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OPTIMIZING NUTRITION IN LOW BIRTH WEIGHT INFANTS

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The most recent global estimates for Low Birth Weight (LBW) prevalence (2015) are about 14.6% of live births (uncertainty range 12.4-17.1). South Asia contributes almost half this burden[1]. The estimated prevalence of LBW in India ranges from 20-25% (approximates the estimated prevalence of 26% for South Asia), comprising about 8-12% preterm infants and about 10-16% small for gestation (SGA) term infants. The concerns around LBW infants relate not only to the increased risk of mortality and morbidity, but also to concerns about the contribution of LBW (both preterm and SGA) to (i) extrauterine growth retardation and later childhood under-nutrition (both wasting and stunting), and (ii) accelerated growth and adult chronic disease (metabolic syndrome and cardiovascular events). It is against this background that there is a need to re-visit the strategies for optimizing nutrition in LBW infants especially during their first 12 weeks of life.

LBW and childhood growth

The Child Health Epidemiology Reference Group (CHERG) examined the contribution of LBW to childhood undernutrition using data from 14 longitudinal birth cohorts in Low- and Middle-Income Countries (LMIC). The estimated odds (95% CI) for stunting at 24 months in preterm and SGA infants were 1.65 (1.42-1.91) and 2.68 (2.3-3.1), respectively. For wasting the odds were 1.35 (1.06-1.72) and 2.42 (1.89-3.11), respectively[2]. The risk was greatest amongst preterm SGA infants as compared to preterm appropriate for gestation (AGA) and term SGA infants.

Besides the foetal effect, one of the other possible contributors could be extra-uterine growth retardation (EUGR) during the postnatal weeks of life. This has been estimated to range from 40-90% at discharge of the infants from the hospital, (depending on the criteria used to define EUGR - centiles or z-score, and the preterm population - <32 weeks or $\geq$ 32 weeks). It has been observed that in preterm infants at discharge, the growth retardation was greater when head circumference was used as the criterion than when weight was used[3]. The burden of EUGR appears to be inversely related to the gestation period and weight at birth. A relevant question is whether EUGR is influenced by the postnatal feeding policies in neonatal intensive care units (NICUs). Studies suggest that delayed initiation of enteral feeding, and low caloric and protein intake at the start of the second week of life could be associated with EUGR[3,4]. However, low caloric or protein intake appears to be associated with EUGR only as regards weight, but not head circumference.

Postnatal growth and later outcomes

Several observational studies have suggested that better postnatal growth was significantly associated with better neurodevelopmental and cognitive outcomes. However, the limited intervention studies do not appear to support these observations[5].

Several studies have reported that faster infant weight gain was associated with childhood obesity. A meta-analysis of individual level data from 10 cohort studies involving 47661 participants noted that each +1 unit increase in weight SD scores between the ages of 0 and 1 year conferred a two-fold higher risk of childhood obesity (odds ratio = 1.97 [95% confidence interval (CI) 1.83, 2.12]), and a 23% higher risk of adult obesity (odds ratio = 1.23 [CI 1.16, 1.30]) after adjusting for sex, age, and birthweight[6].

Animal studies have suggested that accelerated weight gain (the so called 'catch-up growth') - upward centile crossing for both weight and length in the neonatal

CONTENTS

period could be associated with an increased risk of cardiovascular disease (CVD) in adults. There are now human studies to support these observations made in animals. The association between early infant growth and adult metabolic syndrome is strong and appears to have a dose-response relationship[7,8].

Preterm birth and body composition

Nutritional goals in preterm infants attempt to mimic the growth of term neonates at term equivalent age. Systematic reviews and meta-analysis comparing the fat mass (FM), fat free mass (FFM) and total body fat (TBF) percentage of preterm infants (born at 30 weeks) with term infants showed that preterm infants had similar FM and lesser FFM that resulted in higher TBF percentage at term equivalent age than infants born at term gestation[9,10]. Data for preterm SGA infants indicate that, during their postnatal growth they have predominant accrual of fat mass as their preterm AGA counterparts[11]. A more recent study from the Pelotas (Brazil) cohort, extending up to 30 years, concluded that preterm birth was associated with decreased body fat and fat-free mass in childhood but higher fat mass in adulthood. This association was observed in male preterm infants but not in female preterm infants[12].

How should preterm grow during postnatal period?

There is no consensus as to what would constitute an ideal growth pattern for infants born preterm. Using foetal growth parameters as references/standards for growth of preterm infants is clearly not optimal, given that most of them do not achieve anthropometric values comparable to term AGA infants even at term equivalent age (more so among preterm infants <30 weeks of gestation) and are termed "extrauterine growth restriction" or "postnatal growth failure". Fenton *et al*[13]. argued against the use of these terms for preterm infants because

- they are not predictive of adverse outcome,
- they are based only on increase in weight with no consideration for other parameters (e.g., growth of head circumference or body length, body composition, etc.), and
- the statistical growth centile cut-offs were arbitrary.

Studies that used the INTERGROWTH-21 preterm growth standards resulted in a decrease in the categorization as EUGR compared to those that used charts that mimic foetal growth[14,15]. It would probably be more appropriate to view the lower postnatal growth rate as a transitional adaptive phenomenon rather than as a pathology labelled as 'EUGR'.

Feeding strategies for LBW

As observed earlier, the consensus up till now has been that one should aspire to maintain intrauterine growth and nutrient accretion rates for preterm infants even during their postnatal life. Clearly clinicians have found it difficult to surmount the physiological and biological handicaps in the preterm infants. With conventional feeding strategies, it has been observed that by the end of the first week of life, the preterm infant may have a cumulative protein deficit of 15g/kg (while the foetus would have been accruing approx. 2% of protein/day) and a calorie deficit of about 500 Kcal/kg. Table 1 provides the estimated protein and energy intakes across different birth weight strata required for the preterm infant to achieve foetal growth rate[16]. Clearly, the only option for meeting such standards would be to use an aggressive early parenteral nutrition strategy.

Table 1. Protein and Energy needs to achieve fetal growth rate [Ziegler[16]]

	Body Weight			
	900-1200g	1200-1500g	1500-1800g	1800-2200g
Fetal wt. gain (g/kg/d)	19	18	16	14
Protein (g/kg/d)				
Loss	1	1	1	1
Growth	2.5	2.4	2.2	2
Reqd. intake				
· Parenteral	3.5	3.4	3.2	3
· Enteral	4	3.9	3.6	3.4
Energy (Kcal/kg/d)				
Loss	65	70	70	70
Growth	36	38	39	41
Reqd. intake				
· Parenteral	101	108	109	111
· Enteral	119	127	128	131

Early aggressive nutrition.

Being born preterm clearly interrupts the flow of nutrients at birth and if this interruption is to be minimized, then parenteral nutrition must commence from the first day of life. The strategy that has been proposed is to commence with 1.5-2.0 g/kg/day of amino acids on the first day and rapidly building up to 3.5-4 g/kg/day over the next few days; commencing intravenous lipids by 24-48 hrs @ 1g/kg/d and maximizing to 2-3 g/kg/d in a couple of days; and targeting a total energy intake of 90-100 kcal/kg/day along with micronutrients and gradual build-up of enteral feeding to 150 ml/kg/day by 7-10 days (if needed using enriched preterm milk formula)[16]. This approach has contributed to minimizing the burden of EUGR. In randomized controlled trials in term SGA infants the use of nutrient enriched formula led to accelerated weight gain but it also resulted in higher blood pressure and greater fat mass at 5-8 years, and higher insulin insensitivity, lower HDL cholesterol, higher triglyceride concentration and obesity at 18-24 years; these responses appear to be dependent on the rate of weight gain in the first 6 months of life[5].

Human milk for preterm feeding

Many of the early studies on growth and neurocognition in preterm infants were based on the use of preterm milk formula. It is however important to look at data in preterm infants who were fed

exclusively on human milk throughout their stay in the NICU. Bergner followed up preterm infants with birth weights ≤1250 g till 18-22 months (corrected age) who were exclusively fed with mother's milk or donor milk during their NICU stay. It was observed that while the anthropometric z-scores were significantly lower at discharge, the z-scores had returned to birth levels by 18-22 months corrected age. The body composition at 2 years (measured by DEXA) was similar to those of term-matched controls. An increase in the proportion of mother's own milk (MOM) was significantly correlated to decreased fat mass indices (10% increase in MOM predicted 0.08kg decrease in fat mass at 18-22 months). Further, none of the infants had a composite cognitive score <70[17]. A recent review observed that, though feeding human milk to preterm babies resulted in slower weight gain than feeding them formula milk, it resulted in better body composition through deposition of more fat free mass[18].

Feasibility of total enteral feeding.

If the current evidence supports the finding that the slower weight gain associated with the use of human milk has no long-term effects on the growth and neurodevelopment of LBW infants, and that this early feeding with human milk has a beneficial effect on body composition in later childhood, then would it be feasible to provide early total enteral nutrition without having to resort to parenteral nutrition? Nangia *et al* conducted a randomized controlled trial to compare commencement of early totally enteral feeding with human milk versus conventional feeding (which used minimal enteral feeding with human milk alongside parenteral fluids) in 180 stable preterm babies with birth weights between 1000-1499g. They observed that neonates in the total enteral group achieved full feeds faster and had a shorter duration of hospital stay without any increased risk of necrotizing enterocolitis[19].

Proposed feeding strategy

It is evident from available evidence that the current policy of attempting to mimic intrauterine growth during postnatal life in LBW infants is undesirable. It may be worth noting that even with the current non-aggressive enteral feeding of new borns the survival rate of preterm infants has improved. Also, there is evidence that when human milk is fed to such infants, there was an initial lag in growth compared to intrauterine standards, but they eventually attained acceptable growth rates in childhood with lower risks of adult chronic disease.

The optimal feeding practice for stable LBW babies weighing 1000g or more is total enteral feeding from birth with exclusively human milk (mother's own milk and/or donor human milk). Iron supplements may continue to be given to these infants, as they improve iron stores and decrease the risk of iron deficiency anaemia in infancy. However, whether iron supplementation improves neurodevelopment and growth is not clear[20]. The use of vitamin D supplementation at a higher dose of 800-1000 IU/day as compared to 400 IU/day was associated with higher gains in length and head circumference, but the long-term impact of these gains is unclear[21]. The need for vitamin A supplementation is unclear as it has no effect on neonatal survival or neurocognitive outcome[22]. There is low certainty evidence that zinc supplements may decrease all-cause neonatal mortality, but no data is available regarding its effect on neurodevelopment outcome[23].

The optimum strategy to assess growth would be to use the INTERGROWTH-21 preterm chart till 40 weeks postconceptional age and thereafter use WHO child growth standards. During the initial weeks, care should be taken to ensure that the growth charts are used mainly to ascertain the trajectory of growth and not the actual attainment of centiles. This approach would achieve the optimal growth with better neurocognitive outcomes (and thereby better adult human capital) and lower risk of adult chronic disease i.e., obesity and cardiovascular disease, as compared to achieving "accelerated" growth in early childhood and infancy.

Future research should focus on the relationship between parameters such as the type of feeding, growth, and body composition changes in LBW infants and the long-term risk of adult chronic disease.

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FOOD SECURITY DURING COVID 19 PANDEMIC: INDIA'S EXPERIENCE

Prema Ramachandran and K. Kalaivani

Introduction

The UN Millennium Summit articulated the collective desire of nations across the globe to provide a better future for their citizens and approved the Millennium Development Goals to be achieved by 2015. Global review showed that between 1990 and 2015 there was

Fig 1 India Number of new cases/day

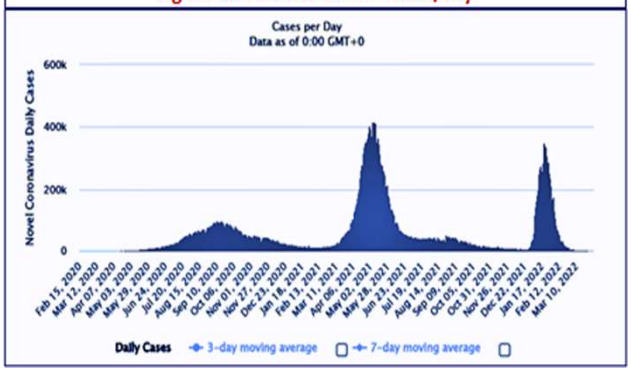


Fig 2 India Number of deaths/day

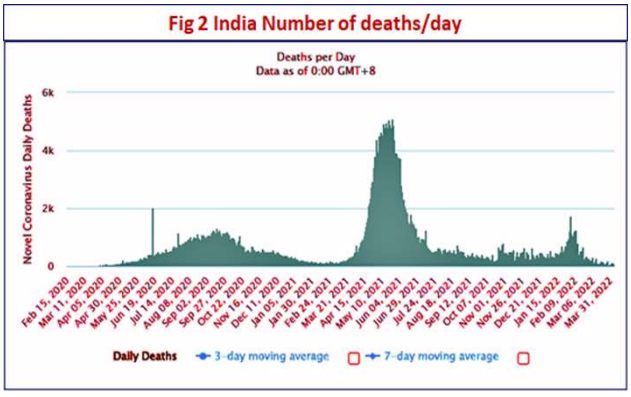


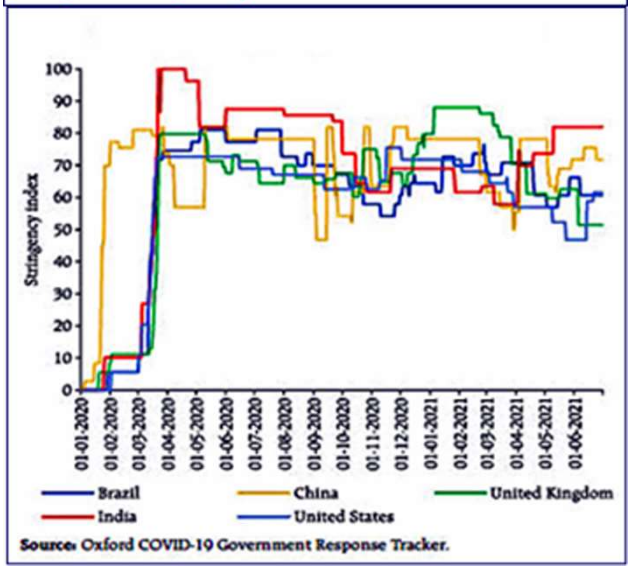
Fig 3 Lockdown in Delhi

a substantial reduction in poverty, maternal and child mortality, improvement in nutritional and health status in most countries. Encouraged by the progress, United Nations General Assembly, approved Sustainable Development Goals (SDG) balancing the economic, social and environmental dimensions and set targets to be achieved by 2030. The targets were ambitious but there was a will to strive to achieve them.

All these aspirations were shattered in 2020 by the COVID 19 pandemic which rivalled the devastating Spanish flu pandemic of 1918. On December 31, 2019, China reported an epidemic caused by a novel coronavirus. Early in 2020, China, Italy and Spain reported that their hospitals were overflowing with patients with severe respiratory illness and case fatality rates were high (16 to 20 %). Faced with the pandemic, most countries, imposed travel restrictions both between countries and within the country to reduce the transmission of infection.

Between January and March 2020 all the detected COVID cases in India were persons coming to India from COVID affected countries or their contacts in India. The country initiated a nationwide lockdown on March 24th 2020 banning all international, national and inter-state passenger transport by air, rail, bus or car; efforts were made to maintain the transport of essential supplies and goods within the country. The population co-

Fig 4 Stringency of lockdown in countries



operated fully and over the next two months there was a near 100% lockdown across the country. This did succeed in keeping the number of cases low; but the restrictions led to a steep fall in economic activity, threatened the livelihoods of people, and increased household food insecurity. The country embarked on progressive unlocking and coped with three waves of SARS CoV2 infection. In the midst of economic slowdown in the last two years, India attempted to reduce unemployment and alleviate poverty through increase in number of persons getting employment under the National Rural Employment Guarantee Act and reduce food insecurity by providing highly subsidised/free food grains under the National Food Security Act. The present article reviews the food security situation during the last two years. Such a review may help the country to evolve appropriate policies, strategies and programmes as we move towards learning to live with COVID 19.

Impact of the COVID 19 pandemic on global food security

Fig 5 Work Participation rates: India

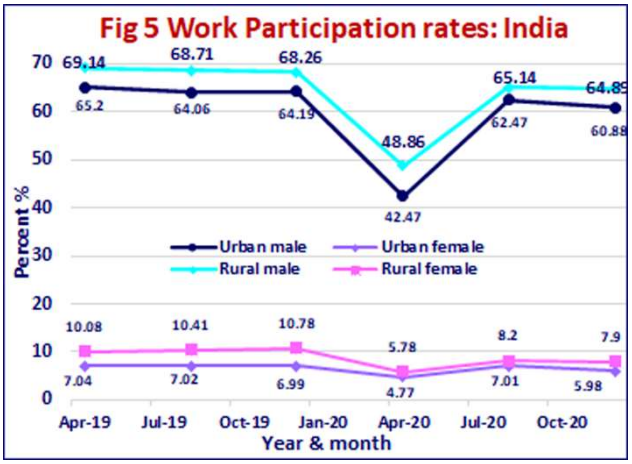
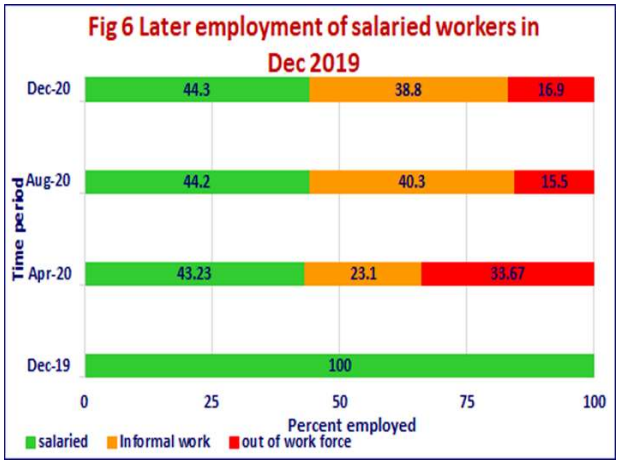
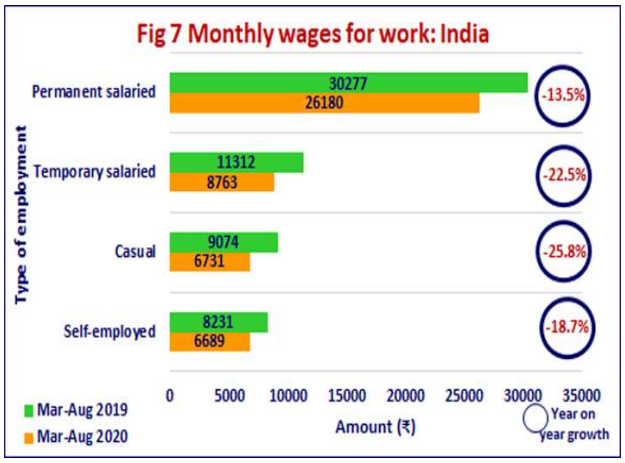
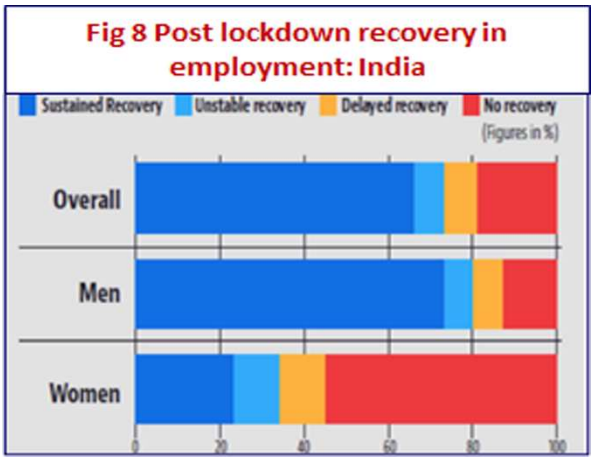


Fig 6 Later employment of salaried workers in Dec 2019







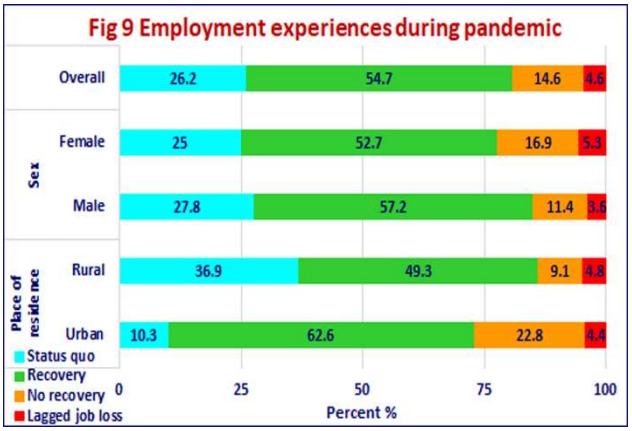
Between January 2020 and March 2022 nearly 500 million cases and over six million deaths due to SARS CoV2 have been reported globally. Global travel and movement restrictions to slow the spread of the coronavirus started in March 2020 and affected 2,700 million workers by April 2020. The COVID 19 pandemic and lockdown to contain its spread led to the largest global economic contraction since the Great Depression in the 1930s. The International Monetary Fund reported negative Annual GDP growth rates in 2020 across all countries. Lockdowns and travel restrictions led to a dramatic increase in job loss, poverty and food insecurity. FAO estimated that in 2020 between 720 to 811 million people in the world faced hunger; 118 million more people were facing hunger in 2020 than in 2019. Nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020; this was an increase of 320 million people in just one year. Close to 930 million (12% of the global population) were severely food insecure in 2020; this was 148 million more than in 2019. Most of the increase in food insecurity was attributable to the COVID 19 pandemic. All countries of the world are trying to reverse the economic downturn and rise in food insecurity and by next year we may have information how far these efforts have succeeded.

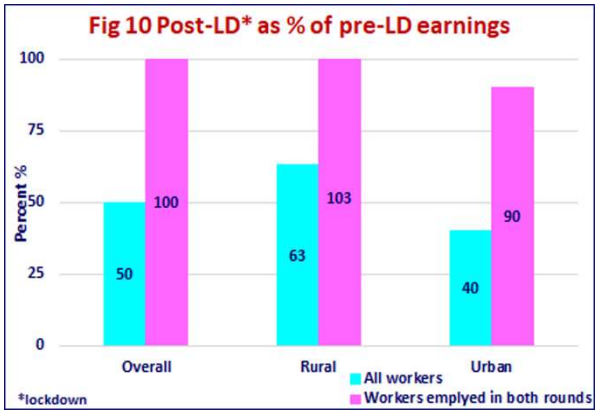
COVID pandemic in India

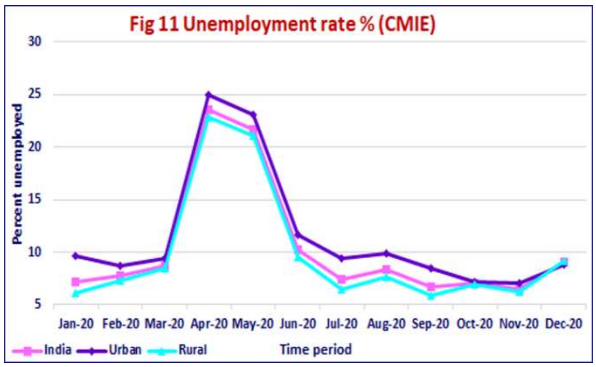
In the period between January.2020 and 23rd March 2022, India had reported over 43 million cases and 5,17,000 deaths due to SARS CoV2 infection. It is accepted that these numbers are likely to be under-estimates; the degree of under-estimation varies between states and urban and rural areas. Sero surveillance for SARS CoV2 antibodies carried out by ICMR indicates that about 2/3rd of tested persons had antibodies suggestive of past infection.

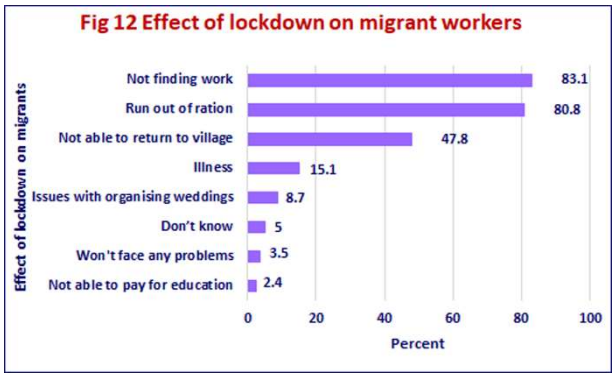
Between January 2020 and March 2022, India experienced three waves of COVID 19 pandemic epidemic (Fig 1 and 2). Strict lockdown in 2020 ensured flattening of the epidemic curve in the first wave and enabled the health system to gear up to tackle the epidemic. During the first wave with the Alpha variant of the virus, the number of cases/million population and the number of deaths/million population were lower in India as compared to other countries. But the cost in terms of a fall in GDP, livelihood loss, economic distress and food insecurity was immense. The second wave in 2021 with the Delta variant affected larger number of people and was devastating in terms of loss of life perhaps because:

- COVID 19 prevention precautions were ignored during the festive season, melas and state election campaigns and









- majority of adults in India had not been vaccinated.

The lockdown during the second wave was shorter because it was clear that large-scale lockdowns did not limit the transmission of this airborne infection across states. Therefore, the economic consequences were not as severe as the lockdown in 2020. The third wave with the Omicron variant in 2022 was of short duration with a steep rise in cases followed by an equally steep fall. Though the number of persons infected was almost comparable to the number infected in the second wave, loss in terms of life or livelihood has been relatively low. This could be because:

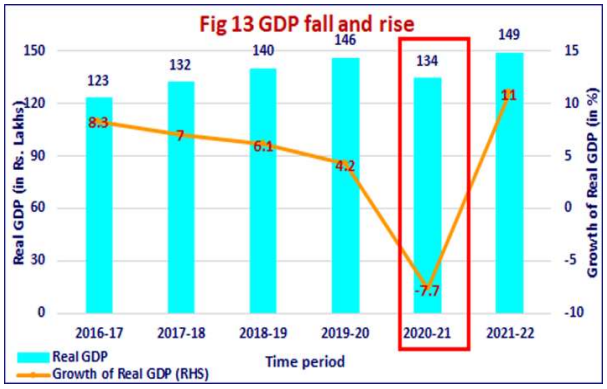
- though Omicron variant had a high transmission rate the infection was relatively mild,
- over 2/3rd of the Indians had antibodies to SARS CoV2,
- over 80% had received two doses of the vaccine, and
- duration of lockdown was short.

Currently, the number of cases reported are lowest since the first wave; the country has removed all restrictions on mobility but has issued an advisory to all citizens to follow all personal COVID 19 prevention measures such as wearing masks, maintaining physical distancing, avoiding crowded and/or ill ventilated places and going out only when necessary.

Lockdown and its impact on employment and wages

Till the day a lockdown was imposed India had reported only 64 cases and one death due to SARS-CoV2 infection. Indian citizens accepted and followed the restrictions. The entire transport sector came to a standstill and roads were empty of traffic and people (Fig 3). Global comparison indicates that the lockdown in India was one of the most stringent and prolonged (Fig 4).

When lockdown was imposed, all economic activities except agriculture and essential services came to a standstill. Many workers especially those working in informal sectors lost their jobs and there was a steep rise in unemployment (Fig 5). Gradual unlocking began in June 2020, and continued despite rising number of reported COVID 19 cases; concurrently there was a slow but sustained improvement in employment. However even in Dec 2020, employment rates in men and women both in urban and rural areas were below the levels recorded in Dec 2019 (Fig 5). Among those who were salaried employees in Dec 2019, less than half continued as salaried employees in 2020. Over 40% could find only informal work and about 1/6th remained unemployed (Fig 6). There was a substantial reduction in monthly wages in all categories of workers. Even the earnings of those who had retained their salaried jobs showed some decline. The earnings of temporary and causal workers dropped by 25%. Self-employed persons also suffered a drop in earnings (Fig 7). Post-lockdown recovery was seen in about 70% of men but in fewer than 25% of women. In 1/5th of men and over half of women, there was no post-lockdown recovery (Fig 8).



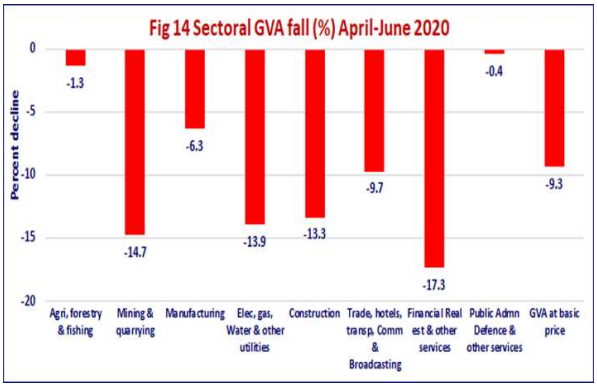
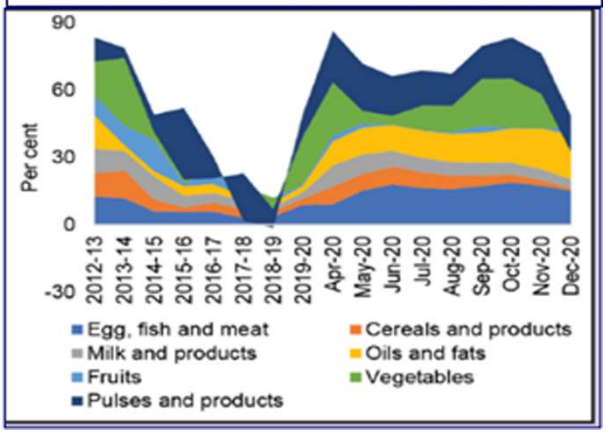


Fig 15 CPI % inflation in food groups



In over one-third of rural and one-tenth of urban population employment experience before and after lockdown during 2020 remained unaltered. Both recovery in employment and lack of recovery in employment were higher in urban as compared to rural areas (Fig 9).

Comparison of pre- and post-lockdown earnings in the overall population showed that there was a 50% reduction. This is mainly because of the steep decline in employment. In rural areas the reduction in earning post lockdown was lower partly because the agriculture sector did not have a marked decline production related activities and increase in rural unemployment rates were lower. In contrast urban earning showed a steep fall because urban unemployment rates were high and even those who remained employed experienced substantial reduction in their earnings (Fig 10).

From June 2020 the country initiated phased unlocking and this brought about reduction in unemployment rate. However even in Dec 2020 the unemployment rates were higher as compared to Jan 2020 both in

Fig 16 Migrant workers: Delhi bus stand

urban and rural areas (Fig 11). The impact of lockdown was most severe in the urban migrant workers. Over 80% could not find work and ran out of rations. They were unable to pay rent and were evicted from their homes. They wanted to return to their villages but were unable to do so partly because of the lockdown and partly because they did not have money. Illness and difficulties in trying to access food grain rations, cash transfers or health care were other problems faced by them (Fig 12). Unable to cope with all these problems many migrants and their families had no option but to walk hundreds of kilometres to reach their villages.

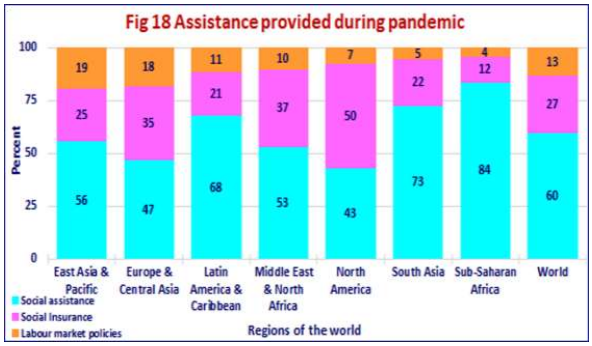
Other economic consequences of lockdown

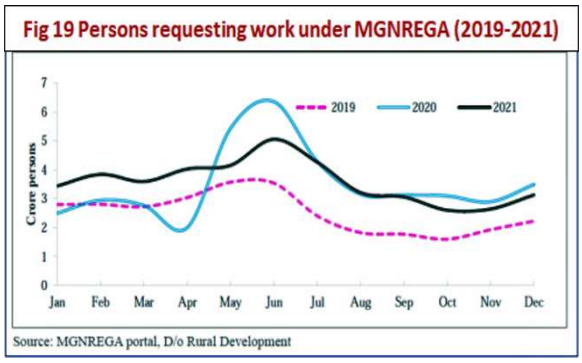
The COVID pandemic and the severe prolonged lockdown in 2020 resulted in a steep fall in GDP growth (Fig 13). All sectors of the economy except agriculture contributed to the fall (Fig 14). The sharpest decline was seen in manufacturing and construction activities. Economic Survey 2021 predicted a rapid V shaped recovery. The devastating second wave and the less lethal but widespread third wave of COVID 19 pandemic had some adverse impact on the pace and sustainability of the economic recovery. Currently there are ongoing debates whether:

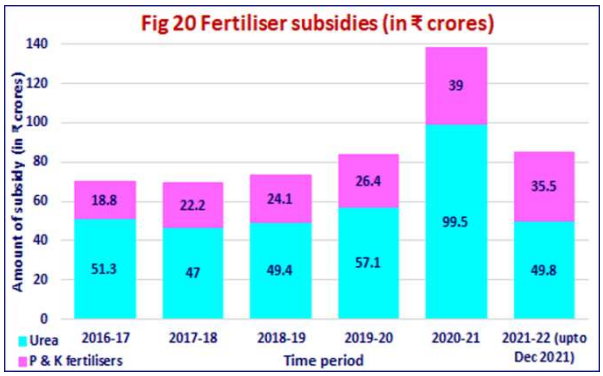
- the pace of recovery is too slow or unsustainable,

Fig 17 Migrant workers and their families walking to their villages

Fig 18 Assistance provided during pandemic







- the economic recovery is uneven between sectors,
- the recovery is V-shaped or and K- shaped;
- there is widening of inequality (with the rich becoming richer and the poor poorer) and the social consequences of such widening economic inequality.

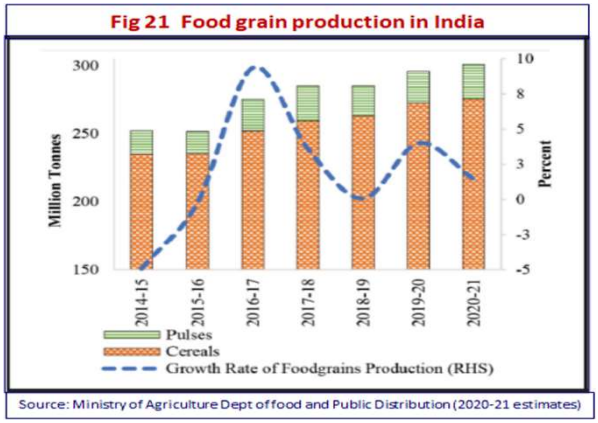
During the past two years the country's focus on agricultural production, continued fertiliser subsidy, procurement of food grain at Minimum Support Price, providing highly subsidised food grains to 2/3rd of the population through NFSA and the additional food grains given under the special schemes have prevented severe food insecurity and hunger during the COVID 19 pandemic. There had been reports that:

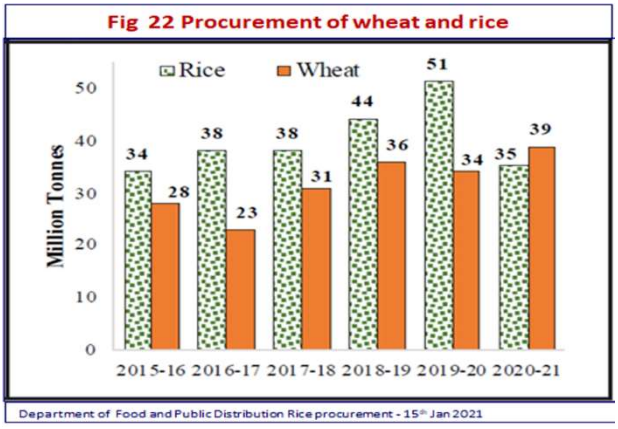
- the neediest persons could not access their entitlement of food grains,
- there were leakages in delivery of food grains and
- some cash strapped recipients sold some of the food grains they got at subsidised rate in the open market.

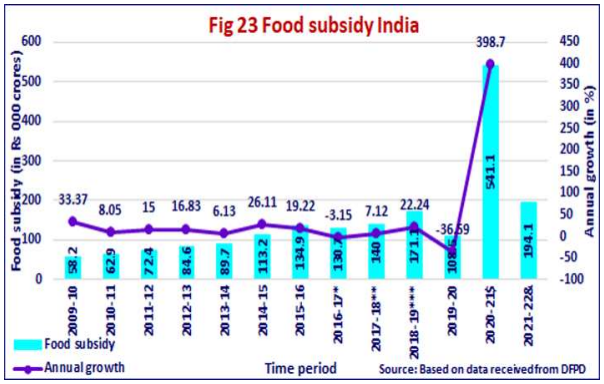
Food grains alone are not sufficient to meet the nutrient requirements of the population. High food inflation especially in cost of pulses, oil, vegetables and animal products (Fig 15) made it impossible even for the middle-income group suffering from job loss and salary cuts to get a reasonably balanced meal.

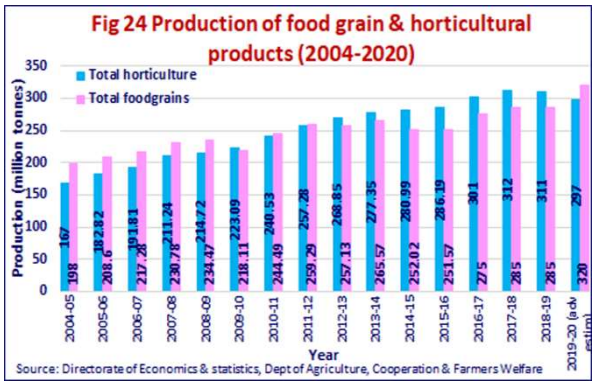
Impact of lockdown on migrant workers

In India migrant workers form a large proportion of the workforce, especially in metro cities and some states. About 1/5th of the urban workforce in the informal sector lost their jobs immediately after lockdown. Millions of migrant workers (their numbers being higher than the population of many countries in the world) and their families had no option but to try to return to their villages. Some states tried to organise buses to help the migrants reach villages (Fig 16). Trains to transport the migrants to their home states were started in May 2020. But in the immediate aftermath of lockdown poor migrants with no savings had to fend for themselves. All available modes of transport were used; many had no option but to walk hundreds of kilometres with their family in hot summer to reach their village (Fig 17). When migrants reached their villages, they were initially kept in temporary shelters away from the village for two weeks to prevent spread of infection to the local population. Families of migrant workers were poor, had only seasonal employment, low wages and no savings. Migrant workers who returned to villages could get only low paid seasonal employment or employment under MGNREGA. The food grains they received reduced food insecurity but families faced economic constraints. When lockdown was relaxed substantially and industries started opening up in late 2020, many workers returned to the city leaving their family in the village. Despite the devastating second wave many migrant workers returned to the cities in the third quarter of 2021 because of lack of rural job opportunities. The third wave struck in early 2022 but because of the short









duration of the lockdown associated with it, there was not much deterioration in the employment scenario. The Economic Survey 2022 predicts that there will be improvement both in economic activities and employment in the coming months.

Efforts to reduce adverse impact of COVID 19 pandemic on poverty and food security

Lockdown during COVID 19 pandemic was imposed to prevent spread of infection and save lives. This did not prevent spread of infection but severely damaged livelihood of millions. To mitigate the impact of lockdowns on economy and employment, almost all countries started unlocking, providing stimulus packages to kick start the economy and provide social assistance to those who lost jobs. In Europe and North America cash transfers (mostly from social assistance and social insurance) formed the major channel for assistance. In contrast, in South Asia and Sub-Saharan Africa, subsidised food grains, essential supplies and services accounted for over three fourth of the assistance provided (Fig 18).

In India assistance consisted of, cash transfers, funds for employment generation (MNREGA) and subsidies (fertiliser, food procurement and providing subsidised food grains). To cope with urgent cash needs, direct cash transfers were made mostly through IT enabled services:

- to 420 million persons; of these more than 200 million were women with Jan Dhan accounts, allaying to some extent the apprehension that the money provided may not be used for reducing food insecurity and obtaining essential services needed for the family;
- funds to revive the construction activities and provide employment;
- additional emergency working capital funding (Rs 30,000 crore) through NABARD was given to farmers, to keep vital agriculture sector productive.

A major thrust was providing employment under MNREGA to improve purchasing power and alleviate poverty. Garib Kalyan Rojgar Abhiyaan (GKRA) was launched on 20th June, 2020 for a period of 125 days in 116 districts of 6 States to boost employment and livelihood opportunities for migrant workers who had returned to their villages and similarly affected citizens in rural areas due to COVID-19 pandemic. During the second-COVID-wave, demand for MGNREGA employment reached the maximum level of 4.59 crore persons in June 2021. After accounting for seasonality, the demand at an aggregate level still seems to be above the pre-pandemic levels of 2019 (Fig 19). In Financial Year 2021-22 over 8.70 crore individuals and 6.10 crore households were provided work so far. There had been reports of delays in getting appropriate work near home and timely payment of the wages.

Fig 25 Road side vegetable stall Delhi Oct 2020

Fig 26 Food grains from PDS

Fig 27 Migrants returning to village by train

Improvement in monitoring at all levels beginning at community level can play a major role in enabling the persons getting optimal benefit. COVID 19 pandemic has resulted in steep increase in urban unemployment rate. Appropriate programmes to reduce the distress due to urban unemployment may have to be evolved, tested and implemented.

Reducing food insecurity by providing food to all those who need has been given a major thrust in the last two years. Despite fall in GDP, subsidies related to food production, procurement and distribution were considerably enhanced:

- fertiliser subsidy was increased to keep agriculture sector productive (Fig 20).
- food grain production continued to increase during the pandemic (Fig 21); procurement of wheat and rice food grains at Minimum Support Price were continued to enable the farmers get appropriate returns for production and build adequate buffer stock of food grains (Fig 22).
- There was a steep increase in food subsidy (Fig 23) in order to reduce food insecurity during COVID pandemic.

Thanks to the Green Revolution, India has been self-sufficient in food production for the last four decades and has been a net food grain exporting country for

Fig 28 Providing cooked food to the needy

over a decade. The National Food Security Mission and National Horticultural Mission enabled Indian farmers to produce needed food grains, vegetables and fruits to meet the requirements of the growing population (Fig 24). Food production continued to grow in the last decade and there were adequate buffer stocks of food grains (Fig 22). Right through the last two years vegetables were available across the country (Fig 25). Projections made by Department of Agriculture suggest that the country will remain self-sufficient in food grain and vegetable production till 2030.

In 2013, India became the first country in the world to enact the National Food Security Act (NFSA) to enable all the citizens to be food secure. The Act provided highly subsidised food grains to 2/3rd of the Indian population as a legal entitlement. When lockdown was implemented, it was realised that millions of Indians, especially the poor, will lose jobs and face food insecurity. The central and state governments utilised the NFSA to provide 35 Kg of cereals and 5 Kg of pulses to all ration card holders. In addition, highly subsidised or totally free food grains had been provided to all those who sought them through Public Distribution System from April 2020 till now (Fig 26). Millions of migrant workers who were returning to villages were fed by the institutions and individuals of the towns and villages they passed on their way. When train services

Fig 29 Cooked food to those who have gone back to villages

Fig 30 Foodgrains and snacks

were restarted in May 2020, the migrant workers were provided ticket for travel and food for consumption during their journey across India (Fig 27). Some states even provided them with food grains to cope with their immediate need when they reached their villages. These provisions enabled the cash strapped migrants to remain relatively hunger free. There were many problems in providing subsidised food grain during COVID 19 pandemic to workers who had ration card in their states but did not have ration card in the place where they had migrated for work. The 'one nation one ration card' scheme which enables ration card holders to access rations in any part of the country was initiated to cope with this problem. When fully operationalised, this may help in improving food security of migrant workers and their families when they move from one place to another.

NFSA had also provided food grains as an entitlement to pre-school children attending anganwadi and children going to school. Anganwadis and schools were closed during the lockdown; families of these children were provided with dry rations free of cost. Realising that there were many families who were unable to cook, several city and state government utilised the ICDS and MDM kitchens to cook the food and provide two meals a day to all those who came to the designated centres (Fig 28). In addition, civil society organisations, philanthropic institutions and individuals came forward to provide both dry rations and cooked food to the needy. The village communities facilitated migrant workers accessing subsidised food grains. They provided cooked food to those who needed (Figs 29, 30). These measures helped to ward off food insecurity and hunger. Dietary diversity of habitual Indian diets was always low; during COVID pandemic there was a further dip because of the high food inflation especially for pulses, oil, vegetables and animal products.

Way forward

The millennials growing up in India and their parents assumed that the country's robust economic growth across all sectors in the first decade of the millennium will continue over two or three decades driven by the abundant young, educated, skilled human resources; this in turn will bring about sustained improvement in the quality of life of the citizens.

India witnessed economic downturn in 2015 which continued in subsequent years with demonetisation and implementation of Good and Services Tax. The stringent and prolonged lockdown during 2020, resulted in an unprecedented 7.7% negative GDP growth, rising unemployment, increase in poverty and food insecurity.

During the last two years the country ensured that agricultural production continued to grow. Procurement of food grain at Minimum Support Price helped the farmers and built up the buffer stock during COVID 19 pandemic.

The second major thrust was providing employment under MGNREGA. To some extent this intervention alleviated poverty due to unemployment.

Progressive rise in food grain production and ample buffer stocks enabled the country to implement the provisions of NFSA and provide highly subsidised food grains to 2/3rd of the population for two years and this prevented severe food insecurity and hunger.

The population has demonstrated their coping skills and resilience in the last two years. It is hoped that in the near future, we will learn to live with SARS CoV2 infection without massive economic or health care costs. If we all strive together, the SDG targets for reduction in poverty, improvement in food security, dietary adequacy and diversity needed for optimal nutrition and health may be achieved, if not by 2030, a few years later.

Dr. Prema Ramachandran is Director and Dr. K. Kalaivani is Deputy Director Nutrition Foundation of India

Recommended readings

1. Ministry of Finance: Economic survey 2021-22 https://www.indiabudget.gov.in/economicsurvey/ebook_es2022/index.html
2. Ministry of Finance: Economic survey 2020-21 https://www.indiabudget.gov.in/budget2021-22/economicsurvey/ebook_es2021/index.html
3. WFP State of food security and nutrition in the world (20201) https://www.wfp.org/publications/state-food-security-and-nutrition-world-sofi-report-2020
4. FAO State of food security and nutrition in the world (2021) https://www.fao.org/publications/sofi/2021/en/

NUTRITION NEWS

Dr V Mohan, Chairman, Madras Diabetes Research Foundation, Chennai will deliver the 45th Gopalan Memorial Oration on "The diabetes epidemic in India: Lessons learnt". The oration will be delivered in virtual mode on 21.4.2022 at 4.30 PM.