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Dipa Sinha



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# Nutrition Status in Palanpur

Dipa Sinha<sup>\*\*</sup>

Village studies have been conducted in Palanpur in Uttar Pradesh, India since the 1950s, with the sixth round of survey in Palanpur being conducted during 2008-10. The primary focus of the previous rounds of the survey was to understand how the economy of the village functioned, how it was changing especially in relation to the agrarian economy, farming practices, rural markets, outside opportunities, population growth and so on. In each round of the survey the areas of investigation were expanded to include newer topics including various social and economic aspects of life in Palanpur (Lanjouw and Stern, 1998).

This round of village survey in Palanpur was mainly focussed on the change in the economy of the village while trying to understand its links with the larger changes occurring outside Palanpur, in Uttar Pradesh, in India and beyond. In addition, this time separate schedules were also canvassed to try and understand gender relations in the village and access to social services (health, education, pensions etc.). Women were interviewed for information on issues related to them. It was the first time that information in a systematic manner, was collected on many of these issues. While there is a wealth of data on the present situation of women in Palanpur, unfortunately there is no systematic and quantitative previous data for comparison. However, earlier rounds of surveys, especially the one conducted in 1983-84 documented qualitative information on women's lives and other social aspects in the village, based on informal discussions, a few interviews and observation; this is useful to get an idea on what changes might (or might not) have occurred in the village.

Different rounds of survey were conducted on these aspects of village life. All children under 18 years of age were interviewed on whether they did any outside work (child labour) and on schooling or private tuition. Information was collected from all the households on the various government schemes they had access to such as the Public Distribution System, social security pensions, early child care services and so on. Further, information was also collected on the expenditure on health amongst all households for major and minor illnesses.

With a focus on better understanding of key gender issues, all married women of reproductive age (15 to 49 years) were interviewed on aspects related to women's status using a structured questionnaire. In-depth interviews were conducted with young unmarried girls on their perspectives of women's lives in Palanpur. As mentioned earlier, since there are not much data from previous rounds on these issues, the main use of the data is to get some understanding of the current situation. However, it is a useful baseline for future rounds of survey in the village. Further, the data could be collected only by female researchers and it was difficult to find women who were able to live in the village for long periods of time. There were also some reservations about raising too many culturally 'sensitive' issues as this could jeopardise other aspects of the survey and our stay in the village. Impressions on many of these (e.g. dowry, domestic violence) were gathered based on observation and informal discussions. Therefore, the questionnaires were restricted to basic information while providing for the potential to go into further detail on many aspects.

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Along with all this information, the heights and weights of all the residents of Palanpur were also measured to get an indication of their nutrition status. The current paper presents the findings of the anthropometric data collected, with a focus on children under five years of age<sup>1</sup>. The focus is on children, as it is well documented<sup>2</sup>, that malnutrition sets in during early childhood and it is also a good indicator of the general nutritional status in a community. Further, links with factors such as mother's education, autonomy and work, family's income, child care practices etc. can be explored. Finally, a small sample survey on heights and weights was also conducted in 1984 and so some comparisons are possible (Kynch, 1998). Further papers will report on social, political and gender issues in Palanpur.

## I. Data

The heights and weights of all the residents of Palanpur who were available and willing were taken during a period of one week in November 2009. While this is very valuable information, there are issues of sample size and quality of data that need to be mentioned. Heights and weights of 1127 persons (out of 1265 residents of Palanpur) were collected during this period. In this paper, we use the data related to children under five years of age and adults over 20 years of age. The first group is chosen because that is the standard age group to study child malnutrition, with anthropometric norms given by the WHO. The second group is chosen as the analysis on adult nutrition status based on data from the 1983-84 survey included those above 20 years of age (Kynch, 1998). In Palanpur, there are 170 children under 5 years of age and 645 adults above 20 years of age. Among the 645 adults of the relevant age group, measurements for 562 persons were taken during the survey<sup>3</sup>. Among the 170 children under 5 years of age, heights and weights were measured for 166 children. However, in this paper we use only the data for 134 children for whom all the other relevant information including date of birth (at least month and year) and mother's characteristics (i.e. those whose mothers were interviewed in the "women round")<sup>4</sup>. While the paper is mainly focussed on child malnutrition, the small sample size is an issue of concern. But since this is a village study, it is expected that large numbers will not be available<sup>5</sup>.

There were two other problems with using the child anthropometry data. First, it is important to know the exact date of birth for children to be able to estimate the standard anthropometric measures such as height-for-age and weight-for-age. As has been the

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<sup>1</sup> This paper presents very preliminary results. Data from other rounds (for e.g. 'Women's questionnaire) which are used here for understanding causations are still being processed. Once the final data is available all numbers will need to be revised accordingly.

<sup>2</sup> Malnutrition at an early age leads to reduced physical and mental development during childhood. The first two years of life are the "window of opportunity" to prevent early childhood undernutrition that causes largely irreversible damage (See Horton 2008, WFP, UNICEF 2009 and references therein). For further information also see the Lancet Series on Maternal and Child Undernutrition (2008).

<sup>3</sup> The remaining were not included as they were either not available in the village during the survey or were not willing to participate. This includes 48 females and 35 males. Of the 562 whose measurements are available, the data for 4 persons has not been used in the analysis, because of errors in measurements.

<sup>4</sup> Further, those whose anthropometric indicators were outliers were removed. There were some women who were not available during the time when the survey related to women was conducted, but were covered later. These women have not been included in this paper. Therefore, a few more children will be added in later analysis.

<sup>5</sup> At the same time it is clarified that no claim is being made that Palanpur is a 'representative village'. On the other hand it is not an especially unusual village either. As mentioned in the earlier book on this village study, the purpose of this study is "*the hope that the unique detailed knowledge of that particular place might generate hypotheses and thoughts which would not arise naturally from a more anonymous data set covering large parts of the country.*" (Lanjouw and Stern, 1998; p. xiii)



experience with most studies involved in collecting the dates of birth in rural India, in Palanpur too it was only in very rare cases where parents were able to recall the exact date of birth of children. A lot of time was spent in trying to arrive at the precise month and year of birth using local events and festivals as reference points. The data were also then triangulated with the information that the anganwadi worker (child care worker of the government Integrated Child Development Services (ICDS)<sup>6</sup> programme) had. However, since the ICDS is almost non-functional in the village, she did not have records for many children.

Secondly, the entire exercise of collecting heights and weights of young children was quite tedious and raised some doubts in our minds on how accurate our measurements were. Most children would cry and refuse to stand/sit still even for the few seconds required to get their weights and heights. Some adults also did not see a point in this exercise and therefore were not very encouraging. Many adults were however more interested in getting their own weights measured and so were older children. While we were wary before starting the measurements because we were told by some that people in this area believed that weighing children would attract the evil eye, and that we should expect a lot of resistance from the parents and especially grandparents, this was not the case in the field. The actual problem was that it was difficult to find flat surfaces to place the weighing machines on and then to get the children to co-operate with the measurement. So, while sitting in the little basket for weighing, children would constantly move and while measuring heights also would not stand up straight. We did our best to get the most accurate measurements, given the odds, and have used only the data that we felt confident about.

While these limitations to the data must be kept in mind, it is also important to note that the results we get are not wildly dissimilar to the measures from secondary sources for the district and the state. And on the whole we believe we may have applied tougher standards, closer checking and more care in general for data collection across the board in Palanpur than for many other studies and surveys. Therefore, we suggest they can be used to arrive at some broad conclusions on the status of nutrition among children in Palanpur and the factors which might be affecting it.

The village survey in 1983-84 also measured heights and weights, providing some degree of comparison over time. However, the 1983-84 nutrition survey was restricted only to a sample of cultivator households and therefore is not strictly comparable to the present data. The nutrition survey in 1984 covered 239 persons in the 36 sample households. The Body Mass Index (BMI)<sup>7</sup> was calculated for all adults, and measures for stunting (height-for-age) and underweight (weight-for-age) for children. While BMI from the previous round and

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<sup>6</sup> The Integrated Child Development Services (ICDS) Scheme has the following objectives: (i) to improve the nutritional and health status of children in the age-group 0-6 years; (ii) to lay the foundation for proper psychological, physical and social development of the child; (iii) to reduce the incidence of mortality, morbidity, malnutrition and school dropout; (iv) to achieve effective co-ordination of policy and implementation amongst the various departments to promote child development; and (v) to enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education. These objectives are sought to be achieved through a package of services comprising: (i) supplementary nutrition, (ii) immunization, (iii) health check-up, (iv) referral services, (v) pre-school non-formal education and (vi) nutrition & health education. These services are provided through an anganwadi centre (each anganwadi centre has an anganwadi worker and anganwadi helper). Based on Supreme Court orders, the ICDS is a universal scheme with anganwadi centres in every village and open to all children under 6 years of age. For further details on the ICDS scheme see <http://wcd.nic.in> and [www.righttofoodindia.org](http://www.righttofoodindia.org)

<sup>7</sup> Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m<sup>2</sup>). BMI values are age-independent and the same for both sexes.



the current round can be compared using the same “cut-offs”, there is no scope of comparison in the case of child malnutrition. This is because BMI can be calculated based only on heights and weights (irrespective of age and sex); and a ‘cut-off’ point for the BMI chosen; below which population can be considered to be undernourished. Even if the ‘cut-offs’ change over time, comparisons can be made with reference to previous cut-offs used even without access to raw data from earlier. However, as indicators of child malnutrition such as stunting and underweight are arrived at in relation to how far the current height or weight of a child is from the standard reference population (of the same age and sex); as standards change we require access to the raw data to re-calculate prevalence of undernutrition.

Evaluation of nutritional status for children is based on the rationale that in a well-nourished population, there is a statistically predictable distribution of children of a given age with respect to height and weight. In any large population, there is variation in height and weight; this variation approximates a normal distribution. Use of a standard reference population as a point of comparison facilitates the examination of differences in the anthropometric status of subgroups in a population and of changes in nutritional status over time. The use of a reference population is based on the empirical finding that well-nourished children in all population groups for which data exist follow very similar growth patterns before puberty (IIPS, 2007).

Until 2006 the most commonly used reference population, was the U.S. National Center for Health Statistics (NCHS) standard, which was recommended at that time by the World Health Organization. These were the standards used for analysis of the data collected in 1984 (Kynch, 1998). However, in this paper estimates based on a new international reference population released by World Health Organisation (WHO) in April 2006 (WHO Multicenter Growth Reference Study Group, 2006) and accepted by the Government of India are used<sup>8</sup>.

Since the standards for defining nutrition status used in the earlier survey are different and the data could not yet be made comparable in the case of children, direct comparisons with results from the previous round of survey is not possible at the moment<sup>9</sup>. However, as mentioned above comparisons on adult BMI based on cut-offs used in the earlier paper are made here.

Whilst we will make the best use we can of earlier data on nutrition it is, nevertheless, very limited. Further, no data was systematically collected in previous rounds on other related aspects of access to health care, age at marriage, child care practices or women’s status. In this paper we restrict ourselves to only broad comparisons of what change might have taken place.

In spite of the data gaps, what emerges from both the rounds of survey is that the levels of malnutrition in Palanpur are high. While there might have been some improvement

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<sup>8</sup> Since the WHO is now the accepted norm, it makes sense to use it. Further, software is also available to analyse the data based on these new reference data. The STATA igrowup package available for download on the WHO website (<http://www.who.int/childgrowth/software/en/>) was used to analyse the data.

<sup>9</sup> The raw data from the previous round of survey is only available in the form of copies of diaries in which data were collected. This is being entered electronically and once we are able to link the data to the current person ids, they will also be analysed using the new standards. This will take some time as names, especially of young children, change. Further the diaries do not have the date of birth but only notes on links to reference events during the time of birth – which have to now be figured out. Attempts are also being made to recover the soft copy (electronic version) of the previous round of data which will make comparison easier.



over the last 25 years, the present data show that levels of malnutrition among children are still high. This is also true for rural Uttar Pradesh in general (more on this below).

## **II. Malnutrition in India – A Background**

India is home to the highest number of malnourished children in the world (UNICEF, 2009). What is puzzling is that in spite of the recent spurt in the economic growth rate, the decline in malnutrition has been unimpressive. Despite sustained growth in the national and per capita incomes over the last two decades, it is seen that there is a minimal decline in the rate of malnutrition among children (Haddad, 2009). International evidence shows that, in average using cross country analysis, for every 3–4 per cent increase in *per capita* income, undernutrition rates as measured by low underweight rates decline by around 1 per cent (Haddad *et al.* 2003).

Rates of malnutrition in India, and also other South Asian countries are higher than those of many poorer countries including those in Sub-Saharan Africa; this phenomenon has been called the ‘*Asian Enigma*’. One of the main factors to which this is attributed is the poor status of women (Ramalingaswamy *et al.* 1996). Studies have also looked at economic factors, child care practices, health seeking behaviour etc. for explaining malnutrition.

According to the National Family Health Survey, 2005-06 (NFHS-3), 40.4% children under three years of age in the country are underweight. This is a fall of only two percent in the seven years since the previous survey was conducted. In 1998-99, by the same measure 42.7% children were underweight (NFHS-2). Other indicators of malnutrition from these surveys, are also quite poor. About 45% of children under three are stunted, and almost 70% children under five years of age are anaemic. Even among adults about one-third of all men and women have a low body mass index (BMI of less than 18.5) (IIPS, 2007).

As can be seen in the table below, malnutrition rates in rural India are high and the situation in Uttar Pradesh is in general worse than for the country as a whole. Therefore while 50.7% of all rural children in India are stunted, in rural Uttar Pradesh 58.4% children are stunted. Further, it is seen that in Moradabad district conditions seem to be worse than the average for Uttar Pradesh. It is difficult to get district level malnutrition data. The only survey which provides this is the District Level Household Survey (DLHS) conducted under the Reproductive and Child Health (RCH) programme in 2002-04 (IIPS and GoI, 2006). Even this survey did not measure the heights of children. The finding of this survey that 72.7% children in Moradabad are malnourished compared to 56% of UP as whole, indicates that the situation in Moradabad is substantially worse than the rest of the state. This result from the survey is surprising considering that Moradabad is more prosperous than the average district in the state.

The figures for malnutrition that we get for Palanpur village from our survey in 2009 are also presented in the table below. According to this, 58.2% of children under five years of age are underweight and 68.6% of them are stunted. Further, about half the adults (51.5% men and 48.7% women) have a body mass index less than 18.5, which is considered to be “normal”. Based on this data, the situation in Palanpur is worse for both adults and children compared to the all India (rural) and Uttar Pradesh (rural) averages. A higher percent of children are stunted and underweight; and higher percent of adults have a low BMI in Palanpur. Further, the difference in stunting and underweight prevalence among girls and boys in Palanpur is striking and much larger than the gap seen for all India (rural) and Uttar



Pradesh (rural); with the malnutrition level among girls being much higher in Palanpur. Such a gap is not seen in the case of adult BMIs. However, as will be seen below, this probably has a lot to do with the small sample<sup>10</sup> of Palanpur and is in fact a reflection of other confounding factors such as socio-economic status of the family.

**Table 1: Malnutrition in India, Uttar Pradesh and Palanpur**

	India*	Uttar Pradesh*	Moradabad**	Palanpur (2009) <sup>#</sup>
% rural children underweight	45.6	44.1	72.7 (56)	58.2
% girls underweight	41.9	43.7	(54.1)	63.4
% boys underweight	43.1	41.2	(56.4)	52.4
% rural children stunted	50.7	58.4	-NA-	68.6
% girls stunted	48.0	57.5	-NA-	71.8
% boys stunted	48.1	56.2	-NA-	65.1
% rural men with BMI less than 18.5	38.4	41.5	-NA-	51.6
% rural women with BMI less than 18.5	40.6	38.9	-NA-	48.7

\* Source: NFHS-3, IIPS 2007 (The data for all India is from the India report of NFHS-3 and the data for Uttar Pradesh is from the UP state report of NFHS-3); the data related to children is for children under five years of age (0-59 months).

\*\* Source: DLHS 2002-04, IIPS and GoI 2006 (average for UP is 55.3). Figures in brackets in the column are the average figures for UP from the DLHS report

# Data from the Palanpur village survey. Data collected in November 2009. The data related to children is for children under five years. The data related to adults is for all adults above 20 years of age.

### III. Adult Undernutrition in Palanpur

While there is a problem, at this stage, in comparison of this round of data from Palanpur from the previous round, in the case of children due to the difference in standards used, comparison can be made in relation to adults. Since information on the BMI, using different cut-off points, is available for adults using the 1984 data; the recent data are also presented using the same cut-offs to enable a comparison. Based on “the International Classification of adult underweight, overweight and obesity according to BMI” given by the WHO, those with a BMI of less than 18.5 are considered underweight. Among underweight populations, those with BMI less than 16.00 are classified as having severe thinness, BMI between 16.00 to 16.99 moderate thinness and BMI between 17.00 and 18.49 as mild thinness (WHO, 2011).

The 1984 data are for 101 adults above 20 years of age from a few sample households, while the present data are for 558 adults above 20 years of age from all households.

By the different cut-offs used earlier, it is seen that the percent of adults who have a BMI of less than the cut-off has fallen over the last 25 years. For instance, based on earlier Food and Agriculture Organisation (FAO) cut-offs (which was defined as the lower limit for ‘normal’ adult BMI) while 97.9% of adult males were below the normal BMI, from the current survey 80.1% are below normal. The improvement among women is lower with almost the same percent of women having a below normal BMI during both periods (50.9%

<sup>10</sup> This is based on data related to 71 girls and 63 boys.



in 1984 and 50.4% in 2009). But the trend observed earlier of more adult men having a below normal BMI than adult women continues to hold with this round of survey as well. Using the current internationally accepted cut-off for underweight of 18.5 (as defined by WHO) male undernutrition is higher than female undernutrition with 51.6% of men and 48.7% of women having a BMI of less than 18.5.

**Table 2: BMI for Adults\*: Comparison with data from previous survey in Palanpur**

Cut-off <sup>a</sup>	Men		Women <sup>^</sup>		Total adults	
	1984 <sup>#</sup>	2009 <sup>**</sup>	1984 <sup>#</sup>	2009 <sup>**</sup>	1984 <sup>#</sup>	2009 <sup>**</sup>
FAO/WHO/UNU (1985) men: 20.1 women: 18.7	97.9	80.1	50.9	50.5	73.3	65.8
Payne (1987) Adults: 18	75	38	45.3	36.2	59.4	37.1
Harriss et al. (1990) Adults: 17	52.1	20.2	30.2	22.9	40.6	21.5
Shetty (1984) Adults: 16	25	8.7	20.8	13	22.8	10.8
WHO current cut-off for underweight Adults: 18.5		51.6		48.7		50.2
Total n	48	287	53	271	101	558

\* Adults defined as all those above 20 years of age <sup>#</sup> based on data collected during the 1983-84 Palanpur village survey. <sup>\*\*</sup> Data from the Palanpur village survey. Data collected in November 2009. <sup>a</sup> The figures for 1984 and cut-offs are as published in Kynch (1998); Table I. The data related to adults is for all adults above 20 years of age in the sample households<sup>11</sup>. <sup>^</sup> 'Women' include pregnant and lactating women – the cut-off points may be too low for such women

Further, for all the different cut-offs used it is seen that between the two surveys the improvement for men is more than that for women. Again, since we do not have further information on diets, work patterns and health status, it is difficult to draw conclusions on possible causes and implication. What can be said overall from these data on adult BMIs is that there seems to be a distinct improvement in male nutritional status since 1984 (especially at lower cut-offs), while at the same time it needs to be said that the number of persons who have a below-normal BMI is still very high.

#### IV. Child Malnutrition in Palanpur

We now move to examine child malnutrition in Palanpur. As mentioned earlier, for young children anthropometric indicators in relation to age are considered more reliable as reflecting nutrition status.

As seen above, the child malnutrition levels in Palanpur are also higher than what is seen from secondary sources of data for Uttar Pradesh as a whole. But this is not entirely surprising, because it is seen that in many other social indicators as well, Palanpur seems to be worse off than the UP average. And direct observation does suggest that many children in Palanpur appear to be less healthy than elsewhere in the district. General levels of hygiene are low. Although there are not many visibly severely malnourished children in the village, many children look undernourished and/or have skin infections, running noses.

<sup>11</sup> FAO/WHO/UNU (1985) cut-off is for lower limit of *normal* adult BMI; Payne (1987) cut off for indicator of *adult undernutrition*; Harriss et al. (1990) cut off for indicator of severe risk to health; Shetty (1984) cut off for indicator of *low labouring availability*



Looking at the break-up of nutrition status data caste-wise<sup>12</sup> it is seen that Thakurs (upper caste) and ‘Others’ in general have lower levels of underweight and stunting than the rest of the castes. The highest number of children malnourished is among the Jatabs (who belong to the Scheduled Castes). What is surprising however is that the level of malnutrition among the Muraos (a land-owning agricultural caste) is also quite high, almost similar to that among the Jatabs, although economically they are probably closer to the Thakurs. This needs to be further explored. However, as we see later, the causes for malnutrition in Palanpur include not just economic status but also child care practices, mother’s education and so on. What needs to be examined is whether there is something specific among Muraos, in terms of their child care practices and so on, that makes children in these households more malnourished. At the same time, with the small sample size and measurements at one point of time, there should be caution concerning the conclusions that can be drawn.

In terms of looking at nutrition status by the asset quintiles, there is a greater negative association between percent of underweight and of stunting and asset quintile. Such a clear association is also observed in case of land ownership of the household with children from families with more land in general having a lesser chance of being undernourished.

**Table 3: Child Malnutrition in Palanpur: By caste and economic status**

	Underweight		Stunted	
	N	%	N	%
<b>Caste</b>				
Thakur	17	53.1	20	62.5
Murao	22	62.9	25	71.4
Jatab	20	69.0	21	72.4
Muslims	11	52.4	16	76.2
Others	8	47.1	10	58.8
Total	78	58.2	92	68.7
<b>Asset Quintiles<sup>13</sup></b>				
1 (Lowest)	21	75.0	20	71.4
2	19	73.1	18	69.2
3	12	63.2	15	79.0
4	12	44.4	16	59.3
5 (Highest)	14	48.3	20	69.0
Total	78	60.5	89	69.0
<b>Land Ownership (household total)</b>				
No land	13	68.4	16	84.2
1-5 bigha	28	66.7	30	71.4
6-10 bigha	13	50.0	17	65.4
11-20 bigha	18	56.3	19	59.4
20+ bigha	6	40.0	10	66.7
Total	78	58.2	92	68.7

<sup>12</sup> For details on different caste groups in Palanpur see Lanjouw and Stern (1998)

<sup>13</sup> The asset quintiles have been arrived at based on data on ownership of the household of various productive and non-productive assets using Principal Component Analysis. For details see Ishan Bakshi and Himanshu (2011)



There is a large difference in malnutrition levels between male and female children, with 65.2% of female children being underweight while 50.7% male children are underweight. Further, it should be noted that while NFHS data for the entire state of Uttar Pradesh also shows that female underweight children are more than male underweight, the difference between the two is not so wide. Given that our sample is quite small and the measurement is at one point of time, not much can be said about the extent of gender discrimination reflected in the gap in prevalence of undernutrition between boys and girls. We note however that such a gap was also noticed in the survey conducted in 1984. The previous round of survey found that “...a significantly higher percentage of girls than boys were severely malnourished, by the weight-for-age criterion.” (Kynch, 1998)

**Table 4: Child Malnutrition in Palanpur: By sex and mother’s literacy status**

	Underweight		Stunted	
	N	%	N	%
<b>Sex of the Child</b>				
Female	45	63.4	51	71.8
Male	33	52.4	41	65.1
Total	78	58.2	92	68.7
<b>Mother’s Literacy Status</b>				
Illiterate	67	58.8	82	71.9
Can Read/Read & Write	11	55.0	10	50.0
Total	78	58.2	92	68.7

Also, as seen in many other studies<sup>14</sup>, in Palanpur there are more malnourished children among those born to illiterate mothers than to those who can read or read and write. The difference is starker in the case of stunting, which is an indicator of chronic undernutrition, than underweight. However, there are very few literate mothers in Palanpur and caution is necessary in interpreting the results.

We have some direct indicators of women’s autonomy available including role in decision-making, outside work and mobility, physical threat and exposure to media. We also look at whether there is any relation between these indicators of mother’s autonomy and the child’s nutrition status. Mother’s autonomy can be seen as one of the pathways through which mother’s education has a positive impact on children nutrition. However, it is seen that there is no consistent pattern emerging where it seems that children of mothers having greater autonomy in economic decision making or exposure to media have lesser chance of being undernourished. In fact, in many cases, it is the other way round where more autonomy seems to indicate more malnutrition, something that is counter-intuitive. However, this needs to be further studied while controlling for confounding factors. Further, other studies using NFHS data have failed to find any significant relation between mother’s autonomy and child nutrition, even after controlling for many other socio-economic indicators<sup>15</sup>.

<sup>14</sup> For example see Mishra and Retherford (2000); Moestue and Hutley (2008) and Miller and Rodgers (2009). The author’s own calculations using NFHS data for all Indian states and controlling for other socio-economic factors of the family also confirms this positive relationship between mother’s education and child nutrition.

<sup>15</sup> See Arulampalam, Bhaskar, and Srivastava (2010) and also author’s own work with NFHS data for all Indian states (unpublished)



**Table 5: Child Malnutrition in Palanpur: By indicators of mother's autonomy<sup>16</sup>**

	Underweight		Stunted	
	N	%	N	%
<b>Economic Decision Making<sup>a</sup></b>				
Less than average decision-making	17	44.7	25	65.8
More than average decision-making	61	63.5	67	69.8
Total	78	58.2	92	68.7
<b>Outside Paid Work<sup>b</sup></b>				
Does no outside paid work	61	56.5	71	65.7
Does any outside paid work	17	65.4	21	80.8
Total	78	58.2	92	68.7
<b>Mobility<sup>c</sup></b>				
Less than average mobility	44	55.0	50	62.5
Can go to 5 or more places alone	34	63.0	42	77.8
Total	78	58.2	92	68.7
<b>Freedom from Threat<sup>d</sup></b>				
Ever beaten by husband	36	57.1	42	66.7
Never beaten by husband	40	61.5	47	72.3
Total	76	59.4	89	69.5
<b>Media Exposure<sup>e</sup></b>				
No media exposure	46	56.1	60	73.2
Any media exposure	32	61.5	32	61.5
Total	78	58.2	92	68.7

<sup>a</sup> This indicator is based on 4 questions that were asked on whether the woman she has a say in how the household's overall income is spent, she gets any cash in hand to spend on her own, she has any land in her name and she has a bank/PO account. All women who said "yes" to 2 or more of these questions are considered as having "more than average decision making". <sup>b</sup> Indicator of women who have done any paid work (cash or kind) in the last year preceding the survey. <sup>c</sup> Women were asked whether they are allowed to go alone to 8 different common places such as the market, to the doctor, to the temple, to the fields and so on. We then categorise women into those who said they can go to 5 or more places alone and those who cannot. <sup>d</sup> Women were asked whether they ever experienced domestic violence in their married life. <sup>e</sup> Women were asked whether they read the newspaper, listened to the radio, watched TV or ever been to the cinema. All women who said that they accessed any one of these media (in whatever frequency) have been categorised as having any media exposure.

An immediate factor that could be considered to be affecting child's nutrition status is whether appropriate child care practices are being followed or not. Important among these are early and exclusive breastfeeding and timely introduction of complementary feeding. In these aspects as well it is seen that Palanpur performs poorly. Only 10% of the women said that they gave their babies colostrum milk, and only about 15% reported timely introduction of complementary feeding. It is believed locally that colostrum feeding is harmful to the babies and therefore is squeezed out before feeding the baby. Further, it is also believed that the mother does not produce enough milk initially and therefore most children are breastfed, for the first couple of days they are given pre-lacteals such as sugar-water and *ghutti*<sup>17</sup>. Data from the NFHS shows that in Uttar Pradesh 96% children are given pre-lacteals (IIPS, 2007).

<sup>16</sup> See Coppoletta and Sinha (2011) for details on women's status in Palanpur

<sup>17</sup> Something like gripe water; made using local herbs



**Table 6: Child Malnutrition in Palanpur: Child Care Practices**

% children given (human) colostrum feeding <sup>18</sup>	10%
% start complementary feeding (solid/semi solid) by 7 <sup>th</sup> month	15%
% children/women who never got any benefit from ICDS	87%

Further, from observation in Palanpur, one saw that rarely were young children given appropriate food when solids were introduced. This was both because of lack of resources and lack of awareness. In general diets in Palanpur are poor in variety with most eating only 'roti' and 'vegetables' (that too not many). The ICDS<sup>19</sup> scheme which is supposed to provide supplementary nutrition for young children and counsel mothers on these issues is non-functioning. Of all the women with young children, only about 13% said that they ever received any service, including supplementary nutrition, from the ICDS. For Uttar Pradesh as a whole NFHS reports that 22.3% of all children under six receive any services from the ICDS (IIPS, 2007).

Two most significant immediate causes of malnutrition are inadequate dietary intake and illness and these tend to create a vicious circle: a malnourished child, whose resistance to illness is compromised, falls ill, and malnourishment worsens. Children who enter this malnutrition-infection cycle can quickly fall into a potentially fatal spiral as one condition feeds off the other. Malnutrition lowers the body's ability to resist infection by undermining the functioning of the main immune-response mechanisms. This leads to longer, more severe and more frequent episodes of illness. Infections cause loss of appetite, mal-absorption and metabolic and behavioural changes. These, in turn, increase the body's requirements for nutrients, which further affects young children's eating patterns and how they are cared for (UNICEF, 1998).

Lack of hygiene, sanitation and clean drinking water leads to infections which in turn contribute to malnutrition. Although not much systematic data is available, from observation it can be said that Palanpur performs poorly in these aspects. Of the 217 households in Palanpur, only 19 households have a toilet with a septic tank/flush system, 5 households use a covered drainage system<sup>20</sup> and all the households use drinking water from hand pumps.

## **V. Factors Affecting Malnutrition**

It is quite clear from the literature and also experience in Palanpur that malnutrition is an outcome of various factors including poverty, income status, gender norms, women's status, child care practices and so on. With such a small sample it is difficult to separate out the effects of each of these factors to determine what is important in determining the nutrition status of a child. However, an attempt is made below to understand the effect of some of the factors looked at above, while controlling for the others. Using a probit model, the odds ratios of a child being underweight are estimated.

<sup>18</sup> The first breast milk (colostrum) is highly nutritious and has antibodies that protect the newborn from diseases. Late initiation of breastfeeding not only deprives the child of valuable colostrum, but becomes a reason for introduction of pre-lacteal feeds (that is, something other than breast milk) like glucose water, honey, *ghutti*, animal milk, or powdered milk that are potentially harmful and contribute to diarrhoea in the newborn (IIPS, 2007). This also triggers the cycle of malnutrition and infection.

<sup>19</sup> See footnote no. 4 for details on this scheme

<sup>20</sup> There is no underground drainage facility in the village



**Table 7: Factors Affecting Child Malnutrition in Palanpur**

<b>VARIABLES</b>	<b>odds ratio of child being underweight</b>
<b>Mother's Schooling - primary</b>	0.18** (0.146)
<b>Mother's Schooling – above primary</b>	2.09 (1.870)
<b>Any exposure to media</b>	1.55 (0.694)
<b>Child is female</b>	1.62 (0.624)
<b>Land ownership</b>	0.97* (0.019)
<b>Mother married before 18</b>	0.72 (0.301)
<b>Mother engaged in a paid job</b>	1.25 (0.608)
<b>Constant</b>	1.78 (0.876)
<b>Observations</b>	129
<b>seEform in parentheses</b>	
<b>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.10</b>	

In the above model, it is seen that the two factors that seem to have a significant effect on a child being underweight or not are mother's schooling and the land ownership of the family. The odds of a child being underweight are significantly lower (at 5% level) for a child whose mother has studied at least up to completion of primary level compared to a child of a mother who has never been to school. However, this is not true for children of mothers who are educated beyond the primary level. But, the odds ratios are not significant and also there are only 2 mothers in the sample who have studied beyond primary.

The land ownership variable is a continuous variable taking the value of the number of *bighas* of land owned by the family. Here it is seen that as the land ownership increases the odds of the child being underweight is significantly lower (at the 10% level). The rest of the factors included such as mother's exposure to media, mother's work status, age at marriage of mother, sex of the child do not show any significant relationship with the child being underweight. It is interesting to note here that while there was a striking difference in malnutrition rates among boys and girls, this difference is not significant once we control for other socio-economic factors. This needs to be explored further<sup>21</sup>.

## **VI. Conclusion and Issues for Further Research**

This paper is a preliminary attempt at understanding the status of malnutrition amongst children and adults in Palanpur village. Although not much can be said about the change in

<sup>21</sup> Based on analysis of data from this round of survey in Palanpur compared with data for 1993, Loic (2008) finds that the survival rate for girl children is less than that for boys, for all children born between 1993 and 2008.



nutrition status over time, due to the lack of adequate data from previous rounds of the survey, based on the adult BMIs one can say that there is a modest improvement in the overall nutrition levels in the village. However, compared to secondary data for Uttar Pradesh it is seen that the level of malnutrition in the village, especially among children, is still very high. This is also disappointing considering that a visible improvement in the living standards of people in the village can be seen between now and the previous comprehensive survey in 1983-84. Almost all the houses in the village are now *pakka*, there is more footwear and better clothes, many are working in jobs outside the village, there is an increase in the use of consumer durables such as mobile phones, motorcycles, TVs etc<sup>22</sup>.

On the other hand, in comparison with the description of women's living conditions and discussions with people in the village seems to indicate not as much has changed when gender relations are concerned. There is a definite change in terms of more girls now being sent to school, but the level of education they complete still remains very low. Older women talk about how the newer generation has more freedoms in terms of mobility, traditions such as *purdah* continue to be practiced. On the other hand, women's participation in activities such as 'gram sabhas' (village meetings) is still very low. There are strict taboos on women's mobility and not many women work outside the home, especially in paid employment. However, from our data it is not clear how much of this affects child malnutrition, other than mother's education status.

Although there is some visible improvement in the public infrastructure<sup>23</sup> in Palanpur since 1984, the quality of public services in the village is still poor. The village school has only one teacher attending the school at any given time (of the one permanent teacher and two para-teachers) and a private school that was running earlier has not been closed down. For most part of our stay in the village during the two years from 2008-10, mid day meals were not served in the school. The direct child nutrition programme, ICDS, is non-functioning in spite of the anganwadi worker and helper living in the village. Most people do not know the services that are supposed to be provided under this programme and it is not clear what happens to the supplementary nutrition that comes for young children. Children have never been weighed, their births have not been registered and immunisation levels are very low. Except for the 'pulse polio' programme for which the Auxillary Nurse Midwife (ANM) comes to the village, there do not seem to be any public health services available. There is further data on public services available and is yet to be studied in detail.

For primary health care, residents of Palanpur mostly go to the (unqualified) medical practitioners in the village. Both of them (one lives in Palanpur and the other comes from the neighbouring village of Pipili) have not been trained but prescribe everything from painkillers to antibiotics. For further care, people go to private practitioners in nearby towns such as Bilari and Chandausi. A lot of money is spent on health care<sup>24</sup> but the quality of health care received is poor and there is no faith in the public health system. Further details on this aspect will be analysed using the data from the round on health expenditures.

In spite of such poor conditions of public services in the village, there are not many instances of collective action by people of the village towards demanding for improved services. This could be an important link explaining why social and human development indicators in Palanpur do not seem to have kept pace with economic progress. This would be

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<sup>22</sup> See Himanshu and Stern (2011)

<sup>23</sup> The school building for instance now has two rooms, toilets for girls and boys separately and a kitchen shed.

<sup>24</sup> Systematic data on health expenditures has been collected and will be analysed



an important study as a follow up to the present paper. This is important since at the macro level it has been seen that state of public services, especially for health and nutrition, have a significant effect on malnutrition outcomes<sup>25</sup>.

While this paper shows that level of child malnutrition in Palanpur is quite high, further research as discussed above will help throw light on the causes of high malnutrition. Along with further study on women's status, health and other services, public action with available data one can also look at food expenditures of households and possibly even the variety in food consumption. Moreover, once the data of the previous round is processed, one can also trace some of the persons who were children in 1984 whose anthropometric measurements are available to see how they are doing now.

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<sup>25</sup> Harriss and Kohli (2009); Subramanyam et. al. (2011)



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