

7.3 NUTRITION IN PREGNANCY AND LACTATION

From time immemorial it has been recognized that women especially pregnant and lactating women form one of the most vulnerable segments of the population from nutritional point of view. Numerous studies in India and elsewhere have shown that in chronically undernourished women subsisting on unchanged dietary intake, pregnancy and lactation have an adverse effect on maternal nutritional status. Maternal undernutrition is associated with low birth weight and all its attendant adverse consequences. Epidemiological studies from India documented the magnitude and adverse consequences of chronic energy deficiency (CED) on the mother child dyad and paved way for effective intervention programmes to address undernutrition during pregnancy and lactation. Over 75 % of pregnant women in India are anaemic and anaemia remains to be a major factor responsible for maternal morbidity, mortality and low birth weight. Too early, too close, too many and too late pregnancies adversely affect nutrition and health status of the mother child dyad; timely contraceptive care has become an indirect effective intervention to prevent deterioration in maternal and child nutrition. Yet another important indirect cause of undernutrition continues to be infections; undernutrition increases the susceptibility for infections; infections aggravate undernutrition. With the advent of HIV epidemic, it is inevitable that over the next decade there will be an increase in undernutrition in women due to HIV infection.

While undernutrition continues to be major problem as in the earlier decades, the current decade has witnessed the progressive rise of overnutrition in women during reproductive age especially among the affluent segments of population both in urban and in rural areas. It has become imperative to assess the nutritional status of pregnant women and give them appropriate advice and care.

Time trends in dietary intake in pregnant women

Data from NNMB and INP surveys (using 24 hour dietary recall method) show that between 1975 and 1995 there has been some increase in dietary intake. By the mid nineties average intake of cereals almost met the RDA. Since then there has been a reduction in cereal intake inspite of the fact that food is available, accessible and affordable. There has been a progressive reduction in the pulse intake, which might be related to the rise in the cost of pulses. Intake of vegetables and fruits continue to be low (Table 7.3.1). Dietary intake of pregnant and lactating women is not different from that of the non-pregnant and non-lactating women.

Groups	Year	Cereals & Millets	Pulses & Legumes	Milk & Milk Products	GLV's	Roots & tubers	Other vegetables	Fruits	Fats & Oil	Sugar & Jaggery
NPNL Women	1975-79	386	31	56	11	51	47	11	9	16
	1996-97	434	29	72	16	53	49	24	13	21
	2000-01	389	26	67	18	69	50	20	12	16
	2005-06	365	27	80	18	63	52	26	13	14
Pregnant Women	1975-79	359	34	75	12	58	44	11	12	19
	1996-97	463	29	70	17	34	42	26	12	15
	2000-01	408	28	77	15	69	44	21	12	17
	2005-06	362	27	87	16	55	49	25	14	14
Lactating Women	1975-79	436	30	58	15	48	45	13	10	16
	1996-97	518	34	67	11	43	42	34	13	19
	2000-01	442	28	65	18	69	54	24	13	13
	2005-06	406	30	80	17	63	56	24	14	13

Source: Reference 7.3.2

Nutrient intake in pregnant and lactating women over the last three decades is given in Table 7.3.2. Between 1975 and 1996 there was increase in the total energy, protein and fat intake. However over the last decade there has been a reduction in the energy and fat intake. This might be due to the increasingly sedentary lifestyle in majority of the population and consequent reduction in energy intake. Calcium and micronutrient intake has been low through out the period. In all periods of time there is no difference in nutrient intake of pregnant and lactating women and NPNL. All these data clearly indicate that in India women do not consume more food during pregnancy and lactation.

Studies carried out by National Institute of Nutrition (NIN) during the seventies and early eighties confirmed that among urban and rural low income group

Groups	Years	Protein (g)	Total Fat (g)	Energy (kcal)	Calcium (mg)	Iron (mg)	Vit A (µg)	Thiamin (mg)	Ribo. (mg)	Niacin (mg)	Vit. C (mg)
NPNL Women	1975-79	45.4	17.1	1698	330	21.0	118.0	1.00	0.70	11.0	24
	1996-97	49.9	24.5	1983	382	22.0	148.0	0.90	0.80	12.0	32
	2000-01	48.2	27.6	1878	445	14.1	219.8	1.20	0.60	14.9	45
	2005-06	46.5	21.8	1738	443	13.8	254.0	1.10	0.60	14.2	47
Pregnant Women	1975-79	40.8	18.8	1597	390	20.0	160.0	1.00	0.60	10.0	21
	1996-97	47.2	21.5	1994	339	23.0	142.0	0.90	0.80	11.0	28
	2000-01	49.7	25.9	1933	463	14.0	227.0	1.20	0.70	15.1	45
	2005-06	46.8	22.5	1726	456	14.0	261.0	1.10	0.60	13.7	42
Lactating Women	1975-79	47.6	18.3	1797	358	23.0	133.0	1.10	0.70	12.0	23
	1996-97	56.5	24.6	2243	373	23.0	162.0	1.10	0.90	14.0	29
	2000-01	50.3	25.9	2028	408	14.6	212.0	1.30	0.60	16.3	48
	2005-06	49.6	22.1	1878	447	14.7	249.0	1.20	0.60	15.5	46

Source: Reference 7.3.2

population in Hyderabad there was no increase in dietary intake during pregnancy and lactation.

Dietary intake ranged from 1200-1800 kcal per day. Pregnant women continued to look after the household and other activities and remain moderately active throughout pregnancy.

These women weighed an average 43 kg prior to pregnancy and gained 6 kg during pregnancy. There was however a reduction in fat fold thickness during pregnancy suggesting that the fat was getting mobilised to meet the gaps in energy requirement (Table 7.3.3). There is no obvious deterioration in the maternal nutritional status during pregnancy or following repeated pregnancies provided the interbirth interval is longer than 24 months. The mean birthweight in this population was 2.7 kg and the low birth weight rate about 33%.

	Weight (kg)	Arm circumference (cm)	FFT (mm)
NPNL	42.3	22.5	10.5
1st trimester	41.5	22.2	9.6
2nd trimester	44.6	22.1	9.7
3rd trimester	46	21.7	9.2
<i>Source: Reference 7.3.1</i>			

Studies carried out at NIN Hyderabad in late seventies showed that there was a socioeconomic gradient in dietary intake but in majority of women in all the three groups dietary intake was not higher in pregnant women as compared to non-pregnant women from some income group. The low income group women weigh ten kg less than high income group of women and birthweight of the offspring was only 2.7 kg (Table 7.3.4). Women from the upper income group consumed 2000 to 2500 kcal per day during pregnancy. In middle and high income groups, pregnant women do not perform hard physical labour during pregnancy and there is a reduction in physical activity during pregnancy. The pre-pregnancy weight in this population group ranges between 45-55 kg and pregnancy weight gain was 11 kg. The mean birth weight of infants is 3.1 kg (Table 7.3.4). These data suggest that among habitually well-nourished women who eat to appetite, there is no increase in dietary intake during pregnancy; unchanged dietary intake did not have any adverse effect either on their own nutritional status or on the course and outcome of pregnancy.

Studies undertaken during the 1980s have shown that there are adaptive changes during pregnancy. There is a reduction in BMR and physical activity and there might be some improvement in the as yet unmeasured efficiency of energy utilisation.

The energy and nutrients saved due to these processes are sufficient to meet the increased requirements for nutrients during pregnancy. So long as

	No. (N)	Age (yrs.)	Parity	Height (cms.)	Weight (kg.)	Hb (g/dl)	Birth wt. (kg.)
Low Income	1468	24.1	2.41	151.5	45.7	10.9	2.7
Middle Income	108	24.3	1.61	156.3	49.9	11.1	2.9
High Income	63	27.8	1.61	156.3	56.2	12.4	3.13
<i>Source: Reference 7.3.1</i>							

there is no reduction in the habitual dietary intake, there is no deterioration in the maternal nutritional status either during pregnancy or during lactation. In well-nourished individuals, additional intake during pregnancy and lactation can result in excessive weight gain and this may lead to overnutrition later in life.

However, there are limits to adaptations under lower dietary intake during pregnancy. Studies from NIN and also from other developing countries have shown that reduction in dietary intake below habitual levels, or increased workload above the habitual levels is associated with deterioration in maternal nutritional status and reduction in birth weight. Some readily identifiable situations associated with deterioration in maternal nutritional status and reduction in birth weight is:

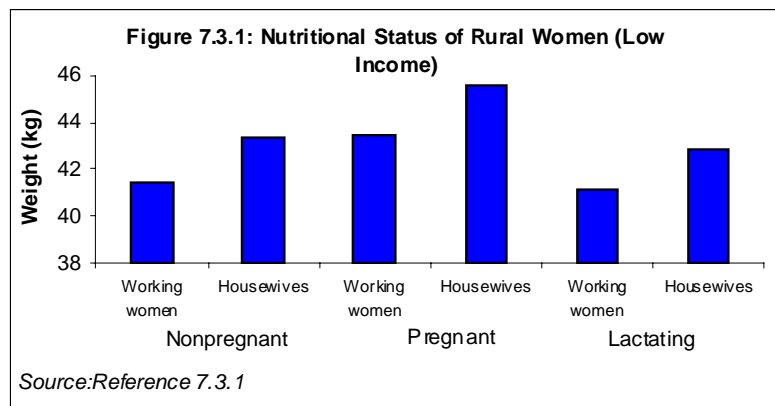
- reduction in habitual dietary intake (during drought and the pre-harvest season)
- increase in work (e.g., newly inducted manual laborers)
- combination of both the above (food for work programmes) during drought
- adolescent pregnancy;

There is a progressive increase in women's participation in labour force partly due to economic reasons. The economic returns are some times essential for improving the dietary intake of the family but dual burden of work at home and at the work place has resulted in some deterioration in maternal nutrition status (Figure 7.3.1).

Yet another important indirect cause of under nutrition continues to be infections. Obstetricians and pediatricians continue to tackle the increased morbidity in anaemic women. With the advent of HIV epidemic in India in the eighties, it is inevitable that over the next decade there will be an increase in the maternal undernutrition associated with HIV in pregnancy and adverse impact of maternal HIV infection on the foetus. Screening for these infections and their management has to become a part of antenatal care.

Maternal nutrition during lactation

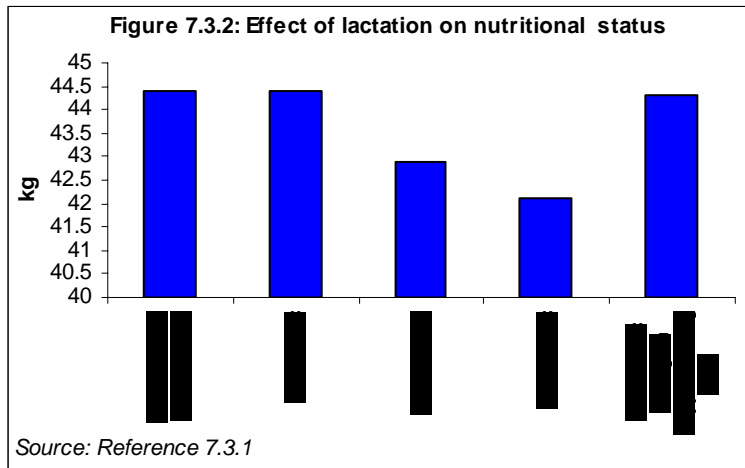
The importance of breast-feeding in infant nutrition and survival has long been recognized. In the last three decades there has been a growing recognition that lactation may have profound effects on the maternal nutritional status and some effect



on the maternal return of fertility after delivery. The advent of the next pregnancy,

or contraceptive measures used to avoid this, may have an effect on lactation and maternal nutritional status.

Studies carried out at the National Institute of Nutrition have shown that among low income group population there was no increase in dietary intake



during lactation. Lactating women continue to undertake habitual work. Lactation involves considerable nutrient expenditure for the mother; the estimated calorie expenditure varies between 400-700 kcal/day. Studies on anthropometric indices in lactating women indicate that the mean body weight, mid-arm circumference and skin-fold thickness at triceps showed a progressive fall with increasing duration of lactation until 18 months in women whose infants were mainly on breast milk. However, with the introduction of supplements to the breast-fed infant there was some improvement in the maternal nutritional status even though her dietary intake remained unaltered. The mean body weight of women whose infants were mainly on solid food but who received two or three breast-feeds a day was higher than that of women whose infants were mainly breastfed. If there was no intervening pregnancy these women regained their body weight once lactation waned (Table 7.3.5 and Figure 7.3.2). Obviously, there are some exquisitely sensitive but ill-understood changes which bring about energy balance and ensure maintenance of maternal nutrition and satisfactory lactation in spite of widely varying habitual dietary intakes well below the RDA.

Table 7.3.5: Changes in anthropometric indices during lactation

Duration of lactation	No. (N)	Height (cm)	Weight(kg)	Mid-arm circumference (cm)	Fat fold thickness at triceps (mm)
Non-pregnant non-lactating	1025	150.0 ± 5.2	44.4 ± 8.16	23.3 ± 2.59	14.1 ± 5.12
<6months	860	150.2 ± 5.20	44.4 ± 7.25	23.1 ± 2.62	13.2 ± 5.03
7-12 months	609	149.0 ± 7.12	42.9 ± 6.72	22.3 ± 2.63	12.4 ± 6.59
>12 months mainly breast fed	280	150.0 ± 6.25	42.1 ± 6.95	21.8 ± 2.52	11.9 ± 6.21
>12 months mainly on supplementary food	384	150.1 ± 5.7	44.3 ± 6.13	22.8 ± 2.07	13.0 ± 6.15

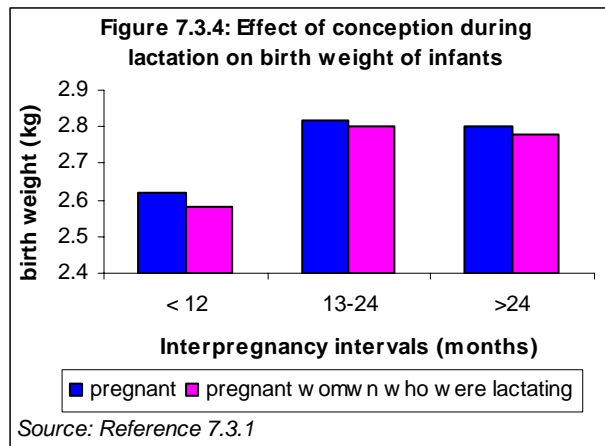
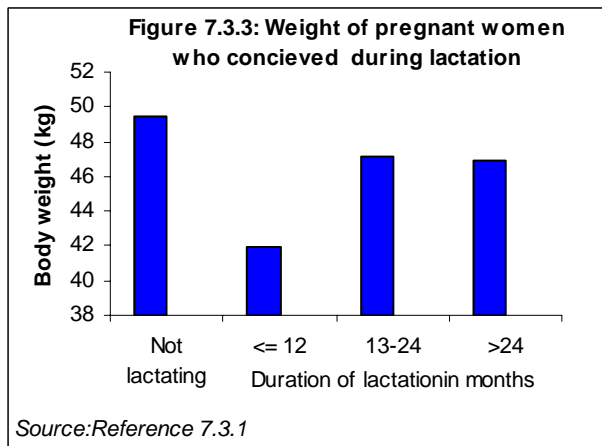
Source: Reference 7.3.1

Effect of conception during lactation on mother child dyad

Data from NFHS -1, 2 and 3 indicate that the mean duration of lactation in India is about 24 months. Available data suggest that conception during the first year of lactation is relatively uncommon; they usually occurs in women who introduce supplements to the infant early, i.e. before six months of age; majority of the conceptions in lactating women occur during the second and third year of lactation. Studies on dietary intake of women who had conceived during lactation have shown that their dietary intake is essentially similar to the dietary intake of nonpregnant women from similar income groups. The average calorie intake is no more than 1200-1800 kcal/day; the diet is inadequate with respect to all nutrients. Obviously the dual stress of pregnancy and lactation may be expected to widen the already existing gap between dietary intakes and nutrient requirements. Investigations undertaken by the National Institute of Nutrition, Hyderabad, indicate that irrespective of the duration of lactation, women who conceived during lactation weighed less in all the trimesters of pregnancy than those who conceived after lactation. The difference in body weight was more marked in the third trimester, especially in the small group of women who had conceived during the first six months of lactation (Figure 7.3.3). Birth weight of neonates born to women who conceived during lactation or conceived within first 12 months after delivery was also lower (Figure 7.3.4). Too close and too many pregnancies have adverse nutrition and health consequences on the mother child dyad; contraceptive care at appropriate time is an indirect but effective intervention to prevent deterioration in maternal nutritional status.

Interventions to improve dietary intake and nutritional status

Research studies in India and elsewhere have shown if pregnant women in whom there has been a reduction in habitual dietary intake or excess energy expenditure or whose body weight is less than 40 kg are identified and given adequate continuous food supplementation and antenatal care there is substantial improvement in outcome of pregnancy, birth weight and neonatal mortality. Encouraged by such data, India has included food supplementation for pregnant and lactating women under ICDS programme. Under the ICDS programme, food supplements are being provided to pregnant and lactating



women who come to anganwadis. The reported coverage is between 15 and 20% in most blocks. ICDS programme does not screen pregnant women for undernutrition or provide adequate, continuous supplements to those with energy gap or those with moderate/severe undernutrition. When food supplements are provided to pregnant and lactating women without screening, identifying undernourished women, ensuring continued supplementation, monitoring compliance and improvement in nutritional status its impact on maternal nutrition and birth weight, is very limited.

One of the major problems is to reach food supplements to the undernourished women. Even when the logistics of reaching the food to women is meticulously worked out and efficiently carried out, food sharing patterns within the family results in the 'target' women not getting the supplements in significant quantities. Obviously this is another important factor responsible for the demonstrated lack of beneficial effect. The lack of adequate antenatal care and continued physical work during pregnancy are two other factors responsible for the lack of impact.

The Tenth Plan envisaged that efforts will be made to weigh all women as early in pregnancy as possible and to monitor their weight gain. Well nourished women will be advised not to increase their dietary intake to prevent overnutrition and obesity. Women who weigh less than 40 kg will be identified and

- given food supplements consistently throughout pregnancy;
- given adequate antenatal care;
- monitored for weight gain during pregnancy.
- If weight gain is sub-optimal, efforts are to be made to identify the causes and attempt remedial measures

Effective intersectoral coordination between auxiliary nurse midwives (ANMs) and anganwadi workers will enable the identification of undernourished pregnant and lactating women and provision of appropriate care to them. The *panchayati raj institutions* (PRIs) can play an important role by ensuring that these women receive food supplement throughout pregnancy.

The National Rural Health Mission (NRHM) envisages that there will be village health and nutrition days where in the ANM and AWW will work together and provide the needed health and nutrition care. As a part of this weighing of pregnant women is to be carried out, those with body weight less than 45 kg can be identified and given food supplementation on priority and monitored for weight gain during pregnancy. Prevention, detection and management of anaemia will also receive the attention it deserves.

References

- 7.3.1 Women and Nutrition in India** edited by C. Gopalan and Suminder Kaur; Nutrition Foundation of India, special publication series 5.
- 7.3.2 NNMB National Nutrition Monitoring Bureau.** 1979-2002. *NNMB Reports*. National Institute Of Nutrition, Hyderabad.