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*Poverty and child malnutrition in Santiago del Estero,  
Argentina, 2010-2020. Some precisions based  
on the interventions of a civil society organisation*

The province of Santiago del Estero is on a vast plain, about twenty meters above sea level. Towards 2010, the mentioned province had 874,006 inhabitants of which 68.7% lived in urban spaces and 31.3% in rural spaces. Forest exploitation constitutes the most important economic activity in the state/province and is explained by the prominence of the forest from Chaco over the territory. Even though, during the last decades, deforestation has become a huge conflict in Santiago del Estero, which nowadays is at the top of the global cut down the mountain rankings (GÓMEZ LENDE, 2021). Among their most highlighted productive activities are also found the agricultural tasks, which focus on the North Salado and Dulce rivers. Thanks to the irrigation wheat, corn, alfalfa, flax, cotton, and fruit tree are grown. The most abundant livestock is goats, followed on a smaller scale by cattle, sheep, horses, pigs and donkeys. The peasant is a central protagonist in the productive structure of the rural area of Santiago del Estero, despite a significant decrease in their numbers, as many of them are settling in larger towns or migrating to the outskirts of major cities due to the expansion of the agricultural frontier (MÁRQUEZ, 2021). In addition to being a pioneer in the process of territorialisation in northern Argentina and having a predominance of primary activities in its productive profile, there is also the attribute of poverty (PAZ and JARA, 2012). Indeed, the population of Santiago del Estero has been characterised by its highest levels of poverty compared to other provinces in the country, according to several measures.

By 2010, Santiago del Estero belonged to the four poorest provinces of the country. In addition, more up-to-date information from the last decade, for the urban population from Santiago del Estero and la Banda, allow us to warn that a significant proportion of the population stays in a situation of monetary poverty.

Indeed, in 2010 the child population had a poverty rate that was 14% higher than the estimated rate for the total population and in 2021, it was higher than 39%. Meanwhile, the indigence rate increased from a gap of 11.5% to 56.8%. In other words, regardless of the variations in incidence, the propensity of the child population towards poverty and indigence has increased concerning the total population (tripling in the case of poverty and nearly quintupling in the case of indigence). Children in early childhood are the poorest among the poor and this tendency has grown in the last decade in Santiago del Estero. However, as mentioned by Kilksberg (2009), poverty is not innocuous, it kills and causes diseases. Such impact on disease and mortality will be analysed specifically here, related to the problem of child malnutrition in recent years.

Throughout this writing, there are some central questions, which we aim to answer. Those questions inquire about the characteristics of poverty and child malnutrition in this province, how these indicators have evolved, where they are focused, the magnitudes of different nutritional problems in childhood, and finally how to assess the performance of an association whose objective is the treatment of child malnutrition.

## POVERTY AND CHILD MALNUTRITION: SOME CONCEPTUAL DETAILS

Nutritional status is defined as the resulting condition of the balance between nutrient intake and energy expenditure produced by the organism. In this sense, it is the product of at least three concurrent factors: *a*) the availability of food, which is included in the political-economic context and conditions of the production and distribution of such food; *b*) dietary habits derived from geographical and climatic conditions mediated by cultural influences (education, customs, beliefs); and *c*) the requirements corresponding to each stage of the life cycle (OYHENART et al., 2008). When considering growth and its patterns, they show marked inter- and intra-population heterogeneity, and they reflect the nutritional status, health, and quality of life of populations (ALFARO, VÁZQUEZ, BEJARANO & DIPIERRI, 2008). Historically, there has been a widespread tendency to consider, in developing countries and particularly in rural areas, the prevalence of malnutrition over overweight, and excess weight as characteristic of high socioeconomic groups (MÉNDEZ, MONTEIRO & POPKIN, 2005). However, modifications have occurred in dietary patterns and physical activity in the context of enormous economic, social, and demographic transformations that have impacted the population's health status (PEÑA & BACALLAO, 2000; POPKIN, 2006). In the childhood age group, the consequences of nutritional deficits are severe and have short-, medium-, and long-term effects, including synergy with other diseases due to weakened immune systems, such as a higher risk of school dropout and precarious insertion into productive activities, resulting from cognitive and brain impairments. In Argentina, data reported by the National Nutrition and Health Survey of 2018-2019 showed that the prevalence of thinness in the population of children and adolescents was 1%, while stunted growth reached 4%, with lower values in groups belonging to high-income families. This situation coexisted with 41% of young people presenting excess weight, equally distributed between overweight and obese (MINISTRY OF HEALTH AND SOCIAL DEVELOPMENT, 2019). However, although these figures provide an approximation of the nutritional situation on a national scale, there are significant variations between regions and provinces and even within the latter (MINISTRY OF HEALTH AND SOCIAL DEVELOPMENT, 2018), a situation that is further deepened in contexts of structural and persistent poverty, such as the one characterizing the province under study.

There is broad consensus in Argentina, as in other countries in the region, regarding the correlation between the issues of child malnutrition, extreme poverty, and lack of food access. Nonetheless, there can be found a connection between the lack of clean water, sanitation, and adequate sanitation services.

Some countries in the region have implemented programs specifically focused on the treatment of chronic child malnutrition. One of the main conclusions has caused a radical shift in the approach to the problem. It has been identified that reversing malnutrition in childhood through a single intervention is challenging and the need for multiple approaches to address this treatment has been proven.

Keats and others (2021) provide a comprehensive synthesis of the existing knowledge, which enjoys broad consensus, regarding the indirect nutrition strategies aimed at prevention. These strategies include preconception care, access to safe piped water, sanitation, and hygiene promotion, both within and beyond the healthcare sector, and they also offer significant nutritional benefits. However, greater efforts are required to improve the coverage of these interventions, especially among the most vulnerable populations. The scientific community recognizes the co-occurrence of conditions such as stunting and overweight or stunting and wasting, highlighting the need for dual or triple-function actions, thus emphasizing the need to address the double burden of malnutrition (undernutrition and overweight/obesity). In addition to interventions involving multiple micronutrient supplementation during pregnancy and early childhood (complementary feeding, vitamin supplements, and fortified foods), other recommendations include kangaroo mother care for preterm and low birth weight new-borns, delayed cord clamping for preterm new-borns, promotion and counselling on breastfeeding, education combined with food provision in situations of food insecurity, family planning and birth spacing, among others.

## METHODS

The main source of information used is the records of the Civil Association Hacienda Camino (ACHC), which is a non-profit organization born in the province of Santiago del Estero and works continuously since 2006 to improve the nutritional parameters of children. These children are monitored by nutritionists, and their mothers receive nutrition counselling. According to the diagnosis, they receive not only milk, but also vitamin supplements,

or special milk from the ACHC centre. Additionally, the kids are assessed by an early stimulation specialist in the clinic, and their mothers are trained to encourage their children's development. Moreover, the centres have kindergarten spaces and group stimulation rooms. The organization mentioned, carries out other programs that even though are not addressed in this article, they demonstrate a comprehensive approach to the families in a context of vulnerability.

The organisation applies a social eligibility criterion, if there is none, an evaluation is carried out according to nutritional criteria. (a) Percentile diagnosis, (b) Weight diagnosis, (c) Height diagnosis.

The already mentioned criteria were replicated in the analysis and allowed to detect the prevalence and characteristics which the issue assumes depending on different sociodemographic variables. During this period, 5,782 kids entered the organization, all of them were less than five years old, being the children younger than one year old the most relevant group (60%). It is worth noting that 2,759 children entered based on nutritional criteria, while 2,808 entered based on social criteria. Among the social criteria, adolescent motherhood stands out due to its prevalence.

Through the National Census of Population, Households, and Housing of 2010, sociodemographic information was obtained, specifically related to poor households defined using the method of unsatisfied basic needs (UBN).

The National Vital Statistics Program was also used as a source of information, providing data on deaths by age and cause.

#### INFANT MORBIDITY AND MORTALITY DUE TO INFANT MALNUTRITION IN SANTIAGO DEL ESTERO

In the specific case of the province of Santiago del Estero, between 1999 and 2013 died ninety children younger than five years old due to malnutrition. That number refers to children who died and were registered, it's clear that the universe of death of kids caused by this pathology and registered under other causes is greater.

Between 2000 and 2022, there were 525 kids younger than five years old who left a health facility and were diagnosed with malnutrition. However, there is a lack of information between 2001 and 2004 that would increase that number.

Finally, we analysed the spatial distribution of these issues, understanding that there could be concentration

hubs and areas where these problems have no magnitude. It can be seen the concentration of mortality in the central area between the Salado and Dulce rivers, while hospital discharges are concentrated in the eastern sector of the province.

One last source of information to analyse is the nutritional census conducted by the Socioeconomic Investigations and Citizen Politics (ISEPCi) in community dining centres in Argentina in 2020. The case of Santiago del Estero shows that out of the 2,182 children weighed, 3.1% were underweight and 4% were at risk of being underweight, totalling a magnitude of 7.1% for this issue (ISEPCi, 2021). Regarding stunting, 2,204 children were measured, of which 4.5% had stunting and 5% were at risk of stunting, which totals a magnitude of 9.5% for this condition. However, the highest magnitude of nutritional problems is found in the high rates of overweight and obesity (16.9% and 21% respectively), highlighting the relevance of this issue in the nutritional health of children in Santiago del Estero. After examining the nutritional problems that characterize the province, the focus then shifts to the analysis of poverty—a proximate contextual determinant of childhood nutritional problems—in the locations where the ACHC is based, carrying out interventions aimed at addressing issues of child malnutrition and development in children aged 0 to 5 years.

#### TERRITORIAL ACTION OF A SOCIAL INTERVENTION

The ACHC is present in most of the territory of Santiago del Estero, with eleven venues within the province and one in the limit with Chaco. The referred venues could be organised in three regions: (a) Santiago Region: which includes the venues in Santiago del Estero city, in Autonomía Neighbourhood, in La Banda and the cities of Sumampa and Suchho Corral. (b) Añatuya Region: includes the venues in the Añatuya, Colonia Dora and Los Juries cities, and the rural locality of Herrera. (c) Monte Quemado Region: includes the venues of Monte Quemado, Pampa de los Guanacos and Taco Poco (this last one in the Chaco province).

#### NUTRITIONAL CRITERIA ACCORDING TO PERCENTILES

More than a third of the analysed kids are found within the normal nutritional parameters, while 41%

presented nutritional deficiencies, from which 19,6% have nutritional risk, 11,9% low weight, and 9,6% low height. If we compare these registers with the national nutritional prevalence from the Second national poll of nutrition and health (2018), the numbers that belong to the local sample are extremely high contrasting with the national average in the same indicators. The low weight in kids from 5 to 17 years reached 1.4% of those, while the low height had a prevalence of a 3.7% (MINISTRY OF HEALTH AND SOCIAL DEVELOPMENT, 2019). The nutritional excess problems don't show in this sample at alarming levels as were detected in the Second National Poll on Nutrition and Health (2018).

We could also observe, that in the deficiencies terms weight and height were both inclined towards the same descendent behaviour, unlike overweight and obesity. These two categories were increasingly positioned in a greater role in the nutritional problems of poor children in Argentina.

This double behaviour from nutritional problems by excess is clear, referring to their proportional growth in the last years and their greater focus in the range of nutritional problematics approached.

## DIAGNOSIS ACCORDING TO NUTRITIONAL CRITERIA

### DIAGNOSIS BY HEIGHT

The diagnosis of short height indicates chronic malnutrition, where deficiencies, structured in time, are shown in the height reached by the kid. In that sense, we can observe the prevalence of stunting (low-length-for-age) is about 36.9% in our sample and 4.1% with a severe low-length-for-age.

We also analysed the temporal behaviour from the low height depending on the seriousness (low height or serious low height) between 2015 and 2021.

That time matches with the biggest case concentration (Fig. 13). In that way, we can observe that the problem stayed around 50% which we consider to be a high number.

At this point, we would like to focus on the kids diagnosed with serious low height. Within this group, 46% are boys and 54% are girls. The most common age range affected by low height is under 1 year (Fig. 14). It is observed that out of the total children with severely low height, 68.7% correspond to children who have not yet reached their first year of life.

## STAYING IN PROGRAMS AND RECOVERY PATTERNS

This is one of the most important points when analysing the impact of a specific task such as nutritional recovery. Throughout the study period, 627 children showed complete recovery after participating in the Family Child Development program implemented by ACHC. These children represent 17.5% of the total number of children enrolled in the program.

We understand that a crucial factor for achieving effective outcomes in terms of both nutrition and child development is program continuity. In this regard, the prevalence of reasons for program discontinuation, specifically "treatment abandonment," works completely against this situation. In all the locations where ACHC operates, the rate of treatment abandonment exceeds 40% of the cases treated.

If we observe the average length of stay in the programs, we find that these children remained in the association for an average of 21.1 months, which is sufficient time to achieve nutritional recovery.

We also analysed the connection between the entry diagnosis and the diagnosis on their way out, depending on the criteria that had, diagnosis by percentiles, nutritional diagnosis, and height diagnosis.

If we pay attention to the criterion based on percentiles, we observe that the greatest impact of the association was on children at nutritional risk and those who were overweight. In fact, 44% of the children entering the programs with nutritional risk achieved a normal condition upon completion, the same proportion as children who were overweight (Table III). The average length of stay in the programs for the former was 17 months, while for the latter, it reached 13 months, indicating a faster average recovery rate.

We also observed considerable progress in underweight and short stature, with 32% of underweight children and 30% of those with short stature also achieving normality. The average length of stay for the former was 20 months, while for the latter, it reached 17 months.

On the other hand, we also observed the difficulty of achieving changes in certain conditions, such as short stature, as 42% of children entering with short stature exited with the same condition. However, it is worth noting that out of these, 65% abandoned treatment at some point, with an average stay of 11 months in the association.

When considering the nutritional criteria, we observed that the greatest impact of the association was on children with mild malnutrition and those with severe

obesity. In fact, 56.5% of children entering the programs with mild malnutrition achieved a eutrophic condition upon completion, while 53.5% of children with severe obesity reached that condition (Table IV). The average length of stay in the programs for the former was 17 months, while for the latter, it reached 30 months, indicating a significantly slower average recovery rate.

We also observed significant progress in moderate malnutrition, overweight, and severe malnutrition, with 47.8% of children with moderate malnutrition, 41.8% of those who were overweight, and 36.8% of those with severe malnutrition also achieving a eutrophic condition. When comparing these criteria with the previous ones, the effectiveness of the programs is much higher when the analysis is carried out according to nutritional criteria. Additionally, we observed that the average length of stay was 19 months for those entering with moderate malnutrition, while those entering with overweight stayed an average of 14 months in the association.

On the other hand, like short stature, we observed the difficulty of achieving changes in the conditions of severe malnutrition. In fact, 1 in 5 children entering with severe malnutrition exited the program without changing their situation of deficiencies. We also highlight that 94% of these children abandoned treatment at some point (which is associated with the persistence of the condition), with an average duration of only nine months in the association.

Finally, we analysed the data according to stature criteria. We observed that compared to the previous criteria, the achievements are much more modest. In fact, 30.6% of children entering with mild short stature achieved normality, while the proportion decreases when considering severe short stature, with only 14% of those entering with this condition attaining normality. This is an indicator of strong structural nature and difficult modification, especially in contexts of structural poverty (Table V). Likewise, the average length of stay for the former was 16 months, while for the latter, it reached 20 months, indicating a slightly slower average recovery rate.

We also observed, as mentioned before, the difficulty of achieving changes in conditions of height deficit. In fact, 36.8% of children entering with severe short stature exited without significant modifications in their deficiency status, a proportion that nearly doubles (66.8%) when analysing the persistence of the short stature condition. In the first case, 83% abandoned treatment (with an average length of stay of 12 months), while in the second case, the proportion of abandonment reached 62% of them, with an average length of stay of 14 months.

## NUTRITIONAL GAINS

To identify the nutritional impact generated by the completion of stay in ACHC centres, we evaluated nutritional gain, understood as the average positive variations in body mass index (BMI), comparatively between children who achieved nutritional recovery and those who abandoned treatment. This analysis was conducted considering the age in years at the start of treatment.

An exploratory analysis found that the mean and median values of BMI increased between the date of program entry and BMI. The mean BMI increased from 15.7 to 16.8, while the median grew from 15.6 to 16.6, indicating this nutritional gain. When observing these variations considering the discharge category, greater gains are observed in those who were discharged due to age and those who achieved complete nutritional recovery (Table VI). The differences remain consistent when considering both the mean value and the median.

In the first place, it is observed that the greatest nutritional gains were seen in children under one year of age. It seems that this age group, besides being the largest, is the one with the greatest plasticity regarding nutritional improvement through intervention.

Secondly, we detected that the nutritional gain is higher in children who were discharged compared to those who abandoned treatment. And thirdly, and perhaps most importantly, there were significant nutritional gains even in those children who abandoned treatment, which provides positive evidence regarding socio-nutritional interventions regardless of the reason for discharge.

## CONCLUSIONS

Santiago del Estero constitutes a point of structural poverty in Northern Argentina, a territory that could be set apart from the rest of the national territory in the concentration of poverty. There has been found significant connection between poverty conditions and child nutrition. In this regard, the impact of deficiencies, especially during childhood, on the affected children is well-known.

Understanding these impacts clearly, the ACHC has been established in the province since 2007, and through a comprehensive approach to the problem (which suggests addressing both the urgent nutritional manifestation and the underlying causal issues), it has managed to assist, diagnose, and include over 5,700 children in its programs. Its branches, distributed in various poverty-

stricken areas across the province, have made this task possible. However, a cartographic analysis reveals the extent and depth of the problem and the vast areas without coverage by this organization, at least.

Among its results, the significant number of children enrolled in the programs stands out, both due to social and nutritional issues, as well as the high rate of program completion. These achievements are clearly based on the demonstrated commitment of mothers and caregivers, as well as the connection established by the association members with the program users, which provides excellent support when considering the variables that explain the success of the programs.

While we have observed a downward trend in childhood malnutrition, we have also detected an increase in

the number of children treated by the association, which is related to the rapid identification of families in situations of social risk and their diagnosis for program enrolment. The quality of information recording is also noteworthy in this regard, as it allows for the identification of strengths and limitations in such interventions.

Food interventions can be helpful, nonetheless, they fade in the face of solid structural conditions that effectively determine the occurrence, development, and consolidation of malnutrition in Santiago's children. Some substantial variables that should be integrated with food programs and considered in any program or plan aimed at eradicating these structural issues in Santiago's childhood are the following: access to clean water systems, sanitation, and maternal education.