spends 0.2 per cent of its GDP (Bertranou, Solorio and Ginnken 2002). Bolivia has created an innovative scheme of universal benefits for the elderly called *Bonosol.* It is estimated that this programme benefits more than 400,000 elderly people with an apparent coverage rate greater than 100 per cent of the population while spending 1.2 per cent of its GDP (Willmore 2007).

The results of evaluation studies suggest that non-contributory social pension programmes have had a major impact in reducing poverty in old age, as well as the incidence of extreme poverty, and a positive effect on reducing indigence (Bertranou, Solorio and Ginnken 2002).

The reports from Brazil and South Africa, two countries with the highest non-contributory pension programmes, indicate that these programmes are not only efficient vehicles to reduce poverty, but also have an influence on the magnitude rather than simply the incidence of

poverty. Households with a non-contributory pension beneficiary have greater financial stability and are less likely to experience a decline in their living standards. Also, receiving the pension is associated with investments in human, physical and social capital, in addition to being able to combat gender inequality (Barrientos *et al*. 2003; Barrientos 2004). However, these evaluations have focused on studying the effect of these programmes on income and poverty, and thus, little is known about their effects on other facets of life of elderly people, such as mental health and nutrition.

1.4 Welfare

The welfare of the elderly goes beyond income security in old age. The United Nations proposes the consideration of five main welfare principles: independence, social participation, care, self-fulfilment and dignity (United Nations Programme on Ageing 2010), and additionally, the aim of these programmes should also ensure that the elderly experience old age in favourable environments (CEPAL 2003). To summarise, although the elderly need to be provided with social protection, it is also necessary to ensure the possibility that this population has the opportunity to experience a good quality of life.

The aspect that first includes the notion of quality of life is the elderly person's perception or subjective assessment that the elderly make of their *physical and emotional health status*, because at this stage the possibility of having physical and mental illnesses increases (Martínez, 2003). Secondly, *family and external social networks* of the elderly (that is, the type of support that flows around the elderly that can provide material, cognitive, instrumental, or emotional support), the value placed on them in regard to support networks, inequality and any form of recognition that can be enjoyed in their significant social relationships, have been reported to have an influence on quality of life (Guzmán *et al.* 2008).

Access to monetary resources offers elderly people the ability to decide on elements that affect their quality of life directly, such as food, housing and retirement. These may also play a fundamental role in empowerment processes or the lack of power the elderly have in their own lives. Thus, empowerment becomes an important vehicle to improve the quality of life of the elderly. However, we cannot discuss empowerment without considering gender, especially in the context where femininity often impairs the decision-making power women can have for themselves or for public issues surrounding them. Gender constructions place even more pronounced disadvantages among the elderly, especially if women live longer than their male counterparts and are therefore likely to become widows (Krzemien 2001*).

Finally, despite the absence of consensus on how to measure quality of life among the elderly, research suggests that the perspectives of the individuals have a powerful role in the definition and conceptualisation of 'quality of life' (Palomba 2003). It is important to note a relationship between the individual's perception of their own living conditions and the effects from them, because it can be associated with how the elderly cope with their lives (Krzemien 2001).

1.5 Experience in Mexico: non-contributory programmes

The ageing population is a global phenomenon. Beyond the numbers, this implies a deep transformation of our societies, requiring a readjustment of policies and programmes to respond to the needs that this transformation generates. In the case of Mexico, a sustained increase of the elderly population has been seen in the past 25 years (CONAPO 2004). There are currently over 10 million individuals of 60 years of age and older (8.9 per cent of the total population),

and 4.6 million of them are 70 years old or older (4.1 per cent). About 27 per cent reside in rural areas (INEGI 2011).

Residents of rural areas have been characterised by lagging historical conditions, since they have lower educational levels and higher levels of poverty than the elderly who reside in urban areas. For the elderly who live in rural areas, the lack of access to health services is a particularly large issue, because most of these individuals did not work in the formal economic sector when they were younger, which results in their reaching old age without pensions or health insurance (Wallace and Gutierrez 2005; Gutierrez 2010).

As mentioned, Mexico is one of the Latin American countries with a non-contributory pension system for the elderly. The first programme of this type was established in February 2001 in Mexico City, under a local government initiative entitled, 'Programme of food support for the elderly of Mexico City' (*Programa de Pensión Alimentaria para Adultos Mayores del Distrito Federal*). The main characteristics of the programme are reflected in its eligibility criteria, the pension amount provided, and its coverage. To be eligible for this programme, elderly persons needed to meet two requirements: (1) to be 70 years old or older; however, in recent years the minimum age was reduced to 68, and (2) to reside in Mexico City for at least three years before receiving the pension (*Programa de Pensión Alimentaria* 2012). For 2009, the programme reached 100 per cent coverage, benefiting around 470,000 elderly (Rubio and Garfias 2010). The programme currently provides a monthly benefit of US$65 per capita and offers free medical services. It is estimated that the cost of the pension is equal to 0.25 per cent of Mexico City's GDP (Willmore 2007).

In 2006, the second programme of this type was implemented for elderly people in beneficiary households of the *Oportunidades* programme, called 'Support component for the elderly of *Oportunidades*' (*Componente de apoyo para Adultos Mayores de Oportunidades*). This programme currently provides a monthly amount of approximately US$22.70 per elderly person, and it is delivered to the head of the beneficiary family either through direct delivery or cash deposit to personalised bank accounts. Another characteristic of this programme is that *Oportunidades* provides a basic package of free health services to the members of beneficiary families, including the elderly members. This package is offered as part of the co-responsibility that has to be accomplished by the beneficiaries. In this case, the elderly have the responsibility to go for health services at least once every six months. However, since the introduction of the *70 y más* programme, the actual register of elderly in the *Oportunidades* component has been decreasing as the localities where they reside are incorporated into the *70 y más* programme (Rubio and Garfias 2010).

2. The intervention: the *70 y más* programme

Implemented nationally throughout Mexico, *Programa 70 y más* is aimed at improving the living conditions among adults aged 70 years and older by boosting their social protection through policy mechanisms. Centred on two components, *70 y más* pursues a twofold objective: (1) to raise the income of the elderly and (2) to improve the social protection of the elderly. At the start of the programme in 2007, the programme had enrolled a total of 1 million beneficiaries and had a total annual budget of 6,250 million Mexican pesos (approximately US$595 million). Within two years, the number of beneficiaries had grown to 1.8 million, and the total budget had more than doubled to 13,000 million Mexican pesos (US$1,400 million), or 0.1 per cent of Mexico's gross national product (Rubio and Garfias 2010).

Under the first programme objective, each elderly claimant receives a direct unconditional cash transfer of 500 Mexican pesos (approximately US$40) every month, which can be collected every two months. At the start of the programme in 2007, the established eligibility criteria included being 70 years and over and residing in a locality with 2,500 or fewer inhabitants (rural localities). It should be noted that our evaluation is based on the two eligibility criteria and does not account for the fact that the programme expanded the eligibility criteria to those residing in a locality with 30,000 or fewer inhabitants after 2011 (SEDESOL 2009). The second programme objective related to health-oriented social participation and social protection actions were late to start and, during the period of this evaluation, it had enrolled a very small percentage of beneficiaries.

In terms of logistics, *70 y más* became operational in the first quarter of 2007, incorporating sequentially (throughout 2007) the 196,000 localities with fewer than 2500 inhabitants that existed in Mexico at that time. This means that there were localities that began to be enrolled until the end of 2007, among which the 516 localities were included in our evaluation study. In fact, in agreement with the programme operators, these 516 localities were not enrolled until the baseline was completed (second week of December 2007). As a result of this process of 'gradual incorporation', it was possible to have the measurement of outcome variables and covariates before the programme began to carry out cash transfers to the elderly living in these localities. It is also important to note that individuals do not become eligible when they reach the age of 70, but are immediately incorporated in the subsequent year.

Regarding *70 y más* coverage, the empirical data available to the study team (obtained at baseline and follow-up measurements) suggest that the programme has included all the elderly residing in programme localities. These data coincide with the programme's claims of 100 per cent coverage.

2.1 Policy relevance

The *70 y más* programme arose as a response to the lack of social security coverage for the elderly population in Mexico, particularly the poor, rural elderly. It consists of a universal non-contributory pension for the elderly residing in rural localities with up to 2,500 inhabitants (per programme eligibility criteria in 2007). Because of the programme's relevance to the political agenda, Congress increased the budget and geographic coverage of the programme every year, so much so that by 2011, *70 y más* included 2.03 million beneficiaries living in 75,979 localities with 3,000 or fewer inhabitants and a budget of 13,287 million pesos. With this expansion *70 y más* became the second largest social development programme in the country after *Oportunidades*. However, at the beginning of 2012, *70 y más* aimed to expand its coverage to highly and very highly marginalised cities, and thus, expand the programme to reach the elderly living in urban zones of the country for the first time (Presidencia de la República 2012).

Despite the efforts undertaken to reduce the vulnerability of the elderly through non-contributory social pensions, there is no information on any rigorous impact evaluations for programmes of this sort, to the best of our knowledge. *70 y más* is one of the few programmes with an integrated evaluation design for rigorously measuring changes in the well-being of its beneficiaries that can be attributed to the programme itself.

An evaluation carried out in 2009 revealed effects on the labour supply of the elderly. The programme affords the elderly the possibility of retiring from the labour market without generating a high cost to their families. The effects of *70 y más* included a decrease of 17 per cent in the proportion of elderly working for pay, and an average cut of 28 per cent in their paid

working hours, with the elderly now turning to family activities. The programme's cash transfers allow beneficiary households to increase their total spending by 340 Mexican pesos (approximately US$30), or by approximately 27 per cent (Galiani and Gertler 2009). This finding may imply that elderly people's well-being will be positively affected. However, how this transfer translates into an effect reaching the elderly has not been shown. Some studies have investigated whether pension income has an effect at household level or causes better outcomes for individuals who live with pensioners. For instance, the pension causes effects on poverty reduction, living arrangements, child labour participation, child school attendance, migration patterns and household food consumption (Martínez 2004; Edmonds, Mammen and Miller 2005; Carvalho Filho 2008; Kassouf and Rodrigues de Oliveira 2012). Regarding health status, there is evidence from South Africa that the pension has a positive effect on perceived health of household members, improves the children's nutritional status and reduces the incidence of household members skipping meals due to lack of money (Duflo 2003; Case 2004; Case and Menéndez 2007). However, the household cannot always be characterised as a static unit where members share the same preferences or pool their resources (Faye 2010), so the available evidence and the previous analysis of Galiani and Gerlter (2009) raises the question whether the pension has a quantitative impact on outcomes related to individuals' well-being and if so which outcomes are involved.

Based on the study by Case and Menéndez (2007), we could argue that access to a financial transfer for the elderly may create a possible increase in their decision-making power in purchasing items. As we presented earlier, there is evidence that investment in children's health and education could be the main priority for the elderly (Duflo 2003; Kassouf and Rodrigues de Oliveira 2012). But how individuals would behave is not always predictable. Particularly in nutrition, a clear prediction of the effect of income on nutrient intake is complicated since individuals choose their food based on preferences that may even have negative effects on their health (Variyam 2003; De Bem Lignani *et al.* 2011). Other reasons could be the sharing rules within the household or individual characteristics of the beneficiaries. The financial transfer could also be allocated to healthcare expenditure depending on their own health status (Faye 2010).

In addition to having an immediate effect on the economy, the cash transfer supplied by the programme can be expected to influence a population group devoid of social protection. A study of the elderly component of the cash transfer programme *Oportunidades* (*Oportunidades-INSP*, 2006) found that the elderly spent the economic support they received from *Oportunidades* mostly on food (92.9 per cent) and medicine (65.7 per cent). These findings suggest that the cash transfers under *70 y más* may produce changes not only in the income, spending and earnings of households with elderly residents, but also in their consumption patterns for food and medicine. In turn, as indirect consequences, changes may also occur in the nutritional status, general health and, more specifically, the mental health of the elderly. In Section 4 we explain further details of the theory of change concerning this topic.

In summary, currently there is a gap in the evaluation literature regarding the impact of economic transfer programmes on the elderly. Our research will provide useful and direct information to those who operate the *70 y más* programme. Since the creation of the programme, there has been great interest in the effects of the programme on the mental and nutritional statuses of programme beneficiaries. In this respect, the results of our study on the mental health and nutrition of elderly beneficiaries will be of great interest not only for the programme operators but also for authorities at the Ministry of Health and the Institute of Geriatrics in Mexico.

3. Objective and evaluation questions

Our objective is to evaluate the impact of the *70 y más* programme on nutrition and mental health conditions. This work will focus on evaluating the impact of the programme's cash transfer feature only.

3.1 Evaluation questions

Nutrition To assess the nutritional status of the elderly, we aim to answer the following evaluation questions:

   a. Does the *70 y más* programme affect the average caloric intake of the elderly, and if so, how?
   b. Does the *70 y más* programme modify the dietary patterns of the elderly, and, if so, to what extent?
   c. What impact does the programme have on the nutritional status of the elderly? Could it have a secondary effect in terms of increased overweight and obesity?

Mental health To assess the mental health of the elderly beneficiaries, we aim to answer the following evaluation questions:

   a. Does the programme significantly reduce the frequency of symptoms of depression in the elderly beneficiary population, and if so, how?
   b. Does the programme produce any positive effects on the levels of autonomy and empowerment of the elderly, and if so, how?

Additionally, with regard to both nutrition and mental health, we seek to identify whether or not the programme has a differentiated effect by gender, indigenous origin, or socio-economic level. In other words, what characteristics or attributes of the elderly are most susceptible to modifying, potentiating, or annulling the impact of programmes such as *70 y más*?

As for its social policy implications, the *70 y más* programme offers an excellent opportunity to document the potential effects a non-contributory social pension programme can have, not just on the naturally expected economic impact but also on the mental health and nutritional statuses of the elderly.

It should be noted that the present evaluation explores only short-term effects (given the limited 11-month time span between baseline and follow-up measurements). It is therefore important to determine whether medium- and long-term observations in the future reveal comparable effects (Rawlings and Rubio 2005; Todd, Behrman, Parker 2009, 2012).

4. Theory of change

The relation between socio-economic status (SES) and health has been analysed extensively in the literature. The evidence suggests that the SES of individuals, commonly measured through income, highest level of education attained, or employment status, is related to a series of health outcomes, such as mortality, morbidity, chronic illnesses and disability, among others (Marmot *et al.* 1997). This association could even be more important in the elderly population (Martelin 1994; Mustard *et al.* 1997; Rautio, Heikkinen and Heikkinen 2001; Huisman, Kunstand Mackenbach, 2003; Huisman *et al.* 2004; Huisman *et al.* 2005; Kunst *et al.* 2005).

With the purpose of understanding the relation between SES and health, two distinct theories have been proposed. The first, Social Causation theory, postulates that at the lowest levels of SES are individuals with the worst health conditions, and that these levels of SES are associated with a series of social, physical and psychological conditions, which can then have implications on the deterioration of health (Dohrenwend *et al*. 1992; Hudson 2005). This not only implies that SES levels can be one of the determinants of health deterioration, but also given that SES is a modifiable factor, interventions or programmes aimed to improve the SES of individuals may also indirectly have positive effects on particular aspects or conditions surrounding the general state of health. The other, Social Selection theory, postulates that the differences in health across distinct SES levels are due to social mobility, a selection process where weak or sick individuals are less capable of improving their social position and, therefore, have a greater likelihood of falling into poverty or even of remaining in a poor state of health (Dohrenwend *et al*. 1992; Goldman 1994). In other words, this theory affirms that individuals are biologically predisposed to poverty, which implies that changing their SES hardly could improve their health statuses.

Although both of the theories postulate a direct relationship between SES and health statuses, they do so based on theoretical and social assumptions that allow them to be seen as complementary theories (Shrout and Link 1998); however, empirical evidence suggests that causation rather than selection is more likely to explain this relationship (Dohrenwend *et al*. 1992; Ritsher *et al*. 2001; Hudson 2005).

From the perspective of a non-contributory social pension programme, using Social Causation theory as a framework may assist in understanding how an intervention that provides an economic transfer to increase income can modify SES, even by a small amount and, therefore, lead to some effect on indicators related to the health statuses of its beneficiaries.

Particularly, the main objective of the non-contributory social pension programme *70 y más* is to improve the lives of its beneficiaries through a financial transfer that occurs every two months. The programme additionally includes an impact evaluation designed to estimate the programme's impact on various economic indicators (for example, income, expenditures, savings, employment status) to determine its effect on health indicators, especially those for mental health and nutrition. What follows is a more detailed elaboration of the possible relationship between SES and the nutrition and mental health statuses of beneficiaries, as found in the literature.

In Appendix A we present the logic model associated with our theory of change as well as its underlying assumptions.

4.1 Nutrition

Epidemiological evidence has found that SES is an important variable to explain not only the health status of individuals, but also their nutrition (Pollack *et al*. 2007). The various socio-economic indicators that seem to influence the nutrition and diet of individuals have been reported as occupation, income, education and ethnicity (James *et al*. 1997; Galobardes, Morabia and Bernstein 2001; Groth, Fagt and Brondsted 2001; Raffensperger *et al*. 2010).

According to the conceptual framework proposed by Szal and Thorbecke (1985) on the relationship between nutrition and poverty, both the diet and nutritional status of an individual are the result of the income-related and economic capacities possessed at the individual and household levels. Similarly, other factors, such as individual preferences, food quantity and quality, food security, domestic food distribution and seasonality significantly influence the nutrition of individuals, and all of them have been shown to be closely and intricately linked with socio-economic status (Islam, 1997; Bowman and Russell 2003; Drewnowski, Darmon and Briend 2004; Drewnowski and Darmon 2005). In general, scientific evidence suggests that people with higher SES and higher levels of education have higher quality and more nutritious diets (Darmon and Drewnowski 2008). By contrast, those living in impoverished conditions tend to consume monotonous diets, relying mostly on few foods. Such lack of variety could lead to nutritional deficiencies and increase the risk of disease over time (Darmon and Drewnowski 2008).

For the elderly, there already exists a risk of nutritional deficiency that can result in poor states of health and nutrition (Solomons 2000). In particular, there may be negative outcomes related to low SES, such as being overweight and malnutrition (Donkin *et al*. 1998; Regidor *et al*. 2004; Sa and Larsen 2007).

All these findings suggest that cash transfers from the *70 y más* programme*,* while an indicator associated with the income of older adults, may have an effect on the nutritional status of our study population. If so, we will develop specific recommendations for programme operators in order to establish educational programmes to inform older adults on how better to use programme transfers to purchase and prepare healthier food.

4.2 Mental health

Regarding mental health, social and psychological research has highlighted that one's social environment encompasses a variety of concepts of potential relevance, such as SES, geography and cultural factors. Specifically, considerable evidence suggests that low SES measured by educational attainment, income and occupational status tends to be associated with a high prevalence of mental and psychiatric disorders among children, adults and older adults (Robins and Regier 1991; Kessler *et al*. 1995; Johnson *et al*. 1999; Dohrenwend 2000; Costello *et al*. 2003; Lorant *et al*. 2003). Research on the relationship between SES and mental health in the elderly has shown that the deterioration in financial status is the most common event that is stressful in later life. Older adults who are economically disadvantaged are more likely to experience persistent mental disorders (Fiske *et al*. 2009; Mojtabai and Olfson 2004).

Despite research showing an association between low SES and mental disorders, controversy exists about the nature of the relationship. Two major theories have been advanced to explain this association. Social Causation theory hypothesises that environmental adversity, disadvantage and stress associated with low SES all contribute to the onset of mental and psychiatric disorders. Social Selection theory hypothesises that constitutional and environmental factors contribute to the onset of mental and psychiatric disorders, which in turn can prevent individuals from rising out of low SES (Johnson *et al*. 1999; Dohrenwend 2000).

Since we expect the economic transfer of the *70 y más* programme to increase the income of older adults, we will use the Social Causation theory to explain the potential impact of the programme on the mental health outcomes of its beneficiaries and to derive the possible social and psychological implications of any effects.

5. Evaluation design

Under the proposed evaluation design corresponding to the characteristics of the *70 y más* programme, the objective was to estimate the magnitude of the programme's effects, if any, on the nutritional and mental health statuses of the elderly. In order to achieve this, a quasi-experimental design for the evaluation was implemented to conduct a regression discontinuity analysis. Baseline data collection occurred in 2007, and first follow-up data collection activities occurred in 2008.

A qualitative component was also implemented in the study in 2009 to assess the mechanisms at the environmental and household levels at which the programme may have had a visible effect on nutrition and mental health conditions. The aim of the qualitative component was to determine the perceived impact of the *70 y más* programme from the subjective perspective of the beneficiaries. Below, the methodology used by both approaches to the evaluation is described in further detail.

6. The quantitative component

Our evaluation design is based on a discontinuity regression approach that takes advantage of the design of the programme. In 2007, the programme established two eligibility criteria: (1) beneficiaries had to be 70 years old and over, and (2) beneficiaries had to reside in localities of 2,500 or fewer inhabitants. The programme and evaluation design served to identify the group exposed to the programme (aged 70–74, in localities with 2,500 or fewer inhabitants) and to establish three control groups: Group 1 (aged 65–69, in localities with 2,500 or less inhabitants); Group 2 (aged 70–74, in localities with 2,501–2,700 inhabitants) and Group 3 (aged 65–69, in localities with 2,501–2,700 inhabitants). Available information includes pre- and post-programme data collected by surveys conducted in 2007 and 2008.

While a completely randomised assignment is considered the gold standard for assessing the effects of a programme, ethical and political considerations rendered it impossible to use randomised assignment for allocation in the case of this programme. Instead, the evaluation utilised the clearly defined programme eligibility criteria to identify intervention and control groups.

6.1 Intervention and control group selection

The variable representing age determined treatment assignment, with 70 years defined as the cut-off point. The variable and the cut-off were arranged to reflect the programme's characteristics, since only individuals aged 70 and above were designated as eligible recipients of the economic benefits of the programme. The intervention group was defined as elderly persons aged 70–74, and a first control group as elderly persons aged 65–69 living in the same communities. The range of the age window was determined by an analysis of 127 household- and individual-level indicators from three national surveys in Mexico: (a) the 2006 *Seguro Popular* Universal Health Insurance Impact Evaluation Survey; (b) the 2002 National Performance Evaluation Survey; and (c) the 2001 Mexican Health and Ageing Study. We compared the indicators for the different aforementioned age ranges on both sides of the cut-off point and confirmed that the widest age window reflecting homogenous groups on both sides of the cut-off was composed of age groups 65–69 and 70–74 (i.e. these groups were homogeneous on the largest majority of characteristics: 112 out of 127).

The second and third control groups described above were formed for the reason that, in biological terms, a single control group of elderly persons aged 65 to 69 may not be sufficient for comparison with the 70–74 intervention group, since the age of 70 has been considered an important clinical point at which the natural ageing process is intensified. Therefore, the second control group was proposed with the inclusion of 70–74 year olds residing in localities where the programme was not in operation in 2007. In regard to economy, health and nutrition, the *70 y más* programme may also be motivating changes in the practices and activities of elderly people under the age of 70 and living in the same beneficiary communities. We hypothesised that knowing that a monetary benefit is forthcoming at the age of 70 might trigger changes in spending and food consumption patterns as well as mental health conditions as individuals anticipate a more favourable life afforded by the programme. If so, 65–69 year-olds in the beneficiary communities may change their practices and activities as a result of the existing programme, and thus potentially jeopardise the validity of the first control group. Therefore, a third control group was designed to encompass elderly persons within the same age group (65–69 years) but residing in localities where the programme is not in operation. This group will also allow us to estimate the potential effect of anticipation of benefits, a factor that should be taken into account for a global assessment of the impact of the *70 y más* programme.

Finding similar localities where the programme is not in operation

In 2007, the programme selectively operated only in localities with 2,500 or fewer inhabitants. This provides another reason for adopting a discontinuity regression design – the population size of each locality could be defined as a second treatment assignment criterion with population size of 2,500 inhabitants as the cut-off point. The second and third control groups were selected from communities with 2,501–2,700 inhabitants. This range of community size was determined by an analysis of 41 locality level indicators from *Conteo 2005*, a large inter-census household survey conducted by the National Institute of Geography and Informatics in Mexico in 2005. After trying different ranges of locality size, the research team verified that the localities on both sides of the 2,500 cut-off (i.e. with less than 2,500 and with 2,501–2,700 inhabitants) were homogenous according to a large majority of indicators (35 out of 41).

6.2 Sample size, power calculations and surveys

Sample size was determined according to 35 indicators obtained from the three surveys mentioned above. The indicators were related to household characteristics, household expenditures, health conditions of the elderly, use of healthcare services and biomarkers. Sample size was calculated using unilateral statistical tests with a 95 per cent confidence level and a power of 80 per cent. Additionally, the calculation of sample size accounted for several scenarios based on the effect of the programme, including expected effects of 1, 2, 3, 4, 5, 10, 15 and 20 percentage points for each of the 35 indicators proposed. The results of the analysis revealed that a sample size of 1,500 elderly per evaluation group would suffice to detect programme effects of up to 4 or 5 percentage points in all of the variables.

The baseline survey was conducted in October–December 2007 among a total of 516 localities in seven states of Mexico. Out of the targeted 6,000 interviews with elderly persons, 5,465 (a 91 per cent response rate) were interviewed during baseline. The follow-up survey was conducted in November–December 2008, and it was possible to locate and interview 5,270 elderly people, or 96 per cent of those interviewed at baseline. It should be noted that the control group did not receive pensions either at baseline or at follow up, as the localities of

residence of persons in the control group initiated the process of enrolment in the programme only after completion of follow up.

Inclusion criteria for the study sample of the quantitative analysis were those subjects with information on baseline measurement or follow up, and mainly from those for whom we had both measurements. Figure B1 in Appendix B shows the sample included for the impact analysis of the *70 y más* programme. As can be seen from the size of the originally estimated sample (6,000 elderly persons), 5,465 were interviewed at baseline, and 5,270 of these were interviewed during follow-up. After reviewing and cleaning the data, the analytic sample for the nutrition indicators was reduced to 4,023, all of whom had complete and plausible measurements. The main reason for the difference in sample sizes was that the analytical technique of the nutritional indicators required each observation to have a complete set of responses to the complex questionnaire reporting diets – the food frequency questionnaire (FFQ) – as well as the one reporting anthropometric measurements. For the mental health indicators, the analytic sample consists of 4,468 elderly persons. A more detailed description of the process that was taken to determine the sample of the mental health analysis is found in Appendix B.

6.3 Impact indicators

Nutrition

Dietary patterns and caloric intake The objective for the nutrition analyses is to ascertain customary food or food-group consumption practices during a given period of time. In order to accomplish this, a short version of the FFQ used in Mexico's 2006 National Health and Nutrition Survey (ENSANUT) was used. This instrument has yielded favourable results in measuring dietary patterns and energy intake. The data compiled from this instrument are to assist in evaluating energy and macronutrient intake, as well to also identify the foods and food groups consumed most frequently by the elderly.

The FFQ collected information on the usual intake of 84 different food items in the seven days prior to the survey, and explored the number of days per week, the number of times per day, the size of the portion and the number of portions consumed of each food item. Intakes of total energy (kcal/d) and macronutrients – carbohydrates, proteins, dietary fat – (g/d) were computed using the food composition tables (FCT) compiled by the National Institute of Public Health, Mexico (INSP) combined with the US Department of Agriculture Food Composition Table, as well as complementary tables from Mexico and Latin America. The adequacy of energy and macronutrient intake was calculated according to specific criteria. The energy estimate was based on the estimated energy requirement (EER) (Institute of Medicine 2005), and the EER for each participant, on normal body mass index (BMI), age, and sex. The World Health Organization (WHO) nutritional guidelines for older adults were used to compute the adequacy of macronutrient intake (WHO 2002). Reference values were as follows: for carbohydrates, 50 per cent of total energy intake; for dietary fat, 30 per cent of total energy intake; and for proteins, 1 g/kg/d.

Nutritional status The anthropometric measures compiled for the elderly were weight and height. The BMI, which is calculated as weight in kg/height per m^2, was categorised as underweight (BMI<18.5), normal weight (18.5≤BMI<25), overweight (25≤BMI<30) and obese (BMI≥30), according to the WHO criteria (WHO 1995).

Mental health

Depressive symptoms Within the framework of research on depression in elderly people, the geriatric depression scale (GDS) is one of the most commonly used instruments. Developed by Sheik and Yesavage, the scale has been validated in numerous countries and contexts (Fountoulakis *et al*. 1999). Currently, it is the most frequently used instrument for measuring depression among the elderly, including those residing in poor or marginalised conditions. Depressive symptoms (DS) were assessed using the GDS 15 items version. We defined a dummy variable equal to 1 if the older adult showed significant mild DS (GDS ≥ 6) and 0 otherwise; similarly, we defined a dummy variable for severe DS which is equal to 1 if the GDS ≥ 10 and 0 otherwise.

Empowerment One of the most immediate and likely effects of the *70 y más* programme relates to the autonomy and empowerment of the elderly. To incorporate these two dimensions into our evaluation, we applied the World Health Organization (WHO) recommendation on active ageing (WHO 2002b). Specifically, the capacity of elderly residents to participate in household decision making was used as the basic indicator for gauging the extent to which elderly persons were empowered. This gave rise to two indicator variables (dummies): the first was equivalent to one where the older adult declared that he or she participated in important (non-economic) household decisions; the second was equivalent to one where the older adult declared that he or she participated in household decisions pertaining to expenses.

7. The qualitative component

The qualitative study was conducted in 2009 and was based on the data collected during the baseline evaluation of the *70 y más* programme. The objectives and research questions were established in accordance with the quantitative component of the study in order to utilise the qualitative exploration to generate a complementary and expanded triangulation of the results. The qualitative component of this research was ethnographic and was designed based on constructivist paradigm concepts (Guba and Lincoln 1994). To be an ethnographic study, the notion of culture has to be central. A simple definition of culture is: 'that collection of behaviour patterns and beliefs that constitutes standards for deciding what can be, standards for deciding how one feels about it, standards for deciding what to do about it, and standards for deciding how to go about doing it' (Goodenough, 1971, pp.21–22, cited in Patton 2002, p.81). The constructivist character of research emphasises that the meaningful behavioural patterns are shared by the subjects, and that these make up their valid reality, as well as the interpretative base that constitutes any interpretation of that reality. With regard to this, the qualitative component aimed to understand the relevant and shared meanings of the social phenomena present within the context of the larger evaluation of interest (Denzin and Lincoln 1994, p.224).

7.1 Qualitative sample

The qualitative sample, being a sub-sample of the quantitative baseline survey in 2007, was purposely selected with maximum variation criteria to achieve maximum representation of the different subgroups observed (Teddlie and Yu 2007). Purposive samples with maximum variation serve to generate information on the widest possible group of cases with the view of establishing a comparison among the different cases. Such sampling is conducted when 'representativeness' is required to achieve comparability and contrast across cases. 'Representative' or typical cases that capture maximum variability in the study dimension are sampled, and a minimum number of cases are selected to obtain their comparability. Comparison and contrast constitute the core of qualitative analysis (Denzin and Lincoln 1994).

Thus, to define the groups that would be studied for the qualitative component; an analysis of the baseline individual and location characteristics was conducted. This provided the information to generate interest groups on which we conducted qualitative research.

To define the sample characteristics and size required for selecting typical or 'representative' cases, elements that can determine the maximum variation in the study phenomenon must be identified on the basis of reported literature and the criteria of the researcher. Once the determiners are defined, units (for example, individuals, groups of individuals and institutions) are selected according to specific criteria and are associated deliberately with the response of a research question.

While research questions must be analysed specifically, there are a number of elements that are commonly used to create samples with maximum variation, such as sex, age, marital status, schooling, place of residence and ethnicity. Once the elements that are likely to weigh heavily in the maximum variation of the study phenomenon are identified, they are stratified, beginning with those that are expected to bear most significantly on the phenomenon. A number of cases are then assigned to the final outcome of each combination, which we have denominated minimal sample unit. Table 1 below, 'General qualitative fieldwork plan', illustrates the design process for a sample with maximum variation and its stratified elements.

While no established formula exists for defining the number of cases that should be selected for each minimum sample unit, other large-scale evaluation studies (González de la Rocha 2008) have selected a minimum number of three cases per minimal sample unit, to achieve so-called theoretical or data saturation (Patton 2002; Guest, Bunce and Johnson 2006; Tineke 2006).

For initial inclusion, the subjects and localities of interest had to have been captured in the baseline survey. Four locations were selected in two of the seven participating states at baseline. To select the participating states, certain criteria were used on structural characteristics that could determine the experience of the beneficiaries with respect to the programme. States were selected if they shared the same levels of marginalisation, migratory intensities and proportions of indigenous populations. For the selection of localities, the difficulty of accessing health services and the ethnicity composition of its inhabitants were also considered so that the perceived experience of the programme could be determined.

Four communities from two States were included with comparable levels of development and migration and with the following characteristics, which were not exclusive: indigenous versus non-indigenous population and being close versus far from a health clinic. The criterion related to the distance from a health clinic was established based on medical mapping developed by the Geographic Information Systems for Health (*Sistemas de Información Geográfica en Salud*) and the Unique Medical Unit Key (*Clave Única de Unidades Médicas*) as well as data from the local sanitary authorities. A close distance was defined in relation to whether primary healthcare was situated up to 30 minutes away from the community by public transportation, with a journey time of greater than 30 minutes considered as far. In the case of the two localities near a health clinic, healthcare was 20 and 30 minutes away, respectively, by public transportation, while the other two were between 45 minutes and 1.5 hours away. Thus, the sample was organised to contain two indigenous localities and two non-indigenous localities, and among these four communities, two localities near a health clinic and two far from one.

To select elderly people who would participate in the qualitative study, the characteristics of the sample at baseline were analysed. Seeking maximum variation, elderly people were included if they met certain individual criteria (for example, sex and health status), social criteria (for example, having or not having social networks) and criteria reflecting the community (for

example, ethnicity and being near health services) (Teddlie and Yu 2007). To gain a better understanding of the subjects and to further understand the perceived impact of the programme, several other key actors of relevance were included to reflect the viewpoints of potential beneficiaries and elderly people with physical disabilities (Connell Szasz 2001). Additionally, observations were carried out at the location of payments on the day the programme handed out pensions in each of the localities to observe the conditions under which support is delivered to the elderly and to observe the dynamics between programme implementers and beneficiaries.

The final sample for the qualitative study included four different types of actors: (1) elderly beneficiaries and their representatives, if applicable, (2) potential beneficiaries[1], (3) 'suspended' elderly beneficiaries[2], and (4) key actors.[3]

Table 1 General qualitative fieldwork plan

Example: Community 1 of 4 / in State 1 of 2										
Example: Locality with few barriers to access health services										
Elderly self reported as healthy				Elderly self reported as sick				Potential Beneficiary		Key Actor
with social nets		without social nets		with social nets		without social nets				
men	women	men	women	men	women	men	women	men	women	men or women
3	3	3	3	3	3	3	3	2	2	2
12 semi structured interviews (SSI) (6 men / 6 women) with healthy elderly				12 semi structured interviews (SSI) (6 men / 6 women) with sick elderly				4 semi-structured interviews (SSI) with PB		2 (SSI)
In each community 28 SSI with elderly, 2 SSI with key actors and one non-participatory observation of the payment day										

7.2 Data collection

Taking into account the baseline characteristics of the communities, the total sample consisted of 129 semi-structured interviews: 99 programme beneficiaries and their representatives, if applicable; 16 potential beneficiaries; and six 'suspended' elderly beneficiaries, eight interviews with local key actors (two per locality), and four observations from support delivery (See Table 2).

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[1] Potential beneficiaries are all the adults who do not receive programme benefits even though they are considered eligible in regards to criteria of age and residence in localities covered by the *70 y más* programme.
[2] Suspended beneficiaries are those who were beneficiaries but were suspended from receiving payment for some administrative problem related to the programme's rules of operation. This category emerged grounded in fieldwork.
[3] Key actors are those subjects who although not being a part of the main group of interest in the programme have important knowledge of community successes and can offer an external perspective.

Table 2 Results of qualitative fieldwork

	VERACRUZ			HIDALGO			TOTAL
Results of Qualitative Fieldwork							
	VERACRUZ			**HIDALGO**			**TOTAL**
	Semi Structured Interviews						
	Inigenous Localities			**Non-Indigenous Localities**			
Social Actor	**Ahitic** Easy Access to HS	**Huacango** Difficult Access to HS	**Subtotal Indigenous**	**San Bernardo** Easy Access to HS	**Tlatzintla** Difficult Access to HS	**Subtotal Non-Indigenous**	
	male 9 female 15	male 10 female 15		male 11 female 15	male 12 female 12		male 42 female 57
Total Beneficiaries	24	25	49	26	24	50	99
OP Potential Beneficiary	4	3	7	4	5	9	16
OP Suspended	2	2	4	1	1	2	6
Total by community	30	30		31	30		121
Semi Structured Interviews with Key Actors							
Key Actor	2	2	4	2	2	4	8
Spot Delivery Observations							
Observations	1	1	2	1	1	2	4

The fieldwork was conducted from February to April 2009 by a team of five anthropologists who lived in the study sites during data collection. All interviews and observations were transcribed in addition to ethnographic notes, which were recorded in field diaries. Notes from the field diaries underwent content analysis together with the interview transcripts in order to achieve data triangulation (Massey 1999; Minayo 2002).

The qualitative component facilitated the understanding of the perceived impact of the programme on the personal and subjective experiences of the beneficiaries, particularly with regard to quality of life, as evaluated through the perception of physical and emotional health, the perception of social support networks, and the sense of empowerment and autonomy in confronting the elements that affect their lives. The manner in which these indicators were defined is similar to the evidence reported in the literature, which argues that the perspectives of individuals have a strong influence on the definition and the conceptualisation of programme effects related to improving quality of life. This may be because there is a direct relation between an individual's perception of their quality of life and the actual impact a programme can have on it (Vera 2007).

8. Analysis strategy

The estimated impact of *70 y más* on nutrition and mental health is derived from both quantitative and qualitative analyses of data. Thus, both the quantitative and qualitative components of the study are presented below followed by the nutrition and mental health findings and then the implications of this study.

8.1 Quantitative analysis

Assuming that the regression discontinuity design of the study succeeded in replicating the environmental conditions of the programme and its beneficiaries, it was only necessary to carry out a simple comparison between the average of any indicator of interest for the intervention group with the average of that same indicator for the control group to estimate the programme's effect. However, this assumption can bias the results greatly, and it is possible that not all observable and unobservable differences between the intervention and control groups will have been removed by the regression discontinuity design. We examined this by comparing a group of baseline characteristics observed between the intervention and control groups. In general, the distributions of the variables analysed across the groups were similar; however, the intervention and control groups were not perfectly balanced in some aspects. In Appendix C, baseline covariates of intervention and control groups containing elderly persons aged 70–74 years were compared; however, it was observed that many of those characteristics were not balanced.

For this reason, we took advantage of the differences-in-differences (DD) model to estimate the programme's effect. Instead of analysing the differences between the variables across treatment and control, this model allows us to analyse the differences in change between treatment and control groups by accounting for two types of potential differences between the groups: (1) the differences that existed prior to the intervention (that is, at baseline or pre-intervention) between treatment and control groups, and (2) the differences arising from unobserved factors at the local level that do not change between baseline and follow-up data collection, which in this case is 2007 and 2008. The DD model is then based on the assumption that in the absence of the programme, the change observed in the intervention group would have been the same as the change observed in the control group, or more succinctly, the trends of both groups would be equal. If there were differences between the groups for unobserved characteristics that vary over time and these were associated with exposure to the programme, the DD model would generate biased estimates of the programme's effect. However, it is expected that the DD model removes a large proportion of the possible causes of bias in its estimates.

The general DD model for estimating the impact of the programme is specified as follows:

$$Y_{ijt} = \beta_0 + \beta_1 T_{ijt} + \beta_2 P_{ij} + \beta_3 (T_{ijt} * P_{ij}) + \mu_i + \varepsilon_{ijt} \quad (1)$$

Where Y_{ijt} is an outcome variable for individual i who lives in locality j at time t. T_{ijt} is an indicator variable that takes a value of 1 if the measurement of individual i is in the post-intervention survey (2008) or 0 if it is in the baseline survey (2007). P_{ij} represents an indicator variable that takes the value of 1 if individual i belongs to the intervention group or 0 if he or she belongs to the control group, while the term (Tijt*Pij) represents the interaction between the two dichotomous variables, μ_i represents a fixed effect at individual level, ε_{ijt} is the error term.

The DD model permits the identification of the treatment effect under the assumption that the change in the treated group in the absence of the programme would have been the same as the observed change in the control group. In Appendix D we present the results of the analysis of this assumption, also called parallelism assumption. When applying this model, the DD model already controls for fixed characteristics over time based on the model's assumption that the change in other variables is balanced between treatment and control groups. Thus, control variables will not be used.

With respect to the error term, standard errors are clustered at the level of the locality in order to account for the correlation between individuals within the locality. Additionally, a quantile regression model was adapted with the same specifications previously described from the aforementioned basic model and depending on whether indicators were continuous or discrete. Lastly, with the objective to explore any possible heterogeneous effects of the programme, we used stratified models in order to estimate the programme effect by sex, ethnicity (indigenous vs. not indigenous), and household socio-economic status (SES) measured at baseline through total monthly expenditures at the household level.

8.2 Qualitative analysis

The information generated by the qualitative component of the study consists of ethnographic data composed of selected excerpts from the transcripts collected from semi-structured interviews (Russell 1994), non-participant observations (Mack *et al*. 2005), and fieldwork diaries (Patton 2002).

All the qualitative research methods used in this study generated qualitative evidence to populate a unique glimpse into the experience of the programme, the significance of the programme to the beneficiaries, and the particular social and household mechanisms that influenced how the impact of the programme was perceived by the beneficiaries. These results complemented the statistical findings by framing the experience of individuals within the context of their environments and communities. The qualitative component also shed light on how the decisions of beneficiaries are influenced by the programme, as well as how they perceived the programme to have impact on their quality of life.

We coded the speeches using pre-defined analytical codes and live or empirical codes using the NVivo 2 programme (QSR International, 2002). A content analysis was conducted in order to find meaningful content and recurrent themes in the interviews and observations through deduction and inference (Minayo 2002). Aside from a preliminary analysis, the content analysis provided a deeper look at the central findings and common themes across one or more groups of individuals, as well as anything that may have reflected an exception or an extraordinary perspective, which can help to explain the realities experienced by the individuals interviewed or observed. We confirmed the validity of the final inferences of the qualitative analysis through two types of methodological triangulation of data: (1) data triangulation, or different voices and tools, and (2) analytical triangulation, or different social scientists independently analysing the same ethnographic data (Denzin and Lincoln 1994; Massey 1999; Patton 2002). For this analysis, we extracted fragments of the transcripts from participant interviews. The excerpts presented in the results section were chosen among others that show similar results, because they were particularly emblematic. Hence, we chose those 'testimonials' to illustrate our findings because they articulately describe similar individual, social, and structural characteristics expressed in the interviews that are representative not only of this individual, but also of many other individuals as well. The analysed effects were not explored or discussed

in the interviews and the observations of the days when pensions were received. Section D2 in Appendix D contains the definitions of each code used in the qualitative analysis.

Additionally, by using triangulation, we confirmed the internal validity of the data. By stating the limitations of the qualitative data implicit in the variation of the characteristics of the participants involved in the qualitative exploration (men and women belonging to indigenous and mixed communities in two states of the country), we sought to create reflexivity to reduce selection bias. Lastly, by comparing and contrasting the qualitative and quantitative results, we obtained a level of data reliability and transferability of the results to a generalisable level supported by the quantitative results (Malterud 2001).

9. Results

9.1 Baseline results

In this section, we present the results from baseline for the nutrition and mental health variables of interest. The results are presented according to the type of comparison and the estimator of interest (programme versus anticipation effect).

Nutrition
In Table E1 of Appendix E, averages of the following variables related to nutrition are presented: nutritional status, energy and macronutrient intake, adequacy of energy and macronutrient intake – also referred to as percentage of adequacy intake (PAI) – and the proportion of macronutrients contributing to the total amount of energy consumed.

First, we present age group comparisons corresponding to the programme effect estimation of individuals 70–74 years old. On average, the treatment group had a lower BMI than control group 2. Based on the BMI classification system proposed by the WHO, the elderly in the treatment group had better nutrition and were less obese when compared to control group 2. Levels of individual energy and macronutrient intake, as well as PAI, were on average higher in the treatment group compared with control group 2. On average, the levels of protein and dietary fat intake were below nutritional recommendations. Adequate levels of protein intake were achieved more often on average in the intervention group, whose PAI were nearly 90 per cent, while control group 1 had PAI near 75 per cent (p<0.01). In contrast, PAI for energy and carbohydrates were greater than 100 per cent and higher in the intervention group (p<0.01).

Second, we present comparisons of the nutritional indicators between the younger elderly groups of the study sample (i.e. control group 1 versus control group 3, 65–69 years old). Between these groups, the BMI was on average greater in control group 3 (p<0.1). Although, examining BMI based on the proposed classification of the WHO, we did not find nutritional status to differ between the two younger groups of elderly in our sample. The individual indicators of energy and macronutrient intake and the adequate levels of them were greater in control group 1 when compared to control group 3. We did not observe any average values that would be considered as inadequate risk levels (i.e. inadequacy of intake <50 per cent). For protein, the PAI was 88.06 per cent in control group 1 and 78.59 per cent in control group 3 (p<0.01). In contrast, the average adequacy of energy intake was near 100 per cent, while that for carbohydrates was greater than 100 per cent. In both cases, the PAI were greater for control group 1.

Several aspects should be highlighted from our findings at baseline. First of all, the data reveal that the comparison groups exhibit significant differences for the majority of the indicators of interest and that the groups were not balanced. Because of this imbalance, the DD model was used to determine the programme effect. Secondly, one of the most notable differences is for energy intake. Both the intervention group and control group 2 (both groups where underweight was the most frequent) have high levels of energy intake (approximately 250 kilocalories, kcal) when compared to control group 1 and control group 3 (groups where the prevalence of obesity was greater). It is possible that this difference is due to the characteristics of where the elderly live. Given that the elderly of the intervention group and of control group 1 reside in rural localities (<2500 inhabitants), it is highly probable that their diets have less variety and are highly energetic. In contexts where food scarcity prevails, such as rural areas, food consumption translates into diets high in energy and deficient in micronutrients, characteristics that provide the sensation of being satiated even though they sacrifice diet quality. Thus, elderly having higher levels of energy consumption does not necessarily reflect better nutritional statuses.

Mental health
The baseline findings for mental health indicators can be found in Table E2 of Appendix E. Different from the nutrition indicators, significant differences were not observed for the majority of the indicators when comparing the two groups of elderly 70-74 years of age (the intervention group versus control group 2). When comparing control groups 1 and 3 (the two groups with elders 65-69 years of age), differences were found in two of the four analysed indicators.

In more detail, we observed that the prevalence of symptoms corresponding to mild depression were not different across the four study groups (approximately 25 per cent), which was also the case when comparing the prevalence of symptoms related to severe depression across the four groups (approximately 3 per cent). The prevalence of these symptoms found in this study at baseline is similar to the levels found in rural populations.

On the other hand, for empowerment indicators, a relatively homogenous distribution was found in the comparison groups, and a high proportion of elderly claim that they contribute to decisions related to spending the household income, as well as to other types of decisions related to household organisation. A relevant and important cultural aspect to note is that rural zones in Mexico are particularly characterised by the respect and recognition for the elderly, but there is also the potential space to improve this recognition and, thus, the empowerment of the elderly.

9.2 Effects of the programme on nutrition

Nutritional status
No effect of the programme was found on the BMI of the elderly included in this study. An effect was also not found when evaluating the impact by sex, ethnicity, and SES. In relation to normal nutritional status, there was no programme effect. On the heterogeneity of effects, a significant positive effect at the level of 10 per cent was detected in the second quartile of total monthly spending (Table 3).

Diet: total energy intake and adequacy of energy intake
The programme did not have significant overall effect on the consumption or the PAI of energy. However, heterogeneous effects attributable to the programme were observed. The impact of the pension on consumption and PAI for energy was significantly higher among women,

indigenous groups, and among the elderly belonging to the lowest quartile of total monthly spending (see Table 3). For women, receiving a pension correlated with an energy intake 140.9 kcal higher and a PAI of energy 11.5 per cent higher than that of men. In the indigenous population, it correlated with an energy intake 191.5 kcal higher and a 12.6 per cent higher increase in adequacy of energy than that of the non-indigenous population. However, the most striking effects occurred among the poorest elderly, where, on average, receiving a pension boosted the energy intake and the PAI of energy by 216 kcal, and 17.6 per cent, respectively.

Diet: macronutrient intake and adequacy of macronutrient intake
The *70 y más* programme had a positive overall effect not only on the intake of carbohydrates and proteins (15.1g and 3.1g, respectively) (Table 3), but also on the PAI for carbohydrates and proteins (8.4 per cent and 5.9 per cent, respectively). In terms of heterogeneity effects, we found that the programme had an impact on intake and PAI for carbohydrates and proteins among women, the indigenous, and the elderly who live in households from the first quartile of total monthly spending. Although there was no overall observed effect attributable to the programme on the intake and PAI for dietary fat, by evaluating the heterogeneity effects, we found that the programme significantly increased both the intake (12.0g) and PAI for dietary fat (22.8 per cent) among the elderly who reside in the poorest households (Table 3). With respect to the percentage to which macronutrients contributed to total energy intake, we did not find either an overall programme or heterogeneity effect on any of the analysed indicators (Table 3).

Thus far, it has been demonstrated that, because of the effect of the programme, significant increases in consumption and PAI of energy and macronutrients were observed. In order to determine whether or not these observed effects are positive or negative, observing the magnitude and direction of the coefficients is not sufficient. The interpretation of these indicators is more complex, since the consumption of excessive amounts of energy, carbohydrates, and dietary fat can have negative consequences on the health status. Additionally, it will be necessary to treat the consumption of protein as a separate case. Because of protein's central role in cellular and organic functions, deficient ingestion could have negative effects to one's health (Institute of Medicine 2005). Although there are no accounts at the national level in Mexico detailing the dietary situation of the elderly population, it has been documented that a significant proportion of individuals between the ages of 20 and 59 were found to be at risk of excessive carbohydrate and dietary fat intake, and although the median adequacy of protein intake is higher than 100 per cent and the prevalence of inadequacy is low, individuals residing in rural areas or in the south region of the country, both of which have been observed to have lower levels of adequacy of intake (116.5 per cent and 122.5 per cent, respectively, versus 126.9 per cent at the national level) and higher prevalence of inadequacy of protein intake (4.2 per cent and 4.4 per cent, respectively, versus 2.9 per cent at the national level) when compared with all of Mexico (Barquera *et al*. 2009).

It is plausible that programme effects will differ in the distribution of dietary outcomes, since these variables contain information that raises different issues at different points in the distribution. To gain a deeper understanding of whether these effects should be interpreted as positive or negative, quartile regression models were used to estimate the impact of the programme on the indicators of adequacy of energy and macronutrient intake. For nutrition, the indicators of adequacy take into account net intake, as well as the concept of adhering to a specific nutritional reference for a certain population (Tables 4a–4d, see Tables section). The baseline distributions of these indicators are presented in Tables F1–F4 (Appendix F).

Results from the quantile regression demonstrate that the programme had a significant effect on the PAI of energy, which increases around the 40th percentile (where for the intervention group at baseline, adequacy of intake is 85.1 per cent) until the 70th percentile (where adequacy of intake is 127.0 per cent). In a similar manner, the effect on PAI of carbohydrate is positive and significant between the 40th and 80th percentiles. In this range of the distribution, the adequacy of carbohydrate intake in the intervention group exceeded 100 per cent during 2007. The impact for the PAI of protein begins at the 30th percentile, and the effect is significant and constant at the 50th and 70th percentiles. The programme effect specifically occurred in the distribution that hovered between 56.7 per cent and 103.0 per cent. Unlike the overall programme effect results in the quantile estimation, it was found that the programme increases the PAI of dietary fat between the 20th and 60th percentiles, precisely overlapping with the suboptimal levels of adequacy of intake, between 38.9 per cent and 85.2 per cent.[4]

The quantile regression models were also stratified to reflect the variables used to explore the heterogeneous effects of the programme, and the results were revealing. Regarding the stratification by sex, the programme effect was concentrated in women, and for the analysis that included the whole sample, the effect was also observed in the central part of the PAI distribution. However, among the women, the effect occurred earlier, around the 30th percentile, and the observed coefficients are high with clear increases across the distribution until most of the coefficients decrease in magnitude and are no longer significant (Table 4b). Notably, the programme had an influence on the part of the distribution that corresponds to lower levels of PAI of energy, dietary fat, and protein; however, the adequacy of carbohydrate intake increased to over 100 per cent among women (see Appendix F, Table F2).

Regarding ethnicity, the impact of the programme was concentrated among the indigenous population and can be found mainly in the lower segment of the PAI distributions. The data show that the programme's effect on adequacy of energy intake among the indigenous elderly increases at the 10th percentile. These coefficients were positive and significant until the 60th percentile. In contrast, the coefficients for adequacy levels of carbohydrate, protein, and dietary fat intake are significant after this point, near the 20th percentile. For these indicators, the programme effect ends in the middle part of the distribution (Table 4c); however, the programme appears to have increased the levels of PAI of energy and macronutrient among elderly with lower levels of adequacy of intake. Additionally, the programme had effects in some parts of the distribution where the PAI were greater than or equal to 100 per cent, particularly in the cases of energy and carbohydrates (see Appendix F, Table F3).

The analysis of heterogeneity related to SES showed that the programme impact visible in the middle of the distribution was concentrated among the elderly belonging to the lowest quartile of total monthly spending. The coefficients show increasingly high magnitudes and for almost all of adequacy of intake indicators, the coefficients are significant starting at the 20th percentiles, and in the case of the PAI of protein, the coefficient is at the 10th percentile and maintains a constant magnitude throughout the distribution. It is noteworthy that the PAI of dietary fat nearly increases across the entire distribution, except for the 10th percentile (Table 4d). According to the values of the distribution, the impact of the *70 y más* programme occurred in the percentiles just below 100 per cent for adequacy of energy and carbohydrate intake; however, the programme also benefitted the elderly who exceeded 100 per cent for these indicators. The effect on the PAI levels of protein occurred where values were substantially low, under 75 per cent (see Appendix F, Table F4).

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[4] For the figures mentioned here, see Table 4a (in Tables) and Table F1 (Appendix F).

In general and as a central finding of the qualitative component of the study, the elderly in the sample alluded to perceiving the programme's effects in physical effects, which can be explained by spending on food and food consumption. On asking them about their perception of the programme's impact, they referred markedly to food purchasing. While this reference was common to men and women, the latter stressed food purchasing more. Additionally, a large proportion of the beneficiaries consistently report that the pension they received was their only source of regular income, and in the case of women, the first income of their own in their life, and through receiving the pension they were able to buy groceries that appeared to improve their diets. Among the groceries purchased and reported by the elderly were, in order of saturation and frequency report; chicken, milk, bread, meat, and cheese.

It is noteworthy that food selection rests on a series of beliefs that associate the consumption of food of animal origin with concepts regarding good nutrition and poverty. For instance, in Mexico, it is commonly believed that an animal-based diet is healthier and more complete than one based on vegetables, fruit and cereal. Likewise, many people believe that meat is the only source of protein. These beliefs are coupled with constructs about being poor, which, heavily reinforced by advertising campaigns, equate socio-economic level with meat consumption. This may explain the food purchasing results reported by the beneficiaries, who declared that they regularly purchased animal products, such as chicken, milk, cheese and eggs, on receipt of programme income.

A secondary finding is that the beneficiaries expressed feeling healthy and eating healthily, which can be attributed to how the informal and subjective recommendations of the programme were perceived through the qualitative component. Some expressed that the ultimate goal expected from their pension was to improve their lives and, therefore, the money would have a better use if destined for food, clothing, and medical attention. In the words of informants, money is: 'for improving nutrition and healthcare'. It should be borne in mind that many of these beneficiaries have taken part in the *Oportunidades* programme, which offers a strong food component in the form of training for women, and many of them now benefit from the *70 y más* programme. As a result, their discourse about the use of money could be significantly influenced by the years of training they have received from other anti-poverty programmes. On the other hand, it is mentioned, also as a secondary finding, that some foods, which used to be grown by the beneficiaries, began to be bought when the land could not produce a sufficient quantity of products or when the elderly could no longer work the land. Maize, beans, and firewood for cooking are some of the products that the elderly now buy with their pensions.

An important result bearing on both nutrition and mental health findings, regarding the redistribution of money and food in the household, was expressed by the informants – especially by women in semi-structured interviews. Women often brought up family characteristics related to consumption and the redistribution of food, that is, food purchased with the money received from the programme is eaten by the entire family, not only by the beneficiaries. This may flow from two phenomena. Firstly, women are usually responsible for purchasing and preparing food. Secondly, as suggested above, gender inequalities make women put themselves in an inferior position towards men and children, so in times of food shortage, women tend to reduce their own portion of food to pass what they would have eaten to the men and children in the home. This effect was notably found by the qualitative inquiry in women who reported that once they received their money their first action is to buy food, and share it with their families. While they feel better because they are able to share, and not only to receive from their families, that is, being reciprocal with their families, they feel the right to eat this food proudly.

Notably, for many beneficiaries, income from the pension did not constitute extra revenue, but rather their only monetary income. As stated by one respondent, 'in the past, long periods of time would elapse without much food' (Huac_H_i_[5]). In other cases, money went on food because, otherwise 'nobody would give them any food' (Ahit_M_i).

Finally, while shopping for and consuming food is a generalised response of the programme beneficiaries, it was shown to be of particular importance among women and the indigenous. It was common for the interviewed women to express that throughout their lives, their spouses had provided household income and that currently they depended on their children, which was the reason the money received from the pension was particularly relevant for their household economy. For many women, this income was the first stable income they had received in their lives. Being their own money, available for spending as they wished, they used it to buy and share food with their families.

Indigenous communities revealed two cultural patterns that elucidate the differentiated impact between them and the non-indigenous communities. On one hand, the elderly were commonly called *abuelito* and *abuelita* (diminutive for grandfather and grandmother in Spanish), denoting respect and a special appreciation for old age. For instance, in one community, there was '*la casa de la tradición*' (the house of tradition) a place where only elderly residents can meet to 'ask for rain for good harvest'. On the other hand, these communities, particularly the smallest, enjoyed strong social networks reinforced by social mechanisms involving the redistribution of food among community members. A central aspect of social networking in one particular indigenous community studied under the project consisted in visiting neighbours and *compadres*, especially if they were ill. Sharing meals and food was a regular practice during visits. Indigenous communities with elements such as respect for elderly and redistribution of assets among community members are likely to generate a positive synergy with programme effects.

It is important to understand testimonies where the voice of the beneficiary is directly heard in its own context and rationale. Appendix G contains a series of selected testimonies that reflect the qualitative findings of the study.

9.3 Discussion and implications

From the nutritional perspective, these results contribute to understanding changes that result from extra income and in many cases the only regular and personal income represented by the programme pension. In dietary terms, an average increase of 15.1 g/day and 3.1 g/day for carbohydrate and protein intake, respectively, was observed when the treatment group was compared with the control group. An increase was also observed in the PAI of carbohydrates (8.3 per cent increase) and proteins (5.9 per cent). Regarding the nutritional status, the *70 y más* programme had no effect on the BMI of the elderly.

The data also demonstrate that, for individuals who are poor and living in vulnerable conditions such as the indigenous, a monetary income contributes to alleviating financial constraints, which is visible through improved nutrition. Once there is certainty on the regularity of payment and the money is received constantly, certain adjustments are made on several levels. The pension represents income which positions the elderly person as an entity capable of making

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[5] The abbreviations in the transcripts refer to the names of the localities where subjects were interviewed (Ahitic, Huacango, San Bernardo and Tlatzintla), followed by H = male or M= female, and i = indigenous or ni = not indigenous.

use of money as they see fit, whether or not this contributes to the household economy or is retained for personal benefit. For example, the existence of a regular pension in South Africa is associated with a reduction in the probability that the beneficiary or the children in his or her household skip a meal for the reason that there is no money to buy it. Case and Menendez (2007) explain how the presence of a beneficiary and the receipt of a pension together can place the elderly in the position of the provider and a key member of the household with a valid opinion and the ability to make decisions about household economic conditions as we can observe for the case of the 70 *y más* programme.

Because of this, and since *70 y más* provides extra income for the elderly, the possibility arises for a greater amount of food consumption and as a result, a more diverse diet, which is not necessarily implied exclusively for the elderly but for the other individuals in the household as well. Martínez (2004) showed that in Bolivia a pension given to the elderly, especially in rural households, increased the consumption of food from their own land and livestock, particularly meat, milk, eggs and certain vegetables, among family members. This suggests that part of the money could be used to boost the investment in agricultural activities, typical actions in a rural population. Evaluation results from *Pensión Guerrero* in Mexico (a pension of 800 Mexican pesos every two months given in the Mexican state of Guerrero) similarly found that the most obvious benefit of the programme from the perspective of elderly recipients was for food, the purchase of medications and economic security (Márquez-Serrano *et al*. 2007).

One interesting result of the analysis carried out is the presence of heterogeneity effects, since the magnitude of the programme's effect on the consumption and adequacy of carbohydrate and protein intake doubled in the case of women and the indigenous and nearly tripled among the poorest elderly. Also, it was observed that the programme had an effect both on total energy intake and the adequacy of energy intake.

The empowerment of women through access to an income under the programme is discussed subsequently, under the mental health results, and has been reported as one of the principal impacts of non-contributory pensions (Barrientos *et al*. 2003; Barrientos 2004). Women decide how to use their economic resources and, as is well known and has been reported by other programmes (*Oportunidades*-SEDESOL 2012), their decisions seek the well-being of their homes. In the case of poor households, this translates into food purchasing. Traditionally in charge of meals, women are more in contact with food, which they consume and share with their families. The programme therefore reverses a condition that has been documented by a number of authors and is characterised by economic restraint and food insecurity. In these conditions, food quality is sacrificed for quantity, adults sacrifice themselves for their children, and women protect their men and children by offering them preferential food consumption (Radimer *et al*. 1992). This constitutes a reminder of how inequity dwells in traditional gender roles that do not favour women. As Barrientos *et al.* (2003; 2004) have shown, this kind of programme can modify gender inequalities giving elderly people access to their own and a more stable income. Meanwhile, the literature suggests that, in these conditions, the elderly are at the highest level of vulnerability (Rivera-Márquez and Guerrero-Alcocer 2006). Programme benefits influence the way beneficiaries manage the household income and distribute food in their homes favouring women's food consumption. The greatest effect of the programme among women is related not only to gender, but also to survival issues, as many beneficiary women are widows and do not possess any land, but may have their own income (Berguer and Luckman 1968; Arriagada 2005). The programme thus creates a feeling of less poverty, food shortage is partially solved, and the pension money is considered by women as their own.

These elements produce a sense of empowerment and with it an increase in food consumption by women.

It is also well known that indigenous people are in disadvantaged economic and social positions when compared with non-indigenous populations (Partridge and Uquillas 1998; Plant 1998; Hall and Patrinos 2005). In Mexico, socio-economic inequality affects ethnic groups in several ways. Individuals who speak at least one indigenous language represent 9.75 per cent of the total population (INEGI 2010), and they are characterised by structurally vulnerable and poor living conditions (Farmer 1999; Holmes 2011). Descendant communities of indigenous native populations tend to live in environments with higher levels of poverty, have worse health outcomes, lower life expectancies and poor school performance – all causal and consequential elements of poverty (Parker *et al.* 2005a, 2005b; Patrinos *et al.* 2007).

Among indigenous people in Mexico, women are particularly vulnerable. Maternal mortality among indigenous women is as much as five times higher than that among non-indigenous women (SSA 2010; Sesia 2003), and only one in four indigenous women have access to family planning methods (Armenta-Paulino 2012). It is likely that for these reasons purchasing food was significantly one of the most important and perceived positive effects of the non-contributory pension observed for these two groups, woman and indigenous. Previous evaluation results from non-contributory pension programmes in Mexico similarly report greater impacts among indigenous households in the poorest and most vulnerable conditions (Márquez-Serrano *et al*. 2007).

As mentioned above, cultural patterns of respect towards the elderly and reciprocity of assets, particularly food, among community members were clearly observed in one of the indigenous communities in the study. As a mechanism of equilibrium and social cohesion (Guzmán, Huenchuan and Montes de Oca 2008; Woolcock and Narayan 2006), reciprocity is an important part of social capital that can generate positive synergies among the indigenous, one of the most vulnerable groups (Salgado 2005). When communities in extreme poverty and vulnerability create nets of social cohesion and recirculation of goods, any input can be greater because it creates a synergy among all members and sharing brings returns in moments of scarcity.

The nutrition indicators at baseline (Table F5, Appendix F) indicate that the indigenous elderly have lower BMI when compared with the non-indigenous elderly. Even though malnutrition is more common among the indigenous elderly, deficiencies in the average values of adequacy of energy and macronutrient consumption were not identified. In contrast, the average level of adequacy approaches 100 per cent, which can be considered excessive in the case for carbohydrates. For both average protein adequacy and total fat intake, the indigenous elderly had significantly higher levels than their non-indigenous counterparts. We can interpret this as evidence that the indigenous elderly were situated at a point where the programme made it possible for the threshold to be crossed for an observable effect from the intervention on dietary intake.

After correction for one of the economic factors that triggered food insecurity, the majority of the elderly spend a significant portion of their income from the economic transfer of the *70 y más* programme to purchase food that is consumed only by them and shared with the home. This reduces the vulnerability of the elderly in general, but women in particular.

The detailed exploration of the programme's effects through the quantile regression models demonstrated notable results in terms of adequacy of intake levels. Briefly, the effect of the programme on diet differs from the indicator, the part of the distribution and the characteristics of interest. First, the results support the heterogeneity of sex, ethnicity and SES, and in fact, particularly favoured the vulnerable populations: women, the indigenous and the elderly living at the lowest socio-economic level as determined through total monthly spending. It is clear that at baseline, the PAI of proteins and dietary fat were the least favourable indicators with low averages and median values that barely reached 70 per cent. However, the data demonstrate that the programme helped to improve both, particularly for those in the central part of the distribution. Even more importantly, the evidence suggests that for individuals with the lowest levels of adequacy of intake, or those at risk of inadequate levels of intake (where adequacy was lower than 50 per cent), the programme improves both the PAI of protein and dietary fat, particularly among the poorest elderly, defined as those in the lowest quartile of total monthly spending. At this level (<50 per cent), the PAI for dietary fat had a significant increase among women and indigenous people. In fact, among the elderly with the highest levels, or the levels over 100 per cent, for adequacy of energy and carbohydrate intake, the programme had a positive effect, but it is important to remember that an excessive diet is not desirable as it can promote weight gain.

Despite the fact that energy consumption ranged from 140 to 200 kilocalories per day among women, indigenous populations and the poorest elderly, we did not find evidence that the pension from the *70 y más* programme had an effect on their nutritional statuses. This leads us to think that during the evaluation period, the programme was promoting weight gain and that this could explain that the population had an elevated level of energy expenditure (Manrique *et al*. 2014). Physical activities are metabolically demanding. However, we should not discount that daily energy intake could be visible in weight gain over time, as well as how the elderly population has a tendency to adopt a more sedentary lifestyle, which can be inherent with age. When that lifestyle is combined with the certainty of receiving a pension, the pattern of any strenuous physical activity can decrease, and the elderly may engage in less demanding physical activity.

According to the study conducted by Arroyo and Méndez (2007), the rural household diet in Mexico is monotonous and high in energy, and it is principally derived from tortillas and portions of vegetable oils. Taking into account household income, the analyses of these household diets showed that households in a better economic position introduced changes in their diets which were associated with an increase in the amount of energy available, as well as increases in the diversity, density, palatability and energy density of their diets. For the elderly, not much has been documented, but it is possible to imagine a scenario of scarcity and insufficient food diversity.

Similarly, from a sample of elderly persons aged 60 or older from poor rural zones in Mexico, Salgado de Snyder *et al*. (2005) demonstrated that, in a typical week, food consumption is dominated by tortillas and chilli peppers, and occasionally (about every 2–3 days), meat, vegetables and fruits are included. However, increasing the household income may positively affect the access to and availability of food, and as a result, these populations may change parts of their diet to enhance the nutritional characteristics of the foods they consume (Darmon and Drewnowski 2008). In general, the evidence from these studies that have evaluated the impact of economic transfer programmes, particularly for the spending or consumption patterns of poor households who are programme beneficiaries, suggests that there is a tendency among beneficiaries to incorporate meat, fruits, and vegetables into their diets (Attanasio and Mensard

2006; Leroy *et al*. 2010). Nevertheless, food purchases can also be a result of the precise or perceived recommendations of the programme with respect to healthcare, whose impact can be seen as an accumulated effect of many years in which other development programmes having given messages to the population of how healthy diets are central to health (Escobar and de la Rocha 2002). Finally we must remember that payment points are located in the municipalities, that is, the political and economic centres regionally. So on the days when the elderly beneficiaries receive their payments, they are also able to access a greater quantity and variety of food products in the municipality.

The results of our analyses support our hypothesis that the *70 y más* programme has contributed to improve certain aspects of health status and diet among elderly programme beneficiaries. Descriptions given by the beneficiaries have also shown that their programme experience was perceived as positive, and the enrichment of their diets was one of the most visible impacts of the programme in their lives. But beyond knowing the nutritional makeup of the diets of the beneficiaries, determining whether or not those indicators satisfy the chosen nutritional reference, or discussing the risks and benefits that can result from a programme such as *70 y más,* it is urgent to complement how this data can translate into what the elderly are actually eating.

From our data, we created a list of the 15 types of food most frequently consumed by the elderly in our sample for both 2007 and 2008 (Appendix F, Table F6). The list denotes a monotonous diet, as previously described for individual and household consumption in rural areas (Salgado de Snyder *et al.* 2005; Arroyo and Méndez 2007), but even more importantly, the list shows that the diets of the intervention and control groups during 2007 were similar. As expected, corn tortillas (first) and cooked beans (second) were the two most consumed food items, and the same was found in 2008.

In 2007, a favourable aspect particularly stands out, which is that the intervention group reported personal consumption of bananas, oranges and mandarin oranges, foods that offer diversity to a diet and are a source of micronutrients. In 2008, the preference to include oranges or mandarin oranges into diets was confirmed, as these foods were the third most-consumed foods in the intervention group. It is important to mention that during baseline, the consumption of drinks with sugar, especially coffee and soda drinks, dominated – a fact observed in both intervention and control groups. Although these drinks containing sugar were still on the list of 15 foods most consumed in 2008, there was a decrease in the frequency they were mentioned.

Descriptively, some increases found are encouraging. The percentage from the intervention group who reported the consumption of eggs and chicken (leg, thigh or breast) increased from baseline to follow-up. In the control group, even though there was an increase in the frequency in which the elderly reported including chicken in their diets, which was smaller for the intervention group, the frequency in which they reported eating egg was lower. The qualitative data provided the opportunity to see how frequently certain types of foods were mentioned and also how they factor into the total amount spent as a result of the pension.

The qualitative component of the evaluation complements the quantitative findings and facilitates the understanding of the community context, particularly from the experience of the beneficiaries. It is explicit in the testimonials that the role of purchasing food is one of the main effects of the *70 y más* programme*.* Gender dynamics also explain how the effect of the programme among women may be not only to alleviate the conditions of scarcity that the

women may experience, but also the important role of empowerment of women due to the fact that they can buy food with their own money and share it with their families creating a sense of reciprocity. The mentioned empowerment plus the large role women have in purchasing and preparing food, both of which have given them greater familiarity with food issues and the vulnerable positions under which the women used to live, can explain the bigger effect found in women. On the other hand, the qualitative component attests to a potential cumulative effect of health education as a consequence of the existence of *Oportunidades* and its educational component, which has been present in these localities for over 10 years. This may have been reflected in the purchase of more nutritious foods with the pension and, additionally, it explains and confirms household food being purchased with household income.

Lastly, if it could be considered that suboptimal levels of adequate consumption among elderly could be a manifestation of food deprivation, where we did not observe the programme to have an effect, this should be an area of further research to understand and tailor future developments of the programme so that nutritional requirements can be fulfilled.

10. Results of the impact on mental health

10.1 Depressive symptoms

The findings for the depressive symptom indicators show that the programme had a significant overall effect on the presence of both mild (p<0.10, Table 5) and severe symptoms (p<0.05). In fact, although there was an increase in the average of these two indicators for both intervention and control groups in follow-up, the negative value of the associated coefficients (−0.05 and −0.028) reflect the fact that the programme contributes primarily to greater feelings of safety and welfare associated with decreased depressive symptoms among the elderly.

The analysis of the effects of heterogeneity show that the impacts of the programme for these indicators are particularly prominent among women (p<0.05, Table 6), the non-indigenous communities (p<0.10, Table 6) and among the elderly who reside in the poorest households (p<0.05, Table 6). For women, receiving a pension represented an absolute decrease of 7 per cent in the prevalence of mild depressive symptoms. However, if one considers that the prevalence of DS in the control group at follow-up was as high as 33 per cent, then receiving a pension represented a relative reduction of 20 per cent in the presence of DS within this population group. As for the indigenous population, the prevalence of severe DS was reduced by 3.2 per cent in absolute terms, but 10 per cent in relative terms.

In general, the findings relative to both overall and heterogeneous effects show that the *70 y más* programme has a significant impact on the reduction of depressive symptoms.

10.2 Empowerment

In empowerment, the overall effect of the programme was significant for: *participates in household decision making* (p<0.01, Table 5) and *makes decisions on household spending* (p<0.01, Table 5). While the heterogeneity analyses supported these trends, the effects were of similar magnitude for men and women (Table 6), indigenous versus non-indigenous (Table 6) and for different levels of SES (Table 6).

Specifically, receiving a pension boosted the percentage of elderly participating in decision making at home by 9 per cent in absolute terms and by 15 per cent in relative terms (compared

with the percentage observed in the control group at follow-up). Likewise, the percentage of elderly people participating in decisions regarding household expenses rose by 10 per cent in the intervention group in absolute terms, implying a 14 per cent increase in relative terms. The results therefore indicate that, in general, the programme exerted a significant impact on the empowerment level of *70 y más* beneficiaries.

The qualitative component of the study found a strong trend related to the programme and shared by the vast majority of participants in regard to the reduction of sadness and increased empowerment. This effect was initially associated with the elderly we directly interviewed, who experienced a reduction of or a relief from poverty and the stress related to having no income at all for most and an increased sense of security and well-being from receiving a regular income that they could consider their own and which they can decide how to spend. Many of the elderly declared that the non-contributory pension was their only source of income at the moment. Moreover, because of the conditions in the rural areas, which can also be characteristic of peasantry, where most of the beneficiaries had lived their entire lives (Camarano, Pazzinato and Marsilac 2002), receiving a stable and fixed monetary income was declared by many men and women, especially women, to be something they had never before experienced. This suggests that there was a significant perceived impact for these beneficiaries that was particularly felt with a greater intensity by women.

At the same time, decreased feelings of sadness were intimately related to acts of empowerment that may be related to what the theory of social capital states as a mechanism of reciprocity, the balance between giving and receiving. The redistribution of goods within social networks and particularly within their households explain the important effect on empowerment and its satisfaction due to the fact of feeling value in the act of sharing and not only receiving. On the other hand, contributing to or making decisions at the household level constituted an important feeling for the beneficiaries because at the moment of contributing to the household income they felt empowered to give their opinion and have a voice in decisions (Nayaran and Pritchett 1999; Bourdieu 2001; Durston 2005; González de la Rocha 2005; Guzmán, Huenchuan and Montes de Oca 2008). Thus, it can be inferred from our interview data that practices and their significance in the communities can infer the social mechanisms that explain and make sense of the context at which we have arrived through our statistical findings on mental health and autonomy.

Following a constructivist interpretative framework, understood as the collective generation of reality and transmission of modulating experiences, it can be deduced from the qualitative data that, when receiving the pension, the elderly perceive the money as their own and that it comes constantly – for instance, they know it is paid reliably every two months (Crotty 1998; Patton 2002). This perception results in a feeling of *a reduction of the stress or sadness* normally caused by poverty and uncertainty or total lack of income. This reduction of stress is meant to be a feeling of safety and welfare. This effect is also seen across our nutrition and food purchase findings. Similarly, in the evaluation conducted by Márquez-Serrano *et al*. (2007) on the non-contributory pension in the state of Guerrero, many elderly beneficiaries stated that the pension was their only income, and having it gave them a sense of security and calm.

A central finding of the study was related to the use of the pension. The fact that the elderly make their own decisions on how and on what to spend their money is a key element linked to the feelings of empowerment described earlier. *Decision making* and the effects of decisions make up the key mechanisms that largely explain the feelings of reduced sadness, which can be associated with depressive symptoms. The elderly, with regard to gender and ethnicity, often

declare that they decide to use their money to buy food, usually for household consumption, as the primary use of the pension; however, medical expenses and payments to workers tend to be the second most mentioned activities for major expenditures. These priorities were similarly found in the qualitative study of the elderly in the state of Guerrero (Márquez-Serrano *et al*. 2007).

The payment to workers, or *payments made to third parties for their labour*, is significantly important for both men and women. For men, to pay a third party alleviates the stress from thinking of how they are no longer able to do their work as they could before and how they are no longer able to generate income. This is similar to findings of Barrientos, Gorman and Heslop (2003) where elderly people used to feel anxiety where, in the context of poverty, they are no longer able to fulfil their responsibilities. For women, who as widows are frequently referred to locally as 'having no male' (Huac M_i) or having no partner, they can now pay a third party to perform the traditional tasks of men, such as fixing the roof of the house and bringing wood for cooking into the house. The capacity of being able to pay a third party for work as well as the empowerment to raise their voices in household decisions thanks to their contribution to income, in poor contexts, can shed light on local mechanisms that help understand these findings on depressive symptoms and empowerment.

Having one's own resources also gives a sense of economic independence for the elderly who in many cases are financially dependent on their children, whose own families demand the majority of their resources (Guzmán *et al*. 2002; Palomba 2003; Salgado 2007). For many women, the money they receive through the *70 y más* programme is the first economic transaction of their entire lives, which has very revealing implications for their autonomy, security and empowerment. These women expressed in the semi-structured interviews how the money gave both themselves and their children a kind of relief, while they felt better for not only reducing the economic burden in their children, but also gaining independence in terms of how to spend their own money.

Finally, the *redistribution of resources* through sharing the pension with the household is at the heart of understanding any changes related to the programme on the empowerment and reduction of sadness among beneficiaries. On one hand, in traditionally rural families, those who contribute to household spending have the right to determine its use. On the other hand, the literature points out the importance of social support networks for linking family social capital to the welfare of the elderly (Bebbington 2000; Kessler 2005; Woolcock and Narayan 2006; Puga *et al*. 2007), as well as the role of reciprocity in giving and receiving, which if the feeling of imbalance or lack of reciprocity is felt, the social capital of the elderly diminishes while the density of social networks are weakened (Bebbington 2005; Durston 2005; Jáuregui *et al*. 2006). This can generate a lack of empowerment or recognition within the household (Sauerwald 2000) and in sum a poor quality of life.

So then, by being able to offer households financial support to purchase food, the elderly obtain *acknowledgement* from the household members and are *empowered* to decide on issues that concern their lives, as well as the collective life of the household. Although this finding is valid for the majority of the elderly interviewed, the women articulated this phenomenon more often than men. In general, the diverse elements described around the non-contributory pensions contribute in different ways through complex social mechanisms to 'reduce suffering', 'give themselves value', 'increase happiness', as well as to improve the emotional health among the elderly.

The transcripts of the qualitative interviews, found in Appendix G, are a representative selection of findings from the qualitative component and are intended to reflect the voices of the elderly, the social mechanisms that explain the impact of the programme, and the meanings that beneficiaries assign to the programme.

10.3 Discussion and implications

Mental health problems represent the most frequent cause of emotional distress among elderly, and because of their devastating consequences, they represent an important public health issue (Kinsella and Wan He 2009). Additionally, a low SES is known to be associated with higher mortality and all-cause morbidity, as well as a greater presence of deterioration in functional abilities (Mackenbach *et al.* 1997; Martikainen *et al.* 1999). This relationship has been established for several mental disorders including depression (Everso *et al.* 2002; Lorant *et al*. 2003; Stansfeld *et al.* 2003).

According to our theory of change, we hypothesised that the *70 y más* programme had an impact related to the economic transfer and on the analysed mental health indicators, since the transfer can be seen as a component of the SES among elderly beneficiaries. Furthermore, the results presented here indicate that social mechanisms are at play under which the beneficiaries experience an effect from the pension that redefines the meaning of money in their lives. Thus, besides meaning a perceived reduction of poverty, the pension the elderly receive has a positive effect on self-determination and decision making at both the individual and household levels. This decision-making power is translated into economic autonomy, sense of value of self, feeling of reciprocity and worth and the reduction of economic dependence on their children.

In turn, the elderly share or redistribute the income they receive across their household, as found in the study by Márquez-Serrano and colleagues (2007). In doing so, they regain the power to give their opinion on household matters, which in turn revitalises their social networks through reciprocity and the sense of being recognised and not being a burden for their families. The resulting effects of these feelings have been previously identified in the literature on social networks of the elderly (Bebbington 2005; Durston 2005; Kessler 2005; Jáuregui *et al*. 2006; Woolcock and Narayan 2006; Puga *et al*. 2007) and are expressed by the elderly participating in the present evaluation as 'no longer suffering', 'feeling valuable, worthy' and 'being happy'.

In particular, some of our results show that if an intervention were implemented to increase the income and the SES of elderly people, some mental health outcomes may change, just as proposed by Social Causation theory (Dohrenwend *et al*. 1992; Hudson 2005). For now, and in the short term, it is reasonable to think that the effect is almost exclusively attributable to the economic transfer and social mechanisms that could be observed in the short term through the qualitative component. Perhaps in the medium and long terms, it will be possible to identify other psychosocial or behavioural factors that contribute to explaining the effects observed.

The mental health indicators we have used in our analyses could broadly be divided into behavioural and emotional categories. The behavioural indicators are more objective and are related to living conditions, such as cognitive deterioration, functional dependence in terms of physical autonomy, functional dependence in terms of the autonomy of movement and some aspects of economic autonomy, such as land ownership or having saved money. The emotional indicators are more subjective and are related to how the elderly express their feelings, emotions, and perceptions related to depression, self-esteem, and empowerment, such as autonomy and power in decision making.

In general, the programme had more observed effects on emotional indicators than on behavioural indicators. These results confirm what other studies have found relating to SES and mental health (Costello *et al*. 2003), which reveals the known fact in social and psychological research that a significant relationship between SES and emotional aspects is more likely to be observed than one between SES and behavioural aspects (Kessler *et al.* 1997; Muntaner *et al*. 1998).

The most conclusive result found in our analyses was the effect of the programme on the presence of mild and severe depressive symptoms, which can be interpreted from the interview transcripts. This is a very important finding, since of all mental health problems experienced by the elderly, the most important based on prevalence is depression. This issue is even more pressing because depression is associated with increased mortality and suicide, as well as morbidity, in terms of functional dependence (Schulz *et al*. 2000; Chapman and Perry 2008; Mezuk *et al.* 2008; Fiske *et al.* 2009; Cho *et al*. 2010). So if the programme has a significant and considerable effect on depressive symptoms, it is possible that it will also have an indirect effect on the mortality and disability of the elderly, an effect that can only be measured in the long term.

A significant effect was also observed among other emotional health indicators, particularly those involving some degree of empowerment. These included decision making in the home, contribution to household spending and decision making on household expenditure, all of which can be found in the literature related to empowerment (Mayo and Craig 1995; Rowlands 1997). Although there was a significant effect for both men and women, it is important to note that the effect seems to be stronger for women. Perhaps this is because for many of the poor and rural women, this is the first time in their life they have an income of their own, which could particularly favour a strong empowerment process in them. In addition women are more often widows, so paying third parties for work can give them a stronger feeling of empowerment and decision making.

The interviews with the elderly help us to understand the mechanisms behind income appropriation and decision making within the household, as well as the effects the programme had on social and financial redistribution, reciprocity and empowerment. Despite this, it was not possible to observe a significant effect on self-esteem among the elderly in either the analyses across the population or the analysis of heterogeneity. It is possible that for this sample, which is mostly illiterate, the sense of empowerment is more important than a feeling of self-worth, which can be more the reflection of an internal or inherent characteristic of being older, and hence more difficult to modify. Additionally, it may be more adequate to construct an assessment of mental health conceptually in urban societies where there is more concentration on the welfare of the individual, which is contrary to what happens in rural societies, where primary concern is for the community (Harris 1988). This is a topic that deserves further research.

Finally, it was not possible to observe an effect of the programme on indicators related to behavioural aspects among the elderly. This fact has also been highlighted in the literature (Muntaner *et al*. 1998; Costello *et al*. 2003), and it is possible that in our case this lack of effect would have been a consequence of the shortness in the duration of time between baseline and follow-up, which was between 11 and 13 months. A longer period of exposure to the programme is required to evaluate these indicators adequately. This is particularly true for cognitive deterioration and functional dependence, which despite being modifiable factors often

require not only more time between measurements but also the use of specific tools designed for this purpose of evaluation.

The situation is different for the indicators related to economic autonomy. While it is true that economic autonomy is an important factor in empowering the elderly, especially women, it is also true that the indicators for land ownership and financial savings used in our analysis may not be appropriate taking into account the amount of pension received and the cumulative duration of time in which that pension was received (Roy and Chaudhuri 2008). This is because land in rural communities in Mexico is often inherited by individuals, and savings are not always expressed as money saved but instead in the purchase of assets, such as livestock or production inputs. Thus, the nominal measurement of goods, or the capacity to save, may not be the most effective measure for economic autonomy, but the capacity to decide on choosing how to use these resources and using them as a result of that decision may regularly be associated with family and community arrangements.

10.4 Cost analysis

This section presents the results of our cost analysis. We start by estimating the cost-transfer ratio (CTR) of the programme, which is defined as the amount of monetary resources spent per unit of transfer made to a beneficiary, and then we compare it with the CTR of other cash transfer programmes in Mexico. CTR has been often used as a measure of operational efficiency by several studies on the cost of transfer programmes in Latin America (Caldes *et al.* 2004; Lindert *et al.* 2006).

Programme costs are not measured directly but are approximated by actual annual expenditures incurred by the programme. We obtained programme expenditure data for 2007–2010 from the accounting records kept by the programme's central office at the Secretary of Social Development (SEDESOL). Total expenditures include total administrative expenses, including expenses on monitoring and evaluation activities, as well as the amount of total transfers received by the beneficiaries. Our data include expenditures incurred by the programme's central office at the federal government level and by state-level offices (*delegaciones*). Table 7 presents the main data and results.

The programme began in 2007 with coverage of slightly over one million people. It rapidly expanded to 1.86 million in 2008 (an 81 per cent increase), to 2.05 million in 2009 (a 10 per cent increase) and to 2.1 million in 2010 (a 3 per cent increase). The expansion was due mainly to modifications in one of the eligibility criteria: in 2007 it started targeting localities with fewer than 2,500 inhabitants; it expanded in 2008 to localities with up to 20,000 people; and in 2009, to localities with up to 30,000 inhabitants, which is the current cut-off point on the locality size eligibility criteria.

The programme had a relatively low level of administrative costs. Administration is about 5–6 per cent of total expenditures and the programme has a CTR in the range of 0.054–0.068. The CTR level of the *70 y más* programme is comparable to the average of 0.063 observed for the *Oportunidades* cash transfer programme in 2001–2003.[6] However, it is possible that there is room for operational efficiency gains because *70 y más* is an unconditional transfer programme,

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[6] We compare *70 y más* to *Oportunidades* and other CCT programmes as we are not aware of cost studies conducted for cash transfer programmes to the elderly in Mexico or the rest of Latin America and the Caribbean. The average 0.063 is estimated by the authors from data presented by Lindert *et al*. (2006, Table 6). *Oportunidades* has actually reported lower CTR levels, such as 0.042 in 2000.

whereas *Oportunidades* is a conditional one, and conditional cash transfer (CCT) programmes allocate significant amounts of resources to the verification of the conditionalities. As an example, in 2000, about 24 per cent of *Oportunidades* administrative expenses were allocated to verifying the conditionalities (Caldes, Coady and Maluccio 2004, Table 3). Other CCT programmes have reported lower CTR levels, such as Brazil's *Bolsa Familia* with a range of 0.027–0.032 in 2003–2005.[7] It is important to note, however, that *70 y más* and CCT programmes are not strictly comparable as they are intended for different population groups and are implemented through different sets of interventions. A careful analysis of the fixed versus variable costs and their relationships with coverage levels is needed to detect if operational efficiency gains are feasible.

Interestingly, the CTR of *70 y más* shows a pattern of change over time different to the pattern observed in other programmes. The programme's CTR has the lowest level in the initial year of the programme (0.054 in 2007), and it increases to 0.068 in 2008 and then stabilises at about 0.064 in subsequent years. Typically, CTR in the initial year of a programme has a tendency to run high because of high start-up costs[8] with significant declines in subsequent years. Possible explanations for these results are: (1) start-up costs were low because of the relatively simple and easy to measure criteria (age and locality size) used for identifying eligible programme beneficiaries. Those criteria are easier and less expensive to measure than poverty scores which require complex systems to estimate poverty based on surveys of household and individual characteristics; (2) implementation benefited from using the existing programme delivery infrastructure established by *Oportunidades* or other ongoing social programmes; (3) programme expansion occurred during the entire period 2007–2010 with high and sustained start-up costs, and as the programme stabilises, significant reductions in the CTR are expected to occur in 2011 and 2012. These explanations are not mutually exclusive and suggest that operational efficiency gains are possible for *70 y más*.

10.5 Relating programme costs to the effectiveness analysis

In this section we present our estimates of cost-effectiveness (CE) ratios for the nutrition and mental health indicators. Marginal effects estimates are provided by the effectiveness analysis presented in previous sections. Since our data do not distinguish between fixed and variable costs, we estimate two CE ratios to provide upper and lower bounds of the CE ratios. The first one uses total programme expenditures (administrative plus transfer expenses), and the second one uses total transfers to beneficiaries only. Given that a large proportion of programme expenditures are transfers, the two bounds are actually fairly close. We present results only for outcomes with significant overall marginal effects.

Nutrition
Table 8 presents our estimates of CE ratios for the nutrition indicators. The first panel is for consumption of macronutrients. Marginal effects for these indicators are interpreted as the average change in the quantity of macronutrients (grams per day) consumed per beneficiary as a result of the *70 y más* intervention. The CE ratio for carbohydrates is estimated to be US$30.24–31.89 per unit of additional outcome (grams per day) generated by the intervention. The CE ratio for proteins is estimated at US$145.77–153.73 per unit of additional outcome (grams per day) generated by the intervention. It is difficult to reach a conclusion about the

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[7] Estimated by the authors from data presented by Lindert *et al*. (2006, Table 6).
[8] Typical start-up activities are programme design, setting up management and pension delivery offices, and identification and enrolment of beneficiaries.

cost-effectiveness of the intervention for these two macronutrients for two reasons. First, we are not aware of other studies that have examined the nutritional impact of alternative interventions for the elderly in Mexico or other similar countries, and that could have related their results to the costs of the interventions. Therefore, we are unable to compare our CE ratios with those of alternative interventions and, in that way, be able to determine whether *70 y más* is cost-effective relative to alternative interventions. Second, for these particular macronutrients, more is not necessarily better: as mentioned in previous sections, increasing consumption of the quantity of carbohydrates per day is not necessarily beneficial for the individual, as its beneficial or detrimental effect depends on the existing level of carbohydrates being consumed. In the case of beneficiaries of the *70 y más* programme, the level of carbohydrates consumed is already, on average, above the recommended level, and additional quantities consumed could be detrimental to their health. We find a different situation for proteins, for which increasing the amount per day consumed is desirable, because this group of elderly people have deficient consumption of proteins. In this case, additional proteins consumed are clearly beneficial to them.

In order to address some of the issues mentioned before, we estimate CE ratios for indicators of adequate consumption of carbohydrates and proteins. The second panel of Table 8 presents the results. As indicated in previous sections, consumption adequacy relates the actual quantity of a specific macronutrient consumed by an individual to the amount recommended to be consumed given the gender and age of the individual. We used as references the amounts recommended by WHO. The units of these indicators are percentages. Therefore, the marginal effects are interpreted as the average change in percentage points of consumption adequacy per beneficiary. We relate these results to expenditures and transfers per beneficiary to obtain lower and upper bounds for the CE ratios. The results indicate that US$54.72–57.69 are spent by the programme to achieve one percentage point increase on adequate consumption of carbohydrates per beneficiary, and that US$78.16–82.42 are spent to obtain a one percentage point increase on adequate consumption of proteins per beneficiary. As mentioned before, an increase in adequate consumption of carbohydrates is not necessarily beneficial in programme participants as they already have a level of consumption above the adequate level. In the case of proteins, programme expenditures increase adequate consumption in participants, which should be beneficial since their consumption of proteins is less than adequate.

These results should be interpreted with caution, as the *70 y más* programme generates changes in multiple outcomes simultaneously. However, in the absence of factors that would allow us to summarise changes in multiple outcomes into a single number with a unique metric (for example, US dollars, Mexican pesos, utility units or healthy days), we are forced to treat each outcome separately as if *70 y más* were an input in a single-outcome production function. A proper CE analysis would require us to estimate a multi-outcome health production function where the *70 y más* transfer is one of the inputs, and then to examine the marginal cost of producing an additional unit of a particular outcome (for example, an additional percentage point in adequate consumption of proteins), keeping the other outcomes constant. However, such an analysis is beyond the scope of this evaluation.

Mental health
Our effectiveness analysis of mental health outcomes provides us with estimates of the change in the proportions of people with particular mental-health-related conditions resulting from the programme intervention. In order to construct a measure of cost-effectiveness that estimates the cost associated with changes in outcomes caused by the programme, we link the estimated marginal effects to programme population data to obtain the number of people impacted by the

programme and then relate these figures to programme costs. For this analysis, we have to consider that while the programme is directed to elderly persons aged 70 and older, our effectiveness analysis is based on a discontinuity approach applied to those aged 70–74. Therefore, our programme impact results are only valid for beneficiaries in the 70–74 age range. We adjust our figures on programme coverage and total costs accordingly. In 2007, the programme reached 1,031,005 elderly persons, of which we estimate that 418,106 were aged 70–74.[9] We apply the marginal effects of the programme to that age group to estimate the number of people affected by the programme for different mental health outcomes.

Our results on mental health indicators can be found in Table 9. For mild depressive symptoms (GDS>5), the programme reduces the proportion of participants with that condition by 5 percentage points, which amounts to 20,905 beneficiaries impacted by the programme. Using total expenditures and total transfers for beneficiaries aged 70–74, we obtain CE ratios in the range US$9,157.14–9,655.90. Higher CE ratios, US$16,352.03–17,242.67, are obtained for severe depressive symptoms (GDS>10) as the programme has a significant but a smaller impact in the proportion of beneficiaries transiting out of that condition: only 2.8 per cent or 11,707 beneficiaries aged 70–74 being affected. The lowest CE ratios are obtained for the indicator on taking decisions related to household expenses, with a range of US$4,319.41–4,554.67 per beneficiary affected. It is difficult to establish whether these results are high or not as we lack information on the CE ratios or expenditures needed for treating one elderly person out of depression using alternative interventions. We have not found any study estimating the costs of depression treatment for the elderly in Mexico or similar countries.[10]

As we indicated in the case of nutrition, these results should be interpreted with caution as *70 y más* generates multiple outcomes simultaneously, and our results are presented for each single outcome.

While we are unable to complete our analysis with a statement on the relative cost-effectiveness of the programme, we consider these calculations important as they provide estimates for a pension programme to the elderly which can be taken as references for future studies relating estimates of programme impact to the costs of alternative interventions for the elderly.

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[9] The 2010 Population Census indicates that out of the total number of persons aged 70 and older in rural areas, 40.55 per cent are 70–74 years of age. Source: *INEGI. Censo de Población y Vivienda 2010*. Data obtained from:
http://www.inegi.org.mx/sistemas/olap/proyectos/bd/consulta.asp?p=17118&c=27769&s=est
A more refined calculation would use the proportion of 70–74 year-olds among the beneficiary population, but the age distribution of the beneficiary population was not available to us.
[10] Lara *et al*. 2009 refer to a study by Martinez Lanz and colleagues (1984) [Martinez-Lanz, P, Medina-Mora, ME, Campillo Serrano C, Evaluación del costo de utilización de los servicios en la práctica médica general. Salud *Mental 1984;7:63–67.*] on the cost of psychiatric conditions. Lara *et al*. (2009) is the only study we found that attempts a CE analysis of depression treatment in Mexico. However, that study has several limitations that renders its results not comparable to ours, namely, that it refers to the general population whereas *70 y más* is targeted at elderly persons aged over 70, and it is based on efficacy studies conducted in developed countries which are not a good reference for the effectiveness of programmes implemented at scale and in actual conditions in Mexico.
[10] Lara *et al*. 2009 refer to a study by Martinez Lanz and colleagues (1984).

11. Policy implications and recommendations

Non-contributory pension programmes have become relevant not only for the level of beneficiaries covered, but also for the amount of funds invested. Even when these types of programmes are faced with significant challenges, such as those related to financing, design, implementation, direction and administration, research indicates that these programmes are valid instruments for reducing poverty and the destitute conditions that may exist among elderly through small and recurring pensions for those who do not have social security benefits (Bertranou, Solorio and Ginnken 2002; Willmore 2007).

Additionally, the impact evaluation results of the *70 y más* programme*,* and in particular the findings of the present work, have documented the positive effects of the programme with regard to mental health and nutrition of the elder beneficiaries. Essentially, this is the case for specific groups of elderly persons, such as women, the indigenous and the poorest, population segments that, as we have seen throughout the entirety of this document, have been traditionally excluded from social protection.

In light of the results presented in this document, as well as of a review of the global context, our first recommendation is that the Mexican government should invest efforts towards universalising the *70 y más* programme in order to ensure basic non-contributory pensions for the elderly. This recommendation is not only supported by the results reported here, but also a main human rights approach supported by the United Nations (Huenchaun and Rodríguez-Piñero 2010). The biggest advantage of this approach is related to public policy implications, since the elderly ought to be conceived only as recipients, which is how it has been traditionally handled, and thus will become subjects of law, or active participants in a setting that respects their differences and promotes their full inclusion (Huenchaun and Rodríguez-Piñero 2010). This universalisation could be gradual, particularly since it would be important to strengthen the programme's operating systems and infrastructure. It is important to mention that an expansion was approved early this year. The programme is now facing the challenge of rolling out *70 y más* nationwide.

As demonstrated, it is important that the elderly receive an income during old age, but it is also necessary that they are covered by medical insurance. Reaching this later stage of life increases the risks related to malnutrition, depression, cognitive problems, falls, lesions and chronic diseases, to mention a few, and these require greater and better healthcare, which can guarantee a certain quality of life. Therefore, it is necessary to arrange a benefit package and not just a monetary transfer for the elderly (Bertranou 2006). Related to the mental health and nutrition issues found in this paper, we believe that the impact of the *70 y más* programme could be increased if the elderly beneficiaries have adequate access to health services that specialise in the health conditions commonly found among individuals in this age group. In this sense, the second recommendation coming out of this evaluation is to link the *70 y más* programme with *Sistema de Protección Social en Salud* (*Seguro Popular*). *Seguro Popular* is an instrument created by the federal government that offers a public health insurance package that can provide financial protection to the population (families and citizens) who are not entitled to social security because of their employment or socio-economic status (SSA 2012).

The investigators of this project organised a seminar entitled '*Protección Social para Adultos Mayores*' in order to create the space for a panel discussion on the effects of pensions on the poor, the main challenges the elderly encounter in seeking healthcare attention, and the

response to the *70 y más* programme from the country's main social protection programme *Seguro Popular*. During this exercise, experts in the field presented methodological bases underlying the link between the *70 y más* programme and *Seguro Popular*, as well as a basic agenda that could serve as an initial screening consultation where a simple questionnaire could identify elderly persons who were at-risk based on their fragility. At this seminar, the director of the *70 y más* programme and the authorities of *Seguro Popular* were able to discuss the feasibility of establishing a formal link between the two programmes.

The third recommendation is related to promotion of and participation in the *70 y más* programme. During the years of evaluation (2007–2008) it was found that the process of consolidation had not developed to its full capacity. We consider that this component could be an efficient vehicle if activities were included to facilitate necessary information flows to programme beneficiaries about nutrition, healthy habits and preventive care, among others, as well as to include participatory activities for the elderly that can help them strengthen their support circles. At the same time, this component could serve as a link between *70 y más* and other programmes that facilitate access to local and healthy food. For example, *Diconsa*, a government-owned company within the social development sector, aims to contribute to the goal of overcoming food poverty through supplying basic and complementary commodities to highly or very highly marginalised localities in rural areas by means of organisation and community participation (SEDESOL 2012).

Finally, *70 y más* is currently the second largest social programme of relevance in Mexico, and in this sense it is necessary to continue evaluation studies in order to understand in depth whether the programme meets its objectives, and to determine whether or not the programme is contributing to its originally stated goal of improve the living conditions of the elderly. In these evaluation activities, it is important to incorporate the elderly who reside in localities with more than 2,500 inhabitants, since the programme expanded its coverage during 2008 and 2009 to include localities with up to 30,000 inhabitants. During 2012 the programme was supposed to increase coverage to highly and very highly marginalised cities, which would have benefitted the elderly in urban areas of the country (Presidencia de la República 2012), since the areas of programme operation where there is no available evaluation information nor an impact may differ greatly in terms of the dynamics of the environment and social networks when compared with rural areas.

Traditionally, research has been focused on understanding the effects on household poverty, investment in schooling and the health of children living with beneficiaries, and little attention has been paid to topics regarding individual health and well-being. Since the *70 y más* programme was designed with the purpose of improving the living conditions of adults aged 70 years and older, the main conclusion of the paper is that the pension had significantly positive effects on two areas of great interest in ageing: nutrition and mental health. As is well known, good nutrition and mental health in the elderly benefit the successful ageing process.

12. Tables

Table 3 Overall and heterogeneous effects of the *70 y más* programme on nutritional status and diet

Outcome	Overall effect	Gender		Ethnicity		SES			
		Male n=889	Female n=1133	Indigenous n=643	Not indigenous n=1180	Q1 n=479	Q2 n=529	Q3 n=517	Q4 n=497
Nutritional status									
BMI, *kg/m²*	−0.059	−0.066	−0.096	−0.034	−0.097	−0.124	−0.080	−0.054	−0.032
	(0.084)	(0.126)	(0.121)	(0.165)	(0.114)	(0.176)	(0.161)	(0.187)	(0.159)
Normal BMI range[a]	0.005	0.019	−0.007	−0.007	0.011	0.014	0.064*	−0.021	−0.033
	(0.019)	(0.027)	(0.024)	(0.036)	(0.024)	(0.037)	(0.037	(0.040)	(0.035)
Total energy and macronutrient intake									
Energy, *kcal*	53.156	−14.050	140.900**	191.500**	4.506	216.100**	−24.730	−32.470	57.640
	(52.649)	(81.380)	(64.610)	(93.100)	(62.950)	(104.600)	(96.820)	(83.260)	(97.580)
Carbohydrates, *g*	15.140*	−2.302	30.670***	36.730**	7.535	40.970**	7.532	15.780	1.176
	(8.546)	(13.060)	(10.320)	(15.100)	(10.490)	(17.370)	(15.110)	(14.210)	(15.820)
Protein, *g*	3.141**	1.201	5.407***	6.925***	1.665	8.688***	0.663	2.127	1.689
	(1.485)	(2.237)	(1.759)	(2.568)	(1.870)	(2.873)	(2.776)	(2.607)	(2.688)
Dietary fat, *g*	1.445	−0.072	3.887	3.356	1.051	12.060***	−3.540	1.560	−2.678
	(1.950)	(2.662)	(2.485)	(3.445)	(2.415)	(4.011)	(3.793)	(3.743)	(3.562)
Adequacy of intake, %									
Energy	5.163	−1.314	11.550***	12.610**	2.813	17.570**	0.641	1.963	2.134
	(3.412)	(4.745)	(4.419)	(6.029)	(4.074)	(7.234)	(6.041)	(5.624)	(5.948)
Carbohydrates	8.368*	−1.647	16.360***	17.860**	5.316	21.070**	6.384	9.228	−0.813
	(4.391)	(6.010)	(5.707)	(7.754)	(5.404)	(9.210)	(7.609)	(7.392)	(7.817)
Protein	5.858**	1.521	10.780***	12.850***	3.758	17.600***	1.420	3.368	2.241
	(2.775)	(3.966)	(3.468)	(4.770)	(3.447)	(5.610)	(5.113)	(4.779)	(4.947)
Dietary fat	2.867	−1.307	7.786	5.316	2.896	22.790***	−6.242	3.307	−5.243
	(3.806)	(4.675)	(5.194)	(6.772)	(4.663)	(7.922)	(7.077)	(7.194)	(6.625)
Contributing to total energy intake, %									
Carbohydrates	−0.132	−0.466	−0.201	0.795	−0.549	−1.112	0.985	−0.207	−0.341
	(0.565)	(0.797)	(0.678)	(0.937)	(0.763)	(0.972)	(0.847)	(1.027)	(0.97)
Protein	0.000	0.143	−0.029	−0.075	−0.019	−0.104	−0.01	−0.298	0.336
	(0.150)	(0.241)	(0.192)	(0.248)	(0.210)	(0.324)	(0.283)	(0.314)	(0.272)
Dietary fat	0.131	0.323	0.23	−0.72	0.568	1.216	−0.975	0.505	0.005
	(0.500)	(0.682)	(0.594)	(0.800)	(0.673)	(0.837)	(0.822)	(0.905)	(0.86)

Note:
Standard errors in parentheses.
[a]Dichotomous variable to estimate the probability of having BMI within the normal range defined by the WHO classification system as 18.5–24.99 kg/m²
*p< 0.10; **p< 0.05; *** p< 0.01

Table 4a Estimation of the programme effect on the levels of adequacy of energy and macronutrients intake using quantile regression

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Indicators of adequacy of intake (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
All elderly									
Energy	1.596	1.440	3.290	7.956***	7.885***	9.092**	12.34***	4.285	−3.585
	(2.683)	(2.454)	(2.873)	(2.919)	(2.904)	(3.87)	(4.477)	(6.443)	(7.602)
Carbohydrates	−0.546	−0.886	2.643	6.504*	12.16**	10.67**	12.38**	16.74**	4.543
	(3.129)	(3.187)	(3.815)	(3.604)	(4.865)	(5.235)	(5.926)	(7.317)	(12.800)
Protein	1.824	0.844	4.185*	2.687	7.175**	7.979**	7.967*	7.652	2.876
	(2.034)	(2.149)	(2.279)	(2.681)	(2.749)	(3.239)	(4.011)	(5.306)	(8.324)
Dietary fat	1.797	5.965**	6.399***	7.548**	9.064***	7.897*	4.000	−7.878	−0.138
	(1.859)	(2.419)	(2.323)	(2.975)	(3.239)	(4.757)	(4.695)	(6.859)	(11.760)

Note:
Standard errors in parentheses
***p< 0.01; **p< 0.05; *p<0.1

Table 4b Estimation of the programme effect on the levels of adequacy of energy and macronutrient intake using quantile regression by gender

Indicators of adequacy of intake (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
Males									
Energy	0.748	1.793	−1.611	1.665	3.095	−2.278	1.563	−4.987	−5.059
	(3.589)	(3.486)	(4.113)	(4.764)	(4.774)	(5.957)	(6.953)	(9.875)	(15.310)
Carbohydrates	−2.006	−3.551	0.913	0.522	−2.938	1.047	−7.338	1.026	−17.48
	(4.719)	(5.038)	5.022)	(5.953)	(6.995)	(7.423)	(9.465)	(12.050)	(18.780)
Protein	1.034	0.072	(1.310	−1.720	1.947	0.597	−1.527	5.176	12.19
	(2.694)	(3.115)	3.232)	(4.331)	(4.054)	(5.255)	(5.766)	(8.340)	(13.480)
Dietary fat	0.890	1.08	3.901	1.081	−3.095	−5.911	−9.412	−8.893)	14.26
	(2.795)	(3.344)	(3.566)	(3.970)	(5.135)	(6.890)	(8.180)	(11.380)	(17.640)
Females									
Energy	3.302	2.877	9.813**	14.85***	15.12***	18.55***	17.61***	8.283	3.695
	(3.709)	(3.679)	(4.303)	(3.981)	(4.117)	(6.258)	(6.293)	(7.970)	(11.430)
Carbohydrates	−1.611	2.203	11.09**	18.54***	21.97***	21.78***	23.47***	21.46*	22.84
	(4.455)	(4.725)	(5.084)	(5.959)	(6.709)	(7.434)	(8.343)	(11.520)	(16.060)
Protein	3.232	1.034	7.644**	10.19***	12.89***	16.96***	14.09**	3.498	3.356
	(2.859)	(3.027)	(3.159)	(3.570)	(3.945)	(4.490)	(5.961)	(7.777)	(11.650)
Dietary fat	2.577	9.414***	12.92***	18.71***	19.56***	21.75***	10.79	−10.87	−0.546
	(2.239)	(3.417)	(3.729)	(4.054)	(4.720)	(6.729)	(8.109)	(10.860)	(18.480)

Note:
Standard errors in parentheses
***p< 0.01; **p< 0.05; *p< 0.1

Table 4c Estimation of the programme effect on the levels of adequacy of energy and macronutrient intake using quantile regression by indigenous ethnicity

Indicators of adequacy of intake (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
Indigenous									
Energy	10.13*	11.49**	17.94***	9.870	12.23*	16.93**	12.680	8.186	14.66
	(5.176)	(5.426)	(5.968)	(6.963)	(6.384)	(7.906)	(9.259)	(13.810)	(20.670)
Carbohydrates	9.396	19.01***	18.62**	29.54***	20.02**	26.56***	18.790	14.140	7.874
	(6.358)	(7.049)	(7.434)	(9.116)	(9.052)	(10.000)	(12.470)	(18.300)	(23.940)
Protein	3.605	11.13***	17.40***	14.28**	14.64**	19.07**	12.96*	5.296	9.437
	(4.374)	(4.096)	(4.660)	(5.612)	(5.974)	(7.902)	(8.038)	(11.330)	(15.150)
Dietary fat	1.488	8.433*	13.88***	11.94*	15.71**	11.160	7.658	−7.829	−15.500
	(3.523)	(4.418)	(4.291)	(6.521)	(7.291)	(8.826)	(11.740)	(17.460)	(23.210)
Not indigenous									
Energy	0.422	−4.129	−4.522	0.905	8.103**	6.264	6.596	5.925	−4.440
	(3.540)	(3.110)	(3.264)	(3.973)	(3.585)	(4.574)	(6.609)	(7.974)	(11.020)
Carbohydrates	−3.923	−6.110	−2.968	0.404	7.118	9.846	6.883	7.475	14.620
	(3.712)	(3.886)	(4.135)	(4.534)	(5.885)	(6.242)	(7.529)	(10.350)	(13.310)
Protein	0.892	−2.096	−0.682	−2.981	1.589	6.594*	4.330	7.733	3.428
	(2.663)	(2.844)	(2.455)	(3.218)	(3.645)	(3.547)	(5.281)	(6.989)	(10.040)
Dietary fat	−0.149	2.378	3.992	4.207	8.531*	4.262	1.788	−5.912	14.670
	(2.638)	(3.420)	(2.715)	(3.721)	(4.397)	(5.183)	(5.857)	(8.895)	(13.990)

Note:
Standard errors in parentheses
***p< 0.01; **p< 0.05; *p< 0.10

Table 4d Estimation of the programme effect on the levels of adequacy of energy and macronutrients intake using quantile regression by SES

Indicators of adequacy of intake (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
Quartile 1									
Energy	8.209	10.29*	12.13*	17.38**	19.83***	21.77**	17.81**	19.980	13.350
	(5.579)	(5.433)	(6.292)	(7.590)	(6.863)	(9.792)	(9.045)	(15.010)	(19.190)
Carbohydrates	3.175	14.63**	16.99*	21.19**	31.04**	26.55**	14.700	23.920	29.050
	(7.182)	(7.326)	(8.863)	(9.264)	(12.110)	(11.710)	(13.070)	(19.010)	(30.250)
Protein	11.45**	12.19**	11.04**	11.69**	13.03**	10.520	12.260	14.160	22.420
	(4.513)	(4.936)	(5.522)	(5.877)	(6.352)	(7.227)	(8.824)	(11.750)	(18.660)
Dietary fat	4.088	9.990*	12.08***	13.06*	15.99**	18.90*	26.19**	41.06*	46.32*
	(4.570)	(5.381)	(4.484)	(6.752)	(7.632)	(10.380)	(10.300)	(21.080)	(26.000)
Quartile2									
Energy	−3.727	−3.583	−3.391	0.645	2.193	−1.937	8.346	−3.377	2.794
	(5.685)	(4.798)	(5.383)	(5.835)	(4.914)	(7.458)	(9.986)	(13.020)	(19.810)
Carbohydrates	−0.785	−6.859	−7.386	2.937	1.912	5.175	11.790	17.550	15.510
	(6.602)	(6.307)	(6.667)	(7.424)	(8.538)	(10.590)	(11.420)	(13.990)	(28.830)
Protein	1.801	−6.834	3.330	1.594	0.732	1.520	5.208	2.447	−1.158
	(4.882)	(4.342)	(3.763)	(4.925)	(5.756)	(6.595)	(7.604)	(10.970)	(16.880)
Dietary fat	2.221	2.695	2.238	2.469	7.651	3.410	−2.046	−14.250	−54.01**
	(3.690)	(3.608)	(4.598)	(5.766)	(6.827)	(9.135)	(10.920)	(12.530)	(26.680)
Quartile3									
Energy	−0.894	−1.009	−1.200	6.951	1.999	7.752	5.587	−6.137	2.420
	(6.025)	(4.997)	(5.731)	(6.238)	6.572)	(7.690)	(9.521)	(12.750)	(18.520)
Carbohydrates	0.164	−4.381	−1.214	2.345	5.327	−1.172	9.543	12.310	23.740
	(6.260)	(7.414)	(8.008)	(8.441)	(9.809)	(10.580)	(12.350)	(13.870)	(23.690)
Protein	0.866	−0.894	−1.027	0.123	3.688	3.755	6.857	−1.090	9.103
	(4.037)	(4.283)	(4.949)	(5.123)	(5.749)	(6.396)	(8.211)	(10.550)	(15.350)

Indicators of adequacy of intake (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
Dietary fat	3.676	6.173	7.423	9.259	8.603	6.686	−2.825	−1.051	−1.103
	(4.426)	(4.535)	(4.886)	(6.512)	(7.281)	(8.528)	(11.410)	(15.540)	(24.720)
Quartile 4									
Energy	−4.079	2.444	6.453	10.90**	10.040	7.853	22.24**	3.945	−22.430
	(4.765)	(5.429)	(5.662)	(5.343)	(6.399)	(8.255)	(9.181)	(16.820)	(18.230)
Carbohydrates	−7.276	−4.910	5.462	11.580	11.380	9.219	20.400	2.033	−60.24**
	(6.493)	(6.829)	(7.516)	(8.769)	(8.630)	(9.442)	(15.100)	(19.720)	(23.690)
Protein	0.116	−0.620	3.619	5.930	8.621	10.41*	11.360	5.621	−10.630
	(3.602)	(4.493)	(4.270)	(5.648)	(5.611)	(5.782)	(8.793)	(11.410)	(15.740)
Dietary fat	−1.416	1.573	5.907	8.220	5.902	4.153	1.177	−25.64*	−19.470
	(3.402)	(4.820)	(4.716)	(5.900)	(6.357)	(9.475)	(9.056)	(13.750)	(21.780)

Note: Standard errors in parentheses
***p< 0.01; **p< 0.05; *p< 0.10

Table 5 Overall effect on mental health indicators: depressive symptoms and empowerment

Outcome	Mild DS (GDS>5)	Severe DS (GDS>10)	Participates in making household decisions	Participates in household spending decisions
	−0.050*	−0.028**	0.089***	0.106***
	(0.028)	(0.014)	(0.027)	(0.029)

Note: Standard errors in parentheses
*p< 0.10; **p< 0.05; ***p< 0.01
DS: depressive symptoms

Table 6 Heterogeneous effects on mental health indicators by sex, indigenous ethnicity and SES

	Programme effect	
Mental health indicators	*Males* *n=987*	*Females* *n=1,254*
Depressive symptoms		
Mild (GDS>5)	−0.032 (0.039)	−0.070** (0.035)
Severe (GDS>10)	−0.028 (0.017)	−0.026 (0.019)
Empowerment		
Participates in household decisions	0.078* (0.041)	0.086** (0.035)
Participates in household spending decisions	0.118*** (0.040)	0.085** (0.037)

	Indigenous *n=764*	*Not indigenous* *n=1,431*
Depressive symptoms		
Mild (GDS>5)	−0.052 (0.050)	−0.047 (0.034)
Severe (GDS>10)	−0.026 (0.020)	−0.032* (0.019)
Empowerment		
Participates in household decisions	0.107** (0.046)	0.079** (0.036)
Participates in household spending decisions	0.152*** (0.042)	0.083** (0.038)

Mental health indicators	*Quartile I* *n=546*	*Quartile II* *n=596*	*Quartile III* *n=558*	*Quartile IV* *n=541*
Depressive symptoms				
Mild (GDS>5)	−0.115** (0.056)	−0.022 (0.042)	−0.024 (0.049)	−0.048 (0.054)
Severe (GDS>10)	−0.019 (0.027)	−0.028 (0.020)	−0.042 (0.027)	−0.028 (0.025)
Empowerment				
Participates in household decisions	0.013 (0.055)	0.133** (0.052)	0.144*** (0.045)	0.059 (0.054)
Participates in household spending decisions	0.030 (0.058)	0.188*** (0.056)	0.074 (0.049)	0.121** (0.053)

Note: Standard errors in parentheses
*p< 0.10; **P < 0.05; ***P< 0.01

Table 7 Beneficiaries, programme administrative expenses, transfers and cost-transfer ratios

Year	Number of beneficiaries	Administrative expenses (US$)	Total transfers (US$)	Total programme expenditures (US$)	Total expenditures per beneficiary (US$)	Administration as % of total expenditures	Cost-transfer ratio (CTR)
2007	1,031,005	25,711,062	472,052,800	497,763,862	482.79	5.17	0.054
2008	1,863,945	50,145,300	740,121,485	790,266,785	423.98	6.35	0.068
2009	2,050,626	61,548,594	965,295,686	1,026,844,280	500.75	5.99	0.064
2010	2,105,306	64,095,313	1,005,661,800	1,069,757,113	508.12	5.99	0.064

Source: Number of beneficiaries and programme expenditure data from accounting records provided by the *Dirección General de Coordinación, Seguimiento y Control, SEDESOL, México*. Monetary figures are in US$ based on annual totals in current Mexican pesos. We use the 2007–2010 average exchange rate of: 12.055 Mexican pesos per US$.

Table 8 Cost-effectiveness results for nutrition

Indicator	Marginal effect	Expenditures per beneficiary (US$)	CE ratio 1: expenditures per unit of outcome (US$)	Transfers per beneficiary (US$)	CE ratio 2: transfers per beneficiary affected (US$)
Consumption:					
- Carbohydrates (g/d)	15.140	482.79	31.89	457.86	30.24
- Proteins (g/d)	3.141	482.79	153.71	457.86	145.77
Adequacy:					
- Carbohydrates (%)	8.368	482.79	57.69	457.86	54.72
- Proteins (%)	5.858	482.79	82.42	457.86	78.16

Source: Expenditures and transfer per beneficiary calculated from programme expenditure data provided by the *Dirección General de Coordinación, Seguimiento y Control, Secretaría de Desarrollo Social (SEDESOL), México*. Monetary figures are in US$ based on current Mexican pesos. Exchange rate: 12.055 Mexican pesos per US$.

Table 9 Cost-effectiveness results for mental health

Indicator	Marginal effect	Population affected	CE Ratio 1: expenditures per beneficiary affected (US$)	CE Ratio 2: transfers per beneficiary affected (US$)
Depressive symptoms (GDS>5)	−0.050	20,905	9,655.90	9,157.14
Depressive symptoms (GDS>10)	−0.028	11,707	17,242.67	16,352.03
Participates in household decisions	0.089	37,211	5,424.66	5,144,46
Takes decisions related to household expenses	0.106	44,319	4,554.67	4,319.41

Note: Results are based on the following estimates: Number of beneficiaries aged 70–74, 2007: 418,106; total programme expenditures on beneficiaries 70–74, 2007: US$201,859,596; total transfers to beneficiaries 70–74, 2007: US$191,430,012. Exchange rate: 12.055 Mexican pesos per US$.

Appendix A: Theory of change

As mentioned in Section 4, we use social causation theory as the framework to analyse and interpret our empirical results. Using such a theory framework from a non-contributory social pension programme perspective can help us understand how an intervention that provides an economic transfer to increase income can modify SES, even by a small amount, and can therefore lead to some effect on indicators related to the health statuses of its beneficiaries.

We now present our logic model together with the underlying assumptions associated with each step, since we have set out what will be the relevant social science theory and approaches that will be used to derive and interpret findings.

A1. Nutrition component
The nutrition component's logic model and its underlying assumptions are described below.

1. The elderly subject is a beneficiary of the *70 y más* programme, and receives 1,000 Mexican pesos every two months (source: programme records and self-report).

   Assumption: the *70 y más* programme is running smoothly, with older adults effectively enrolled in the list of beneficiaries and this list is regularly updated. Additionally, the cash transfer is regularly delivered, continuously and without interruptions every two months.

2. The elderly beneficiary decides that part of his economic transfer will be spent on food for the household (source: self-report).

   Assumption: the beneficiary has decision-making power, both within the home and externally, and their relationships with other household members have not been altered either by the presence of the programme or other external events.

3. Food purchases increase (source: self-report).

   Assumption: the economic transfer is necessary and indeed reflected in the purchase of food. This assumption is more credible to us as our previous research with older adults, with the same characteristics of rurality and poverty, have shown that a high percentage of government transfers is used to purchase food.

4. The elderly beneficiary consumes purchased food (source: self-report).

   Assumptions: there is enough food available in the community where older adults reside; the extra demand for food does not affect food prices in the community.

5. The consumption of prepared food positively influences the nutritional status of the elderly beneficiary (this will be appraised under the food frequency questionnaire and anthropometric measurements).

   Assumption: purchased foods are healthy and properly prepared.

A2. Mental health component
With regard to the steps proposed in our logic model for the mental component, the underlying assumptions are described in detail bellow.

1. The elderly individual is a beneficiary of the *70 y más* programme (source: programme records and self-report).
   Assumption: the programme is running smoothly, with older adults effectively enrolled on the beneficiary list, which is updated regularly.

2. The elderly individual receives the transfer of 1,000 Mexican pesos every two months effectively (source: programme records and self-report).

   Assumption: the cash transfer is delivered continuously and without interruptions every two months.

3. The elderly individual decides what their cash transfer will be spent on and how it will be spent (source: self-report).

   Assumption: the elderly individual has decision-making power, both within the home and externally, and their relationships with other household members have not been altered by the presence of the programme or other external events.

4. The decision-making process generates feelings of autonomy and self-esteem (source: self-report).

   Assumption: although the relationship between the delivery of a cash transfer, the process of making decisions and feelings of autonomy and self-esteem may be affected in very different ways, we assume that beneficiaries are not stressed by the ability to make decisions and that it enhances their levels of autonomy and self-esteem.

5. Feelings of autonomy and self-esteem reduce the presence of depressive symptoms (source: self-report).

   Assumption: although we do not explicitly propose a causal relationship between autonomy, self-esteem and depressive symptoms, we rely on the vast psychological literature that has demonstrated the importance of the relationship between these indicators, and the fact that a cash transfer has a simultaneous effect on depressive symptoms and feelings of autonomy and self-esteem among older adults.

Appendix B: Analytical sample definition

Figure B1 shows the general process through which we obtained the analytical samples to estimate the impact of the *70 y más* programme. For both nutrition and mental health indicators, the final sample involved a series of definitions and criteria discussed in this appendix.

Figure B1 Analytic sample definition
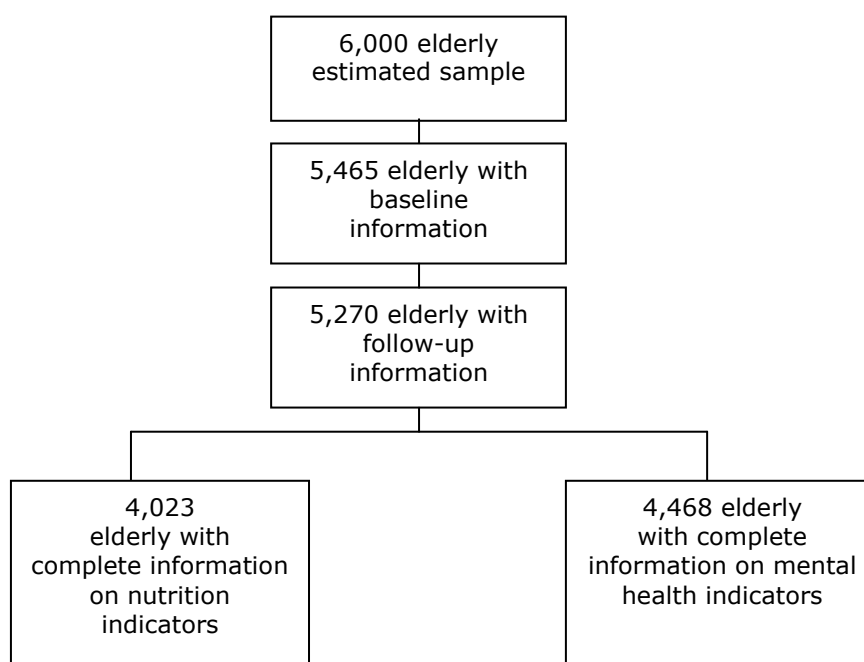
B1. Nutrition

Figure B2 shows the detailed process through which we obtained the sample of 4,023 elderly people, and the complete and valid information we used to estimate the programme's effect. Of the 5,465 elderly people who we surveyed at baseline, 525 were not evaluated during follow-up: 127 had passed away and 397 either refused to provide their anthropometric measurements or could not be measured because they could not remain standing for long enough or had a body curvature (anthropometric filter). Of the remaining 4,941 in the follow-up, 1,023 had incomplete information nutritional and anthropometric information, leaving 3,918. After cleaning the baseline data, 608 of the 3,918 with complete information had invalid anthropometric or nutritional intake values either in follow-up or in the differences estimation between 2007 and 2008. For the 1,023 with incomplete data, we identified a group of 713 whose anthropometric measurements could be imputed from available data. The final analytical sample consisted of 3,310 elderly with complete and valid information and the 713 who underwent the imputation process.

Figure B2 Analytic sample definition for nutrition indicators
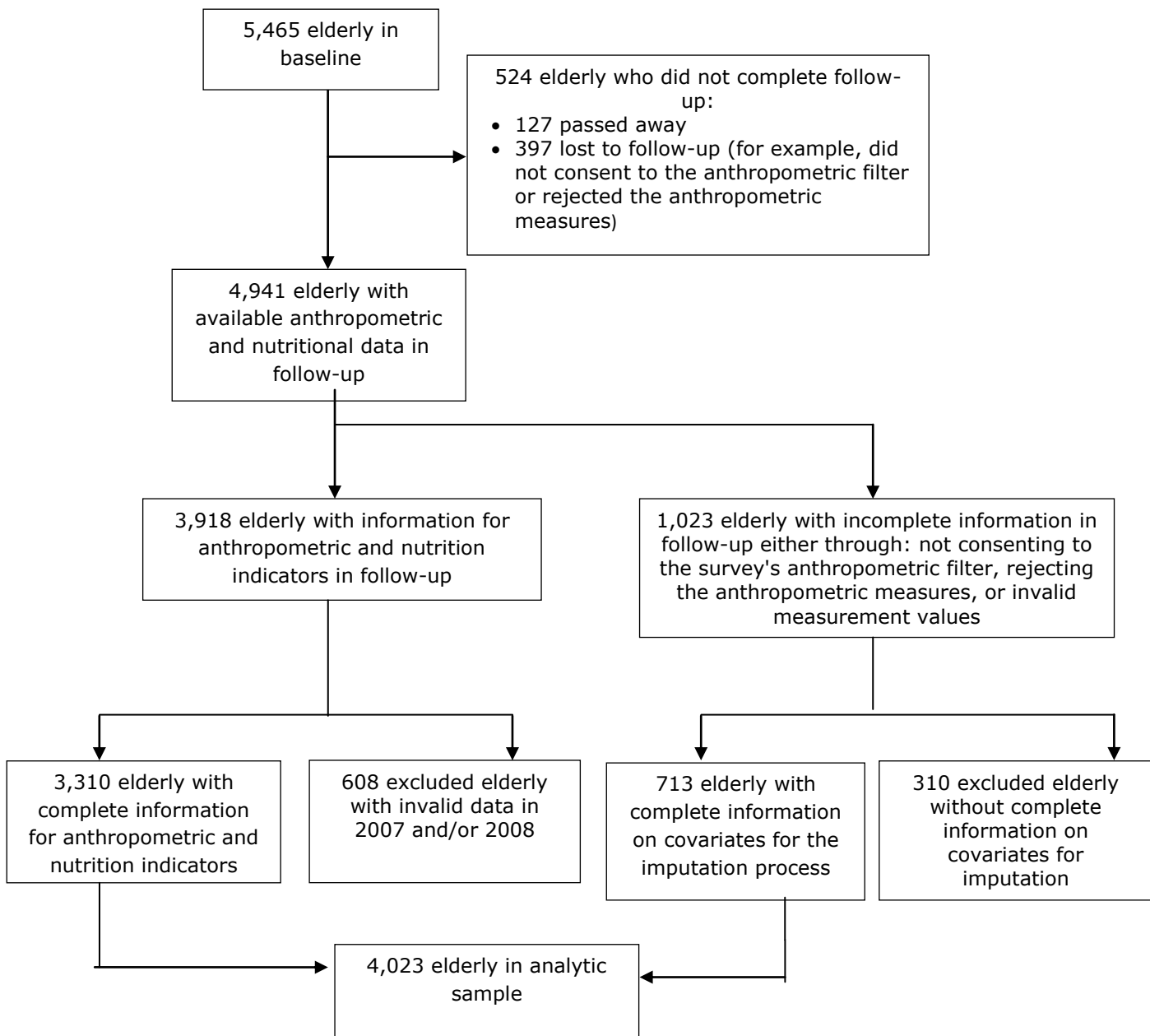
B2. Imputation

For the 713 whose values were imputed, there was no data – not even partial data – available for weight or height. Since the BMI variable was constructed from both of these indicators, we decided not to impute weight or height, but instead the BMI. For this, sex, age and baseline BMI values were used as co-variables in the imputation models.

The basic aim of imputing data is to solve the complex problem of incomplete data by using a portion of the existing data to impute the missing ones. For that, rather than fill in missing data values, some parameters, or estimators, were created from the observed data, which were then used to calculate the value of the missing data. This strategy differs from multiple regression models in its iterative estimation

process, which generates several groups of estimates until it finds those with certain desirable statistical properties. This suggests that the missing data will have more appropriate values (Dempster *et al.* 1977).

The multiple imputation process used in this report shares the advantages of the regression models' simple imputation processes, while adding information on the inherent uncertainty of the missing data (Rubin 1987). In the multiple imputation method, each missing value is replaced by a list of simulated values, *k,* which generate *k* valid alternatives of complete databases. Then, each of these *k* databases is analysed in the same way they would be if analysed with complete and valid data. The results, which may vary according to the *k* databases, are then combined using simple arithmetic to obtain global estimators and standard errors. The latter reflects the uncertainty of the imputation process.

As with any statistical procedure, multiple imputation methods need certain conditions to be met to ensure the results are reliable. It is known that these methods work properly if there is a sufficiently large sample size (Little and Rubin 2002; Dempster *et al.* 1977) – the latter suggest that 500 subjects will be sufficient for the most applications and contexts as a rule of thumb – and the assumed probabilistic mechanism that generated the missing values is correct (Schafer and Graham 2002). Although it is desirable that these conditions are met, it is also true that some alternatives have been developed and make the implementation of these conditions easier to conduct without sacrificing the validity of the results (Schafer and Graham 2002).

To carry out our multiple imputation process, we used an imputing algorithm consisting of chained equations as it is programmed in the module *mice* of the statistical package R (van Buuren and Oudshoorn 2000; van Buuren *et al.* 1999). Through this process, we created a total of 10 imputed data groups and conducted the final analyses of the programme's impact from these.

As part of this analysis of imputation and in order to determine whether or not the presence of missing values introduced any bias to our analyses, we carried out some comparisons with certain variables of interest and impact indicators between those who were included in the analytical sample and those who were excluded (see Tables B1 and B2). Significant differences between these two groups suggested that the excluded elderly are different from those in the final sample. Therefore, there could be a bias in the estimates obtained.

Table B1 Comparison of socio-demographic variables between elderly included in and excluded from the analysis

Variables	Elderly in the analysis	Excluded elderly	p-value
	n=4023	*n=1442*	
Age	69.4	69.4	0.575
Female	50.8	52.6	0.219
Indigenous	37.1	35.2	0.369
Total monthly household expenditure (Mexican pesos)	2,198.8	2,134.9	0.515

Note: Values are mean

Table B1 compares the following socio-demographic variables: age, sex, ethnicity (indigenous or non-indigenous), and total monthly household expenditure. There were no differences between subjects who were excluded from the analysis when compared to those who were part of the impact analysis.

Table B2 Comparison of nutrition indicators between the elderly included in and excluded from the analysis

Nutrition indicators	Elderly in the analysis	Excluded elderly	p-value
Nutritional status			
BMI	25.0	25.3	0.348
Underweight	0.04	0.04	0.636
Normal	0.5	0.5	0.732
Overweight	0.3	0.3	0.486
Obese	0.1	0.2	0.223
Total energy and macronutrient intake			
Energy (kcal)	1,742.8	1,967.8	0.032
Carbohydrates (g)	278.1	300.9	0.163
Protein (g)	47.0	51.0	0.124
Dietary fat (g)	49.3	56.1	0.066
Adequacy of intake (%)			
Energy (kcal)	104.9	116.4	0.060
Carbohydrates (g)	133.8	142.8	0.234
Protein (g)	83.8	90.3	0.178
Dietary fat (g)	89.6	99.3	0.134
Percentage of contribution to total energy (%)			
Carbohydrates	64.1	62.6	0.121
Protein	11.0	10.9	0.695
Dietary fat	25.3	25.6	0.697

Note: Values are mean

Table B2 shows the nutrition indicator analysis. Significant differences were found in only three of the analysed indicators: the excluded elderly at baseline consumed both more energy and fat ($p < 0.05$ and $p < 0.1$) and had higher levels of adequate energy consumption ($p < 0.1$). There were no differences in the other indicators.

In general, these results show that those included and excluded from the final sample did not differ substantially in the compared characteristics. However, this is a comparison of observed values that should not be extrapolated to consider that the groups are homogenous for observed or unobserved factors in any way.

B3. Mental health

For mental health indicators, the process was less complicated, since the final analytical sample was defined based on the standard rule from studies on the elderly that only mentally apt individuals or their caregivers (defined as the people who provide assistance to the elderly in their basic and daily activities) can respond to survey questions. By this definition, caregivers can actually answer most questions on behalf of the elderly person – for example, those related demographics, labour, socio-economic circumstances – but not those related to perception. Thus, caregivers cannot answer any survey questions where the elderly person has to express their feelings or emotions.

Of the 5,270 elderly observations in the baseline and follow-up (see Figure B1), 802 had cognitive deterioration in either baseline or follow-up. As a result, the final sample for the mental health indicators was 4,468.

Appendix C: Tables: characteristics of elderly

Table C1 Socio-demographic characteristics of elderly, by study group

	Intervention (aged 70–74)	External control (aged 70–74)	p-value[a]
Sex			
Female	50.3	64.32	***
Literacy			
Can read and write	34.82	28.99	**
Indigenous language or dialect			
Speaks only indigenous dialect	9.63	11.36	
Civil status			
Married/in a civil union	64.95	46.53	***
Employment			
Does not work	79.25	78.43	
Children born alive			
Does not have children	7.1	8.99	
Head of household			
Is head of household	64.51	72.33	**
Affiliated with *Seguro Popular*			
Yes	30.15	34.08	**
Has a birth certificate			
Yes	93.00	90.23	*
Has voting credentials			
Yes	97.46	96.44	
Has elderly citizen credentials			
Yes	52.64	45.27	***

Note:

Values are %

[a] z-proportion test

*p< 0.10; **p< 0.05; ***p< 0.01

Table C2 General characteristics of elderly living environment, by study group

	Intervention (aged 70–74)	External control (aged 70–74)	p-value[a]
Housing tenure			
Own home, entirely paid for	51.36	56.52	**
Material for the majority of the floor			
Earth	35.76	34.00	
Material for the majority of the walls			
Partition	52.35	57.46	**
Number of rooms in household			
4 or more	25.6	12.68	***
Has a restroom			
Does not have	10.90	10.66	
Piped water in household			
Yes	68.21	83.53	***

Note:
Values are %
[a] z-proportion test
*p< 0.10; **p< 0.05; ***p< 0.01

Table C3 Household characteristics of elderly, by study group

Variables	Intervention (aged 70–74)	External control (aged 70–74)	p-value[a]
Number of children (aged 0–14)			
0	56.23	69.62	
1–2	30.05	20.73	
3 or more	3.72	9.64	***
Number of adults (aged 15–64)			
0	16.72	33.08	
1–2	33.24	35.2	
3 or more	50.03	31.73	***
Number of elderly individuals (65 and older)			
1	38.97	65.86	
2	55.23	33.27	
3 or more	5.8	0.87	***

Note:
Values are %
[a] Chi-square test
*p< 0.10; **p< 0.05; ***p< 0.01

Appendix D: Analysis strategy

D1. Tables: assumption of parallelism

In this appendix, we present the results of the tests carried out to test the assumption of parallelism underlying the differences-in-differences (DD) model. Following the recommendations made by Duflo (2002), we adjusted the DD models using a pair of alternative control groups (taking advantage of our evaluation design, we account for two control groups of 65–59 year-olds), as well as a series of DD models using the original control group (70–74 year-olds) but with a set of indicators that were not affected by the programme.

Table D1 Testing the parallelism assumption: alternative control groups

		Original control group (aged 70–74)	Alternative control group (aged 65–69, localities<2,500)	Alternative control group (aged 65–69, localities>2,500)
Depressive symptoms	Mild	−0.050 (0.028)*	−0.014 (0.020)	−0.004 (0.033)
	Severe	−0.028 (0.014)**	0.015 (0.010)	0.010 (0.012)
Empowerment	Participates in making household decisions	0.089 (0.027)***	-0.007 (0.021)	0.049 (0.030)*
	Participates in household spending decisions	0.106 (0.029)***	0.016 (0.022)	0.079 (0.027)***

Note: Standard errors in parenthesis
***p< 0.01, **p< 0.05, *p< 0.10

Tables D1 and D2 show the comparisons between the alternative control groups for mental health and nutrition indicators. The results for mental health indicators appear to not support the assumption of parallelism, since the coefficients differ; for nutrition indicators, on the other hand, it appears that the assumption has been met.

Table D2 Testing the parallelism assumption: alternative control group

		Original control group (aged 70–74)	Alternative control group (aged 65–69, localities <2,500)	Alternative control group (aged 65–69, localities >2,500)
Nutritional status	BMI	−0.059 (0.084)	−0.175 (0.074)**	−0.227 (0.0879)**
	BMI normal range[b]	0.005 (0.019)	0.011 (0.017)	0.0424 (0.0186)**
Total energy and macronutrient intake	Energy, kcal	53.156 (52.649)	85.690 (47.870)*	148.6 (50.72)***
	Carbohydrates, g	15.140 (8.546) *	14.410 (7.507)*	28.36 (7.838)***
	Protein, g	3.141 (1.485) **	1.944 (1.370)	4.500 (1.484)***
	Dietary fat, g	1.445 (1.950)	2.529 (1.850)	3.540 (1.923)*
Adequacy of intake (%)	Energy	5.163 (3.412)	5.400 (2.933)*	9.393 (2.979)***
	Carbohydrates	8.368 (4.391)*	6.398 (3.690)*	12.05 (3.751)***
	Protein	5.858 (2.775) **	5.014 (2.472)**	9.077 (2.727)***
	Dietary fat	2.867 (3.806)	4.474 (3.412)	4.801 (3.567)
Contribution of macronutrients to total energy (%)	Carbohydrates	−0.132 (0.565)	−0.409 (0.426)	0.145 (0.626)
	Protein	0.000 (0.150)	−0.115 (0.119)	−0.205 (0.167)
	Dietary fat	0.131 (0.500)	0.524 (0.379)	0.0602 (0.558)

Note: Standard errors in parenthesis
***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

Table D3 shows the analyses with a series of alternative indicators. In all the analyses, it was observed that the coefficients are statistically equal to zero, suggestive of evidence in favour of the assumption for parallelism.

Nevertheless, the results do not appear to provide categorical or absolute evidence in favour of, or against, the assumption of parallelism. In principle, using alternative control groups of 65–69 year-olds were probably not the best option for controls. These groups were not used to estimate the impact of *70 y más,* being as they are a different age group. Likewise, we are not confident that they are best suited to test the assumption of parallelism.

The alternative indicators that we used, however, appear to offer strong evidence in favour of parallelism, because for some indicators, we used the remaining members of the household and not the elderly people themselves.

Nevertheless, we accept that some of the indicators we used could still be questioned with regards to the programme's impact on them.

Table D3 Testing the parallelism assumption: alternative outcomes

	Original control group (aged 70–74)
Number of children who are currently alive	0.093 (0.080)
Number of years married or living with partner	0.339 (0.640)
Percentage of edentulous	−0.020 (0.016)
Percentage of hip fractures in the last 12 months	−0.002 (0.007)
Death of ≥1 household member in the last 12 months	0.005 (0.009)
Proportion of deaths in the household in the last 12 months	−0.003 (0.004)
Number of days ill or with health discomfort in the last 4 weeks before the interview (average for all members of the house, except the elderly)	0.545 (0.384)
Number of walking kilometers without tiring (average for all members of the house, except the elderly)	−0.300 (1.119)

Note: Standard errors in parenthesis

D2. Codes

Codes used for nutrition findings

Because of the ongoing relationship between the elderly people's perception of improved nutrition and physical health, the following codes were included in the analyses related to nutrition:

1.1.1 Physical health: Elderly people's perception of their personal state of health, which they could rate as good, bad or in the healing process. Identifies why that is so.

1.1.1.1 Physical health impact: Whether or not the elderly person perceived an impact from the programme on their physical health.

1.1.1.2 Physical health significance: The interpretation, meaning or explanation that the elderly person uses to describe their physical health.

Similarly, codes related directly to the use of the money participants received through the programme were included in the nutrition analyses, to understand how the elderly people decided to use the money, from their own perspective.

1.5.2 Resource use: Whether the resources participants received for work they were previously able to perform but can no longer do is the same as it was before – for themselves, their family and their community.

Codes used for mental health findings

To analyse the mental health outcomes, two types of codes were used: those related directly to emotional health and those related to family networks, particularly emphasising decision-making power within the household. The detailed analysis of the relationship between the elderly participants' income, family support and reciprocity dynamics, and the elderly people's participation in household decisions constitute the focal point that allowed the understanding of the possible social processes of reciprocity and empowerment. From the qualitative perspective, these explain the programme's impact on mental health.

First, we analysed the codes related directly to the perception of participants' emotional health.

1.1.2. Emotional health: The elderly person's perception of their own emotional state, which they could rate as happy, sad, worried, etc. Identifies why that is so.

1.1.2.1 Emotional health impact: Whether or not the elderly person perceived an impact from the programme on their emotional health – for example, did the programme make them feel more content or not, more sad or not, etc.

1.1.2.2 Emotional health significance: The interpretation, meaning or explanation that the elderly person uses to describe their emotional health.

Second, we examined whether elderly participants made financial decisions regarding the money they received. If they answered yes, we analysed the manner in which they used it.

1.5.1 Decision on resources: Whether the elderly participant makes the decision to spend the resources, regardless of what is purchased.

1.5.2 Resource use: Whether the resources participants received for work they were previously able to perform but can no longer do is the same as it was before – for themselves, their family and their community.

The codes used to analyse the programme's impact on mental health include:

1.3.1.1 Other household decisions: Decisions that are taken in the household; whether the elderly individual participates or gives their point of view. This does not refer to the use of economic resources.

1.3.1.2 Support received at home: The kind of support the elderly receive in the household or from their spouse; whether this support is instrumental, economic, emotional or cognitive.

1.3.1.3 Significance of support received at home: The meaning that the elderly individual gives to the support they receive; whether they find it alleviating or burdensome.

1.3.1.4 Household programme impact: Whether participants perceive any change in relation to their household or spouse, since the start of the programme. For example, whether or not they are more involved in household decisions; whether the family takes them less into account, due to their independence.

1.3.1.5 Household support: The kind of support elderly participants give their partner or household; whether this support is instrumental, economic, emotional or cognitive.

1.3.1.6 Household support significance: The meaning that elderly people give to the support they give to their partner or household; whether they believe it is alleviating or burdensome for their household or partner, or if they believe it is not needed.

D3. Semi-structured interview guide for *70 y más* programme beneficiaries in rural areas

Objective of the interview

Explore how *70 y más* beneficiaries perceive that the programme has affected their quality of life.

Elements to explore:

A. How they perceive their physical and emotional health conditions.

B. How they perceive the decision-making process related to programme resources

C. How they perceive their empowerment and social networks.

D. How they evaluate and perceive the impact of *70 y más* programme.

Introduction to the interview (following the reading of the letter of oral consent)

Hello, good morning/afternoon. My name is (name of the interviewer) and I work for the National Institute of Public Health of Mexico. As previously mentioned, my colleagues and I are interviewing several beneficiaries of the *70 y más* programme.

The purpose of this interview is for you to tell me about you experience with the programme and the benefits you have received. I would also like to hear your opinions and suggestions on how the programme works.

During this conversation, I would like you to comment on the way decisions are made regarding the use of programme resources in general, your health and your relationship with your family and other persons who are not family members. The interview will last about an hour. Thank you in advance for the time you are giving me.

 A. *How they perceive their physical and emotional health conditions*

First, let's talk about how you are feeling these days:

a) *General assessment of her/his <u>health status</u> (both physical and emotional).*

1.   Tell me about your health. How have you been feeling lately? Why do you feel like that?

2.   Tell me about your state of mind. How have you been feeling lately? Why do you feel like that?

Now, I am going to ask you a few questions about the programme resources:

B. *How they perceive the way the <u>programme's economic resources are used</u> and how <u>decisions are made</u> in this regard*

a) *For elderly people who collect their money personally*. Tell me…

1.   Who picks up the money from the programme?
2.   What is your day usually like when you pick up the money from the programme?
3.   Do you receive the money from the programme? How do you use it?
4.   All families make decisions – for instance, before preparing a meal, someone decides what to cook. In your family, who decides how the money you get from the programme is used? Why is it decided that way?

b) *For elderly people who do not collect their money personally*. Tell me…
   1. Are you given the money from the programme?
   2. How is the money you get from the programme used?
   3. Who decides what to use it on? Why is it decided that way? Do you agree with that?

Now, let's talk about your family, friends and people from your community:

C. How they perceive their <u>empowerment</u> and social networks

Exploring what social networks they participate in, what kind of support is available and what kind of relations they maintain.

a)   Family

1. Following the example we just discussed regarding family decisions, in your own family, which decisions do you give an opinion on, and which decisions do you make yourself? Why is it that way?
2. What decisions do you not give your opinion on or make yourself? Why is it that way?
3. What are the main things that your family helps you with? Why do you think so?
4. What are the most important things that you help your family with? Why do you think so?

b) Relations with people who do not belong to your family

1. Do you have any friends, *compadres, comadres* or other persons outside your family who you get together with?
2. What do you get together for? How often do you get together? Where do you get together?
3. What things that you need do these people help you with? Why do you think so?
4. What do you help them with? Why do you think so?

Now, I would like to hear your point of view on the programme.

D. How they evaluate the programme and perceive its impact

1.   How did you find out about the programme?
2.   What do you know about it? What is this programme for?
3.   What aspects of the programme do you like most?
4.   What would you change or do you dislike about the programme?
5.   Do you think that any of the following aspects of your life have changed as a result of programme support?
        5.1. Your health, why?
        5.2. Your state of mind, why?
        5.3. Your relationships (with friends, neighbours, family and other people in your community), why?

Appendix E: Tables: descriptive indicator statistics

Table E1 Descriptive statistics of nutrition indicators at baseline, by group and type of comparison

Nutrition indicators	Programme effects			Anticipation effects		
	Intervention group (aged 70–74) n=1,138	Control group 2 (aged 70–74) n=884		Control group 1 (aged 65–69) n=1,162	Control group 3 (aged 65–69) n=839	
Nutritional status						
BMI	24.76	25.30	**	24.83	25.29	*
Underweight	0.05	0.03	*	0.04	0.04	
Normal	0.50	0.48		0.51	0.48	
Overweight	0.34	0.34		0.35	0.35	
Obese	0.11	0.15	**	0.11	0.13	
Total energy and macronutrient intake						
Energy (kcal)	1805.71	1557.77	***	1873.40	1671.48	***
Carbohydrates (g)	290.62	245.61	***	300.78	264.00	***
Protein (g)	48.61	43.30	***	49.81	44.90	***
Dietary fat (g)	50.17	45.60	**	52.14	47.93	**
Adequacy of intake (%)						
Energy	110.36	98.85	***	109.61	97.55	***
Carbohydrates	142.22	124.65	***	140.32	122.83	***
Protein	87.27	78.76	***	88.06	78.59	***
Dietary fat	92.61	87.28		92.44	83.91	**
Contribution of macronutrients to total energy (%)						
Carbohydrates	64.61	62.79	***	64.48	63.43	**
Protein	10.96	11.28	**	10.81	10.93	
Dietary fat	24.43	25.93	**	24.71	25.64	*

Note: Values are mean
***p<0.01; **p<0.05; *p<0.10
BMI: body mass index

Table E2 Descriptive statistics of mental health indicators at baseline by type and group of comparison

	Programme effects		*Anticipation effects*		
Mental health indicators	*Intervention group (aged 70–74)* *n=1,353*	*Control group 2 (aged 70–74)* *n=888*	*Control group 1 (aged 65–69)* *n=1,345*	*Control group 3 (aged 65–69)* *n=882*	
Depressive symptoms					
Mild (GDS>5)	0.25	0.25	0.24	0.28	**
Severe (GDS>10)	0.03	0.03	0.04	0.04	
Autonomy/empowerment					
Participates in household decisions	0.72	0.74	0.76	0.80	**
Participates in decisions on household expenses	0.69	0.72	0.74	0.76	

Note:
Values are mean
***p< 0.001; **p< 0.05; *p< 0.10

Appendix F: Tables: distribution of indicators for levels of adequacy of intake

Table F1 Distribution of indicators for levels of adequacy of intake in intervention and control groups, at baseline

Adequacy of intake (%)	Percentiles								
	q10	q20	q30	q40	q50	q60	q70	q80	q90
Intervention group									
Energy	47.1	62.0	74.1	85.1	96.3	108.8	127.0	152.1	198.2
Carbohydrates	56.4	76.5	92.6	107.2	124.8	144.4	166.3	195.2	258.0
Proteins	36.3	48.6	56.7	66.3	75.7	87.0	103.2	123.8	157.3
Dietary fat	29.3	38.9	49.2	57.9	70.2	85.2	108.5	136.3	185.3
Control group									
Energy	44.2	56.2	66.8	78.0	87.9	100.0	116.5	134.6	171.5
Carbohydrates	50.2	66.5	80.8	96.2	112.2	126.7	147.4	171.9	215.8
Proteins	33.1	42.8	51.1	59.1	69.7	79.3	91.3	109.5	139.6
Dietary fat	28.1	39.8	49.8	58.8	70.4	83.2	99.2	123.3	176.9

Table F2 Distribution of indicators for adequacy of intake in intervention and control groups at baseline, by sex

	Percentiles								
Consumption adequacy (%)	q10	q20	q30	q40	q50	q60	q70	q80	q90
Females									
Intervention group									
Energy	47.1	61.5	72.6	84.4	95.5	107.7	127.2	150.7	195.9
Carbohydrates	58.5	78.1	92.9	108.1	124.9	147.6	167.0	198.7	257.8
Proteins	34.4	46.9	55.1	63.0	73.1	83.4	100.3	123.8	156.1
Dietary fat	30.4	39.0	48.6	57.2	68.0	82.1	108.9	140.0	196.1
Control group									
Energy	45.1	56.7	68.9	80.8	90.9	103.7	119.3	139.4	174.6
Carbohydrates	51.2	69.5	85.9	103.1	121.0	136.2	153.5	179.6	223.3
Proteins	31.9	42.7	51.8	60.9	71.5	81.7	93.0	109.8	139.6
Dietary fat	28.9	42.3	53.2	64.5	76.1	91.2	106.5	128.8	180.6
Males									
Intervention group									
Energy	47.1	62.3	76.2	86.7	97.8	110.4	126.0	155.3	200.4
Carbohydrates	54.3	74.6	92.3	106.0	124.8	142.5	165.9	193.5	258.7
Proteins	37.9	50.3	59.6	68.7	78.0	90.0	104.5	124.3	161.3
Dietary fat	28.1	38.7	49.3	58.4	71.2	87.4	108.3	135.0	176.9
Control group									
Energy	43.8	55.5	63.7	73.9	83.0	90.1	107.1	123.1	164.9
Carbohydrates	49.5	62.8	76.0	86.6	98.3	114.5	128.3	159.5	192.5
Proteins	34.8	43.2	50.0	57.4	68.1	76.6	87.2	104.8	139.3
Dietary fat	25.6	36.0	46.7	53.9	62.9	73.8	86.8	109.1	166.4

Table F3 Distribution of indicators for adequacy of intake in intervention and control groups at baseline, by ethnicity

Adequacy of intake (%)	Percentiles								
	q10	q20	q30	q40	q50	q60	q70	q80	q90
Indigenous									
Intervention group									
Energy	46.5	63.5	75.2	91.3	105.0	120.3	138.1	169.1	218.9
Carbohydrates	56.1	77.3	97.6	112.7	138.6	156.3	181.0	219.8	289.6
Proteins	38.7	50.6	59.3	72.1	86.1	96.4	113.1	134.0	180.4
Dietary fat	30.6	41.4	51.5	61.6	73.9	97.0	119.8	154.6	229.4
Control group									
Energy	46.8	59.3	72.3	83.1	90.7	109.5	126.4	148.6	190.8
Carbohydrates	55.2	75.0	86.8	107.8	120.6	141.7	158.0	184.1	245.1
Proteins	37.0	47.3	57.7	67.4	76.1	86.9	100.3	120.3	158.9
Dietary fat	29.1	41.7	53.2	64.8	77.2	92.6	111.2	139.1	191.4
Not indigenous									
Intervention group									
Energy	47.1	61.5	74.1	83.3	93.2	104.8	122.5	145.1	191.5
Carbohydrates	56.4	76.5	91.4	104.5	118.8	139.6	159.6	191.0	240.5
Proteins	35.1	47.9	55.8	65.0	72.3	81.5	98.3	118.2	149.4
Dietary fat	29.0	38.7	47.5	56.8	67.9	82.1	104.0	128.9	168.1
Control group									
Energy	43.8	53.22	62.28	73.95	84.59	93.86	109.4	126	164.1
Carbohydrates	48.2	62.5	75.9	89.7	105.3	120.2	136.0	162.0	201.5
Proteins	31.8	41.1	48.6	55.7	64.8	74.6	87.8	104.4	128.3
Dietary fat	26.9	38.6	49.1	57.1	69.0	80.5	97.3	118.1	171.7

Table F4 Distribution of indicators for adequacy of intake in intervention and control groups at baseline, by socio-economic level (quartiles of total monthly expenditure expenditure)

Adequacy of intake (%)	Percentiles								
	q10	q20	q30	q40	q50	q60	q70	q80	q90
Quartile I									
Intervention group									
Energy	43.4	58.5	71.8	81.5	94.6	106.8	125.2	158.3	196.1
Carbohydrates	55.5	74.4	89.9	104.2	118.2	142.6	173.8	207.2	251.0
Proteins	31.4	44.9	53.8	65.0	74.4	87.6	103.9	124.4	152.6
Dietary fat	28.1	37.1	46.1	55.7	67.0	81.0	106.4	133.3	183.4
Control group									
Energy	46.1	60.0	74.3	86.4	99.0	111.9	126.0	148.5	177.0
Carbohydrates	52.2	74.8	88.0	108.0	122.3	139.9	159.4	193.4	232.2
Proteins	39.9	49.7	57.8	67.2	76.0	83.6	100.3	120.8	158.9
Dietary fat	29.9	45.8	55.8	65.7	79.6	96.6	116.5	158.5	198.8
Quartile II									
Intervention group									
Energy	46.9	62.1	77.8	88.6	100.1	115.8	131.4	153.1	198.4
Carbohydrates	54.0	78.4	97.4	108.1	129.7	149.3	170.5	191.7	248.2
Proteins	36.1	49.8	58.5	67.9	79.6	93.1	109.2	127.9	160.6
Dietary fat	28.0	38.7	48.4	58.5	70.2	87.4	116.0	145.6	207.1
Control group									
Energy	40.2	51.9	63.5	73.5	82.0	89.4	108.6	127.0	164.2
Carbohydrates	46.3	62.4	76.5	91.9	103.1	116.5	140.0	164.7	206.9
Proteins	31.9	38.7	48.0	54.4	62.8	72.8	85.4	104.4	138.6
Dietary fat	28.4	34.7	45.4	55.1	67.3	77.7	97.4	119.5	149.0
Quartile III									
Intervention group									
Energy	52.2	63.2	77.2	87.5	96.8	108.6	127.1	148.5	182.5
Carbohydrates	57.2	77.8	94.8	111.0	124.3	144.7	163.3	199.4	244.3
Proteins	37.5	49.4	56.9	66.3	75.6	83.4	98.4	119.4	143.6
Dietary fat	30.6	41.0	50.3	59.3	70.7	83.8	103.9	132.6	180.8
Control group									
Energy	47.9	60.4	70.0	83.3	89.9	101.9	117.2	131.8	171.6
Carbohydrates	54.4	71.9	85.5	99.7	120.3	128.8	149.5	175.8	222.9
Proteins	34.1	44.6	53.1	62.5	72.2	81.9	93.1	109.7	145.0
Dietary fat	29.6	43.9	54.3	64.4	75.5	86.3	98.8	136.9	181.4

Adequacy of intake (%)	Percentiles								
	q10	q20	q30	q40	q50	q60	q70	q80	q90
Intervention group									
Energy	50.0	62.5	71.8	80.7	92.3	106.7	122.1	146.0	204.0
Carbohydrates	60.8	77.5	90.1	102.6	124.1	141.6	160.8	199.9	277.0
Proteins	38.4	49.8	56.3	65.7	74.3	83.1	100.6	123.2	165.0
Dietary fat	30.4	40.7	49.2	58.1	73.0	89.0	109.9	136.9	167.5
Control group									
Energy	43.0	53.8	60.5	73.4	84.9	97.4	111.4	128.2	167.8
Carbohydrates	49.3	63.3	78.0	90.1	107.6	119.8	139.8	158.9	197.4
Proteins	31.8	39.7	47.5	56.2	66.9	77.7	88.3	100.1	122.6
Dietary fat	24.7	35.5	45.4	54.1	65.1	77.4	93.6	106.5	145.1

Table F5 Descriptive statistics of nutrition indicators at baseline, by ethnicity

Nutrition indicators	Intervention group (aged 70–74)			Control group (aged 70–74)		
	Indigenous *n=377*	*Not indigenous* *n=747*		*Indigenous* *n=266*	*Not indigenous* *n=433*	
Nutritional status						
BMI	23.8	25.2	***	24.5	25.7	**
Underweight	0.07	0.04	*	0.03	0.04	
Normal	0.57	0.46	***	0.56	0.46	**
Overweight	0.31	0.36		0.30	0.33	
Obese	0.06	0.14	***	0.10	0.18	**
Total energy and macronutrient intake						
Energy (kcal)	1,885.4	1,769.2		1,663.6	1,500.0	**
Carbohydrates (g)	305.3	283.6	*	262.3	234.4	**
Protein (g)	50.4	47.9		45.8	42.0	*
Dietary fat (g)	53.9	48.4	**	48.3	44.8	
Adequacy of intake (%)						
Energy	119.4	106.1	**	107.1	93.9	**
Carbohydrates	155.0	136.0	**	135.1	117.4	**
Protein	95.9	83.2	***	86.5	74.6	**
Dietary fat	102.9	87.7	**	94.2	84.6	
Contribution of macronutrients to total energy (%)						
Carbohydrates	64.3	64.7		62.6	62.1	
Protein	10.8	11.0	**	11.2	11.4	
Dietary fat	24.9	24.2		26.2	26.5	

Note:

Values are mean

BMI: body mass index

***p< 0.01; **p< 0.05; *p< 0.10

Table F6 Ranked list of most frequently mentioned foods (% of total respondents), as consumed by group and time of data collection

	Baseline (2007)							Follow-up (2008)						
	Intervention group (aged 70–74)			*Control group (aged 70–74)*				*Intervention group (aged 70–74)*			*Control group (aged 70–74)*		
Rank		**%**	**Rank**		**%**		**Rank**		**%**	**Rank**		**%**		
1	Homemade corn *tortillas*	86.4	1	Cooked beans	80.7		1	Cooked beans	90.8	1	Cooked beans	91.2		
2	Cooked beans	85.3	2	Homemade corn *tortillas*	75.7		2	Homemade corn *tortillas*	85.6	2	Homemade corn *tortillas*	70.5		
3	Coffee with sugar	65.5	3	Rice	63.0		3	Oranges or mandarins	67.4	3	Rice	68.9		
4	Rice	61.1	4	Regular soda	61.6		4	Rice	66.9	4	Banana	67.2		
5	Banana	57.3	5	Coffee with sugar	58.7		5	Coffee with sugar	63.6	5	Oranges or mandarins	66.6		
6	Regular soda	54.8	6	Eggs, fried or scrambled	56.4		6	Banana	61.1	6	Coffee with sugar	55.1		
7	Doughnuts and *churros*	52.1	7	Doughnuts and *churros*	56.4		7	Pasta soup	56.5	7	Pasta soup	51.8		
8	Oranges or mandarin oranges	49.2	8	Banana	54.4		8	Eggs, fried or scrambled	53.3	8	Chicken leg, thigh or breast	51.2		
9	Eggs, fried or scrambled	44.8	9	White bread	53.4		9	Chicken leg, thigh or breast	50.8	9	Eggs, fried or scrambled	50.8		
10	Milk (distinct from fortified milk)	44.3	10	Cheese	51.8		10	Doughnuts and *churros*	46.4	10	Regular soda	41.6		
11	Cheese	42.2	11	Pasta soup	51.2		11	Milk (distinct from fortified milk)	45.4	11	Milk (distinct from fortified milk)	40.7		
12	Chicken leg, thigh or breast	39.7	12	Chicken, meat or vegetable soup	48.9		12	Regular soda	42.7	12	Cooked potatoes	37.4		
13	White bread	38.3	13	Chicken leg, thigh or breast	45.3		13	Cheese	40.0	13	Cheese	36.4		
14	Pasta soup	38.3	14	Milk (distinct from fortified milk)	43.0		14	Refried beans	36.4	14	Doughnuts and *churros*	36.1		
15	*Tamales*	37.7	15	Refried beans	42.0		15	Cooked potatoes	33.7	15	Tomatoes	35.7		

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Appendix G: Qualitative testimonials

Testimonials that make the voices of beneficiaries heard are important because they help add context to the data.

G1. Nutrition testimonials

G.1.1 The purchase and consumption of food

In the following interview, an indigenous woman expresses that the money is 'for eating'.

P[11]	'OK, and when you receive the money, how do you use it?'
T	[Náhuatl] 'Support.' [Náhuatl]
R	[Náhuatl] 'Milk, cheese, chicken.' [Náhuatl]
T	'Mmm, this buys some food – chicken, cheese, milk, sometimes roasted meat, she says, sometimes chicken to make soup for the girl.'
R	[Náhuatl] 'Grapes, apples.' [Náhuatl]
T	'Grapes, bananas, she says.' (Ahitic_M_i[12])

G.1.2 Most frequently mentioned foods

The foods most frequently reported by interviewees were chicken, milk, bread, meat and cheese, as mentioned by the woman above and the non-indigenous man in the following transcript.

R	'And now they have given us the opportunity... support for the elderly… And then, this day that they have given us a piece of meat, a little cheese…some chicken, some milk…'
P	'Mmm.'
R2	'Something like that... and another thing is beans, but yeah, it is much better now.' (SanBe_H_ni)

G.1.3 Discussions on the appropriate use of money

Although not found to be a general response among the majority of the elderly, but rather an exception, some elderly adults expressed that the ultimate goal of the pension was to improve their lives, and therefore, the money would be better used to pay for food, clothing, living expenses and medical care. The following transcript from an indigenous man details how he perceived the programme recommendations on the day he received the pension.

R	'Yes, I told him, I spend it on food, because they suggested that we should not use the money for parties.'
P	'Yes.'
R	'To have parties. Yes, the government specifically gives this to us for [nutrition and living] maintenance. We don't work much any more... because for us to buy something, not being able to walk the way we used to... if there is support, it seems that we will spend it on something that will improve things for us. Then, the educated people (*'licenciados'*) arrive. I say they are educated because, they spoke to us [on the day we first got the pension]. Before they gave us money,

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[11] The excerpts begin with the following abbreviations: P = question, T= translator, R= respondent. The original in Náhuatl, the native language of the indigenous interviewees, can be read in some of the transcripts.

[12] The transcripts contain the following abbreviations: H = male, M= female, i = indigenous, ni = not indigenous, preceded by the name of the locality where the beneficiary was interviewed (Ahitic, Huacango, San Bernardo or Tlatzintla).

they told us that this is money for us to support ourselves. And so I tell you this, because I listened very well to their instructions on what the money is for and who is giving us this money – and [I know] that the money is from the federal government.' (Huac_H_i)

G.1.4 Household food consumption
Women repeatedly described their families' consumption of the food they purchase with the pension. The transcript below is from an indigenous woman, who clearly explains that the money is used for her and her grandchildren.

T   'She says that she gets up and eats, feeds the children, and then she goes away for about half an hour to Platón [the place in her municipality where they go to receive payment]. Sometimes they are late in giving you the money, but when she receives it, she buys a roasted chicken and tortillas. She buys this when [her money] arrives, and then she gives them to her grandchildren to eat.' (Ahit_M_i)

G2. Mental health testimonials
The following transcripts are a representative selection of findings from the qualitative component and are intended to reflect the voices of the elderly, the social mechanisms that explain the impact of the programme, and the meanings that beneficiaries assign to the programme.

G.2.1 Reduction of sadness
In this testimonial, a non-indigenous woman expresses her sadness as 'shame' when she did not have money and when she was sick and had to ask for money within her networks.

P   'And how do you feel about the programme? Do you feel that your health has changed since you joined the programme?'
R   'I eat better now, I have "a cent" to buy a piece of meat at least, something like that…Some bread. It didn't used to be like this; we couldn't buy anything because we didn't have any money (laughter)... And now... yes, now we have this. I do feel better.'
P   'And about how you feel, do you feel any change?'
R   'No, I feel happy (laughter). I do, there may be people who are not happy, but I do feel happy.'
P   'And do you think that how you feel is related somehow to the programme, or is it because you're a happy kind of person anyway?'
R   'Well, indeed I didn't feel sad before, I used to be ashamed because I didn't have enough money to buy the things I needed. Whenever I got sick, I would have to beg for money. But now, at least we have some money. If I get sick, at least I can buy medicine now.' (SanBe_M_ni_118)

In the following testimonial, we see an indigenous man declare that he is happy, because he has something to eat.

P   'Please ask him how he feels now that he is receiving the programme? How does he feel about getting [the support]? Does he feel comfortable, calm, or does he feel bad or stressed? How does he feel?'
T   (Laughter) 'He says that when he receives the support he feels happy and he buys some meat and other things. When he is home, he gets together with my

	godmother [an elder's wife]... close together... happy because they receive the support.'
P	'Finally, I only wanted to ask if he feels that, after receiving this money, anything has changed in his health and mood?'
T	'He feels better because before [the programme], he had no support. But now he's getting support, he feels better, more comfortable. But he says he didn't [feel this way] before, because sometimes he had no money to buy a little something for the kitchen. Well, now he feels better because he has the support.' (Ahitic_H_i)

G.2.3 Autonomy, making decisions about their money

The elderly beneficiaries consistently claimed that their money was not taken away by their families, and that they themselves decided how and on what to spend it. Here is a non-indigenous man talking about it:

P	'So, for example, do [your daughters] tell you how to spend your money?'
R	'No, no, nothing like that. They don't even ask me or tell me what to do with my money… I know I have to help them. But they don't take anything away from me; I have the money, I keep it. Anyway, I give them money because I know they don't have enough, because they are poor and they don't have enough money for medicine for example, or for transport.'
P	'Mmm.'
R	'But they don't tell me what to do. They don't tell me "Now you have money, give it to us," no. It's clear the money is mine and I decide what to do with it.' (SanBe_AM_H_ni)

G.2.4 Economic autonomy when unable to work or not having a 'male'

In the case of men, it is very clear that the pension income reduced stress levels when compared to how they felt prior to the programme when they did not have money and were unable to work to generate income. For women, the pension allowed them to pay for tasks that are traditionally considered men's work, and which they could not do themselves due to bad health. Both men and women felt they no longer needed to depend on their children.

P	'Hi, I would like to know, since you have received the "support", have you felt any change in the way you feel?'
R	'Well, now we can buy what is good for the stomach – some chicken, a little piece of beef. Sometimes we buy... sometimes I ask somebody to buy me stuff in Molango [the main town in the municipality], and then they bring me some food and we eat. They bring me fish, we can even buy fish now. Well, the point is that we have to look after our health now, because if we don't, we can get sick, and if we're sick, we can't work.'
P	'Yes…'
R	'Indeed, even when I got up today, I wanted to work, but I can't. I feel that I won't be able to work in the *milpa* [corn fields], in spite of the strong teachings of our forefathers. I can't work any more.' (Tlalz_H_ni)

In the following this testimony, an indigenous woman describes being able to pay someone else to do some work for her:

T	'She says that she has noticed that, since she has the money, she is much better. She said, "It's not like before". She used to have to go to the mountain and bring back firewood on her forehead [a traditional way to carry firewood]. She had to sometimes do it three times a day.'
P	'Mmm... and why?'
T	'Because with the money, she can find some workers, and now they bring her firewood so she has it at home.'
P	'Mmm, so that is the way the programme is helping her?'
T	'Yes, she said that it helps, and also because she can buy some meat, she feels it helps.' (Huac_M_i)

In these next two testimonies, a man and a woman explain how the programme has given them economic independence, so they no longer have to rely on their networks and children.

R	'I, what I have left, I keep it [for savings], and…when I'm sick, well, I don't have to ask anyone to lend me money.' (SanBe_ M_ni)
P	'Mmm, and how do you feel now that you have the programme?'
R	'Oh! It's a great help, because I don't have to ask my children for help any more.'
P	'And how do you think they feel about this?'
R	'I believe that they are ok with this. I say it because they don't worry any more. They are not thinking that they have to help me.' (SanBe_H_ni)

G.2.3 Redistribution of income

The elderly beneficiaries say that they decide how to spend the money, but as we also saw in the nutrition analysis, they often share and redistribute it in their family networks. The following testimonies – one from an indigenous woman and another from a non-indigenous man – both reveal that they redistribute their money within their families.

T	'Mmm… She says that she feels good with the *70 y más* programme. She feels that it has helped her. She says she feels more important with this money, mainly in relation to her family because with this money she can help her daughter a little bit. She also says that she helps her daughter with her embroidery; when her daughter can't finish them, she helps her.'
P	'And could you ask her what the most important thing is that she feels she gives her family?'
T	'She says that she can't do much other than share her food. She says she always cooks for her grandchildren because they help her, too. When [her grandchildren] come, they give her some 1,000 pesos, or they bring some [soft drinks] or some clothes. She says that it's because that she always prepares some food for them. That's all she gives them.' (Ahitic_M_i)
P	'Do you think that anything has changed in your relationships with your family, since you started received the money?'
R	'No, nothing like that, not at all. I'm OK with my brothers, with my niece. I mean this money is indeed some help. I mean a little help, but at least it's some help; it helps my sister and me. Well, actually, [it helps] my nephews and nieces too, because we all live together here [in this house]. Now we're here all together.' (SanBe_ H_ni)

G.2.4 Recognition and empowerment

These last two testimonials – from a non-indigenous woman and man – express both the sense of recognition they feel when receiving the pension and the sense of empowerment they get from contributing money to the household and deciding on how it is used at this level. The woman clearly expresses the satisfaction she experiences when she gives instructions on what types of food need to be purchased to share with her family.

> R   'When do I feel happy? Well, I feel happy when somebody tells me something nice; I feel happy too when I ask [my family] to buy something for me, and then we eat; yes, when I tell them what to buy. When I receive my money, I tell them to buy some bread, some little thing…and we eat. Yes, in those moments, I feel happy.' (Tlatz_M_ni)

The man expressed the sense of feeling being 'recognised' by the government.

> P   'I have a question: have you noticed any change in your mood? How is your mood?'
>
> R   'Yes, I feel good.'
>
> P   'Why would you say that is?'
>
> R   'Well, it's because they're giving us some money.'
>
> P   'And how do you feel about receiving this money?'
>
> R   'Oh! Happy, happy. Because with this money, we eat (laughs), yes.'
>
> P   'I'm going ask something else: do you feel that since you've been receiving this money, anything has changed in your relationship with your wife or your son, for example?'
>
> R   'Yes.'
>
> P   'Yes, does it change something?'
>
> R   'Well, we get along like we always have, but it has changed too, it's not like before. It used to be sadder. Now it looks like we're happier, because we're receiving this little help.'
>
> P   'Why would you say that you were sadder before?'
>
> R   'I felt sad, because nobody helped us. The government didn't pay us any attention; they treated us as if we didn't exist. I felt that nobody could even see us, the peasants. The governors didn't pay us any attention.' (Huac_H_ni)

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