NICK
Nutritional **I**mprovement for children in urban **C**hile and **K**enya

BRIEFING PAPER 4
NICK
(Nutritional Improvement for children in urban Chile and Kenya)

Impact Evaluation in Mombasa

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I. Introduction

This paper is concerned with both child stunting and its possible link to domestic violence.

1.1 Assessing the Impact: Difference in difference procedures

We have carried out a before-after, case-control study to determine the impact of coordinated intersectoral actions on young child nutritional statuts. The intervention area in Mombasa was the informal settlement called Chaani, the control area was the informal settlement called Kongowea. The first wave of child anthropometric and household survey data was in July 2011, the second in June 2013. The classic – although relatively new! - way to assess impact of the intervention is to say:

- If the areas are well-matched then any changes – independent of the intervention - should be similar in the control and intervention areas
- If there is a positive impact of the intervention, then the situation should have improved more in the intervention area, and vice versa if there is a negative impact

Difference-in difference
Then one compares the change in the intervention area against the change in the control area (the procedure is known as difference-in-difference). This procedure has been applied to the rates of moderate and severe stunting in Chaani and Kongowea and to rates of domestic violence in the two years.

It is always crucial to check that there have been no significant changes in other factors that are known to affect child health and specifically nutrition that have *differentially* affected control and intervention areas. In particular, we are concerned with any possible changes in any known structural and social determinants of child nutritional status in the two areas (which are sometimes know as the Social Determinants of Health).

Possible intermediate factors
- Civil conflict
- Education
- Employment
- Food distribution and consumption,
- Food security/ coping strategies
- Housing
- Income
- Political Situation

- Population change /immigration
- Social security,
- Transport

Of these, the only ones which might change quickly (i.e. between Summer 2011 and Summer 2013) and, crucially, differentially between the two informal settlements in Mombasa (Chaani and Kongowea) are employment, food distribution and consumption, food security, income and population change. Our findings showed that there have indeed been changes in the levels of civil conflict and the political situation in Kenya between 2011 and 2013 but those changes, whilst different across the country, would not have been different between Chaani and Kongowea. Education levels, housing and transport would only change slowly and not differentially between the two slums. There have been some changes in social security but they would have been the same for both slums. Moreover the relevant impact of changes in food availability is better measured through changes in coping strategies so that the changes to examine are employment, food security, income and population change.

2. Stunting

2.1 Stunting Rates in Kenya, Coast and Mombassa at Baseline

For under 5 year olds

Nationally in 2008-09 DHS, the rates for severe stunting for under 5 year olds were about 16% for boys and 12% for girls, and for moderate stunting they are about 37% for boys and about 33% for girls; in Coast Province (including Mombasa), the severe stunting rates were about 16% for boys and 12% for girls, and for moderate stunting about 41% for boys and 37% for girls; and in the poorest household quintile, severe stunting was about 20% for boys and 17% for girls, and moderate stunting was about 46% for boys and 43% for girls. Nationally in 2009 MICS, the rates for severe stunting for under 5 year olds were about 16% for boys and 14% for girls, and for moderate stunting they are about 37% for boys and about 33% for girls; in Coast Province (including Mombassa), the severe stunting rates were about 17% for boys and 14% for girls, and for moderate stunting about 35% for boys and 32% for girls; and in the poorest household quintile, severe stunting was about 22% for boys and 20% for girls, and moderate stunting was about 47% for boys and 43% for girls. In the MICS Informal Settlements Survey, the rates for severe stunting for under 5 year olds were about 8% for boys and 6% for girls, and for moderate stunting they are about 27% for boys and about 19% for girls.

For 2 to 5 year olds

All three surveys give breakdowns by single years of age and so the rates can be calculated nationally for the 24-59 months age group. Nationally in 2008-09 DHS, the rates for severe stunting for2 to 5 year olds were about 16% for boys and 13% for girls, and for moderate stunting they are about 39% for boys and about 35% for girls. Nationally in 2009 MICS, the rates for severe stunting for2 to 5 year olds were about 16% for boys and 14% for girls, and for moderate stunting they are about 37% for boys and about 32% for girls. In the 2009 MISS survey, the rates for severe stunting for2 to 5 year olds were about 10% for boys and 7% for girls, and for moderate stunting they are about 28% for boys and about 25% for girls.

Table 1 :Comparative Nutritional Information for Kenya, Coast and Mombasa Informal Settlements, 2009

		Weight for Age		Height for Age		Weight for Height		Number of children
		-2SD	-3SD	-2SD	-3SD	-2SD	-3SD	
DHS	National	16.1	3.6	35.3	14.2	6.7	1.9	5,470
	Coast	23.5	5.4	39.0	14.3	10.7	3.3	485
	Poorest	24.9	7.0	44.4	18.8	11.3	3.8	1,359
MICS	National	21.2	5.7	35.3	14.7	6.0	1.4	5,917
	Coast	21.1	4.0	33.7	15.5	6.4	1.5	566
	Poorest	29.1	9.3	45.3	20.9	7.6	2.4	1,390
MISS		14.4	3.2	23.5	7.2	6.1	1.3	444
	Boys	16.2	3.8	27.2	8.2	7.9	1.6	241
	Girls	12.1	2.5	19.0	5.9	4.1	1.0	204
	Poorest	19.5	5.6	32.8	11.7	5.5	2.0	146

Sources: DHS Table 11.1, p.143; MICS, Table 15; MISS, Table 5.1, p.13

2.2 Stunting Rates in Chaani and Kongowea in 2001 and 2013

Rates among 24-59 month old children measured[1] in the two slum areas in Mombassa in 2011 were higher than the 2009 national rates, and much higher than the rates in the MICS 2009 Mombassa Informal Settlement Survey. Severe stunting was about 18% for boys and 13% for girls with both rates higher – but not by much - in Chaani; moderate stunting was about 40% for boys and 35% for girls with the rates for boys higher and the rates for girls lower in Chaani. Two years later in 2013, severe stunting was about 12% for boys and 10% for girls with both rates higher in Chaani; moderate stunting was about 33% for boys and 30% for girls with the both rates higher in Chaani.

Table 2: Severe and Moderate Stunting in Chaani and Kongowea in 2011 and 2013: children between 24 and 59 months inclusive only.

	N	< -3	< -2	Mean	SD
CHAANI					
• 2013 Male	220	13.2%	34.5%	-1.33	1.42
• 2011 Male	197	18.3%	40.6%	-1.69	1.45
• 2013 Female	256	11.7%	32.8%	-1.41	1.29
• 2011 Female	176	13.6%	31.3%	-1.46	1.37
KONGOWEA					
• 2013 Male	268	10.8%	31.3%	-1.27	1.47
• 2011 Male	208	17.8%	38.5%	-1.65	1.40
• 2013 Female	255	9.0%	27.5%	-1.28	1.31
• 2011 Female	229	11.8%	38.9%	-1.49	1.39

So hereafter, we are reporting the findings for 24-59 month old children:

[1] Note that, among those interviewed, the rates are different and the intervention area appears to have improved more (see Annex I); however, those who agreed to be interviewed would be a biased sample of those measured.

- In Chaani, for males there has been a 5.1% drop in severe stunting and a 6.1% drop in moderate stunting; for females, 1.9% drop in severe stunting and a 1.5% rise in moderate stunting.
- In Kongowea, for males there has been a 7.0% drop in severe stunting and a 7.2% drop in moderate stunting; for females, 2.8% drop in severe stunting and a 11.4% drop in moderate stunting.
- For severe stunting the difference-in-difference is a 1.9% larger drop in Kongowea for males and a 0.9% larger drop for females; the changes values are obviously similar and certainly not statistically signficant. For moderate stunting, the difference-in-difference is a 1.1% larger drop in Kongowea for males and a 12.9% larger drop for females; the latter is larger than the comparative drops in severe stunting, and is statistically significant at the 0.1 level.

Overall therefore, the changes in severe stunting are the same, but there have been larger drops in moderate stunting in the control area, although the difference is only statistically significant for females. Nevertheless it is clearly important to explore the reasons for the result which is not favourable to the intervention area.

2.3 Other Factors

The changes to examine are employment, food security, income and population change. Employment has been measured as the proportion of the two main adults in the household in different kinds of occupation; food security through the percentage adopting different coping strategies; income through reported household income from up to three different sources; and population change in terms of in- and out-migration to surveyed households in the two areas.

2.3.1 Employment

There has been a drop in formal employment and in those reporting a business occupation in both areas, but the drops are steeper in Chaani (from 27% to 19% and from 28% to 13%) than in Kongowea (from 21% to 18% and from 38% to 14%). In contrast there has been a substantial rise in petty trading in both areas but the rise is steeper in Chaani (from 8% to 34%) than in Kongowea (from 12% to 35%). The percentages reporting casual waged labour has risen a little in Chaani and fallen a little in Kongowea.

Percent of First two Adults in Household reporting Different Occupations

		Percent of first two respondents reporting different occupations (N)			
		Employed	Casual Waged Labour	Petty Trading	Business persons
Chaani	2011	27	33	8	28
	2013	19	38	34	13
Kongowea	2011	21	37	12	38
	2013	18	34	35	24

Note: because percentages are percentages of first two respondents, they do not necessarily add up to 100%

2.3.2 Coping Strategies

In general, there has been an increase in the use of emergency coping strategies in both areas over the period, but the increase has been more striking in Chaani than in Kongowea: reducing meals/day increasing from 34% to 54% in Chaani and from 46% to 53% in Kongowea; skipping a meal a day increasing from 7% to 19% in Chaani and from 10% to 19% in Kongowea; reducing size of meals increasing from 33% to 47% in Chaani and from 42% to 37% in Kongowea; buying cheaper foods increasing from 22% to 29% in Chaani and from 24% to 26% in Kongowea; buying food on credit increasing from 12% to 29% in Chaani and from 17% to 24% in Kongowea; buying cheaper foods increasing from 3% to 29% in Chaani and from 5% to 16% in Kongowea.

Percent of Respondents Reporting that their Households had Adopted Different Coping Strategies

		Percent of respondents reporting different Coping Strategies (N)					
	Max N	Reduce meals/day	Skip food for a day	Reduce size of meals	Buy cheaper food	Buy food on credit	Borrow food from relative
Chaani 2011	206	34	7	33	22	12	3
2013	256	54	19	47	29	29	29
Kongowea 2011	243	46	10	42	24	17	5
2013	235	53	19	37	26	24	16

2.3.3 Income

Reported household income is based on their reports of income from three different sources: the weighted totals of household income show that there were declines in both areas but that the decline has been more in Chaani: (when computed) from c.10,400 to c.6,950 – a 33% drop) than in Kongowea (from c.8,600 to c.6,700 – a 23% drop)

Average monthly income from different sources and total household income

		Average monthly income from different Sources (N)			Total average monthly income	
		First	Second	Third	Totalled	Computed
Chaani	2011	12,262 (129)	6,833 (24)	13,874 (34)		10,411 (213)
	2013	9,748 (190)	7,809 (53)	2,520 (5)		6,947 (328)
Kongowea	2011	11,236 (122)	7,826 (33)	13,369 (35)		8,635 (244)
	2013	9,417 (176)	10,387 (62)	2,740 (5)		6,691 (346)

2.3.4 Population Change

Population change has been measured in terms of the levels – and changes in the levels - of in-migration and out-migration in the two areas. In Chaani in-,migration has increased by 5.5%V compared to Kongowea where in-migration had increased byu only 1.5%. In

contrast, out-migration has dropped by more than half in Chaani by 5.0%, compared to Kongowea where it has dropped by 3.8% from a higher level.

Percent in-migration and out-migration in the two areas in 2011 and 2013

	In-Migration		Out-Migration	
	Chaani	Kongowea	Chaani	Kongowea
2011	7.1	10.2	8.5	10.5
2013	12.6	11.7	3.5	6.7

3. Domestic Violence

The same procedure has been applied to the questions on domestic violence, asked only of women, which were repeated in 2011 and 2013. The questions have been divided into those reflecting psychological pressure because of the way the husband behaves (not letting the wife go out, excessive drinking etc.), and those where the woman is directly harmed either through insults in front of others or physically. The rates have of reporting domestic violence in terms of psychological pressure do not differ substantially between the two areas; whilst the rates of reporting direct harm are in general higher in Chaani than in Kongowea, especially in 2013 after the intervention.

It can be seen that the pattern of responses to the two groups of questions are very different: in genral the changes in the responses to the 'psychological' questions over the two-year period are not very different between the control and intervention areas, although it does look as if there has been a relative improvement in the intervention area in respect of the husband drinking alcohol, and that women in the intervention area are much more concerned about the level of humiliating domestic violence after the intervention than before

	Chaani			Kongowea			
	2011	2013	**Change**	2011	2013	**Change**	***D-in-D***
1a Jealous talking to other men	42	29	**-13**	38	25	**-13**	***0***
1b Accuses you of Unfaithful	18	24	**6**	18	21	**3**	***3***
1c not meet female friends	19	12	**-7**	16	9	**-7**	***0***
1e Knowing where you are	36	27	**-9**	29	24	**-5**	***-4***
8 Drinks alcohol	35	38	**3**	23	34	**11**	***-8***
2a1 Humiliates you	21	43	**22**	14	34	**20**	***2***
2a3 Insults you	24	52	**28**	27	44	**17**	***11***
3a1 Push or shake you	13	43	**30**	14	29	**15**	***15***
3a2 Slap you	25	69	**44**	37	54	**17**	***27***
3a3 Twist arm, pull hair	25	31	**6**	37	22	**-15**	***21***

In terms of difference-in-difference analysis for 'pushes and shakes you' which is about the intermediate level, the adult women in households in Chaani in 2011 were 1% less likely to

report being pushed and shaken than households in Kongowea, whilst in 2013 they were 14% more likely to reprotthan households in Kongowea.

4. Summary and Interpretations

For both moderate and severe stunting and for levels of physical domestic violence, rates have improved more in control than in intervention areas. For domestic violence, this may well be a reporting problem; with more attention being paid to physical domestic violence as a result of the interventions around domestic violence in Chaani, so respondents are more likely to report.
But, given that height was measured using the same instrument and by the same trained nutirtionists on both occasions, that cannot be the explanation for the negative results for moderate and severe stunting. Changes in employment, food security, income and population change have all been in the same direction, with Chaani suffering more than Kongowea.

ANNEXES:

I: THESE ARE ANTHROPOMETRIC RESULTS FOR CHILDREN WHERE THE HOUSEHOLD SUIRVEY WAS ALSO COMPLETED

	N	< -3	< -2	Mean	SD
CHAANI					
• 2013 Male	148	14.2%	33.1%	-1.39	1.38
• 2011 Male	115	20.9%	46.1%	-1.88	1.49
• 2013 Female	166	15.1%	33.7%	-1.53	1.39
• 2011 Female	98	14.3%	37.8%	-1.51	1.46
KONGOWEA					
• 2013 Male	170	8.2%	30.6%	-1.21	1.39
• 2011 Male	131	14.5%	36.6%	-1.57	1.31
• 2013 Female	168	8.9%	21.3%	-1.11	1.32
• 2011 Female	113	8.0%	23.0%	-1.26	1.24

So the story for the children where the household survey was completed is (for 24-59 month olds):

- In Chaani, for males there has been a 6.7% drop in severe stunting and a 13.0% drop in moderate stunting; for females, 0.8% rise in severe stunting and a 4.1% drop in moderate stunting.
- In Kongowea, for males there has been a 6.3% drop in severe stunting and a 6.0% drop in moderate stunting; for females, 0.9% rise in severe stunting and a 1.7% drop in moderate stunting.
- For severe stunting the difference-in-difference is a 0.4% larger drop in Chaani for males and a 0.1% larger rise for females; the values are obviously very similar. For moderate stunting, the difference-in-difference is a 7.0% larger drop in Chaani for males and a 2.4% larger drop for females; although these are larger than the comparative drops in severe stunting, they are not statistically significant.
- Overall therefore, the changes in severe stunting are the same, but there have been larger drops in moderate stunting in the intervention area, although the difference is not statistically significant.

II: ADDITIONAL TABLES ON HOUSEHOLD CONSUMPTION

FOOD EXPENDITURE ON STAPLES ACROSS WHOLE SAMPLE

		Average monthly food spend on staples (Kenyan Shillings)						
	N	Maize Meal	Rice	Vegetables	Sugar	Tea	Salt	Oils/ Fats
Chaani 2011		1,814	848	764	509	123	51	488
2013		1,124	646	636	454	93	29	472
Kongowea 2011		1,815	748	836	566	92	54	493
2013		1,092	719	776	596	111	38	524

EXPENDITURE ON FISH AND MEAT FOR THOSE WHO REPORTED BUYING

	Average monthly food spend on fish and meat (Kenyan Shillings)			
	Fish	Meat	Goat Meal	Chicken
Chaani 2011	818 (148)	940 (184)	483 (50)	1,129 (12)
2013	497 (184)	783 (205)	646 (51)	293 (16)
Kongowea 2011	649 (175)	865 (178)	606 (40)	630 (4)
2013	637 (200)	859 (241)	848 (74)	298 (24)