

Original Article

Nutrition scenario in Karnataka, a state in southern India

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India is an agricultural country and the majority of India's population live in rural areas. This is so in Karnataka, a state in southern India. The present report consists of a detailed nutrition situation analysis. Karnataka has a population of 45 million, which is approximately 3–5% of India's population. One in every two women are agricultural labourers, reflecting women's predominance in the field of agriculture. The state has a literacy rate of 56%. The food consumption patterns reveal that cereals and millets are the main food items. However, protective foods (i.e. foods that are rich in proteins, vitamins and minerals) are consumed in lesser amounts. When compared with the average Indian recommended dietary intake (RDI), the intake of energy in adults was found to be higher, as was protein. The average intake of vitamins, however, was 50% less than the RDI. Unlike adults, energy deficiency is a problem in the diets of preschool children. Growth retardation has been observed in a vast majority of children in Karnataka. An improvement in the nutritional status of rural adults has been observed in recent years. Protein energy malnutrition, vitamin A deficiency and B-complex deficiencies are the major nutritional deficiencies among preschool children, while anaemia remains a major health problem in women. Improvement in the healthcare system has brought a decline in the infant mortality rate in Karnataka and the state attained universal immunization coverage in 1990. The National Nutrition Programme – Integrated Child Development Scheme provides an integrated package of services to residents of Karnataka.

Key words: nutrition situation analysis, women, agriculture, food consumption, growth, adults, preschool children, nutrition programs, Karnataka, India.

Introduction

India's population, estimated at 844 million in 1991, is the second largest in the World after China. India is an agricultural country and the majority of India's population (74% in 1991) live in rural areas, although the urban growth is well ahead of the rural rate due to migration.¹ This is the case in Karnataka, a state in southern India. More than 71% of the population in Karnataka live in rural areas dependent on agriculture for their livelihood. The state consists of 20 districts with 175 *taluks* (i.e. a headquarters which covers a group of villages), comprising 29 396 villages.²

The present report comprises a detailed nutrition situation analysis with data desegregated, as far as possible, into rural and urban. It includes data on nutrition and mortality outcome *vis-a-vis* age, sex and socioeconomic status. Changing trends in food consumption and nutritional status of children and women are described. Data on other nutrition related indicators such as population growth, health services and environmental conditions are also included to further understanding of observed trends in nutrition.

Socioeconomic trends

Demography and age–sex structure

Karnataka has a population of 45 million (1991 census), representing approximately 5.3% of India's population.³ Females constitute 48% of the total population in the country.⁴ According to census reports, the sex ratio of 933 and 963 females per 1000 males in India and Karnataka, respectively, during 1981 declined to 929 and 960 in 1991.^{4,5} Children aged less than 14 years comprise nearly 40% of the total population, 12.6% of which are preschoolers. The 20–60 year age group constitutes 44% of the workforce population.⁵

The death rate of women, especially during their reproductive years, exceeds that of men in the same age group, which is attributed to the poor nutritional status of women from a very young age.⁶ The phenomenon of early motherhood and repeated pregnancies coupled with heavy and relentless work loads are among the causes of early death.⁷

Occupational profile

In rural areas one in every five men and one in every two women are agricultural laborers, thus indicating the predominance of women in the agricultural sector. In urban areas dominant work includes occupations related to trade and commerce, industry and services of all types as well as live-stock rearing.³

Child labour

According to the 1981 census the percentage of child labour in Karnataka was 2.60% of total population. The percentage of child workers among the total workforce is 7.08%. The percentage of child workers among the child population is 6.53%. Areas where children are employed include beedi production (a beedi being a type of Indian cigarette) and the construction industry. In addition, children are employed in large numbers in hotels, garages, newspaper vending agencies and repair shops.⁵

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Situation of children

Urban children

Karnataka has an urban population of 13.85 million spread over 254 cities and towns. The state ranks fifth in India in terms of the degree of urbanization and accounts for 6.3% of the country's total urban population. The rate of growth and migration to the cities and major towns is creating acute problems regarding housing, traffic and transportation.⁵

Children in urban areas suffer from multiple disadvantages in the areas of nutrition, health, sanitation and access to facilities and services required for balanced growth. It is evident that the pressures of urbanization have resulted in urban children gradually losing their rights to food, shelter, education and other services.⁵

Female children and adolescents

The situation of the female child in Karnataka is a matter of concern. An adverse sex ratio, high malnutrition, maternal mortality, poor school enrolment levels, high drop-out rates and low skill levels with low value in the workforce are indicators of a fundamental preference for the male child and a belief that girls are more a liability than an asset. This belief has resulted in perpetuation of socio-cultural practices which affect the entire life cycle of girls and women.⁵

Sex discrimination as a factor responsible for poor health and nutrition becomes less important when compared with the overwhelming role of poverty, which affects vast sections of men, women and children in India and which conceals the disparities in the status of women across various social and economic groups.^{8,9}

Childhood disability

The number of disabled children in the 0–14 years age group is estimated at 133 892, representing 38.4% of the total number of disabled persons. The number of visually handicapped children is 10 585, hearing impaired 18 807, orthopaedically handicapped 89 289 and mentally handicapped 14 366. The major causes of children's disabilities are poliomyelitis; vitamin A deficiency causing blindness; iodine deficiency causing goitre, cretinism and mental retardation; maternal-related causes which lead to intra-uterine growth defects during pregnancy, for example, communicable diseases, accidents and consanguineous marriages; and accidents during childhood.⁵

Status of women

The demographic consequence of the lower status of women in India has found expression in various forms such as infanticide; higher death rates for women compared with men across almost all age groups; lower life expectancies for females than for males; a lower sex ratio in the population in terms of number of females per 1000 males; and higher morbidity and lower literacy rates as well as lower levels of employment in the nonagricultural sector.¹⁰ Although these factors can be considered primary indicators of the lower status of women, they also have implications in terms of current levels of nutrition (food and nutrient intake, body size, fertility etc.).^{11,12}

Literacy

Karnataka has a literacy rate of 56%. It ranks 14th among India's 25 states. Male literacy is 67.25% and female literacy is 44.34%.⁵ Literacy rates for females, which stood at 8.9% in 1951, rose to 24.8% in 1991. However, this is still lower than the rise in male literacy, which rose from 24.9% in 1951 to 46.3% in 1991.⁸ The major impediments to tackling this problem appear to be poor school enrolment levels for girls and their persistently high drop-out rate.⁵ These are attributable to the practice of keeping female children at home to attend to household chores and to take care of younger siblings.

While Karnataka has recorded some remarkable achievements in several districts through the Total Literacy campaigns, inter-regional and inter-district variations in literacy remain. The rural literacy rate stands at 29.63% compared with the urban literacy level of 63.63%. The literacy levels among scheduled castes (i.e. populations with comparatively low socioeconomic status) range from 20 to 59% compared with 38.46% among other communities.⁵

A large number of children have no effective access to primary education. As many as 45% of enrolled children are absent every day. By the end of Class IV the drop out rate is as great as 30%.⁵

Poverty levels

The estimates of poverty were found to be greater in rural than in urban India, 32.7 compared with 19.5%, respectively. The percentage of population in Karnataka below the poverty line was found to be 32%.³

Food consumption (general)

Consumption levels and patterns

Diet surveys reveal that cereals and millets constitute the bulk of the Indian diet. On the basis of weight, cereals and millets constitute 59% of the total diet in the case of rural and 41% in the case of urban households. The consumption of vegetables, green leafy vegetables and milk is low. Protective foods such as fruits, fish and meat are consumed only in a very small proportion of families on any particular day.³

Food consumption in the urban population

Different segments of the urban population — the high income group (HIG), middle income group (MIG), low income group (LIG), industrial labour (IL) and slum dwellers (SD) — show a wide variation in consumption. Cereals and millets constitute more than 50% of the weight of total food consumed among the LIG, IL and SD populations, while this food group forms about one fourth and one third of the total food for the HIG and MIG, respectively.³

Cereal intake is lowest among the HIG and shows a decreasing trend with improved economic status. However, income status bears a positive relation to the consumption of protective foods such as pulses, milk, fruits, flesh foods, oil and sugar. Among these foods, milk is a sharp differential between the income groups.³

Food consumption in the rural population

Large inter-state variations are seen in the consumption levels of cereals, pulses, milk and fats and oils (Table 1).

Table 1. Average intake of food items (g/cu/day)

Indian states	Cereals	Pulses	Milk	Fats and oils
Andhra Pradesh	534	28	82	13
Gujarat	493	32	139	21
Karnataka	548	50	91	8
Kerala	369	18	87	14
Madhya Pradesh	614	56	117	10
Maharashtra	463	36	85	15
Orissa	628	40	23	16
Tamil Nadu	406	27	69	9
Uttar Pradesh	497	45	89	4
West Bengal	548	12	22	11
ICMR balanced diet standard	460	60	150	15

Cu, consumption unit. Cu is defined as one unit of energy consumption for an average male involved in sedentary work. ICMR, Indian Council of Medical Research. Source: National Nutrition Monitoring Bureau Report 1981–91.

As shown in Table 1, the intake of cereals (548 g/consumption unit (cu)/day) and pulses (50 g/cu/day) in Karnataka is above the level of 460 g and 60 g suggested in the ICMR balanced diet guidelines. However, the average consumption of milk and fats and oil did not meet the requirements for a balanced diet.¹²

Food consumption of pre-school children

Data compiled by the National Nutrition Monitoring Bureau (NNMB) on the food and nutrient intakes of preschool children in 10 states revealed that the intake of cereals and to some extent fruits and sugar showed an increase between the periods of 1975–79 and 1988–90, while no remarkable changes were seen in the consumption of other foods in either the 1–3 or 4–6 years age group, as shown in Table 2.¹³ Cereals dominate the diets of preschool children, who generally have a low intake of protective foods.

Food consumption of rural adults

It is widely acknowledged that the dietary intake of food and thereby nutrient intake of the majority of rural and low income urban populations of both sexes is below the desirable level.¹²

Data gathered by the NNMB on the food and nutrient intake of rural adults in 10 states indicated that women's consumption of food is slightly lower than men's consumption of food.¹³ The main point of this report is that cereals predominate the diets of both men and women irrespective of their socioeconomic status.¹⁴ The common feature of the diets of the low income groups (both in urban LIG, industrial workers and slums) and of populations in rural areas is the low intake of protective foods such as pulses, leafy and other vegetables, milk, oils and fats, and flesh foods, including fish.¹³

As per the NNMB data over the last decade there have been changes both in the pattern of intake and in the type of food grains consumed.¹⁵ While the consumption of cereals, wheat and rice shows an upward trend, the consumption of millets – for example, jowar (*Sorghum vulgare*), bajra (*Pennisetum typhoideum*) and ragi (*Eleusine coracana*) — and of pulses shows a downward trend. The mean consumption of vegetables, milk, oils and fats and sugar have remained unchanged.

Nutrient intake

The average dietary energy intake per consumption unit is approximately 2280 kcal, which is close to the Recommended Dietary Intake (RDI). There are, however, wide variations between the states in India. Intake is above the RDI in the state of Karnataka (2431 kcal).³

The overall intake of protein is around 629 g/day, a level close to the RDI of 60 g. The intake of other nutrients was below the RDI. Maximum deficit is seen in vitamin A. There has been little change in the intake levels of any of the nutrients over the last 10–15 years.³

Nutrient intake of children

Although energy deficiency is not serious among adults it is an important problem in the diets of preschool children.¹⁵ The average intake of calories in the 1–3 years age group during 1988–90 was 908 kcal, compared with 834 during the 1970s (Table 3), indicating an increase of 74 kcal per child per day. An increase of 142 kcal per child was seen in the 4–6 years age group between the two survey periods and was mostly due to increased consumption of cereals, although a

Table 2. Average consumption (g) of foods among preschool children

Age (years)	Year range	Cereals (g)	Pulses (g)	Vegetables (g)	Nuts and oil seeds (g)	Fruits (g)	Fish (g)	Other flesh foods (g)	Milk and milk products (g)	Fats and oils (g)	Suga and jagge (g)
1–3	1975–79	158	14	35	5	14	5	2	74	5	12
	1988–90	176	14	31	5	18	5	2	68	5	16
4–6	1975–79	228	20	52	7	14	6	2	57	6	14
	1988–90	263	20	51	5	23	4	3	62	7	18

Table 3. Average nutrient intakes among preschool children

Age (years)	Year	Protein (g)	Total fat (g)	Energy (kcal)	Calcium (mg)	Iron (mg)	Vitamin A (µg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)
1–3	1975–79	22.8	13.7	834	304	10.2	136	0.50	0.38	5.08
	1988–90	23.7	13.5	908	256	10.2	117	0.52	0.37	5.56
4–6	1975–79	30.2	16.0	1118	359	15.0	159	0.76	0.48	7.09
	1988–90	33.9	17.1	1250	147	15.3	153	0.83	0.52	8.40

slight increase in the intake of protein, thiamin and niacin was also observed in both groups.¹²⁻¹⁵

Nutrient intake of adults

A comparison of mean intake of nutrients among different income groups showed that although energy deficiency is not a serious problem among adults, the intake of iron, vitamin A and riboflavin was low in all groups except the high income groups. The intakes of energy, protein, calcium, thiamin, niacin and ascorbic acid were comparable in all groups.¹⁴

A comparison of the mean intake of nutrients also showed that the differences between men and women were not significant. The intakes of energy, calcium, iron, vitamin A, riboflavin, ascorbic acid and folate in women were lower than the recommended dietary allowances (RDA) for Indians.^{14,16}

Dietary intake of energy ranges from 1200 to 1600 kcal in the case of women from urban low income group, which is also similar to the intake of women from the rural low income group.¹⁷ However, rural women have been found to spend more energy in daily household chores. Moreover, they also tend to help in agricultural activities. It is therefore not surprising that these women have inadequate energy levels, which are reflected in body weights 1-2 kg lower than their counterparts.¹⁷ It is a fact that women expend a greater proportion of family energy. Estimates based on 560 households in six villages of Karnataka show that women have a shortfall of 100 kcal per day while men have a surplus of 800 kcal per day on average, particularly if the energy demands of women's domestic work are included.¹⁸

Nutritional status: pattern and trends

Somatic status of preschool children

The mean values of height, weight, mid-arm circumference and fat fold at triceps of children aged 1-6 years are presented in Tables 4 and 5. The comparison of the survey data from NNMB for 10 states during the periods 1975-79 and 1988-90 indicated that mean absolute gain in weight between the first and fifth year was 5.9 and 6 kg for males, respectively, and 6.1 and 6 kg for females, respectively (Table 4).¹² In Karnataka the mean absolute gain in weight was 5.8 and 6.3 kg for males during 1975-79 and 1988-90, respectively, and 6.1 and 6.2 kg for females, respectively.

The mean heights of Indian boys and girls of 1-6 years as a whole at age 1+ were 72.5 and 73.9 cm for males during the period 1975-79 and 1988-90, respectively, while for females it was 71.7 and 72.5 cm during the period 1975-79 and 1988-90, respectively.¹² In Karnataka the mean heights were 72.7 and 73.8 in boys between the survey periods, and 70.3 and 72.9 cm in girls between the survey periods. The absolute gains in height were 27.7 and 28.3 for boys between the survey periods, and 28.9 and 27.6 cm for girls between the survey periods. These figures were not different when compared with pooled data.¹²

In Karnataka a vast majority of children in the lower socioeconomic groups show varying degrees of growth retardation. The mean heights and weights of the children have almost remained static over the last decade as shown in Table 4.⁵

As seen in Table 5, arm circumference and fat fold measurements do not show wide variations between the two periods for either male or female children. A comparison of children in Karnataka with children in all of India (pooled

Table 4. Mean anthropometric measurements of height and weight of children (1-6 years)

Age (years)	No.		Years	Height (cm)		Weight (kg)	
	India*	Karnataka		India*	Karnataka	India*	Karnataka
Males							
1+	540	101	1975-79	72.5	72.7	8.0	8.0
	1140	200	1988-90	73.9	73.8	8.3	8.0
2+	610	84	1975-79	79.9	80.7	9.5	9.5
	1381	225	1988-90	82.1	82.2	10.1	9.9
3+	736	139	1975-79	85.9	86.5	10.9	10.8
	1467	208	1988-90	89.5	89.1	11.5	11.3
4+	899	152	1975-79	92.9	94.1	12.3	12.4
	1987	264	1988-90	96.5	95.8	13.0	12.7
5+	619	85	1975-79	99.8	100.4	13.9	13.8
	978	169	1988-90	101.8	102.1	14.3	14.3
Females							
1+	500	93	1975-79	71.7	70.3	7.6	7.3
	954	173	1988-90	72.5	72.9	7.9	7.6
2+	548	92	1975-79	78.4	78.7	9.0	8.9
	1257	203	1988-90	80.7	80.4	9.6	9.3
3+	710	119	1975-79	85.2	85.5	10.5	10.4
	1524	229	1988-90	87.8	87.5	11.1	11.0
4+	732	108	1975-79	92.3	93.4	11.9	12.1
	1770	221	1988-90	95.2	94.8	12.6	12.4
5+	534	92	1975-79	99.6	99.2	13.7	13.4
	874	143	1988-90	100.9	100.5	13.9	13.8

*The pooled data from 10 states in India where the National Nutrition Monitoring Bureau has conducted the diet and nutrition survey.

Table 5. Mean anthropometric measurements of arm circumference and fat fold at triceps of children (1–6 years)

Age (years)	No.		Years	Arm circumference (cm)		Fat fold at triceps (mm)	
	India*	Karnataka		India*	Karnataka	India*	Karnataka
Males							
1+	540	101	1975–79	12.7	13.1	8.0	7.7
	1140	200	1988–90	13.2	12.9	7.8	6.7
2+	610	84	1975–79	13.3	13.4	8.1	8.3
	1381	225	1988–90	13.7	13.5	8.3	7.4
3+	736	139	1975–79	13.6	13.9	8.3	8.6
	1467	208	1988–90	14.2	13.9	8.4	7.3
4+	899	152	1975–79	13.8	14.2	7.9	8.2
	1987	264	1988–90	14.3	14.2	7.9	7.1
5+	619	85	1975–79	14.1	14.2	7.2	7.2
	978	169	1988–90	14.3	14.3	7.0	6.4
Females							
1+	500	93	1975–79	12.5	12.6	7.8	8.2
	1054	173	1988–90	12.9	12.6	8.0	6.7
2+	548	92	1975–79	13.0	13.3	7.6	8.8
	1157	203	1988–90	13.5	13.2	8.4	7.7
3+	710	119	1975–79	13.5	13.8	8.6	9.1
	1524	229	1988–90	14.1	13.9	8.8	8.0
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	1770	221	1988–90	14.4	14.2	8.5	7.7
5+	534	92	1975–79	14.3	14.5	8.0	8.5
	874	143	1988–90	14.7	14.6	7.8	7.3

*Data from 10 states pooled. Source: Reference 8.

data) also revealed little difference between the two periods.¹²

Protein energy malnutrition (PEM) is the most widespread disease among children. In Karnataka severe malnutrition was estimated to be around 3% in 1989, compared with 6% during the 1976–79 period. Chronic malnutrition was estimated to be around 37% in 1989. Protein energy malnutrition forms of malnutrition are prevalent in 1.8% of children in 1989 compared with 3% in 1975. Although there has been significant decline in levels of severe malnutrition, improvement in child nutrition is not reflected in the growth performance. A vast majority of children in the lower socioeconomic groups show varying degrees of growth retardation. Late introduction of supplementary feeding while weaning a child is the most important cause for faltering growth and subsequent severe malnutrition.⁵

Somatic status of women

Somatic status is generally assessed by anthropometric measurements such as height, weight, mid-arm circumference, fat fold thickness and waist/hip ratio. As per the NNMB reports (Table 6), the rural adult women in the 20–44 year age group were 150 cm tall and weighed 42.4 kg on average.¹⁹ Urban women belonging to the lower income group and women working in industrial establishments were found to be heavier (44.8 kg) but not significantly taller (150.7 cm) than their rural counterparts.²⁰

Mean heights, weights and body mass index (BMI) of women in Karnataka were 152 cm, 42.6 kg and 18.6, respectively,¹⁹ as observed during the surveys carried out by the NNMB. A positive shift in the distribution of BMI values noted during the 1970s and 1980s is suggestive of an improvement in the nutritional status of rural adults.³

Mean mid-arm circumference and fat fold thickness

ranged from 22.6 to 24.9 cm and 13.0 to 18.0 cm for the women from the high income group in the 20–25 and 40–45 year age groups, respectively.²¹

The prevalence of obesity was higher in women than in men.²² Mean waist/hip ratio was found to be 0.85 for males and 0.78 for females having BMI < 20.²³

Clinical malnutrition

The major nutritional deficiencies among preschool children are protein energy malnutrition (PEM) (kwashiorkor and

Table 6. Mean heights and weights of Indian women by socioeconomic and state classification

	No.	Height (cm)	Weight (kg)	BMI (kg/m ²)
NNMB				
Rural	13626	150.6	42.4	18.7
Urban	129	154.9	52.2	21.8
High Income	592	151.8	49.2	21.4
Middle Income	538	150.4	44.8	19.8
Industrial workers	661	150.7	44.8	19.7
Slum dwellers	649	150.0	42.2	18.8
State				
Kerala	1290	149.3	42.3	18.9
Tamil Nadu	1385	150.7	43.5	18.9
Karnataka	1976	151.5	42.6	18.6
Andhra Pradesh	1645	150.8	42.7	18.8
Maharashtra	1560	150.1	41.5	18.4
Gujarat	1791	152.9	43.6	18.7
Madhya Pradesh	873	150.7	44.4	19.6
Orissa	474	148.6	42.0	19.0
West Bengal	1344	148.5	39.9	18.1
Uttar Pradesh	1288	150.0	41.9	18.6

NNMB, National Nutrition Monitoring Bureau, New Delhi.

marasmus), vitamin A deficiency (bitot spots) and vitamin B complex deficiency (angular stomatitis). The prevalence figures indicate a greater degree of vitamin deficiencies than of PEM. The NNMB repeat surveys have shown a substantial reduction of clinical malnutrition in children between the period 1975–79 and 1988–90. The prevalence of severe PEM (kwashiorkar and marasmus) is less than 1%. Taking Bitot's spots as an index of vitamin A deficiency, the prevalence has shown a reduction of 60%.³

Micronutrient deficiencies

Vitamin A deficiency

In Karnataka the prevalence of Bitot's spots is around 2.8%: this has remained static for the past decade. The prevalence of Bitot's spots was as high as 7% during 1975–82 in urban slums, and approximately 2.5% during 1987 in integrated child development services projects. Subclinical deficiency of vitamin A is still widespread even though xerophthalmia is showing a declining trend.⁵

Iron deficiency anaemia

Iron deficiency anaemia is one of the major nutritional problems affecting the health of women and children. Approximately 67% of preschool children are estimated to be anaemic in Chitradurga and 90% in the Bidar district.⁶

Iodine deficiency

Surveys carried out in 144 taluks in 404 villages covering 237 000 individuals in Karnataka indicated that four districts (Chickmagalur, Kodagu, Dakshina and Uttara Kannada) have more than a 10% prevalence of goitre. Smaller endemic pockets in other districts have also been reported.⁵

Morbidity status

Though availability of data on morbidity status is limited, there is considerable evidence to show that the health status of women and children may be low due mainly to anaemia. A study by the Indian Council of Medical Research (ICMR) showed that the distribution of haemoglobin levels of women aged 13–19 years in rural areas was 7.3% with less than 8 g/dL, 27.3% with 8–10 g/dL and 65.4% with slightly more than 10 g/dL. Anaemia remains a major health problem in women, adversely affecting their nutritional status and in particular, reducing their work output.^{24,25}

Other morbidity factors include peak prevalence of tuberculosis among women below 35 years of age, while for men this figure was above 45 years of age.²⁵

Health care of mothers

Antenatal care

More than 60% of pregnant women in Karnataka receive iron and folic acid, while 40–70% have access to antenatal care.⁸ Over 60% of deliveries are attended by trained birth attendants.⁸

Health indicators

Fertility

During the last 40 years though there have been considerable gains with respect to women's health, while other aspects such as nutrition have not shown any improvement. Despite

nearly four decades of family planning programs, fertility rates are still high. The average number of children born to a woman was 4.6 in 1981, which declined slightly to 3.5 in 1989.²⁶ In Karnataka the total fertility rate is 3.3 as per sample registration systems (SRS).⁵

Crude birth rate

The crude birth rate (CBR) in the whole of Karnataka stands at 26.2 per 1000. In rural areas the rate is 27.3 while in urban areas it is 23.3.⁵

Child mortality rate

Infant mortality rate

Infant and child mortality rates are sensitive indicators of socioeconomic development as well as the efficacy of various public health and medical programs.

In India the infant mortality (IMR) has declined from 129 per 1000 live births in 1971 to 80 in 1991.³ In Karnataka it has declined from 89 per 1000 live births in 1976 to 73 per 1000 live births in 1992 (with this figure rising to 82 in rural areas and falling to 41 in urban areas).⁵ Female infant mortality has declined to 97 (1986) and the mortality rate for children under 5 years has decreased from 53 per 1000 children in 1970 to 21.1 in 1990.⁵

The neonatal mortality is 45.3 per 1000 live births and the post-neonatal mortality is 20.2.⁵ There are large and consistent differences in the mortality rates between urban and rural areas, with neonatal and post-neonatal mortality being higher in rural areas.

Maternal mortality rate

In Karnataka maternal mortality rate (MMR) is estimated to be between 400 and 500 per 100 000 live births. The major immediate causes of maternal deaths are bleeding (22% or 2500 deaths per annum), anaemia (20% or 2250 per annum), puerperal sepsis (12% or 1350 per annum) and toxemia (12% or 1350 per annum). The underlying factors are early marriage, early and frequent child bearing with short periods of time between pregnancies, illiteracy, malnutrition and poor availability of proper maternity services.⁵

Birth weight of infants

In Karnataka the prevalence of low birth weight babies ranges from 27 to 56% in urban and 33 to 41% in rural areas. Low birth weight is a major contributing factor to neonatal mortality, with maternal malnutrition being the major cause of low birth weights. Other risk factors include age, height and weight of the mother, interval between pregnancies and anaemia. Mean age for females at marriage is 19–21 years, although this is much lower in rural areas. Data shows that 15–20% of mothers have heights and weights lower than the normal standards, which poses obstetric risks and increases the chances of having a low birth weight baby.⁵

Life expectancy at birth

The available data show that life expectancy at birth has increased for females from 49 years in 1975 to almost 62 years in 1990.¹ In Karnataka life expectancy at birth has increased to 62 years.⁵

Health and environment

Immunization coverage

Karnataka attained universal immunization coverage in 1992–93 when more than 85% coverage was reported for each antigen in practically all districts barring some of the northern and eastern districts. The universal immunization program is one which covers all pregnant woman with at least two doses of tetanus toxoid and all infants with one dose of bacill Calmette-Guérin vaccine, three doses of oral polio vaccine, three doses of diphtheria-pertussis-tetanus vaccine and one dose of measles vaccine.⁵

Deliveries and tetanus status of pregnant women

Karnataka has achieved more than 90% immunization of pregnant women against tetanus. The percentage of institutional deliveries is 33.8% as per SRS 1990. In the state as a whole approximately 37% of deliveries occurred in medical institutions and the remaining 63% were domiciliary deliveries, most of which were attended by the traditional birth attendant (TBA) or another person. An analysis of the background characteristics shows that women residing in urban areas, women with higher literacy rates and women with fewer living children had a higher prevalence of institutional deliveries.⁵

Drinking water supply

Karnataka has made substantial strides in the provision of drinking water facilities. As of March 1992, 100% of the state's rural and urban populations have been covered by one drinking water source per 250 people.⁵

Sanitation

The rural sanitation coverage through Government programmes as of June 1993 was 0.47%, while coverage through private initiatives was approximately 7%, in relation to household latrines. Institutional and community latrines are being developed on a small scale.⁵

National nutrition intervention programs

A special feature of India's national nutrition programme is the Integrated Child Development Service (ICDS), the world's largest child development programme. It is the most comprehensive and holistic child survival and development scheme for enhancing the health, nutrition and learning opportunities for preschool children and their mothers by simultaneously providing all the requisite services at the village level. The ICDS cares for children below 6 years of age and also takes care of the essential needs of pregnant women and nursing mother.²⁶

The ICDS provides nutrition, immunization and health check-up services, as well as nutrition/health education and preschool education (3–6 years). It also encompasses other supportive services such as water supply and sanitation. At present there are 3120 sanctioned ICDS projects in the country benefiting 16.3 million children and 3.2 million mothers. Over the last 15 years the scheme has helped to reduce the incidence of nutritional deficiencies, increase the child survival rate and enhance the health, nutrition and learning opportunities of preschool children. It is hoped that the programme will reach every community development block of the country by the turn of the century.²⁶

Interventions against vitamin A and mineral deficiencies

The strategy for control of vitamin A deficiency, directed in particular towards preschool children, involves each preschool child (1–5 years) receiving a dose of 200 000 IU of vitamin A prepared oil, administered orally once every 6 months. The program is operated through the existing health service and the ICDS by auxiliary nurse midwives (ANMS) and anganwadi workers (the anganwadi being the area in a village where health and nutrition activities are conducted). In total, approximately 30 million children are covered by this programme.²⁷

Iron and folic acid distribution program

Under the anaemia prophylaxis program women (pregnant, lactating and those practising family planning) receive tablets containing 60 mg of elemental iron and 500 µg of folic acid (folifer) per tablet, while children under 12 years are eligible to receive tablets containing 20 mg of iron and 100 µg of folic acid. The distribution is undertaken by the infrastructure provided at primary health centres, sub-centres, Mother and Child Health Centres (MCH) and ICDS anganwadis.²⁷

Iodised salt distribution program: Iodine prophylaxis program against endemic goitre/IDD

The Government of India has taken the initiative to ensure the iodization of all salt used for human consumption in the country. The state governments are responsible for the distribution of iodised salt within the state, either through the public distribution system or through open markets.²⁷

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