ISSN 0377-4910

ICMR BULLETIN

Vol. 30, No. 9 September, 2000

PRIORITIES IN CHILD HEALTH

The care of mothers and children, which is the most vulnerable section of the society, occupies a paramount place in the health service delivery system. Specific programmes for enhancing maternal and child health have been in place since the early fifties. For the reduction of morbidity and mortality specific programmes like the universal immunisation programme for control of vaccine preventable diseases, oral rehydration therapy for control of morbidity and mortality due to diarrhoeal diseases, prophylaxis programmes against nutritional anaemia in pregnant and lactating women and vitamin A prophylaxis programme against blindness among children below five years of age, have been implemented in the country. All these programmes were integrated under the Child Survival and Safe Motherhood (CSSM) Programme, which laid emphasis on newborn and essential obstretic care in addition to safe delivery and strengthening of emergency services. For promotion of breast feeding a Baby Friendly Hospital Initiative has been undertaken in hospitals and other health facilities where deliveries are conducted.

The Reproductive and Child Health (RCH) initiative of the Govt. of India has also intensified the services in child health. In many other countries child health has been incorporated with reproductive health care. However, in our country as children require special focussed attention, the programme has been termed as Reproductive and Child Health. This Programme covers all the services under the CSSM and Family Welfare Programme and also includes two new interventions, namely management of reproductive tract infections and adolescent reproductive health.

There has been substantial improvement in some of the health indicators over the years and infant and child mortality rates have declined considerably (IMR from 105/1000 live births in 1983 to 72 /1000 live births in 1998 and child mortality from 45.5 in 1981 to 26.1 in 1994)[1,2]. However, by international standards infant and under five mortality rates are still high in some states [2]. Perinatal and neonatal mortality rates also remain high and contribute significantly to high infant and child mortality. Diarrhoeal diseases and respiratory infections are still the major killer diseases in children. Other diseases of concern are typhoid, tuberculosis, rheumatic fever/rheumatic heart disease, childhood asthma, paediatric AIDS, *etc*. Malnutrition is another major problem contributing to many morbidities. According to the National Family Health Survey (1998-99) data nearly half (46.7%) of all children under the age of three are underweight and a similar proportion (44.9%) are stunted[3]. Malnutrition has been implicated in more than half of all child deaths world-wide.

Some areas in child health that need to be addressed are highlighted in this write-up.

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Perinatal Health Care/Neonatal Health Care

Magnitude of the Problem

The global burden of neonatal deaths is estimated to be 4.8 million of which 3.2 million deaths occur during the first week of life[4]. As many as 1.24 million neonates die every year in India, amounting to nearly a quarter of the total burden. The current neonatal mortality rate in India is 47/1000 live births accounting for almost two-thirds of infant deaths. Therefore, reduction in infant mortality is linked to reduction in newborn deaths. Neonatal mortality is indeed the most significant child health challenge facing the nation.

The major causes of neonatal deaths are sepsis (pneumonia, meningitis, omphalitis, neonatal tetanus, and diarrhoea), birth asphyxia, birth injury and low birth weight (prematurity and intrauterine growth retardation). However, there are several contributory factors like poverty, illiteracy, low socio-economic status, harmful traditional practices, inadequate health/medical care, inability to recognise the danger signals in the sick newborn, lack of transport facility for accessing emergency care, poor maternal health, failure to promote early and exclusive breast feeding and so on[5].

Perinatal mortality is a sensitive index of the health status of women and the quality of MCH services as it is related to various high risk factors and diseases in the mother as well as gestational age and birth weight of the newborn. Perinatal mortality and stillbirth rates are still high in India. A very slow decline (15.8%) in the perinatal mortality was observed during 1981-91 as compared to neonatal mortality (26.9%), infant mortality (27.3%) and child mortality (35.7%) rates[6]. Perinatal hypoxia, infections and congenital malformations are the major causes of perinatal deaths. Prematurity and low birth weights are associated with most of these deaths.

According to WHO, 25 million low birth weight (LBW) babies are born every year throughout the world[7]. Half of all perinatal and one-third of all infant deaths are directly or indirectly related to LBW. LBW infants are at much higher risk of mortality and severe morbidity compared to full term infants. They are at 3-4 times greater risk of dying from diarrhoeal diseases and acute respiratory infection if they are not immunized. The etiology of LBW is multifactorial; the duration of gestation and intrauterine growth rate being two major factors which influence birth weight. Several maternal factors like poor maternal nutrition, anaemia, certain infections, eclampsia, workload after mid-pregnancy, short birth intervals, teenage pregnancy, use of tobacco and alcohol consumption contribute to LBW. Prevention of low birth weight is a major challenge.

Interventions–Newborn Care

Community level care

Early recognition and prompt management of high risk cases at different levels of health care starting from domiciliary to the tertiary level is of utmost importance to save the lives of many babies. Interventions must be designed to meet the needs of mothers and newborns in the community in different settings. There is a need to develop a model for improving the neonatal care in the country under field conditions. Innovations like solar heated rooms as surrogate incubators, use of thermocol boxes for safe transport of babies, use of sunlight as phototherapy for management of jaundice, bag and mask for resuscitation of neonates, *etc*.need to be assessed.

Interventions to reduce the incidence of LBW and prematurity include delay childbearing in young adolescents, promote maternal education, improve maternal nutrition, reduce tobacco use, diagnose and treat RTI/STD, management of anaemia during pregnancy, *etc*.

Some of the interventions that can reduce neonatal morbidity and mortality are[5]:

(i) Antenatal care: Tetanus toxoid immunisation, and diagnosis and treatment of UTI/ RTI, tuberculosis and anaemia.

(ii) Intrapartum care: Prevention of prolonged labour, optimal management of complications, clean delivery, and clean cutting of the cord

(iii) Postpartum care: Optimal cord care, promotion of early and exclusive breast feeding and avoidance of prelacteal feeds

(iv)Promoting gender equality

There is also a need to study the care-seeking behaviour of the communities for their sick babies, develop case management protocol (algorithm) for community care of sick neonates on the line of the management protocols for diarrhoea and ARI in the community.

Involvement of village *panchayats* and other influential community leaders in the planning and monitoring of the neonatal care provided by the health functionaries needs to be assessed. Studies have demonstrated that community health guides, traditional birth attendandants (TBA), *anganwadi* workers (AWW) and village level health workers can also be trained effectively for identification and domiciliary management of high risk babies[8-12].

The Indian Council of Medical Research (ICMR) had carried out a multicentric study to develop a comprehensive package of interventions for improving maternal and child health care by adopting the approach of identification and management of high risk pregnant mothers and their offsprings within the existing health care delivery system at the primary health center (PHC) level. The results of this study showed that it is possible to improve the quality and coverage of MCH care at PHC level[13].

Secondary level care

Secondary level care for the management of sick babies/ infants has an important role to play in health care delivery. As the tertiary hospitals are overburdened, inaccessible

antibiotic therapy and cardiovascular, respiratory and surgical support if needed. Blood culture is the surest way of diagnosis, but takes 48-72 hours for establishing the diagnosis. Molecular biology techniques based on polymerase chain reaction (PCR) which could rapidly identify bacteria in clinical specimens have been described. Evaluation of the molecular diagnosis of sepsis in the newborn has shown that the technique was suitable for the rapid diagnosis of sepsis[14]. There is a need to strengthen the tertiary hospitals to develop such facilities for early diagnosis of sepsis. There is also a need to identify the risk factors for neonatal sepsis[15].

There is a need to evaluate adjunctive therapy such as plasma exchange, intravenous immunoglobulin (IVIG), exchange transfusion, *etc*., which have been proposed to improve the outcome in babies with neonatal sepsis in addition to conventional antibiotic treatment[15].

and potential source of infection for the sick babies, those who do not require sophisticated investigations, therapy or surgery should be managed at the secondary level of the health care delivery system.

According to the National Family Health Survey (NFHS) more than 70% deliveries took place at home during the four-year period preceding the survey[14]. As most of the deliveries take place at home and the community has limited means of reaching distant health facilities during emergencies, most neonatal deaths also occur at home. Thus it has become essential to find ways to provide neonatal care to normal, at risk and sick neonates at home to reduce neonatal mortality.

Tertiary level care

Sepsis

Bacterial sepsis (septicaemia/pneumonia) is a major problem in the newborn nursery; the incidence of sepsis varies from 1-10 /1000 live births. Sepsis continues to be a significant cause of death in the neonatal period with high mortality rates. The accurate recognition of organisms causing potentially fatal systemic infections is of crucial importance. Hence microbiologic surveillance is important to guide therapy, identify new agents of importance to the neonate, recognise epidemics, *etc*. Moreover the organisms associated with neonatal infection are different in different geographic regions thus reinforcing the need for local microbiologic surveillance[15]. The treatment of neonatal sepsis requires early recognition, appropriate and adequate

Respiratory distress syndrome

The respiratory distress syndrome (RDS) due to hyaline membrane disease occurs in 1-2% of all babies born in hospitals, while its incidence in premature babies (<28 weeks of gestation) is reported to increase to more than 50%[17,18]. Currently, the management requires treatment with surfactant therapy, which is beyond the reach of the common man (Rs. 25,000 to 50,000/- per baby). Surfactant use is still not prevalent in our country[19]. Antenatal/intranatal steroids have a role in the reduction of hyaline membrane disease when given to preterm mothers. However, in our country majority of pregnant women report too late in labour making antenatal/intranatal steroids ineffective or they may have contraindications to postpone delivery *eg.* antepartum haemorrhage, eclampsia, *etc*. Glucocorticoids administered postnatally have been shown to improve short-term lung function. Preliminary studies in Chandigarh has shown the beneficial effect of early postnatal steroids in reducing the severity of disease and oxygen requirement during the first five days of life[20]. There is a need to carry out large multicentric trials to evaluate the efficacy and safety of postnatal steroids as compared to surfactant for the prevention and treatment of hyaline membrane disease, an issue that is more relevant to developing countries.

Meconium aspiration syndrome

The meconium aspiration syndrome (MAS) affects more than 400,000 neonates world-wide each year. Meconium stained amniotic fluid occurs in 7-15% of all deliveries and MAS develops in 5-10% of these babies. As many as 12% of infants with MAS will die[21]. There is no uniformity in the optimum management of MAS and hence there is need to investigate methods for preventing MAS and managing the disorder in those who develop it.

Database for perinatal and infant mortality and morbidity

There is lack of reliable information in the country about the deaths and illnesses of pregnant women, newborns and infants. Obtaining accurate information on the causes of death is important for many reasons. It is useful for providers of primary health care, for local and national health administrators, for investigators as they design interventions for prevention and treatment and for health planners who implement and evaluate health care programmes. There is a need to develop an effective information system to generate a reliable database. Such an effort for collecting data on neonatal morbidity and mortality in the hospitals has been initiated by the National Neonatology Forum[17,22]. A similar effort is required for collecting data from the community.

The ICMR recently organised an Expert Group meeting to identify priority areas of research on neonatal health. Development and validation of simple criteria for diagnosing neonates with sepsis, home based management of neonates with sepsis, identification of organisms causing neonatal sepsis in the community, their antimicrobial susceptibility and molecular epidemiology, development of low cost technologies for newborn care at the primary level, birth asphyxia, etiology and prevention of low birth weight, birth defects and genetic disorders, newborn care services at the secondary level, generation of a database for perinatal and neonatal mortality and morbidity were some of the areas identified by the Expert Group.

Infants and Under 5 Care

Breast feeding and weaning

Breast feeding is one of the most natural and effective low cost means for survival and health of the child. It is well known that breast feeding lowers the rate of respiratory and gastrointestinal illnesses in children. Although breastfeeding is almost universal (95%) in India, a majority of mothers squeeze the first milk *ie* colostrum from the breast which provides natural immunity and important nutrients to the newborn. On an average 51% infants less than 4 months of age are exclusively breast fed. Weaning or the age at which complementary feeding is started is also generally delayed in many communities in India. About a third of the infants aged 6-9 months receive timely complementary feeding[3,14]. Delay in weaning and improper weaning is a cause of malnutrition in children. The Baby Friendly Hospital Initiative has been undertaken by the Govt. of India for the promotion of exclusive breast feeding for babies delivered in the hospital. Such efforts need to be strengthened at all levels of health care including the community to increase awareness, knowledge and improve feeding practices among mothers. Proper weaning has to be promoted with the food available from the family kitchen.

Growth and development

Growth and development of infants and children are important parameters that provide information on the health status of children. The growth chart is an important epidemiological tool for the early diagnosis of malnutrition, occult infection or other adverse environmental factors. It is important for each country to have its own growth standard against which the children can be evaluated. The ICMR had published growth standards for Indian children in 1972[23]. There is a need to update these standards.

Child development concerns not merely physical health but also the process of change by which a child learns to handle even more difficult tasks of moving, thinking, speaking and relating to others. While emphasis is given mostly on survival of children, the life long impact of the interaction of nutrition, childcare and nurturing on cognitive and social development is also equally important. Most child development programmes usually start at a late age of 3 or 4 years. The best child development programme should aim at strengthening the capacity of mothers through home visits and child stimulation from infancy until the age of three. Early child stimulation interventions within the first year of life have the greatest impact on the most disadvantaged groups and populations, attenuatting the effects of poverty, severe malnutrition, low birth weight and prematurity[7].

Malnutrition

Many women and children in the reproductive age group suffer from iron deficiency anaemia; the prevalence is 40-50% in developing countries (over 50% in pregnant women)[24]. Prevalence is highest in south Asia (upto 80%). Anaemia in pregnant women contributes to LBW. In India almost 30% babies are of low birth weight. Low birth weight female babies, grow up to be small mothers who in turn give birth to low birth weight babies. According to NFHS-II data sheet, 74.3% children below the age of three are suffering from anaemia[3]. In infants and young children even mild anaemia can impair intellectual as well as physical development[24].

Nutritionists have been concerned that zinc deficiency affects a large number of women and children world-wide. In developing countries the prevalence of zinc deficiency is likely to be near 100% in pregnant women[25]. In children, it is associated with decreased immunocompetence and increased rate of infection. The consequences of zinc deficiency on human health in developing countries have not yet been recognised. In pregnant women zinc deficiency increases the risk of prematurity, intrauterine growth retardation and complicates pregnancy including childbirth[25]. There is a need to conduct large scale studies to examine the role of zinc supplementation in pregnant mothers and to determine whether supplementation can result in a significant reduction in disease specific child mortality. Mortality studies, acute treatment and prevention trials, defining best and most effective regimens for zinc supplementation and safety studies need to be carried out[26]. This information would be beneficial from the programme point of view and would help in the cost benefit estimation of a population based supplementation programme[25].

Recently, the ICMR organised an Expert Group meeting and an Indo-US workshop to identify priority areas for research on nutrition and health of women, infants and children with emphasis on micronutrients. Assessment of the prevalence of micronutrient deficiencies in the vulnerable sections of the society (preschool children, adolescent girls and pregnant and lactating women), impact of zinc supplementation on morbidity and mortality in low birth weight and normal infants/preschool children and the development of a community based intervention to promote complementary feeding between 6 months to 2 years of age using a multiple integrated strategy through health workers, integrated child development services (ICDS), women's groups and information, educaiton and communication (IEC) channels for control of undernutrition were identified as some of the priority areas of research.

Iodine deficiency has been described as the world's single most common cause of preventable brain damage and mental retardation. Iodine deficiency in a pregnant mother is associated with greater incidence of stillbirths, spontaneous abortions, congenital malformations, low birth weight, infant and child mortality and may lead to cretinism. The IQ scores of iodine deficient children are lower than those who are not[7]. Iodised salt has been a success story and continuous efforts are essential for its sustainability through systematic monitoring of salt iodine at all levels and verification of elimination of iodine deficiency disorders.

Vaccine preventable diseases

Immunisation has resulted in a dramatic improvement in child health during the last few decades. Vaccines have drastically reduced the incidence, severity, sequele of diseases and mortality from the target diseases among hundreds of millions of children. Immunisation coverage of 80% against BCG, measles, third dose of DPT (diphtheria, pertussis and tetanus) and oral poliovirus vaccine has been achieved among infants world-wide. In India immmunisation against BCG, 3 doses of DPT and oral polio and measles ranges between 50-70%[3]. However, the vaccine coverage is variable and children still suffer from vaccine preventable diseases (VPD). There have been reports of occurrence of diphtheria cases from south Asia, West Bengal and some tertiary hospitals in north India[27]. More than 40% of cases were seen in children above 5 years of age. A large epidemic of diphtheria also occurred in the Russian Federation in 1990 which spread to all the states by 1994 to account for 90% of all diphtheria cases reported world-wide during 1990-95[7]. These facts emphasize the need to strengthen our immunisation programme, assess the quality of vaccine and establish surveillance systems for vaccine preventable diseases.

The World Health Organisation has recommended immunisation of all infants with 3 doses of hepatitis B vaccine as the 7th vaccine under EPI. Vaccines are also available against mumps, measles and rubella (MMR), typhoid, hepatitis A, *Haemophilus influenzae* type b (Hib) and chicken pox. The burden of disease and epidemiology of each condition need to be estimated for recommending routine use of thesse vaccines. There is also a need for evolving consensus and a strategy to bring down the prices of these vaccines.

Acute respiratory infections

Acute respiratory infections (ARI), primarily pneumonia is the major cause of morbidity and mortality among children throughout the world. It has been estimated that 3.9 million children die each year from ARI, most of them in the developing countries[24]. ARI causes 19% of all deaths in children below 5 years and 8.2% of all disability and premature mortality[28]. Of the deaths due to pneumonia, 90% occur in developing countries. Pneumonia is the leading cause of death in India accounting for 30% of the under five deaths[29].

Although there is an ARI Control Programme in the country, the interventions have not led to the desired reduction in the incidence, morbidity and mortality due to pneumonia. Studies are necessary to improve the implementation of the present national programme for

A reliable information system needs to be established so that high quality data are available to assist in planning for control of acute respiratory infections.

control of ARI and to resolve other issues to bring down morbidity and mortality related to ARI. High priority needs to be given to evaluation of the ARI Control Programme. There is a need to assess the clinical response to cotrimoxazole – the drug given for therapy in the ARI Control Programme as there are reports of resistance to this drug[30]. A major international conference sponsored by the World Health Organisation (WHO) was held in Canberra in 1997 to discuss the prevention and management of acute respiratory infections. It was recommended that controlled clinical trials with alternative drugs like amoxycillin given orally three times a day for two days rather than five days for the treatment of pneumonia need to be carried out. If found effective, such a regimen would make the cost of a course of amoxycillin comparable to that of cotrimoxazole[28].

More accurate, pathogen specific disease burden estimates for *Streptococcus pneumoniae*, pneumococcus, respiratory syncytial virus (RSV), *H.influenzae* type b (Hib), *etc.* need to be carried out. This would provide opportunity for estimation of disease burden due to different pathogens, molecular characterisation, surveillance for antimicrobial susceptibility and monitoring resistance rates which would be of use for making therapeutic decisions.

There is a lack of community based information on the disease burden caused by *H. influenzae*, the severity of disease and sequelae. Community based studies to measure the disease burden caused by Hib in India are needed urgently for assessment of the cost benefit of Hib immunisation of all infants[31]. Research is also needed to find out the role of other pathogens like chlamydia, mycoplasma and ureaplasma in causing pneumonia in children in developing countries[28].

Studies have shown significantly high antibody levels in infants after immunisation of mothers with Hib and pneumococcal vaccines. Further studies need to be carried out to examine and evaluate the efficacy of such a strategy in reducing deaths due to pneumonia[32,33]. Preliminary results of community based trials of the impact of zinc supplementation in preschool children showed a reduction of 45% in the incidence of acute lower respiratory infection (ALRI) among supplemented children[34]. Further studies need to be carried out to determine the impact of zinc supplementation in the prevention of ARI, and to examine the role of zinc as an adjunct in the treatment of childhood pneumonia especially in malnourished children.

Rheumatic Fever and Rheumatic Heart Disease

Rheumatic fever/ rheumatic heart diseases (RF/RHD) in children and young adults are a major health problem in developing countries. A WHO study conducted in 16 developing countries has estimated a prevalence of RF/ RHD as 2.2 /1000 school children[42]. In a multicentric task force study of ICMR the prevalence of RF/RHD was found to vary between 1.0 and 5.4/1000 children of 5-14 years age group[43]. In a rural community of north India a prevalence of RF/RHD of 2.1/1000 and an incidence of 0.54/1000 children in the age group of 5-15 years were observed[44]. Approximately 30-40% of patients seen at the cardiac OPDs in major hospitals are cases of RF and RHD[43].

The preventive and control strategies for RF/RHD with long term penicillin prophylaxis are well known. In Chandigarh, a registry system for RF /RHD cases has been set up for a rural community block of Haryana where health workers and school teachers were trained to identify patients to have suspected streptococcal sore throat. This study showed that it is possible to prevent a second attack of acute rheumatic fever by improving compliance for monthly penicillin injections[44]. Such models need to be replicated in other states also to study the feasibility of developing a control programme for RF/RHD.

The diagnosis of group A streptococcal pharyngitis by culture is difficult in the peripheral health facilities. There is a need to develop a field test for the diagnosis of RF/ RHD. Using a cocktail of antibodies a rapid field test has been developed, which has been found useful for identification of cases with recurrence of rheumatic activity and RHD[45].

Acquired Immune Deficiency Syndrome

Paediatric AIDS (Acquired Immune Deficiency Syndrome) is substantially under recognised because of difficulties in establishing the diagnosis of HIV infection in early infancy as well as the clinical features overlapping with those of other severe diseases of childhood. Perinatal transmission of HIV has been well documented, the rate of transmission has been estimated to be between 15-35% in children of HIV positive mothers. The most alarming trends of HIV infection are in South Asia[1]. Realising the problem of the high prevalence of HIV infection in India, there is a need to estimate the burden of this disease in the paediatric population, the natural history of the disease, develop low cost strategies to identify cases and prevent transmission of infection from mother to the infant and the management of such cases.

Of the hereditary anaemias, thalassaemia is the most common genetic disorder and is of great public health importance. It has been estimated that in India, approximately 10,000 infants are born each year with thalassaemia major. There is also a need to develop a nation-wide control programme for thalassaemia by antenatal screening for beta thalassaemia carrier status and preventing the birth of affected children by using molecular techniques for the diagnosis.

Integrated Management of Childhood Illnesses

The most important causes of mortality in children are ARI, diarrhoea, malaria, measles and malnutrition[7]. In an attempt to reduce the under five morbidity and mortality in developing countries and to improve the health worker's performance in managing childhood illnesses, the WHO and UNICEF jointly developed a strategy, the integrated management of childhood illnesses (IMCI)[53,54]. The IMCI strategy combines the improved management of childhood illness with aspects of nutrition, immunisation and other important factors influencing child health, including maternal health. The objectives of the strategy are to reduce death and the frequency and severity of illness and disability, and to contribute to improved growth and development. The core of the IMCI intervention is integrated case management of the five important causes of childhood deaths *ie* ARI, diarrhoea, measles, malaria and malnutrition.

Integrated guidelines for the management of the sick child has been developed through a process of review of existing disease specific guidelines. Currently 60 countries are at different stages of implementation of the IMCI strategy. This strategy is also in the process of implementation in our country. Studies from the African subcontinent evaluating the feasibility and validity focussing largely on paramedical workers, have demonstrated the

Childhood Asthma

Asthma is the most common chronic disease of childhood causing absence from school. Besides the physical discomfort caused by the disease it also affects the psychological development in children. The international study of asthma and allergies in childhood has reported highest prevalence of asthma in developed countries than in the developing countries[35]. India has an estimated 15-20 million asthmatics, with a prevalence between 10-15% in 5-11 yr age group[36].

Asthma cannot be cured but it can be controlled. Several environmental factors like living conditions, life-styles, genetic factors, *etc.* have been attributed to be responsible for asthma. There is a need for carrying out research in the epidemiology of asthma at both the individual and environmental levels. Clinical, cellular and molecular studies need to be carried out to find out the role of genetic factors, atopy, breast feeding, smoking, place of residence, *etc.* Research is also needed to find out the asthma gene, inflammation markers and to develop newer and safer devices to reduce morbidity and mortality in children.

Typhoid Fever

Typhoid accounts for over 16 million cases annually globally with an estimated 6 lakhs deaths[37]. Accurate population based figures of the burden of typhoid fever in developing countries are not available. Estimates indicate that there are 1000 cases/100,000 population in some Asian countries. Drug resistant strains of *Salmonella typhi* have posed a major problem in the treatment of patients with typhoid[38-40]. Multidrug resistant typhoid fever is frequently associated with increased morbidity and mortality[41]. It is essential to develop a surveillance system for antimicrobial suseeptibility of *S.typhi*. Management strategies for typhoid include use of the appropriate antibiotic. It is essential to develop suitable guidelines for prompt recognition and appropriate therapy for typhoid in the community. The development of an algorithm based on clinical and simple laboratory criteria for rapid diagnosis of typhoid and strategy for subsequent therapy would provide rational management of this disease and reduce the risk of emergence of further drug resistance.

Birth Defects and Genetic Disorders

Birth defects / congenital malformations account for 8-10% of perinatal deaths and 13-16% of neonatal deaths in India[46-48]. In a national multicentric study to determine the prevalence of malformations, neural tube defects (NTDs) were found to be the highest (3.5/1000 births)[49]. The prevalence of NTD from different parts of India has been reported to vary from 0.5-11/1000 births. NTDs are multifactorial in etiology – genetic and environmental. The efficacy of periconceptional folic acid supplementation to women with a history of a child with NTD, for prevention of recurrence of NTD has been established[50,51]. It can also prevent the first occurrence of open NTD in the general population[52].

Genetic disorders occur in two waves – one at birth and the second that manifests in adult life. Chromosomal disorders account for almost 50% of abortions during the first trimester, 5% abortions in the second half of gestation and 5% of diseases in the newborn. Congenital malformations or defective morphogenesis have a frequency of about 1.9% at birth, with a higher frequency among stillbirths (9.1%). Of the births with genetic disorders in India, congenital malformations account for the highest group followed by Down syndrome, hereditary anaemias including thalassaemia and sickle cell disease, and metabolic diseases[49].

Genetic disorders/congenital malformation are not considered priority health problems in most developing countries including ours as infections and malnutrition far outweigh them in terms of morbidity and mortality. However, in view of the fact that congenital malformations contribute significantly to neonatal mortality and morbidity and physical handicap in later life there is a need to give serious consideration to this problem. Identification of high risk pregnancies and their referral to proper health care facilities where genetic counselling and antenatal diagnosis can be provided is of utmost importance. Many congenital malformations can be detected in the early stages of pregnancy by using techniques like ultrasonography, amniotic fluid analysis, chorionic villus biopsy at the tertiary level hospital. There is also a need to establish a registry system for recording birth defects. This would not only help in estimating the burden of the problem, but also help the health planners to include this condition while allocating resources and assessing the training needs of the various categories of health staff. There is a need to develop a programme for prevention of NTD by use of periconceptional folic acid supplementation.

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usefulness of the IMCI algorithm[35,36]. Only one study in India has evaluated these algorithms for management of childhood illnesses at the hospital set up with well-trained personnel and under good supervision[57]. Since three quarters of our population live in rural areas serviced by a large primary health care infrastructure, there is a need to evaluate this strategy at the field level.

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This write up has been contributed by Dr. Reeta Rasaily, Senior Research Officer; Smt. I.Kambo, Deputy Director General and Sh. N.C. Saxena, Deputy Director General (Senior Grade) & Chief, Division of Reproductive Health and Nutrition. ICMR Hqs, New Delhi.

INDIAN COUNCIL OF MEDICAL RESEARCH

AWARDS AND PRIZES 1998 AND 1999

The Indian Council of Medical Research invites nominations/applications from Indian scientists for its various prizes and awards in the field of biomedical sciences. Details of the awards/prizes, as also the format for application may be obtained from the Director General, Indian Council of Medical Research, (Indo-Foreign Cell), Post Box No.4911, Ansari Nagar, New Delhi-110029.

Nominations/completed applications should reach this office by **31st December, 2000.**

DETAILED INFORMATION

1. Basanti Devi Amir Chand Prize (Value Rs.5,000)

This prize will be awarded annually to a senior research worker of more than ten years standing for work of outstanding merit in any subject in the field of biomedical science, including clinical research. The term "Clinical Research" implies research into the mechanism and causation of disease, including its prevention and cure. The criteria for award of the prize are the significance and value of addition to existing knowledge contributed by a worker in a particular field in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

The selection for this prize is made one year in advance.

****2. Dr.P.N.Raju Oration Award (Value Rs.5,000)**

This prize will be awarded in alternate years, to an eminent scientist, preferably a medical person, for his/her work in any subject of national importance in the field of medicine or public health. The award for 1998 will be in the field of RESEARCH IN ENT/OPHTHALMOLOGY.

****3. Sandoz Oration Award for Research in Cancer (Value Rs.2,500)**

This prize and medal will be awarded in alternate years, to an eminent scientist for outstanding work carried out on a particular aspect of **cancer**. The eminence is to be judged on the basis of his/her contributions to cancer research which should have been recognised nationally and internationally and helped towards control, prevention and cure of cancer.

****4. Dr.Y.S.Narayana Rao Oration Award in Microbiology (Value Rs.4,000)**

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **microbiology**. The criterion for award of the prize is the significance and value of addition to existing knowledge

**Awards which will not be given for 1999

contributed by a worker in microbiology in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

****5. Chaturvedi Kalawati Jagmohan Das Memorial Award (Value Rs.2,000)**

This prize and a gold medal will be awarded once in three years, to an eminent scientist, preferably a medical person, for his/her work in the field of **cardiovascular diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in cardiovascular diseases in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

6. Dr.Kamala Menon Medical Research Award (Value Rs.5,000)

This prize will be awarded to an eminent scientist, preferably a medical person, for outstanding contribution made in the fields of **internal medicine** and **paediatrics** respectively in alternate years. The criterion for award of the prize

is the significance and value of addition to existing knowledge contributed by a worker on a subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The awards for 1998 and 1999 will be in the fields of INTERNAL MEDICINE and PAEDIATRICS respectively.

7. Kshanika Oration Award to a Woman Scientist for Research in the field of Biomedical Sciences (Value Rs.5,000)

This prize will be given annually to an eminent woman scientist for outstanding work carried out in any branch of biomedical science, contributing to the alleviation of human suffering. The criterion for award of this prize is the significance and value of addition to existing knowledge contributed by her in any field of biomedical sciences in which she has been actively engaged over a number of years and has shown sustained activity in research.

****8. Dr.M.K.Seshadri Prize in the field of Practice of Community Medicine (Value Rs.10,000)**

This prize and a gold medal will be awarded in alternate years, to an eminent scientist or institution whose original work has led to useful inventions in or otherwise significantly contributed to the practice of **community medicine**.

†9. M.N.Sen Oration Award for Practice of Medicine (Value Rs.5,000)

This prize will be given once in three years, to an eminent scientist for outstanding work carried out in the field of **practice of medicine (clinical, laboratory or therapeutic)**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker to the practice of medicine in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

10. JALMA Trust Fund Oration Award in the field of Leprosy (Value Rs.5,000)

This prize (and a medal) will be given annually to an eminent scientist for outstanding research in the field of **leprosy**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on any aspect of leprosy in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

11. Dr.J.B.Srivastav Award in the field of Virology (Value Rs.10,000)

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **virology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in virology in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

**Awards which will not be given for 1999
†Award which will not be given for both 1998 and 1999

12. ICMR Prize for Biomedical Research for Scientists belonging to Under-privileged Communities (Value Rs.10,000)

This prize will be given annually to an eminent scientist for his/her outstanding contributions in any field of biomedical sciences. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in the particular field in which he/she has been actively engaged over a number of years and has shown sustained activity in research. This prize will be awarded to **scientists belonging to under-privileged communities**.

13. ICMR Prize for Biomedical Research conducted in Under-developed Areas (Value Rs.10,000)

This prize will be awarded annually to an eminent scientist for his/her outstanding contributions in any field of biomedical sciences. The criterion for award of the prize is the significance and value of biomedical research carried out by a **worker based in under-developed parts of the country, or for work carried out in under-developed parts of the country** over a period of five years preceding the year for which the award is to be given.

****14. BGRC Silver Jubilee Oration Award (Value Rs,5,000)**

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **haematology/immunohaematology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

***15. Smt.Swaran Kanta Dingley Oration Award (Value Rs.10,000)**

This prize will be given in alternate years, to an eminent scientist for outstanding contribution in the field of **reproductive biology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in the field of reproductive biology in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

16. Dr.M.O.T.Iyengar Memorial Award (Value Rs.4,000)

This prize will be given annually to an eminent scientist for outstanding contribution in the fields of **malaria, filariasis, plague or medical entomology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in any of the fields of malaria, filariasis, plague or medical entomology in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

****17. Prof.B.K.Aikat Oration Award (Value Rs.3,000)**

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **tropical diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in tropical diseases in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

****18. Dr.Vidya Sagar Award (Value Rs.5,000)**

This prize will be awarded in alternate years, to an eminent scientist for outstanding contributions made in the field of **mental health**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in mental health in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

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*Awards which will not be given for 1998
**Awards which will not be given for 1999

19. Amrut Mody-Unichem Prize (Value Rs.10,000)

This prize will be given to an eminent scientist for outstanding work carried out in the fields of **cardiology & neurology,** and **gastroenterology** (in alternate years). The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on a subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The award for 1998 and 1999 will be in the fields of CARDIOLOGY AND NEUROLOGY and GASTROENTEROLOGY respectively.

20. Amrut Mody-Unichem Prize (Value Rs.10,000)

This prize will be given to an eminent scientist for outstanding work carried out in the fields of **maternal & child health,** and **chest diseases** in alternate years. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The award for 1998 and 1999 will be in the field of CHEST DISEASES and MATERNAL AND CHILD HEALTH respectively.

***21. Chaturvedi Ghanshyam Das Jaigopal Memorial Award (Value Rs.3,000)**

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **immunology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

****22. Lala Ram Chand Kandhari Award (Value Rs.5,000)**

This award will be given in alternate years, to an eminent scientist for outstanding research in the fields of **dermatology and sexually transmitted diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

***23. Dr.Prem Nath Wahi Award for Cytology and Preventive Oncology (Value Rs.30,000)**

This award will be given in alternate years, to an eminent scientist for outstanding contribution in the field of **basic and/or clinical cytology, and/or preventive oncology**. The criterion for award is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

***24. Dr.D.N.Prasad Memorial Oration Award (ValueRs.20,000)**

This award (and a medal) will be given in alternate years, to an Indian scientist for significant contribution to research in the field of **pharmacology**, carried out in India, as evidenced by research papers and inventions. The criteria for award

in the field of pharmacology, carried out in India, as evidenced by research papers and innovations. The criteria for award will be the significance and value of addition to existing knowledge in research in pharmacology.

**25. Prof.Surindar Mohan Marwah Award (Value Rs.25,000)

This award will be given once in 3 years to an Indian scientist for significant contribution in the field of **geriatrics**, through sustained research in India on the problems of the aged as evidenced by research papers in science publications. The subject matter could be biomedical or psychosocial research on problems of the aged, both basic and applied.

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*Awards which will not be given for 1998
**Awards which will not be given for 1999

Prizes/Awards for Young Scientists below 40 Years of Age
on January 1st of the Year for which the Awards are being Given

26. Shakuntala Amir Chand Prizes (Four in Number of value Rs.1,500 each) :

These four prizes will be awarded annually to the **best published research** work in any subject in the field of biomedical science including clinical research. The term 'Clinical Research' covers research into the mechanism and causation of disease and its prevention and cure, and includes work on patients in hospitals, field studies in epidemiology and social medicine, and observations in general practice.

Both medical as well as non-medical graduates are eligible for award of the prize. The prizes are awarded to Indian nationals for work done in any institution in India. **Work started in India but completed abroad will not be acceptable.**

Papers published in Indian or foreign journals in the previous two years will be considered for award of these prizes in the current year.

**27. Raja Ravi Sher Singh of Kalsia Memorial Cancer Research Award (Value Rs.2,000)

This prize will be awarded in alternate years, to a scientist for outstanding work done in the **experimental or clinical aspects of cancer or in the organisation and conduct of any service or service-cum-research programme in cancer prevention and treatment**. For the prize to be awarded in the current year the work carried out in the previous year will be considered.

**28. Dr.V.N.Patwardhan Prize in Nutritional Sciences (Value Rs.7,000)

This prize will be given in alternate years, to an eminent scientist, for outstanding work carried out in India on **fundamental, clinical or field studies in nutritional sciences**. The criterion for award of prize is the contribution of a worker to nutritional sciences in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

29. Tilak Venkoba Rao Award (Value Rs.1,000)

This prize will be given to an eminent scientist for research in the field of **psychological medicine** and **reproductive physiology** respectively in alternate years. The criterion for the award is the significance of contribution to existing knowledge by a worker who has been actively engaged in research on the subject over a number of years.The award for 1998 and 1999 will be in the fields of PSYCHOLOGICAL MEDICINE and REPRODUCTIVE PHYSIOLOGY respectively.

**30. Dr.T.Ramachandra Rao Award (Value Rs.3,000)

This prize will be given in alternate years, to a scientist for his/her outstanding contribution made in the field of **medical entomology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

**31. Dr.C.G.S.Iyer Oration Award (Value Rs.1,500)

This prize will be given in alternate years, to a scientist for his/her outstanding contribution in the field of **leprosy**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

**Awards which will not be given for 1999

**32. Dr.Dharamvir Datta Memorial Oration Award (Value Rs.3,000)

This award will be given in alternate years, to a scientist (medical or non-medical) for work carried out in the last 5 years in India in the field of **liver diseases**. The criteria include significance and value of addition to existing knowledge contributed by a worker in this speciality, with special reference to application of findings to clinical hepatology.

**33. Prof.B.C.Srivastava Foundation Award (Value Rs.5,000)

This award will be given in alternate years, to a scientist for work in the field of **community medicine** in medical colleges/recognised institutions. The criterion for the award is the significance of research contributions to the practice of community medicine by a worker.

34. Smt. Kamal Satbir Award (Value Rs.5,000)

This award will be given annually to individuals for outstanding contribution to research on **non-tuberculous chest diseases, especially respiratory allergy and chronic obstructive lung diseases**, pertaining to mechanism and causation of the diseases, their prevention and/or management.

The work to be assessed would be the research carried out in India and published in scientific journals during the three years preceding the year for which the award is to be given.

35. Major General Saheb Singh Sokhey Award (Value Rs.10,000)

This award will be given annually to a scientist for his/her outstanding contribution in the field of **communicable diseases** depending upon its significance and value in terms of addition to existing knowledge contributed by the worker in that field. The facets of work to be considered could be basic or applied research which add to the knowledge on the mechanism and causation of communicable diseases, their prevention and/or their management. The work to be assessed would be the research carried out in India and published in scientific journals, during the 3 years preceding the year for which the award is to be given.

36. Dr.H.B.Dingley Memorial Award (Value Rs.5,000

This award will be given annually to individuals for outstanding contribution to research in the field of **paediatrics** by Indian scientists. The work to be assessed would be research work carried out in India and published in scientific journals during the 3 years preceding the year for which the award is to be given.

***Dr. B.R.Ambedkar Centenary Award for Excellence in Biomedical Research**
(Value Rs.1.00 lakh)

Dr. B.R.Ambedkar Centenary Award for excellence in biomedical research was instituted in the year 1991-92 as part of the Dr. Ambedkar Birth Centenary celebrations. The award, of value Rupees one lakh, is to be awarded in alternate years, for excellence in any field of biomedical research, as evidenced by scientific publications in internationally recognised journals, and contribution to advancement of knowledge and/or improvements in medical practices, health programmes etc. This award is open to all age groups.

Direct applications are not accepted for this award. Only nominations by certain categories of people will be considered. Details are available in a separate brochure, which is available on request.

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*Awards which will not be given for 1998
**Awards which will not be given for 1999

HOW TO APPLY

Applications/nominations should provide the names and other particulars of the candidates for award of the prizes to the Council in the prescribed proforma.

Five copies (**Ten copies** in the case of the **Basanti Devi Amir Chand Prize**) of each of the following documents will have to be sent with the application:-

1. The proforma for application/nomination with the details duly completed.
2. A note giving full details of the outstanding research contribution of the nominee or applicant which makes him/her worthy of the award.
3. A short biographical sketch of the candidate.

4. A list of papers published by the candidate giving details of those published in Indian and Foreign Journals separately, and also indicating whether the journals are indexed or not.
5. Five reprints each of five recent significant papers published on the subject of the award by the applicant/ nominee (for the **Basanti Devi Amir Chand Prize, ten reprints** of each paper are required).

The applications for **Shakuntala Amir Chand Prize** should be sent along with **ten copies** each of the following documents.

1. The proforma for application/nomination with the details duly completed.
2. Reprints of the papers submitted for the prize.
3. A note giving details of research work done by the candidate.
4. A list of papers published giving details of those published in Indian and Foreign Journals separately, and also indicating whether the journals are indexed or not.
5. A short biographical sketch of the candidate.

Nomination for Dr. B.R. Ambedkar Centenary Award for Excellence in Bio-Medical Research should be in the separate format prescribed. Direct applications will not be entertained for this Award.

TERMS & CONDITIONS OF ICMR AWARDS/PRIZES

1. Only work published in Scientific (scholarly) Journals will be considered for ICMR Awards.
2. Normally work done during the preceding five years on the subject will be considered (except where otherwise indicated, under "Detailed information on the ICMR prizes/awards".
3. If a scientist has received an ICMR award for a particular subject, the same material will *not* be considered for another ICMR award or the same award in a subsequent year, unless there is evidence that additional work have been done. As such, those applicants/nominees who have received an ICMR award previously, should clearly indicate the additional work done by them and substantiate the same with reprints of subsequent publications.
4. Only applications/nominations which are complete in all respects will be considered. Five sets of documents (10 in case of Basanti Devi and Shakuntala Amir Chand Prizes) should be submitted, each set containing one copy of the documents indicated in the Section "How to Apply". If sets received are not complete, the application/ nomination will not be considered.
5. Applicants/Nominees need not provide "No Objection Certificates" from co-authors (since 1990 onwards). However, in the event of any dispute, the onus will be on the applicant/nominee/recipient of an ICMR Award or Prize, and ICMR will not be responsible for any such dispute arising out of counter claims.
6. The nominations/applications complete in all respects and with all the required documents should reach the Council not later than 31st December, 2000.

JOINT APPLICATIONS

In the case of joint applications/publications, the prizes shall be divided between the applicants/authors in such proportion as the Selection Board may decide. The role of the individual who applies for the prize should be clearly indicated so as to make it easy to determine whether major part of the work has been done by that person.

A certificate from the Senior Author that the candidate applying for the award has himself/herself made significant contribution to the research work for which his/her paper is being recommended for the award should also be submitted along with the application.

Proforma for furnishing relevant information about the Nominee/Applicant

Name of Award Applied for _____

1. Name of the Nominee/Applicant:
2. (a) Date of birth and age as on 1st January of the year for which the award is being applied for: (b) Sex:
3. Academic qualifications beginning with the Bachelor's degree:
4. Present employment and posts held previously:
5. Details of outstanding research achievements during the last five years:
6. Whether the achievements have been recognised/awarded by any learned Society/Institution (if so brief outline to be given):
7. Number of scientific papers published and reprints of those papers to be considered for the present application:
8. Subject of research work presented for the award:
9. Whether you have received earlier any award for the same work or paper; if so, give the following:
   (i) Name (ii) Year (iii) Value of award and
   (iv) Exact caption of work for which the Prize was awarded:
10. Give names and designations of all the joint authors,if any, on the work/paper(s) submitted for the award:
11. State whether for the same work/ paper(s) any of the joint authors have received any award. If so, give the names of all the authors, the name of the prize awarded, year ofaward and its value:
12. If you are a joint author, state precisely what has been your individual contribution to the work:
13. State whether you have applied for any other award for the same or any other work. If so, state the name of the award and the subject of work submitted for the award:
14. (i) List of papers, if any, submitted earlier for any other award and (ii) List of papers published subsequently and now submitted for consideration of the award:
15. Address for correspondence: *(including telephone, fax number and e-mail address).*

NOTE: Applicants for the ICMR Prize for Biomedical Research for scientists belonging to Under-privileged Communities should provide attested Caste/Community Certificate.