SPECIAL ISSUE ON
INTERNATIONAL YEAR OF CHILD

Indian Journal
OF
PUBLIC HEALTH

(Quarterly Journal of the Indian Public Health Association)

VOLUME XXIII July—September 1979 NUMBER 3

EDITOR
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ANNUAL SUBSCRIPTION Rs. 25.00 (Inland) SINGLE COPY Rs. 6.25 (Inland)

INDIAN JOURNAL OF PUBLIC HEALTH

Quarterly Journal of the Indian Public Health Association

VOLUME XXIII | July—September 1979 | NUMBER 3

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3,
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NATIONAL PLAN OF ACTION FOR INTERNATIONAL YEAR OF THE CHILD 1979*

1. Declaring 1979 to be the International Year of the Child, the U. N. General Assembly has set out its general objectives as follows :

a. "To provide a framework for advocacy on behalf of children and for enhancing the awareness of the special needs of children on the part of decision-makers and the public ;

b. To promote recognition of the fact that the programmes for children should be an integral part of economic and social development plans, with a view to achieving in both the long-term and short-term, sustained activities for the benefit of children at the national and international levels".

2. India has always been a strong advocate of the cause of the child and played a notable role in getting the United Nations General Assembly to pass a Resolution declaring the Universal Children's Day which is observed in India on 14 November every year. India has also been staunch supporter for declaring 1979 as the International Year of the Child and was the first country to announce its contribution of Rs. 900,000/- to UNICEF for the purpose.

3. The needs of children and our duties towards them are enshrined in our Constitution. Article 39 of the Constitution proclaims that the State shall, in particular, direct its policy towards securing that the health and strength of workers, men and women and the tender age of children are not abused and that children are not forced by economic necessity to enter a vocation unsuited to their age or strength. It further declares that childhood and youth are to be protected against exploitation and against moral and material abandonment. Constitution also enjoins upon the State to provide free and compulsory education for all children until they complete the age of fourteen years.

4. Keeping in view the constitutional provisions and the United Nations Declaration of the Rights of the Child, Government of India adopted a National Policy for Children in 1974. The policy recognises children as the nation's supremely important asset and declares that the nation is responsible for their 'nature and solicitude'. It further spells out various measures to be adopted and priorities to be assigned to children's programmes with a focus on areas like child health, child nutrition and welfare of handicapped and

* From the booklet on the subject by Government of India, Ministry of Education and Social Welfare, Department of Social Welfare, New Delhi, September, 1978.

destitute children. The Policy also provides for setting up of a high-level National Children's Board to focus attention on child welfare and child development and to ensure at different levels, continuous planning, review and coordination of all essential services directed towards children.

5. In accordance with the above general objectives, 1978, the year preceding IYC, is to be devoted to advocacy and preparatory work in connection with programmes of Child Welfare/Development, consolidation and strengthening of ongoing programmes for children and introduction of new ones where needed, so that a series of action programmes could be launched to realise concrete objectives laid down for the observance of the Year.

6. **Objectives** : The specific objectives of the observance of the International Year of the Child in India shall be as under :—

a) To make concerted efforts to significantly reduce the incidence of maternal and child mortality and morbidity by providing effective programmes and services for their health and nutritional needs.

b) To promote community awareness and education about the crucial importance of the healthy development of the child and a happy family life as the foundation for the child's security and well-being.

c) To facilitate optimum psycho-social development of pre-school children so as to prepare them for schooling by providing a network of Balwadis/Anganwadis/Creches/ day-care centres/nursery schools.

d) To strive for the speedy realisation of the goal of universal elementary education and to substantially reduce the rates of school drop-out.

e) To secure the basic rights of children and to protect them against neglect, cruelty, hazards and exploitation by promoting effective implementation of existing legislation and enacting new ones where necessary.

f) To secure entitlement of all children in the poverty groups born on/after 1 January 1979 to public assistance for their survival, growth and development.

7. **The Approach Strategy** : The objectives of the IYC are of a global nature encompassing all children in the age group of 0-14 years and call for massive inputs and viable infrastructures. However, in view of our resource constraints and differential degrees of ecological deprivation, our approach must be endowed with a certain focus and realism. The following guidelines may be kept in view while formulating action programmes for the observance of the International Year of the Child in this country :—

a) The general theme of IYC in India shall be "Reaching the Deprived Child"

b) The IYC should not be construed as a one-year programme. It should be viewed as a spring-board for vigorous continued action during the residual part of the Century. The goals and objectives as spelled out should positively be achieved by the end of the Century and to this end, a perspective plan for the next two decades (1979-99) should be evolved.

c) The empahsis during the period shall be on children of weaker sections of society, namely Scheduled Castes, Scheduled Tribes and other poverty groups located in rural areas and urban slums. Within this target group, greater attention should be bestowed on children in the age group of 0-6 years, primary school children as also pregnant and nursing mothers. It has been estimated that out of 115 million children (1971 census) between the ages of 0 and 6 years in India, at least 46 million are below the poverty line. Of these, 9.2 million live in the teeming urban slums, 2.8 million in tribal areas, and 34 million in rural areas, often inaccessible and beset by drought, flood and other hazards of marginal existence.

d) Since it will be difficult to cover, during IYC, all children under health and nutrition programmes, priority should be given to cater to the needs of children below the age of 6 years, pregnant and nursing mothers.

e) During the IYC, an attempt should be made to reduce maternal and infant mortality rate by about 5 percent.

8. In the light of the objectives and approach strategy as outlined above, the action plan has been divided into the following six broad heads, each spelling out concrete measures to be undertaken in respective fields followed by guidelines for their implementation :

a. Health and Nutrition including environmental sanitation and supply of safe drinking water.

b. Education including pre-school elementary and community education.

c. Social Welfare.

d. Legislation.

e. Publicity.

f. Fund raising.

INDIAN JOURNAL OF
PUBLIC HEALTH
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July—September, 1979

INTEGRATED CHILD DEVELOPMENT SERVICES SCHEME— OBJECTIVES, ORGANISATION AND IMPLEMENTATION

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There have been significant achievements in India in all spheres of development in last 3 decades. Nevertheless, various problems concerning child welfare are still of fairly large dimension. The incidence of morbidity, mortality and malnutrition among children continues to be high. Various surveys in our country have indicated that the incidence of severe malnutrition amongst preschool children is as high as 15-20%. The infant mortality rate varies in different parts of the country and is influenced among others, by social factors and level of socio-economic development of the community.

An integrated approach to early childhood services including nutrition supplement was adopted and in pursuance of National Policy for Children the scheme of ICDS was sanctioned in plan of social welfare sector. On 2nd of October, 1975, the Government of India lunched the scheme in 33 community development blocks with following objectives :—

1. to improve the nutritional and health status of children in the age group 0-6 years ;
2. to lay the foundations for proper psychological, physical and social development of the children ;
3. to reduce the incidence of mortality, morbidity, malnutrition and school drop-out ;
4. to achieve effectively coordination of policy and implementation amongst the various departments to promote child development ; and
5. to enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education.

It was decided to provide a package of following essential services to children 0-6 years, nursing and expectant women and women in 15-44 years age group.

i) Supplementary nutrition
ii) Immunization
iii) Health check-up
iv) Nutrition and health education
v) Referral services
vi) Non-formal education

On account of the key role of protected water supply efforts were also made to improve the rural drinking water supply through UNICEF and other Government Agencies.

One anganwadi has been established for a unit of 1,000 population, which is the focal

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point for delivery of the entire package of child development services. The anganwadi worker is a female worker recruited from the village. She is assigned the responsibilities of non-formal education to preschool children, supplementary nutrition and health education while 3 other services of the package are rendered by the Auxiliary Nurse Midwife (ANM). The surveillance of growth and development of children is inbuilt in the package. The treatment of common ailments during childhood was later introduced realising the availability of anganwadi worker in the village all the time.

Organisational structure and work load

The administrative unit for the location of ICDS project was chosen as a community development block in rural areas, tribal development block in tribal areas and slums in the urban areas. In selection of projects priority was given to areas backward in developmental services, nutritionally deficient and predominently inhabitated by the scheduled castes and tribes. Initially the 33 projects were placed in 11 tribal, 18 rural and 4 urban areas. In the years 1978-1980 the ICDS scheme has been expanded to 150 projects (56 tribal, 70 rural and 24 urban). Each project has approximately following number of beneficiaries per 1000 population.

Children 0-6 years	—	170
Pregnant women		30
Lactating women	—	70
All women of child bearing age (15-44 years)	—	200

To strengthen the health services, an additional doctor, 2 lady health visitors and 8 ANMs have been sanctioned in these projects, so as to make 1 ANM available for 5000 population at the periphery.

The entire package of services has been envisaged to be delivered by the social welfare and the health functionaries of the block through guidance from the respective authorities from district and state. The flow-chart at the end illustrates the administrative arrangements in an ICDS project.

Training of personnel : The anganwadi workers have been given basic training for 3 months at anganwadi training centres and a continued inservice training is given by the PHC physicians on all pay days with demonstrations at the maternal and child health and family welfare planning clinics and subcentres in groups of 8-10 anganwadi workers.

Monitoring and evaluation : The evaluation of organisation and implementation of the scheme has been entrusted to the PEO Cell of the Planning Commission, and periodic monitoring and evaluation of health and nutrition was undertaken by All India Institute of Medical Sciences through annual surveys which were conducted by the medical college consultants.

Role of medical colleges : To provide technical guidance, supportive supervision and training to various grades of functionaries of the programme, it was deemed necessary to appoint paediatricians as consultants to projects nearest to the medical colleges. To conduct periodic surveys for assessing the impact of services on health and nutrition, graduate interns were mobilised and in 15 projects it was possible to conduct 3 surveys within 2 years.

In the expanded programme, taking the distance of projects from the medical colleges and propagative nature of work, and also easy mobility of district staff, the paediatricians and the health officers of the respective district headquarters were appointed as consultants to the ICDS projects. Presently 54 consultants are the paediatricians or teachers of preventive and social medicine from medical colleges, while 35 consultants are officers from the districts.

Achievement of ICDS :

1. *Establishment of infrastructure :* Despite the difficulties in the system of appointments a very large proportion of health and non-health staff (87% and 99% respectively) is on the ground in projects of first phase, of which more than 88% of staff has undergone formal training.

2. *Training of functionaries and supportive supervision :* The basic training of anganwadi workers, mukhyasevikas and child development project officer was arranged by the National Institute of Public Co-operation and Child Development. All the physicians placed at the ICDS project and their supervisors at the district were trained regionally at the medical colleges by the consultants. The All India Institute of Medical Sciences introduced the in-service training of anganwadi workers and the ANMs within PHC with emphasis on primary health care and monitoring of maternal and child health and nutrition. The orientation is conducted by the physicians at the PHC or at sub-centres.

3. *Co-ordination :* The Child Development Project officers and the PHC physicians are the key persons in the implementation of the programme. The experience at the projects shows that medical college consultants have been successful in introducing environment of team approach by participating in various activities of anganwadi through co-ordinated supervision, re-organisation of the services of administration, referrals and establishing an information system through regular data collection. The services to high-risk-mothers and children were intensified, both at village and health centre level.

4. *Results of the surveys :* Three surveys were conducted in 28 projects at three different points at an interval of approximately one year on a sample of 10% anganwadis. Data from 15 projects has been compiled, which shows that there is a progressive increase in coverage of population of women and children regarding their enrolment, supplementary nutrition, antenatal and postnatal check up, immunisation and distribution of vitamin A and folifer tablets. Further, there is remarkable improvement in the nutritional status of children with almost 50% reduction in Grade III and Grade IV malnutrition.

Special benefits of the ICDS programme :

1. The blocks where an ICDS project is running h .ve also been selected for upgrading the PHC under the minimum needs programme. The ICDS programme has ensured the supply of refrigerators to these PHCs thereby helping in the immunisation programme. Sufficient amount of medicines including folifer tablets and vitamin A have been given to these projects with additional budget for medicine from ICDS. These projects were

given the transport at a priority basis. Rural electrification and water supply programmes have also been augmented in this project areas.

2. Anganwadi-worker as an agent of health care delivery to mothers and children :

The anganwadi worker has been envisaged as a caretaker for growth and development of young children and education of young mothers. Their selection from the local comm nity and ability to render the package of service at the anganwadi has proved to be an asset. The fact, that she is the only available and accessible health worker at the village level became a compelling need to train her in giving treatment for common ailments at first contact. Her training in primary health care and first aid has been found extremely beneficial to the community and complementary to work of ANMs. The health care has now been included in the syllabus of anganwadi workers' basic course and continued training at the PHC and the sub-centres aims at making them proficient in treatment of 'at risk' children and mothers.

3. Active involvement of paediatricians and teachers of community medicine has installed an academic impetus to the performance of health functionaries and management of severely malnourished children. Continuous training of various level workers has ensured better standards. The participation of graduate interns in the health surveys has proved to be an interesting field exercise which is hopefully expected to motivate them in the MCH work in their future practice. The consultants from the medical colleges have also been able to mobilise members of other disciplines in training and surveys. Most of the medical colleges are currently participating in this national programme.

4. The state directorates of health services have taken special interest in ICDS recognising the approach as an alternative strategy to delivery of health care.

What should be better achieved in ICDS

1. Children in age group 1-3, particularly the ones who are suffering with severe degree of malnutrition still remain inadequately covered. A system to establish nutrition therapy for such children at home or at sub-centre and PHC needs to be developed, though high calorie therapeutic food has been made available for treatment of those affected.

2. The referral system from anganwadi to the PHC and onwards needs support from the administration.

3. Inspite of renewed emphasis, the nutrition and health education activities remain low in service priority.

4. The improvement in water supply and sanitation has also not picked at a faster pace.

Conclusion

The comprehensive approach of child development is well conceived in ICDS projects and preliminary programme in 150 areas shows promising results. The ICDS programme is an example of unified efforts of Social Welfare and Health Departments leading to fulfilment of needs of those, who are deprived and neglected.

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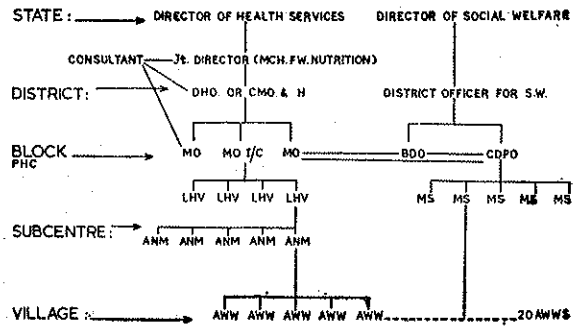
ADMINISTRATIVE FLOW DIAGRAM FOR A RURAL ICDS PROJECT



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PUBLIC HEALTH
Vol. XXIII No. 3,
July—September 1979

SURVEILLANCE OF EPI TARGET DISEASES

R. N. Basu*

Introduction

Major causes of sickness and death of children in India are infectious diseases, many of which are preventable by immunization. The expanded programme on immunization (EPI) has been initiated in the country with the objectives of (i) integration of immunization services, (ii) expansion of immunization coverage of susceptibles, (iii) organization of reliable disease surveillance system (iv) production and quality control of vaccines (v) addition of antigens in existing programme (vi) development of cold chain for the storage and transport of vaccines (vii) orientation of health personnel (viii) ensuring community participation and (ix) periodic evaluation of the on-going programme. The traditional measures like the number of vaccinations and percentage of achievement of target of vaccination, do not ensure prevention of the disease. Success of the programme can only be indicated by the prevention of morbidity of the concerned diseases. There is need for setting clear objectives to quantified reduction in morbidity and mortality during certain period of time. EPI is a long term continuing programme and surveillance of the target diseases is one of its important components.

Need for disease Surveillance

Disease surveillance is systematic collection, compilation and analysis of morbidity and mortality within defined population for taking appropriate action. This registers and quantifies changes in disease patterns, that can be used to evaluate an immunization programme objectively, and to introduce needed modifications of the programme. In the context of EPI, surveillance has application for providing data to be used for :

a) Quantification of specific diseases preventable by immunization to measure the magnitude of the problem and indicate priorities. Thus surveillance identifies the need for an immunization programme.

b) Identification of population at particular risk of disease, death and disability by location and age ;

c) Study of the disease transmission pattern as means of formulation of strategy.

d) Monitoring of the effectiveness in achieving the programme objectives accurately and continuously by ensuring whether immunization programme is succeeding in preventing disease.

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Surveillance has five functional elements, namely (i) data collection (ii) preliminary data analysis (iii) epidemiological investigation (iv) action for control and (v) feed back. In this paper, data collection is discussed.

Currently Available Data

At present the information is being collected on 20 communicable diseases which include seven EPI target diseases (Diphtheria, Whooping Cough, Tetanus, Polio, Measles, Tuberculosis and Typhoid) on a monthly basis by the Central Bureau of Health Intelligence (CBHI). The data is related to patients treated in medical institutions (mainly hospitals) only. Even this data does not include information from many large hospitals. Sometimes the figures from a single hospital exceed the figures sent by the State authorities for the whole state. Moreover, all the states and Union Territories (UT) do not send their report to CBHI. Out of 31 States and U Ts, the number of units reported varied from 19 to 23 during 1972-1976.

Year	No of States/UTs reported
1972	19
1973	21
1974	23
1975	23
1976	19

In the States, there is no review of number of reporting units, and their regularity in submission. In Kerala, out of 879 reporting units, on an average, 575 reports at the state level were received each month. In Ropar district of Punjab, in 1978, out of 41 expected reports, 22 monthly reports were received on an average.

There is also discrepancy in data preserved at the State Bureau with that of CBHI as many of the delayed reports received from the periphery have not been incorporated subsequently.

Incidence of Tuberculosis as reported by State Programme Officer and CBHI during 1974 1977 in M.P.

Year	Cases of Tuberculosis	
	Reported by State Programme Officer	Recorded at CBHI
1974	363045	58556
1975	344343	57360
1976	355215	84274
1977	220652	81837

In many health institutions, cases of cough were reported as whooping cough and vice versa. Cases which do not visit medical institutions, are not included in the above reports. Many cases of measles and whooping cough get treatment within the community. Deaths from neonatal tetanus are not attended to. The epidemiological information available at present is fragmentary and do not represent the actual situation of the whole country, particularly in rural area. The infrastructure in different states is at various level of development and therefore the data cannot be compared objectively.

Appropriate Information System

An appropriate information system has to be established to provide the basis for programme development and evaluation. Some of the diseases with which the immunization programme is concerned, are easily recognized, such as measles. Others such as

diphtheria and pertussis, are much more difficult to diagnose. Residual paralysis is relatively easily recognised as compared to acute cases of polio. Because of these differences, no single method of surveillance can be used, with equal reliability for all of the diseases, The EPI target diseases deserve special attention, as national programme exists for the control of these diseases, The following steps need to be taken for improving the present situation.

i) Strengthening of current reporting from medical institutions.

ii) Supplementing the institutional information by reports from the health workers in the field.

iii) Additional data from selected centres.

iv) Special survey.

The first two will supply minimum data in terms of cases and deaths only. The last two sources will provide epidemiological data for detailed study.

Strengthening of current reporting system

The reporting units, flow of information, and proforma have to be examined and standardized. In some States, the reports from primary health centres come directly to State headquarters. Medical College hospitals or private hospitals have not been included as reporting units in certain areas. Supplementary reports should be encouraged and at the end of the year corrected reports have to be compiled at all levels. The diagnosis given in the medical institutions are expected to be rational. The physicians must understand the importance of disease reporting. They must record the diagnosis in out-patient registers clearly, so that compilation can be done monthly.

The number of cases and deaths from the target diseases, treated during the preceding month is all that is needed at this point. It is important to have all reporting units submit monthly return including 'Nil' reports. When reports are late, missing or improperly completed, the State/Central office should promptly attempt to obtain the correct information.

Reports from Health Workers

The health staff of primary health centres during their routine field visits, are coming across with different sickness including EPI target diseases. They should be encouraged to report those and Sanitary Inspector should make a monthly compilation of the information for despatch to district health office. Orientation of the health staff will provide the necessary skills to make correct diagnosis in most cases. During the fever with rash surveillance as part of smallpox eradication programme, the reporting of measles cases by health workers was found to be satisfactory in terms of adequacy and correctness. Preliminary analysis of data and investigation of unusual outbreaks will help in improving the quality of reporting Items of information related to EPI expected for monthly transmission from PHC to district, which in turn sends to State level after consolidation, can be seen in Appendix A. A simple wall chart as was maintained, during smallpox eradication campaign, showing all reporting centres and month, at district health office and State directorate, will provide a simple method of monitoring incoming reports. By entering the data of a report from each centre, under the appropriate month, it is possible to identity non and late reports.

Additional data from selected Centres

Teaching hospitals and primary health centres under supervision of Medical Colleges may supply additional epidemiological information in the form of age incidence, previous history of immunization, relationship with nutrition, investigation of large-sized outbreaks or unusual episodes. Infectious Diseases Hospitals and Rehabilitation Centres will be the source of detailed information of particular diseases. Information on prevalence of meningeal and military form of tuberculosis will be available from district tuberculosis centres and hospitals. These centres may be termed as sentineal centres.

Special Surveys

Systematic residual paralysis survey carried among samples of primary school children will provide an indication of the magnitude of polio problem. The actual incidence of polio has to be adjusted considering recovery, death, and non-attendance in school. As most of the neonatal deaths occur at home, enquiry of childhood deaths would give information on likely death due to tetanus. Experiences have shown that para-medical workers can be effectively used for these surveys after short orientation. Simple guidelines for these surveys for Polio, Tetanus and Whooping cough on the basis of WHO EPI manual are given in appendix B. Institutions have to be identified who will conduct these special surveys periodically.

Appendix 'A'

MONTHLY REPORT OF EXPANDED PROGRAMME ON IMMUNIZATION

State/Union Territory

Number of reporting units_____

Number of reports received_____

Month_____ Year_____

A. Surveillance

Disease	Cases	Deaths
Diphtheria		
Whooping Cough		
Tetanus		
Measles		
Tuberculosis		
Poliomyelitis		
Typhoid fever		

Vaccination Performance (number)

Smallpox	DT (1st dose)
B.C.G.	DT (2nd dose)
D.P.T. (1st)	TT (1st dose)
D.P.T. (2nd)	TT (2nd dose)
D.P.T. (3rd)	TT (3rd dose)
Booster	
Polio (1st)	
Polio (2nd)	Typhoid (1st dose)
Polio (3rd)	Typhoid (2nd dose)
Booster	

Signature

Appendix 'B'

SURVEY OUTLINE FOR NEONATAL TETANUS WHOOPING COUGH AND RESIDUAL POLIOPARALYSIS

The objective is to estimate the incidence of Tetanus neonatorum and Whooping Cough in randomly selected villages. One health worker covers a small village/ward population 500-1000) in one day. He visits every house and asks the following questions.

For Tetanus Neonatorum

1. Has there been a delivery in this house or family during last three months?
2. If yes, where is the child ?
3. If the child has not survived, when did the child die ? (age)
4. If the child died in the first month of life ;
   a) Did the child drink milk for several days and then stop ? (In case of cerebral birth trauma, the child is not able to drink milk from the beginning.)
   b) Were there any convulsion, any trismus, any opisthotonus ?
   c) Did the child die of tetanus (DHANUSTANKAR) ?
5. Do you know of any recent deliveries in neighbouring houses ? (for checking).
6. Record the result village by village.
   No. of live births.
   No. of suspected Tetanus Neonatorum cases.

For Whooping Cough

1. How many children in this family are under 1 year and 1-4 years.
2. Any children d ed during the last one year ?
3. What was the cause of death ? Elicit the possible cause of whooping cough by telling the mother symptoms of the disease.
4. What was the age of the child at the time of death ?
5. How/Where was the child treated ? If hospitalized, ask for record.
6. Did any child 1—4 years, suffer from whooping cough (use local name) during the last one year.
7. If so, how/where the child was treated ?
8. Is there any whooping cough case (1-4 years) at the time of visit ?
9. Record the result village by village.
   No. of children under 1 year
   No. of children under 4 years
   No. of deaths during last 1 year
   No. of children who suffered from whooping cough and survived.
   No. of children who died of whooping cough.

For Residual Polio Paralysis.

Health worker examines the children in randomly selected schools. Suspected cases of paralysis/paresis are re-examined by Medical-Officer.

1. Children aged 5-10 years are partly undressed with short trousers only.
2. Child stands before examiner and any asymmetry seen in muscles is noted.
3. Child turns around and the examiner sees him from the back
4. Child stretches arms sideways up : any non-function is noted.
5. The symmetry of muscles of extremeties and scapular region will be compared.
6. Child walks away and the examiner watches the child's gait and if there is any foot drop, he notes it.
7. If paralysis is detected, the examiner will have to determine whether it is flaccid, asymmetric, and whether there are any sensory changes.

INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3,
July — September, 1979

ECOLOGICAL APPROACH TO CHILD CARE IN INDIA

S. C. Seal*

Children in every country are the most precious possession of parents. The well-being of the child, its growth and development in a healthy atmosphere is and should be a universal aspiration of every family as well as a national concern as child is the future of manhood and asset of a nation. The various factors that govern the development of the child are ideology, political structure, economic standard, socialization pattern and value system. These factors in conjunction with the physical environment from the ecological womb in which the child is nurtured by the family both living in the same ecological space.

In the past, with much less population, sufficient land and high mortality rate, it was advantageous to parents and communities, particularly agriculturists to have large number of children. Today there is some realization that small families of healthy children with opportunities of education are to be preferred. At present in most of the countries in the world increasing attention is being given to health of mothers and young children and there is a feeling that if a country is to make rapid progress in economic and other developments it can be brought about within reasonable time after adequate services have been provided for the medical, nutritional and general care of small children, to become effective members of the adult society of the future. Furthermore demand for more children would naturally come down with assurance of survival of those born to reach the stage of useful adulthood.

Birth of a Healthy Child

The first essential need is the birth of healthy child with normal physical and mental components. In this respect, the most critical days in a child's life are those immediately before, during and after birth. The closer the time of delivery, the greater is the danger to the infant; the maximum rate of mortality of human being as a whole is the perinatal infant mortality. This largely depends upon three factors namely, mother's health, process of delivery and the initial environment to which it first opens its eyes.

Although every couple intuitively yearns for a child, but how many of them realize the responsibility involved in bringing up as a healthy and worthy inheriter? There appears to be an apathy to fulfil this responsibility as their behaviour pattern in relation

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to child birth is influenced by manifold factors namely (1) current belief and customs of delivery system ; 2) employment of untrained dais having no knowledge of contamination or infection for conducting delivery, particularly in the rural set up ; (3) without any attendant and proper shelter often costing the life of the mother or the child or of both ; (4) frequent pregnancies without spacing ; (5) many children to be cared for ; (6) want of common knowledge for proper rearing of the child ; (7) absence of adequate means to provide food and environment for normal development of the child.

Very long ago Manu *Samhita* described the laws and methods regulating child birth which were as scientific as of the present days, advocating a newly built hut (*Aturgriha*) for delivery and stay in isolation for one month with strict observance to save both mother and child from contact with others and possible infection (*Chhut*) on the plea of birth uncleanliness (*Janamasauch*). But in course of time the system deteriorated almost to the level of superstition. Not very long ago and even now in the rural setting the parturating mother was being placed in the worst environment such as an abandoned cowshed, husking room or some corner of the generally unused room for delivery with use of discarded linen, apparently polluted, often leading to infection, tetanus neonatorum and early death of the baby and sometimes of the mother as well. Use of bamboo strips for cutting the cord without caring for infection also caused high neonatal mortality due to tetanus and other infections.

Although lately the situation has changed for the better in certain communities with introduction of maternal and child care through establishment of primary and subsidiary health centres, effecting a reduction in infant mortality rate but this service being not adequate there has not been any significant decline in the still-birth and perinatal infant mortality rate even after the introduction of small family norm and birth control measures. At least three important measures need to be augmented for better success namely, (1) appropriate health education right into the rural families on responsibility of child birth, appropriate place of delivery and subsequent treatment of mother and child, child rearing, family planning and advantages of small family norm, (2) training of dais and (3) utilization of health centres for antenatal care and provision of facilities for hospital as well as home delivery system.

Importance of Environment

From the day of conception till the day of death the genetic constitution of a life is constantly subjected to influence of either internal or external environment perhaps causing certain modifications. When death results from environmental factors, e.g., from infection, physical accidents, lack of food and shelter, extremes of climate and so on it is called *ecological* death, as distinguished from *physiological* death such as by old age, failure of vital organs, mental and physical derangement or damage, etc. Too many children are still dying in India, the majority of deaths being environmental or ecological in origin, the need for control of environment is imperative.

Importance of health of mother and antenatal care

It is essential that mothers who have conceived shall have adequate health care, nutrition, rest and exercise to bear the brunt of pregnancy and to beget a healthy offspring There are certain diseases which have definite adverse effect on child bearing. Syphilis is one. The infant born to such mothers may be a still birth, or the child may be born with congenital syphilis with or without actual physical defect. Genetic anomaly arises out of the constitution of husband and/or wife and chromosomal disorders may lead to many kinds of physical defects such as of limbs, face, body, nervous system, cerebral diplegia, microcephaly, hydrocephaly low intelligence, psychosis, mental deficiency (idiocy, mongolism, etc.) and other hereditory traits such as, high blood pressure, diabetes, asthma, haemophilia, albinism, phenylketonuria and many others. To avoid these unwanted happenings the ancients made certain marriage laws for selection of partners. In USA every couple before marriage is compulsorily required to get a certificate of freedom from syphilis. Genetic counselling before marriage may be one of the measures to avoid such diseases as far as possible. Secondly couples with such defects are perhaps the fittest subjects for sterilization. They can however adopt a child if they like.

There are certain diseases from which if the mother suffers during pregnancy it becomes harmful to the offspring. These may cause still birth or the infant may be born with certain defects as in case of chickenpox, german measles and small pox. Mother should be vaccinated against smallpox and inoculated against tetanus to avoid smallpox for herself and to give passive immunity to her offspring against smallpox and tetanus. Again, the mother may suffer from mild or severe toxaemia of pregnancy. For all these proper antenatal care is the ready remedy for all mothers as well as the babies.

Child growth and development

India had the first manuscript on the management of children many years before the birth of Christ. *Kashyapa Tantra* had a chapter on *Kaumara Bhritya* i.e. service or aid to children. This was followed by Sushruta who wrote a chapter on *Kaumara Bhritya* in the second century A.D.

The growth impulse is inherent on the young of all animals and living creatures including human being and in obedience to natural impulse children grow even under hampering surroundings such as pavement dwelling, bustee or slum conditions, etc. But for perfect development of body and mind certain fundamental physical conditions are required. Among these are pure air, sunshine, food, water, warmth and protection, sleep and rest, freedom of movement and exercise. It is therefore plain wisdom to surround the child during early growth period as far as possible, with these conditions and environment which are conducive to healthy growth. Whatever qualities the child may have inherited from the parents, may be modified by his surroundings either to his advantage or disadvantage. Various studies made in this connection show that in rear and alley houses with low sanitary conditions, dark overcrowded badly ventilated rooms (as

in the bustee), many more babies die in the first year of life than in the better houses.

Children who play a large part of their time indoor, and specially those who live or work in close, hot, overcrowded huts, rooms or houses are apt to be dull, listless, pale and underdeveloped. A baby may thrive for the first year or two of life in such a surrounding but a child old enough to run about should have much more freedom than such quarters afford and should be able to spend a great part of his life out of doors. Even though the house or the living room itself is small and lacking conveniences and adequate sanitary requirement it does not matter much if the child can spend most of his life out of doors exposed to sunshine, fresh air and free exercise in company with his playmates. This problem does not generally arise in rural areas but it is a serious problem in cities and towns where bustee dwellings are extremely insanitary without any provision of open space nearby.

Child feeding and nutrition

For child feeding Indian mothers depend on tradition, local customs and sometimes on beliefs mingled with superstition, particularly in the rural setting. Nature has ordained that child should get all initial feeding from other's breasts but artificial living and condition of mother's health have gradually led to the disease and abuse of breast feeding. Flooding the market with artificial baby food, sophistication of womanhood and mothers taking to regular jobs in cities and towns are some of the additional reasons for abandoning breast feeding. In other words, motherhood, the highest sanctimonius function of human life is being allowed to be furnished at the alter of so called sophistication and civilisation. Strong emphasis on breastfeeding should therefore be advocated from all platforms, public or private, medical or nonmedical. On the other hand, many thousands of babies in India are nipped in the bud before or shortly after birth because of illness, overwork and underfeeding of their mothers during the nine months of prenatal life and a large contingent of them die of prematurity, underfeeding and malnutrition. Those babies require special care of feeding for their survival and growth.

It is estimated that more than half the babies born in India is suffering from some sort of *malnutrition*, and 10 to 20 percent from severe malnutrition with some leading upto the stage of Kwashiorkor mainly arising out of unbalanced dieting for want of the required amount of milk, vegetable or other animal proteins. Dissemination of knowledge and supplementation of feeding by social, voluntary or governmental organisations in a systematic programme all over the country and not merely by scrap, as is being done now-a-days on philanthropic basis, are necessary. The *Balwadis* and *Anganwadis* Schemes launched by the Government of India are the most desirable and welcome programmes but these should be integrated and devetailed with mothers' education on child rearing according to the prevailing local situation to have a permanent effect and benefit.

Another feature often noticed in our country among the well-to-do families is overfeeding but they should realize that the child's digestive system is not capable of dealing with all foods as the grownup people and that these

organs also require to be gradually trained. Hence in India a traditional weaning process by providing solid food starts from *Annaprasana* ceremony (cereal eating) at six months. At the same time prolongation of breast feeding (generally by the poor or country women) alone beyond six months without supplementation of solid foods is detrimental to the growth of the child as is the cause of anaemia in these children.

The question of school feeding will only come if the child survives upto 5 years.

Defective and Delinquent children :

As mentioned earlier quite a sizeable proportion of children are born in India with physical and mental defects and some acquire it during the stage of rearing. Those that are born with low intelligence can be taken care of by organising special institutions for the purpose of making them at least partially useful to the society. To help such children it is to be found which children are at risk most. Low intelligence (IQ) may arise from brain damage and cerebral palsy. Low economic factors and large families are often associated with low verbal IQ and reading retardation. These seem to be a result of both hereditary factor and persisting malnutrition and uncongenial environmental factors. There are methods now available for remedial teaching but institutions are very few in the country. Unless the government undertakes to establish such institutions the advantage of a few private institutions can be taken by the well to do only. The author once suggested that in every school irrespective of the standard should employ a social worker trained in psychiatry as one of the regular teachers compulsorily, just as it employs a physical instructor, to deal with the low IQ group. This can, however, be done without undertaking an additional financial burden as the social worker will normally act as a teacher of a general subject of her choice and in addition will deal with the low IQ with perhaps a small allowance.

Those that are born with physical defects can at least be partially restored to working condition by rehabilitation and surgical measures. In certain instances, genetic counselling and obligatory sterilisation may be adopted. For the blinds and deaf and dumb there are institutions, both voluntary and governmental, but these are inadequate for taking care of the large number that is born with these defects. Blindness due to diseases like smallpox and veneral diseases are definitely preventable by taking a good antenatal care, those that acquire the diseases due to *malnutrition* are also prevantable. For all these voluntary organisations have been mainly active to the field but the State and Central Government should undertake the task as a national policy.

A fairly large number of children are becoming *delinquent* due to adverse environmental and socio-economic conditions, particularly those who are born to poor families living in huts or bustees where child care is virtually unknown. Some of them become urchines and indulge in criminal or unsocial acts. For such children there are Juvenile Courts and rescue homes for correction and rehabilitation but these are inadequate in comparison with the extent and rising trend of the problem. The advantage of Borstal Institutions are generally enjoyed by families other than those coming from the poor strata.

Another group of children who are born to beggars, homeless families and pavement dwellers, also turn into beggars or street urchins and thus inflate the number of ordinary and criminal beggars. The author had made a study of these cases and was able to motivate 60-70 percent of the beggar women overburdened with children to accept voluntary sterilisation. In fact, many of them did not want to bear any more children but did not know how to achieve it. Sterilisation came handy to their rescue and they welcomed the measure.

Exploitation of Children

Child abuse and neglect are becoming common with increasing economic distress, unemployment and overcrowded living. The ecological stress factors associated with maltreatment of children are economical stresses, social stresses and intrafamilial and interactional patterns combined, to some measure, with psychological factors, to produce a general or usually a chronic condition of abuse, neglect or some other form of child maltreatment. Unmarried motherhood, parental discord, broken family, existence of co-wife, too many children, trouble with the neighbours, mental retardation, malnutrition dissatisfied or irritant child, frequent sickness in the child and various other social illnesses contribute towards maltreatment of the child and mere physical treatment is not right answer but it should be followed by social treatment by appropriate agencies.

There are two other kinds of child abuse in the society that need to be mentioned here: (1) Employment of children in odd jobs in factories, clubs, restaurants, tea shops, households, offices, etc. inspite of the existing legislation ; and (2) exploitation of children by designing beggars. Young children are lifted by the gang who maim their body through inhuman measure and present them in the street or suitable place to attract the sympathy of the passersby for donations or alms. Some of them are also trained for steeling, shoplifting, pickpocketting and other antisocial acts. The government in collaboration with the public should organise appropriate bodies to deal with these conditions and save the children from such humiliation and spoiling their lives for good.

Child Protection

Accidents claim the lives of more children each year than the next six leading causes of morbidity (pediatric diseases) combined. These produce injuries that require medical attention in one out of every three children. In the pre-schol age group 90 percent of these accidents and at least half of the fatalities occur in and around home. The commonest causes are fall (heading the list), fire, drugs and poisons, sharp instruments, coins and jwelleries, pins and needles, drowning, fruits and nuts, animals, vehicles, etc. Certain amount of protection can be given to the children by training and warning and by keeping the household materials (drug, poisons materials, coins and jwelleries, sharp instruments) not in use out of bounds for children as far as possible. Training in School should include accident prevention along with other school health programmes.

Prevention against childhood diseases is an essential programme. Vaccination against smallpox, polio, tetanus, whooping cough and

tuberculosis followed some months later by anticholera and antityphoid vaccines are to be started shortly after birth and should be completed within a year and a half with booster doses to be given during school carrier. First aid measures should be kept ready at every home and school. Health practices should start from the infant stage and gradually augmented during pre-school and school stage ending in regular health education course.

Problem of Working Mothers

Upto the age of 5 years the child is heavily dependent on mother and any situation that causes separation of the child from the mother even partially tells upon the health and psychological make up, and the child being deprived of mother's loving care develops individualistic trait instead of feeling for others. This situation arises in cities and towns in the families of working mothers. Industrial establishments partially manage this problem by maintaining 'creche' for suckling babies for feeding them at intervals. In other establishments the baby has to be left with relatives, ayahs, nurses, neighbours or foster homes (few) but this arrangement is not conducive to the normal development of the child. Even the hospital authorities having realized this problem are now allowing mothers to stay witp their hospitalized babies but working mothers cannot avail of this advantage.

The brief account of child care from ecological standpoint presented above is only to high light certain aspects which urgently require attention of the people and the government. Healthy growth of the child through proper and adequate child care prepares a strong foundation upon which a stable and strong superstructure of the child's adulthood can be built to ultimately strengthen the national edifice. Certain basic conclusions can be drawn from the above discourse namely,

1) Environment has a great influence on the family and the child.

2) Physical and mental make up with which the child is born can also be modified by these environmental factors.

3) Changes in the ecological parameters reflect in the variation in the growth and development of the child and also in the incidence, course, morbidity and mortality of childhood diseases.

4) Control of environment is easier and cheaper than all attempts to cure ill-health and disease. Hence preventive pediatrics is much more important than curative.

5) One must study and understand the social factors (which may differ from place to place) which contribute to the causes and continuance of the morbidity and mortality of children to enable the authorities to formulate the most useful method of control for which the following principles can be suggested—

a) An objective and imaginative approach to child health is necessary based on the knowledge of local customs and practices.

b) A maximum return in terms of child mortality and healthier children is to be obtained from the limited funds available.

c) Arrangements should be made for maternity service (antenatal, natal, and postnatal) extended upto the village level with necessary health education to mothers regarding child nutrition and child rearing.

d) Care for children should be extended to every section of the community services and need to be near the children's home by subsidized nutrition programme through health centres, mobile units and home visiting.

e) Minimum sanitary facilities are to be provided by improvement of bustee dwelling with some open spaces found for children's play and movement.

f) Accidents being the cause of high mortality measures to be taken to reduce the household hazards as much as possible through proper education of the children and inmates of the household regarding safety measures.

g) Child maltreatment and abuse should be tackled on social service model through protective care unit of a public Social Service agency in collaboration with the hospital pediatric departments on the one hand and legal steps in preventing the kidnapping of the children for begging and criminal purposes and for controlling child employment.

h) Sufficient number of institutions are to be provided to take care of the delinquent and physically and mentally defieient children including the blind and deaf and dumb.

i) Society should recognize the problem of the working mothers and evolve some remedy to deal with the situation locally.

j) Small family norm should be advocated from all platforms.

INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3
July—September, 1979

ALTERNATIVE APPROACHES TO IMPROVE CHILD HEALTH IN INDIA

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Why alternatives ?

Because the existing health care strategies currently in vogue in India, have resulted in the all too familiar statistics, which child health workers are both sick of hearing and ashamed of. High birth rates (35.2), high mortality (122) and the increased incidence of diarrhoeal diseases are associated with poor nutritional state in pre-school children (upto 60%). Coupled with this poor health situation in children, are the seemingly insoluble administrative headaches of health planners such as, lack of doctors, nurses, equipment at the primary health facility which exists in the villages. Of course various combinations of these individual problems vitiate the situation further. There may be doctors, but no equipment. Equipments such as refrigerators and vehicles are in position, but not in a working condition nor there may adequate funds allocated for their functioning.

Community Participation

Doctors, nurses, keep struggling in most difficult and trying situations in the villages, often become frustrated and come to the conclusion that due to paucity of resources the above situation cannot be corrected. But we overlook the fact that human resources which this country is blessed with are not exploited fully for their own betterment. At the First International Conference on Primary Health Care held in Alma Ata, the most frequently stated theme was "People have the right and duty to participate individually and collectively in the planning and implementation of their health care."[1] The principle of community participation has been increasingly central in social and economic development thinking in recent years but it has never been more completely at the heart of the matter than at Alma Ata. Speaker after speaker emphasized the same points. Full community and individual participation at every stage in the development of primary health care services is essential. Self reliance and self determination must be allowed to flourish and must be supported by all levels and sectors of Government.

Primary Health Care

Primary health care is taken to mean a health approach which integrates at the community level all the elements necessary to make an impact upon the health status of the people. Such an approach should be an

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integral part of the national health care system. It is a response to the fundamental human need of a person to understand and be assisted in, the actions required to live a healthy life and to know where to go for relief from pain and suffering. A response to such needs must be a series of simple and effective measures in terms of cost, technique and organisation, which are easily accessible to the people in need and which assist in improving the living conditions of individuals, families and communities. These include preventive, promotive, curative and rehabilitative health measures and community development activities.[2]

What alternatives for the child in India ?

1. *Village/Slum Level Health Workers*

The community should select and sponsor mature female workers, may be a trained "dai" or a school leaver preferably married with grown up children of her own. They undergo a short course of training which covers simple topics on the preventive aspects of mother and child care. They do not replace doctors, but they may substitute them in a simple under six clinic in weighing children, immunising them and advising mothers on nutrition and health education. She may supervise the health and well being of 300-500 children under six years.[3]

This category of worker is known as "Anganwadi Workers" in the ICDS project of the Govt. of India being implemented in a few selected blocks. Recently they have been identified as "Shishu Kalyanis" in the nutrition supplementation programme undertaken by the Govt. of West Bengal, UNICEF and CARE for 30 of the worst flood affected blocks in West Bengal. Their training has now been entrusted to Child In Need Institute (CINI).[4]

2. *Nutrition Supplementation and Health Education Programme*

Nutrition supplementation with low cost locally available foods specially for "at risk" cases such as children under six years, pregnant and lactating mothers is now identified as a prime need in any rural or urban community in India. "Spot feeding" or "take home" food may be the two methods of delivery. The food should be used as a tool in delivering much needed nutrition and health education to the community. This supplementation is to be phased out gradually, once socio economic programmes to generate both food and income take root amongst the deprived sections of the community.

3. *Health by the people*

The village/slum health workers form part of a health care delivery system where the community themselves participate in the activity. A token contribution is levied for services rendered, simple medicines are disbursed whose costs are subsidised by the fee collected. The allowance of the health worker may also be met from the subsidy. A vigorous campaign is launched by the community to undertake immunisation programmes specially for children against preventable diseases and also against mothers for new born tetanus.

4. *Mahila Mondols, Youth Clubs etc.*

Such organisations have an invaluable role in strengthening and supporting community development activities. Through the block

administration and through the Panchayats women and youth groups can be mobilised. The women groups may be involved in the preparation of low cost nutritious foods for children, as well as be involved in kitchen garden and adult literacy classes. The youth groups may be involved in drama, puppet shows etc. to bring about social change through the use of conscientisation techniques. Another avenue may be the setting up of a village craft training centre, helping mothers to learn mat making, weaving, sewing etc.

Summary

Flaws and weaknesses in the existing health care system have resulted in high child morbidity and mortality This can possibly be corrected adequately by involving the community and allowing them to participate at all levels in improving their health state. Primary health care should be emphasised at all times to enable the community to receive preventive, promotive, curative and rehabilitative health measures in a simple and effective manner.

A few alternatives are presented where community sponsored mature women termed village/slum health workers are key personnel involved in delivering primary health care. The "at risk" population is covered by the nutrition supplementation and health education programmes and the people all contribute to a low cost health care.

Mahila Mondols and Youth Groups share in this responsibility to make health care a reality.

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3,
July — September, 1979

INFANT MORTALITY IN AN URBAN LOCALITY OF CALCUTTA

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It is a universal truth that infant mortality is one of the most sensitive indices of the health and level of living of a community, state or nation. Demographers put great emphasis on the infant mortality because it is the largest single age-category of mortality, at this age causes of mortality are more specific than for the adults and also because the deaths can be controlled fairly easily by application of specific health programmmes

Infant mortality continues to be high in developing countries where the rate is as high as 200 or more per 1000 live births. In the developed countries it is much less where the rate may be as low as 10 per 1000 in Denmark and 11.7 per 1000 in 1972 in Japan. This remarkable achievement has been possible due to revolutionary advances in perinateology. The gradual decline in infant mortality throughout the world is due to improvement in the socio-economic condition, better standard of health care delivery system and advancement in the field of chemotherapy, antibiotics and insecticides.

In India, infant mor ality has shown a downward trend during last few years. Nearly half of the infant deaths occur during the first month of life of which more than 50 per cent occurs in the first week Of all the accountable causes of infant deaths, medical causes are the immediate causes and the rest are due to multiple factors like biological, social, economic and cultural which run together and threaten the survival of the infant.

Thus a multi-pronged attack is needed to reduce the infant deaths and conceivably it is not an impossible task. But the few, who are born with congenital abnormalities will probably die inspite of all efforts. Therefore the infant mortality is not likely to reach the zero level and the reduction to that level will depend on preventing one of its principal causes i.e., congenital abnormalities which is rather difficult to control for the community at large.

Material and methods

Information on infant deaths from 1957 to 1974, classified according to calendar month of occurrence of death, age at death and type of residence (slum or non-slum), were assembled from the records maintained in the vital statistics section of the Urban Health Centre, which is the practice field

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of the All India Institute of Hygiene and Public Health, Calcutta. These deaths pertain to the resident population of the service area of the Health Centre and are collected by the field staff (Field Investigators, Computors & para-medical staff) of the Health Centre for the purpose of providing the information on infant deaths to the M.C.H. section for their related services and for compiling the vital indices. These deaths were further classified by cause of death.

For the purpose of assessing the level of mortality among infants two types of rates were considered viz. the conventional infant mortality rate and adjusted infant mortality rate. Information on deaths by ages occurring in different months of any calendar year were referred back to identify the cohorts of births to which these deaths belonged. Then the infant deaths out of the births of any calendar year, thus ascertained, were divided by the births of the same year to get the adjusted I.M.R. for the year. It amounts to a cohort study on a restrospective basis and therefore the rates, had it been studied in a prospective way, are likely to be very near to the true I.M.R. These adjusted I.M.R. have further been studied with reference to the distribution of deaths by age in months during infancy in order to find out the behaviour of this distribution pattern over years.

Findings

Conventional infant mortality rates for the years from 1957 are shown in table 1, separately for slum and non-slum localities.

TABLE 1 : Conventional Infant mortality rate for the slum and non-slum areas in Chetla.

	Infant mortality rate per 1000 live births		
Year	Slum	Non-slum	Combined
1957	94.7	64.5	79.4
1958	87.0	66.4	77.4
1959	71.9	82.4	76.8
1960	89.3	75.2	82.9
1961	78.8	67.2	73.7
1962	79.4	60.4	70.9
1963	93.4	45.4	72.8
1964	75.2	56.0	67.5
1965	77.1	77.3	77.2
1966	77.5	64.5	73.0
1967	85.1	41.7	68.1
1968	82.9	47.8	69.8
1969	78.2	62.8	72.5
1970	87.8	65.7	79.5
1971	93.8	61.3	81.7
1972	91.0	62.9	81.2
1973	94.1	63.9	83.0
1974	103.0	65.5	89.2

From a perusal of the rates given in table I it appears that conventional I.M.R., both in slum and non-slum areas, had been rather insensitive to passage of time. An attempt was made to study the trend of the I.M.R. in relation to "adjustment factor" which is defined as the proportion of infant deaths in any calendar year out of the births of the same year.

It appears from the figures of adjustment factor in table 2 that the proportion of deaths of the infants born and died in the same calendar year did not appreciably change over the years in both slum and non-slum areas.

Table 2 : 'Adjustment factor' slum and non-slum areas.

Year	Adjustment factor in percentage	
	Slum	Non-slum
1957	67.0	73.5
1958	80.2	67.2
1959	66.7	74.3
1960	71.4	62.3
1961	71.8	82.4
1962	64.2	65.9
1963	77.4	67.6
1964	75.9	79.5
1965	72.7	79.6
1966	72.4	72.7
1967	77.2	88.0
1968	60.8	85.2
1969	80.3	75.0
1970	73.2	86.5
1971	75.0	75.9
1972	67.1	81.0
1973	67.0	88.9
1974	65.6	70.9

One of the disadvantages of the conventional I.M.R. is that the rate is influenced by the fluctuation in the number of births which forms the denominator of the rate. In order to alleviate this difficulty, adjusted I.M.R. as described earlier, was worked out and are furnished in table 3.

This exercise also was not of any avail, since the adjusted rates remained more or less unchanged over the years.

TABLE 3 : Adjusted infant mortality rate in slum and non-slum areas in Chetla.

Year	Adjusted infant mortality rate/1000 live births		
	Slum	Non-slum	Combined
1957	81.1	66.4	73.6
1958	92.7	66.3	80.0
1959	75.9	90.2	82.6
1960	85.7	64.9	73.0
1961	83.4	73.1	78.9
1962	71.6	54.9	64.6
1963	91.4	41.4	70.0
1964	77.1	58.2	69.8
1965	77.1	75.7	76.6
1966	74.4	52.7	67.0
1967	99.1	43.4	77.3
1968	66.1	56.6	62.6
1969	85.4	59.8	75.7
1970	85.9	70.3	80.1
1971	97.0	64.9	83.8
1972	97.0	57.6	81.8
1973	98.1	64.1	84.9

Analysis

This insensitive behaviour, of both the conventional and adjusted I.M.R. over the years was further examined through the level of mortality at various ages during infancy. In order to do this, the adjusted infant mortality rate of any year was classified according to the twelve ages at death in months. By doing so the variation in the number of deaths, caused by varying number of births in different years, was reduced to a comparable base. Further breakdown of the neonatal period, as is conventionally done, into different risk periods of the neonatorum was not attempted for avoiding any difficulty due to induced heterogenecity in the data.

The straight-forward technique of analysis of variance of proportions of adjusted infant mortality rates per 1000 live births at various monthly ages was carried out and the results

are shown in table 4. Through this analysis it was intended to investigate the effect of factors like time, place of residence, age at death during infancy, and their possible mutual interactions on the mortality level during infancy.

TABLE 4 : Analysis of variance table.

Source of variation	D.F	Sum of squares	Mean square	F
Between years	16	229.6936	14.3558	1.18
Between slum and non-slum	1	199.0250	199.0250	16.32**
Between Ages at death	11	32482.5088	2952.9553	242.10**
Interaction of age & place of residence	11	142.1749	12.9250	1.06
Interaction between place of residence and year	16	276.9194	17.3075	1.42
Interaction between age and year	176	2333.0666	13.2561	1.09
Error	176	2146 6989	12.1972	—
Total	407	37810.0872	92.8995	—

From the F value corresponding to "years" it is observed that the mortality among infants did not change significantly over the passage of time. This corroborates the findings in tables 1 and 3.

Further it is seen that the mortality among infants differs significantly among slum and non-slum dwellers. It is also found that the mortality force among the infants at different monthly ages of deaths differ significantly. This finding, when judged in the light of interaction between year and ages at deaths being not significant, could enable us to combine the experience of all the years (from 1957 to 1974) to provide the average mortality pattern according to age at death in months as shown in table 5, separately for the slum and non-slum areas.

TABLE 5 : Adjusted infant deaths per 1000 live births by age at death in slum and non-slum areas.

Age at death in month	Adjusted infant deaths per 1000 live births		
	Slum	Non-slum	Combined
—1	34.97	36.17	35.1
—2	8.87	4.94	7.6
—3	5.15	2.96	4.5
—4	4.76	3.46	4.4
—5	4.85	3.74	4.6
—6	4.30	1.60	3.3
—7	5.15	3.65	4 7
—8	3.63	2.04	3.0
—9	2.97	2.24	2.8
—10	3.08	2.33	2.9
—11	2.11	1.20	1.9
—12	3.88	2.59	3.5
	83.72	66.93	78.3

TABLE 6 : Survivorship table of infants born in slum and non-slum areas.

Age	Slum				Non-slum			
	l_x	d_x	1000_{qx}	l_x	l_x	d_x	1000_{qx}	l_x
at birth	16821	158	9.3930	1000	11894	89	7.4828	1000
3 days	16663	128	7.6817	991	11805	96	8.1321	993
6 days	16535	77	4.6568	983	11709	72	6.1491	985
0 month	16458	225	13.6712	978	11637	157	13.4914	979
1 month	16233	150	9.2404	965	11480	62	5.4007	966
2 months	16083	87	5.4094	956	11418	39	4.4530	961
3 months	15996	80	5.0013	951	11379	41	3.6031	957
4 months	15916	81	5.0892	946	11338	47	4.1454	954
5 months	15835	71	4.4837	941	11291	20	1.7713	950
6 months	15764	81	5.1383	937	11271	43	3.8151	948
7 months	15683	56	3.5707	932	11228	26	2.3156	944
8 months	15627	50	3.1996	929	11202	27	2.4103	942
9 months	15577	52	3.3383	926	11175	27	2.4161	940
10 months	15525	36	2.3188	923	11148	15	1.3455	938
11 months	15489	65	4.1965	921	11133	30	2.6947	937
12 months	15424	—	—	217	11103	—	—	934

It is evident from table 5 that the mortality of infants in the first month was highest both slum in and non-slum areas but the portion of death during first month to total infant deaths was higher in non-slum area (54%) than in slum area (42%) but the difference was not significant.

The pooled data of seventeen years was utilized for constructing the survivorship pattern of infants born in the slum and non-slum areas as given table 6.

It is observed from table 6 that mortality rate (qx) was highest among children of both slum and non-slum areas during 1st month of age and registered a decline thereafter except for a sudden upward jump at the 6th and 11th month. Increase in mortality at 6th month and after may possibly be attributed to weaning resulting in malnutrition. This phenomenon is common among the children in the developing country as observed in table 7 when the mortality tends to increase arround 6th and 8th month in countries like U.A.R., Phillippines, South Africa etc. But in the developed countries like Canada, U.S.A., U.K., Australia etc. there is continual decline in mortality after the 1st month without any intermediate increase. The public health implications of this difference is worth noting.

Findings in table 8 corroborate with the findings in table 7 and suggest that the main causes of death from 6th month onwards are the diseases of dysentery and gastroenteritis

TABLE 7 : Age specific mortality rate (qx) in selected developed and developing countries.

Country / Year	Canada 1966	U.S.A. 1966	Sweeden 1966	Australia 1966	Swiss 1965	U.K. 1966	Mexico 1966	Chile 1965	U.A.R. 1964	Guatemala 1966	Philippines 1965	S. Africa 1966
Under 1 day	9.432	8.546	4.039	6.787	8.145	5.679	2.927	11.490	7.520	7.167	9.542	6.318
1—3 days	4.072	4.772	4 061	3.997	8.756	3.250	8.323	9.485	4.300	6.687	6.318	12.289
4—6 days	9.255	8.763	8.418	1.012	.866	7.350	3.198	3.853	3.623	5.441	6.049	3.825
7—27 days	1.774	1,666	1.341	1.404	1.328	1.532	8.910	14.339	12.920	16.318	11.486	13.285
28days—2months	1.669	1.645	.614	.901	.720	1.109	6.262	14.063	9.417	9.624	5.892	10.278
2 months	1.357	1.222	.319	.747	.545	1.057	5.510	14.008	9.609	9.761	3.898	11.976
3 months	1.033	.940	.172	.747	.481	.790	5.510	11.901	10.319	6.534	3.418	13.267
4 months	.760	.697	.262	.597	.435	.549	4.277	8.920	10.181	4.642	2.981	11.565
5 months	.516	.510	.196	.451	.333	.457	3.371	6.850	9.565	4.181	2.946	10.855
6 months	.390	.399	.196	.392	.407	.371	3.721	5.430	12.214	5.103	3.231	9.866
7 months	.379	.323	.098	.255	.379	.310	2.942	4.310	9.626	4.520	3.303	7.901
8 months	.300	.284	.139	.324	.231	.216	3.053	3.384	10.912	5.255	3.897	7.298
9 months	.281	.211	.106	.210	.296	.183	2.737	3,092	8.616	5.056	3.548	6.188
10 months	.248	.214	.106	.210	.185	.182	2.142	2.297	7.948	4.978	3.012	5.634
11 months	.174	.232	.114	.260	.194	.166	1.889	2.114	5 020	4.572	2.940	5.320

TABLE 8 : Percentage Distribution of Infant deaths classified according to cause of death, age at death and locality.

I.C.D.	Cause	SLUM Age at death								NON-SLUM Age at death								
		—1 day	—4 day	—7 day	—1 mth	—3 mth	—6 mth	—1 year	infants	—1 day	—4 day	—7 day	—1 mth	—3 mth	—6 mth	—1 year	infants	2 X
773	Marasmus	—	—	—	12.2	4.3	7.9	3.2	4.7	—	—	—	26.7	8.1	3.9	6.0	8.0	2.27
776	Pre-maturity	69.5	73.9	64.2	22.4	3.7	1.4	1.6	22.9	66.7	61.3	66.0	24.8	4.1	1.3	1.5	25.0	1.29
772	Malnutrition	—	—	—	2.6	13.4	15.8	15.0	9.0	—	—	—	2.0	6.8	19.2	12.8	7.1	5.59*
762	Post Neonatal Asphyxia	25.7	11.4	1.9	1.3	—	—	—	4.2	29.8	27.4	4.3	2.0	—	—	—	6.9	1.64
764	Diarrhoea of Newborn	—	—	7.5	10.9	—	—	—	2.2	—	—	—	5.9	—	—	—	1.1	4.18*
491 493 501 761	Bronchitis and Broncho-pneumonia	—	—	11.3	29.6	36.6	21.6	21.7	20.6	—	—	17.0	24.8	27.0	18.0	21.8	17.4	9.52*
061	Tetanus	—	1.1	1.9	6.4	0.6	—	—	1.4	—	—	2.1	2.0	—	—	...	0.5	3.43
048 571	Dysentery and Gastroenteritis	—	—	—	0.6	26.2	28,8	24.9	15.3	—	—	—	2,0	32.4	33.3	27.8	16.1	1.48
085	Measles	—	—	—	—	0.6	—	4.7	1.5	—	—	—	—	1.4	—	2.3	0.7	2.79
	Other causes	4.8	13.6	13.2	14.0	14.6	24.5	28.9	18.2	3.5	11.3	10.6	9.8	20.2	24.3	27.8	17.2	5.44

and diseases of the respiratory tract infection. This table also suggests that the endogenous causes of death like Prematurity and post-natal asphyxia were equally prevalent in both the areas (slum and non-slum) and proportions did not differ significantly Whereas the proportion o death due to diarrhoeal diseases, pneumonia & bronchopnemonia and malnutrition was significantly higher among the slum children than among non-slum children.

Summary

For the purpose of assessing the level of mortality among infants in the service of the Urban Health Centre, Chetla, two types of rates viz. the conventional infant mortality rate and adjusted infant mortality rate were worked out separately for slum and non-slum areas based on data on infant deaths from 1957 to 1974.

Both these rates found to be insensitive to passage of time in slum as well as non-slum areas. Even the adjustment factor i.e proportions of death of the infants born and died in the same calender year did not appreciably change over the years, both in slum and non-slum areas.

Further analysis of the data showed that the adjusted infant mortality rate differs significantly among slum and non-slum dwellers. The endogenous causes like prematurity, postnatal asphyxia etc. were equally prevalent in both the areas and higher rate in the slum area was principally due to diarrhoeal diseases, pneumonia, bronchopneumonia and malnutrition etc. which may be regarded as the exogenous causes of infant mortality.

Mortality force among the infants at different monthly ages at death differed significantly and the mortality in the first month was highest both in slum and non-slum areas.

The pattern of survivorship of infants at different points of time during infancy revealed 3 peak points of higher mortality i.e. during 1st month, 6th month and 11 month. Increase in mortality at 6th month and after is possibly due to weaning and malnutrition subsequently. This patternt is different in the developing and developed countries of the world. In developed countries like USA, UK, Canada etc. there is continual decline in mortality rate after the first month whereas in the developing countries like U A.R,, South Africa etc. there are ups and down in the mortality rate during the period of infancy.

Acknowledgement

We are thankful to Dr. N. S. Deodhar, Director, All India Institute of Hygiene and Public Health, Calcutta for encouraging us to do this piece of work and kindly allowing us to publish the paper. Our thanks are also due to the field staff who have taken great pains in collecting this valuab e data since the insception of the Urban Health Centre at Chetla.

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII No. 3,
July—September 1979

A LONGITUDINAL STUDY ON PHYSICAL DEVELOPMENT OF THE CHILDREN FROM BIRTH TO ONE YEAR OF AGE IN AN URBAN COMMUNITY

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Introduction

Physical development is one of the most important chapter in child development in its whole life. It differs from one country to other and in different parts of the country. This is particularly so in a country like India where the socio-economic conditions, ethnic groups and food habits vary from place to place.

For detecting any early deviation from normal physical development of a child in a particular community, a standard norm is pre-requisite. Several studies on physical development[1–6,10–13] of the children have been done in different parts of the country. Hence a longitudinal follow up study on physical development of the children from birth to one year of age was undertaken in an urban community in Calcutta.

Material and Methods

The present study was conducted at Chetla Urban Health Centre of All-India Institute of Hygiene and Public Health, Calcutta. All the 220 births that took place in the study area during the months of September, October and November, 1974 were initially selected for the present study. They were then subjected to the following selection criteria within 7 to 10 days of their births through home visits before they were finally included as study subjects :—

1) All full-term normally delivered babies having birth weights above 2.5 kg with no abnormal perinatal history and congenital anomalies were selected for the present study.

2) Babies with family history of heriditary diseases and mental retardation were excluded.

3) Babies who had abnormal conditions in neonatal period of life, icterus and asphyxia were also excluded.

Another cotingent of 10 children was excluded for illness, malnutrition and temporary loss of contact. The total number of infants actually followed was 123. Of them 67 were males and 56 females, 120 (97.6 percent) Hindu and 105 (85.4 percent) Bengali speaking. The literacy status of their mothers

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and occupation of their fathers and economic status of their families, family size and diet habits are given below in percentages :—

1. LITERACY STATUS OF MOTHERS :

Illiterate	23.6
Just literate	8.1
Under matric	50.4
Matric & above	17.9

2. FATHERS' OCCUPATION :

Skilled workers	27.6
Clerical job	26.0
Shop owners	21.9
Unskilled workers	17.9
Businessman	5.8
Unemployed	0.8

3. PERCAPITA MONTHLY INCOME (FAMILY) :

Rs. 20.00 to Rs. 49.00	24.4
Rs. 50.00 to Rs. 99.00	35.8
Rs. 100.00 to Rs. 149.00	24.4
Rs. 150 and above	15.4

4. FAMILY SIZE :

Less than 5	61.0
5 to 9	28.4
More than 9	10.6

5. DIET HABITS :

Non-vegetarian	96.8
Vegetarian	3.2
Consumers of fish or egg (daily)	52.9

Subsequent visits and examinations of the infants were done fortnightly upto the age of 2 months and thereafter at monthly intervals upto the age of one year.

Feeding habits of the children were as follows :—

Upto 3 months of age :

Only breast fed	18.7 percent
Both breast and artificially fed	59.3 ,,
Only artificially fed	22.0 ,,

By 6 months of age : 50.4 percent babies were discontinued breast feeding.

The physical development of the infants were assessed by the following anthropometric measurements :

1. *Weight :*—'Detecto-lever' type of beam balance was used for taking weights both at birth and for subsequent recording after checking it each time before use.

2. *Length (crown-heel) :*—Length was measured on a specially prepared wooden board with a fixed head piece and moveable wedge foot piece, The child was laid on this board fully stretched and the length measured in centimeters beginning from one month of age onward.

3. *Chest and head circumferences :*—The chest and head circumferences were measured by means of a tape at the maximum circumference beginning from one month of age.

All these measurements were taken regularly at monthly intervals till the 12th months (one year) for each child and the increase of weight, length, head and chest circumferences were determined for the 3rd, 6th, 9th and 12th month of age for each child seperately to calculate averages of the respective periods.

Results and Discussions

Weight :

The mean birth weights and on susequent months of the study children have been

TABLE 1 : Showing Range, Mean with standard deviation of weights in Kg from birth to one year of age of the study children.

Age	MALE			FEMALE		
	Range	Mean	S.D	Range	Mean	S.D.
At birth	2.56 to 3.40	2.81	0.20	2.52 to 3.24	2.78	0.24
1st month	3.25 to 4.50	3.70	0.50	3.40 to 4.01	3.45	0.30
3rd month	4.54 to 6.43	5.31	0.42	4 25 to 5.93	5.00	0.34
6th month	5 85 to 8.03	6.67	0.45	5.45 to 7.43	6.45	0.40
9th month	6.65 to 8.96	7.42	0.55	6.30 to 8.01	7.10	0.62
12th month	7.12 to 9.83	8.24	0.60	6.65 to 8.75	7.64	0.48

presented in table 1. It was observed that the mean birth weight for males was 2.81 kg. (SD=0.20) and for females was 2.78 kg (SD=0.21).

The weight increased steadily in both the sexes and at 6th month of their age their mean weight was more than double of their respective mean birth weights, thereafter the weight increase was less marked and at 12th month of their age the mean weights were not tripled of their mean birth weights.

By third month of their age the mean gain in weight (Table-2) was 88.9 percent and 80.0 percent respectively for males and females of their respective birth weights and the gain during this period (0-3 months) was maximum ; the observed gain in weight was minimum during the 6-9 months of age. This pattern of growth has also been observed from the graph (Fig-I A&B) of 50th percentile weight in both the sexes. The 50th percentile weight of the study group was very close to 50th percentile weight of I.C.M.R. Standard[2]

TABLE 2 : Showing average gain in Kg. from birth to one year of age and rate of increase from birth weight.

Sex	Average birth-weight in Kg	Average gain in weight in Kg. and rate of increase				Total increase (birth to 12 month)
		0—3 months	3—6 months	6—9 months	9—12 months	
Male	2.81	2.50	1.36	0.75	0.82	5.43
Rate of increase (in percentage)	—	88.9	48.0	26.6	29.02	192.7
Female	2.72	2.22	1.45	0.44	0.65	4.76
Rate of increase in percentage)	—	80.0	55.0	15.5	23.5	174.0

FIG:-I- GRAPHS SHOWING 50th PERCENTILE OF WEIGHT OF CHILDREN AS COMPARED WITH I.C.M.R.(1968) AND HARVARD STANDARD (NELSON, 1975)

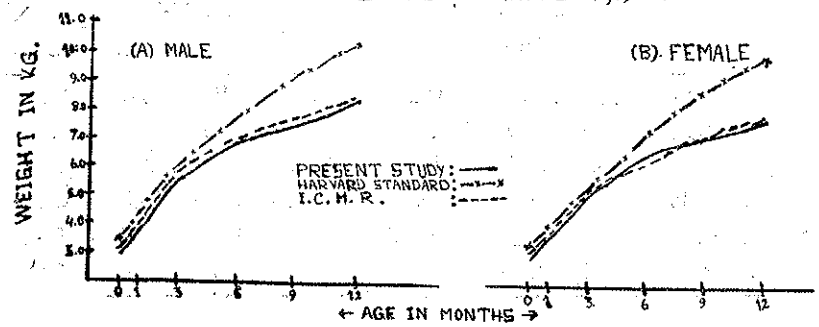
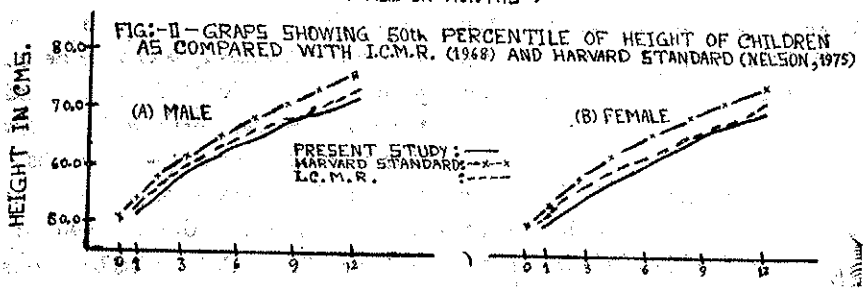


FIG:-II-GRAPS SHOWING 50th PERCENTILE OF HEIGHT OF CHILDREN AS COMPARED WITH I.C.M.R. (1968) AND HARVARD STANDARD (NELSON, 1975)



but much below the 50th percentile i.e. close to 10th percentile weight of Harvard Standard[9].

Higher birth weights in males than in females and difference in gain in weights between two sexes might be due to genetic predisposition and has also been observed by many workers in India[1-3] and in Western countries[7-9].

The steady gain in weight during early months and slower gain in weight during later months of their age were most probably due to the maintenance of adequate nutrition in the early life from mothers' milk (81.3 percent infants were breast fed upto 3rd month of their age) and lack of adequate nutrition during later life (50.4 percent of the children were only artificially fed at 6th month of their age). Similar observations were also made from the studies in low and lower-middle socio-economic group of communities in different parts of the country[1-3, 10-13].

Height (crown-heel length) :

Mean length of the children from one month to 12th month (one year) of age has been presented in Table-3. The mean length at one month for males and females were respectively 52.50 Cm (SD=0.95) and 51.01 (SD=0.45).

During one month to 3rd month of age the increase in length in both the sexes was more steady than during other months of infancy (table-4). The females gained more in length than males during their age period 3 to 6 months whereas the males gained more in length than females

TABLE 3 : Showing Range, Mean with Standard Deviation of lengths in Cm. from one month to one year of age of the study children.

Age	MALE			FEMALE		
	Range	Mean	S.D.	Range	Mean	S.D.
1st month	50.60 to 55.00	52.50	0.95	49.79 to 53.82	51.01	0.45
3rd month	56.15 to 61.15	58.24	1.00	54.63 to 59.46	56.80	0.81
6th month	61.12 to 66.03	63.40	1.10	59.71 to 64.77	62.58	1.61
9th month	64.63 to 70.40	67.49	1.58	63.91 to 69.22	66.54	1.60
12th month	63.20 to 75.00	71.03	1.54	67.67 to 73.59	69.32	1.72

during the age period 9 to 12th months. This difference in gain in length between two sexes might be due to the influence of nutrition as well as genetic predisposition which requires further study, however a similar observation to the present one has been made in a study at Varanasi[11].

TABLE 4 : Showing average increase in length in Cm. from one month to one year of age.

Sex	Length at one month in Cm.	Average increase in length in Cm.				Total increase (1-12 mths)
		1—3 mths	3—6 mths	6—9 mths	9—12 mths	
Male	52. 0	5.74	5.16	4.09	3.54	18.53
Female	51.01	5.79	5.78	3.96	2.48	18.31

The pattern of growth in length of the 50th percentile of the study children has been presented in graph (Fig-II A&B). Unlike weight curve the length curve was not so sharp in the earlier age period indicating more or less uniform gain in height. The 50th percentile height of the study group compared favourably with 50th percentile height of I. C. M. R. Standard[2] and falls below the 50th percentile (between 25th and 10th percentile) of Harvard Standard[9].

Head and chest circumferences :

The mean head circumference of the study children from one month to 12th month (one year) of age has been presented in table-5. The mean head circumference at one month of age in males and in females respectively was 36.02 Cm (SD=0.42) and 36.46 Cm (SD=0.62).

The mean head circumference increased rapidly in both sexes upto the age of 3rd month, less so during 3 to 6 months and thereafter very slowly upto the age of 12 months (table-6). At 12th month the head circumference of males was more than that of females. The slow rate of increase in head circumference was also observed in a study of

TABLE 5 : Showing Range, Mean with Standard Deviation of Head Circumference in Cm from one month to one year of age of the study children.

Age	Male			Female		
	Range	Mean	S.D.	Range	Mean	S.D.
1st month	34.30 to 37.54	36.02	0.42	34.11 to 37.02	39.46	0.62
3rd month	38.62 to 40.85	39.63	0.64	37.14 to 39.82	38.34	0.81
6th month	40.11 to 43.42	41.46	0.90	39.75 o 42.88	40.91	0.81
9th month	42.37 to 45.27	43.18	1.10	41.53 to 43.00	42.25	0.59
12th month	43.15 to 46.01	44.66	0.60	42.17 to 45.65	43.33	0.81

TABLE 6 : Showing average increase in head circumference in Cm from one month to one year of age.

Sex	Head circumference at one month in Cm.	Average increase in head circumference in Cm				Total increase (1-12 mths)
		1—3 mths	3—6 mths	6—9 mths	9—12 mths	
Male	36.02	3.61	1.86	1.72	1.48	8.64
Female	35.46	2.88	2.57	1.34	1.08	7.87

the children belonging to low socio-economic group at Delhi[5].

The mean chest circumferenec of the study children from one month to 12th month of age has been presented in table-7. The mean chest circumference at one month of age in males and in females respectively was 34.80 Cm (SD=0.77) and 33.62 Cm (SD=0.59). These measurements were 1.22 Cm shorter than head circumference in males and 2.84 Cm shorter than head circumference in females.

TABLE 7 : Showing Range, Mean with Standard Deviation of the Chest Circumference in Cm. from one month to one year of age of the study children.

Age	MALE			FEMALE		
	Range	Mean	S.D.	Range	Mean	S.D.
1st month	33.13 to 36 24	34.80	0.77	32.40 to 35.63	33.62	0.59
3rd month	36.93 to 40.73	37.95	1.10	35.10 to 38.99	36.63	1.19
6th month	39.44 to 43.65	40.57	1.27	37.59 to 42.65	39.50	1.49
9th month	40.87 to 44.98	41.00	1.50	40.38 to 43.83	40.92	1.31
12th month	42.29 to 47.06	43.30	1.22	41.43 to 45.76	42.10	1.75

TABLE 8 : Showing average increase in chest circumference in Cm. from one month to one year of age.

Sex	Chest circumference at one month in Cm.	Average increase in chest circumference in Cm.				Total increase (1-12 mths)
		1—3 mths	3—6 mths	6—9 mths	9—12 mths	
Male	34.80	3.15	2.62	1.43	1.30	8.50
Female	33.62	3.01	2.87	1.42	1.18	8.48

The mean chest circumference increased very rapidly upto the age of 3 months and also to less extend during 3 to 6 months but very slowly thereafter (table-8). The chest circumference did not equalise with the head circumference at the age of 12th month (one year). Rapid increase in chest circumference in earlier months and slower rate of its increase in the later months of age are related to the nutritional status of the children during their respective age periods in infancy which was also observed by other workers.[3,6,12-14]

If the nutrition of the children was good the birth weight became tripled and the chest circumference eqalised with the head circumference by one year of age (12th month), thereafter the chest circumference increased more than the head cir-cumference. Udani[13] in a study in the low socio-economic group at Bombay and Dean[14] amongst African children in Kampala observed that head circumference remained higher even upto the age of 2 to 3 years. Ghai and Sandhu[3] in a Delhi study amongst upper scioeconomic group of children observed that the chest circumference was higher than head circumference at 10 to 11 months in boys and at 12 months in girls As the present study conducted in the families belonging to low and lower-middle income group the pattern of growth of the children is similar to that observed by the former group of studies[13,14].

In a community whose socio-economic condition is poor the gain in weight upto the age of 3 to 4 months is maintained if the habit of breast feeding prevails but the nutrition suffers much as he grows, the reason being the nutritional requirements is not met up adequately from the supplementary feeding due to poverty and ignorance of the family concerned.

Therefore to plan a nutrition education programme in a community a study of physical development of the children is prerequisite.

Summary

Physical development of one hundred twenty three healthy new born babies (67 males and 56 females) were studied from birth to one year of age in an urban community in Calcutta. Anthopometric measurements were recorded at birth and thereafter at monthly intervals by home visits.

Mean birth weight of males was 2.81 Kg (SD=0.20) and that of females was 2.78 Kg (SD=0.21). In weight 50th percentile of

the study group was very close to 50th percentile of the I.C.M.R. Standard and little below the 10th percentile of Harvard Standard. In height the 50th percentile of the study group was similar to the 50th percentile of the I.C.M.R. Standard and below the 25th percentile of the Harvard Standard. The birth weights were doubled around 5th month of age but it did not triple at the age of one year. The chest circumference of the study children did not equalise with the head circumference at the age of one year.

Acknowledgemet

Our acknowledgement is due to the Director, All India Institute of Hygiene and Public Health, Calcutta for permitting us to carry out the research work at the Urban Health Centre at Chetla, Calcutta.

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INDIAN JOURNAL OF PUBLIC HEALTH
Vol. XXIII, No. 3,
July — September, 1979

PROPHYLAXIS OF VITAMIN A DEFICIENCY : A COLLABORATIVE FIELD TRIAL

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Introduction

We have earlier reported high prevalence of occular signs of vitamin 'A' deficiency in a rural community of a relatively prosperous State of North India[1]. There was no evidence of any significant protein malnutrition in that population. Dietary survey had revealed deficient intake of vitamin 'A' and adequate consumption of protein[1].

There is no agreed approach to the prophylactic programme for vitamin 'A' undernutrition. Government of India has accepted the recommendation of the National Institute of Nutrition and accordingly, massive dose therapy with 200,000 I.U. every six months of vitamin 'A' palmitate in oil is being given to the preschool children[2]. However, studies from South India suggest that massive oral dose prophylaxis may have to be staggered at more frequent intervals than every six months period[3]. Dr. Macyor from Nutrition Unit of W.H.O. has recommended that more field studies be carried out with massive dose programme to prove its prophylactic value[4]. Present study was carried out in a rural community with a high prevalence of vitamin 'A' deficiency occular signs to compare the clinical effect of 200,000 I.U. biannual oral dose of vitamin 'A' acetate in oil with 100,000 I.U of quarterly dose.

Material and Methods

Population and Allocation of Regimens :

The clinical trial was conducted in three villages of Haryana State, Balwari, Bokha and Basdoda. The total population of these three villages, as listed by a complete population census prior to the start of the trial was 2269 persons. This population was allocated randomly, in equal proportions, to one of the following three treatment regimens :—

i) Vitamin 'A', 100,000 I.U. given orally, quarterly.

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2. Associate Prof. of Biostatistics
3. Associate Prof. of Rural Health
4. Assistant Prof. of Ophthalmology
5. Lecturer, Ophthalamology
6. Lecturer. Human Nutrition Unit
7. „ „ „ „
8. Senior Research Officer
9. Post-graduate student

ii) Vitamin 'A', 200,000 I.U. given orally, biannually with a placebo given at 3 and 9 months after start of trial.

iii) Placebo given orally, quarterly.

Vitamin A dispensed as acetate in oil was used as the placebo. All the samples were distributed as coded specimens and neither the persons receiving them nor distributing them knew the contents. House to house visit was carried out for the administration of the sample. Since the individual person was the unit for random allocation, members of the same family often received different treatment regimens. Eight hours and 24 hours after the administration of the 'sample' toxic symptoms were recorded in an adequate number of persons.

Assessment

At the start of the trial a detailed clinical examination of the population for evidence of vitamin 'A' deficiency occular signs, was undertaken. The heads of households were carefully questioned for evidence of night blindness in the household. Of the 2269 persons enlisted for the trial only 1503 were available for this survey. Of these 1503, 475 had been allocated to Placebo, 510 to vitamin 'A' 100,000 I. U. and 518 to vitamin 'A' 200,000 I U.

At the end of the trial a resurvey of the population, on same lines as the earlier, was undertaken. This survey covered a total of 1363 persons of whom 427 had been allotted at the start of the trial to placebo, 460 to vitamin 'A' 100,000 I.U. quarterly, and the remaining 476 to vitamin 'A' 200,000 I.U. biannually. Of the latter two vitamin 'A' groups, only 208 and 295, respectively, had received all the scheduled doses of the regimen. Of these, 208 and 295 who had received all the scheduled doses of vitamin 'A' only 199 and 283, respectively, had been assessed in both the surveys.

The surveys were carried out by a team of medical personnel in cooperation with senior ophthalmic specialists. Particular care was taken in standardizing the diagnostic techniques used by the team in the survey. It has become apparent from pilot study that night blindness, Bitot's spots and corneal xerosis could be considered as dependable findings while conjuctival wrinkling and pigmentation carried a lot of uncertainty and observer bias. Complete eye examination, including fundus study was done in each case to exclude associated eye diseases which could produce night blindness or Bitot's spots. A special procedure was used to bring Bitot's spots to prominence by application of 'Kajal', a black carbon particle deposit obtained by burning cotton soaked in mustard oil.

Results

Prevalence of occular signs on admission to trial :

The comparison of the individuals allocated to the three regimens, placebo, vitamin 'A' 100,000 I.U. quarterly and vitamin 'A' 200,000 I. U. biannually, with respect to prevalence of night-blindness and Bitot's spots at the start of the trial are presented in Table 1.

The individuals in the Placebo and vitamin 'A' 200,000 I.U. group had closely similar

TABLE 1 : Comparison of prevalence of night blindness and bitot's spots on admission to trial in persons randomly allocated to the prophylactic regimens.

Age (Years) (At start of Trial)	Placebo Group					Vit.A : 100,000 (I.U) Quarterly					Vit.A : 200,000 (IU) Biannually				
	Number in Trial	Night Blindness		Bitot Spots		Number in Trial	Night Blindness		Bitot Spots		Number in Trial	Night Blindness		Bitot Spots	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
1	7	0	(0)	1	(14.1)	5	0	(0)	0	(0)	5	0	(0)	0	(0)
1— 4	64	0	0	7	10.9	69	2	2.9	10	14.5	83	3	3.6	9	10.8
5— 9	102	4	3.9	15	14.7	105	7	6.7	13	12.4	94	5	5.3	17	18.1
10—19	133	12	9.0	18	13.5	128	5	3.9	20	15.6	125	6	4.8	19	15.2
20—29	54	0	0	9	16.7	41	2	4.9	5	12.2	45	1	2.2	4	8.9
30—39	32	1	3.1	3	9.4	56	1	1.8	4	7.1	46	2	4.3	4	8.7
40—49	21	1	(4.8)	1	(4.8)	30	3	10.0	2	6.7	34	4	11.8	4	11.8
50—59	26	0	0	2	7.7	33	1	3 3	5	15.2	41	0	0	8	19.8
60	36	2	5.6	1	2.8	43	2	4.7	8	18.6	45	2	4.4	3	6.7
All ages	475	20	4.2	57	12.0	510	23	5.8	67	13.6	518	23	4.4	68	12.2

Figures in parenthesis indicate percentages based on less than 25 observations.

prevalence figures at the start. The prevalence of night blindness was 4.2% and 4.4% respectively, while that of Bitot's spots was 12.0% and 12.2% respectively. The group allocated vitamin 'A' 100,000 I.U. showed a slightly higher prevalence of both night blindness and Bitot's spots, 5.8% and 13.6% respectively. However, these differences are not unusually large for a random allocation, and therefore, permit a valid contrast of the effect of administration of the two different regimens of vitamin 'A'.

Prevalence of occular signs at the end of trial :

Table 2 and 3 present the prevalence of night blindness and Bitot's spots at the end of the trial, as assessed by the repeat survey, in individuals who had taken all the doses of placebo and vitamin 'A' according to the schedule. 427 persons had received placebo at quarterly intervals, 208 vitamin 'A' 100,000 I.U. at quarterly intervals, and 295, vitamin A at the start and at 6 months and a placebo at 3 and 9 months.

TABLE 2 : Prevalence of night blindness at the end of the clinical trial in the three study groups.

Age (Yrs)	Placebo Group			Vit. A : 100,000 I.U. quarterly			Vit A : 200,000 IU Biannually		
(At start of trial)	Number examed.	Positive No.	%	Number examed	Positive No.	%	Number examed	Positive No.	%
1	9	0	(0)	1	0	(0)	4	0	(0)
1— 4	61	0	0	39	0	0	48	0	0
5— 9	96	6	6.2	46	1	2.2	52	0	0
10—19	103	4	3.9	40	1	2.5	64	0	0
20—29	41	0	0	10	1	(10.0)	25	0	0
30—39	39	1	2.6	25	3	12.0	29	0	0
40—49	24	0	(0)	13	0	(0)	21	1	(4.8)
50—59	25	0	0	15	0	(0)	27	0	0
60	29	1	3.4	19	0	(0)	25	0	0
All ages	427	12	2.8	208	6	2.9	295	1	0.3

TABLE 3 : Prevalence of Bitot's Spots at the end of the clinical trial in the three treatment groups.

Age (Yrs)	Placebo Group			Vit. A 100,00 Quarterly			Vit. A 200,000 Biannually		
(At start of trial)	Number examined	Positive No.	%	Number examined	Positive No.	%	Number examined	Positive No.	%
1	9	0	(0)	1	0	(0)	4	0	(0)
1— 4	61	2	3.3	39	2	5.1	48	1	2.1
5— 9	96	6	6.2	46	3	6.5	52	2	3.8
10—19	103	4	3.9	40	3	7.5	64	3	4.7
20—29	41	5	12,2	10	0	(0)	25	2	8.0
30—39	39	1	2.6	25	1	4.0	29	4	13.8
40—49	24	0	(0)	13	1	7.7	21	1	(4.8)
50—59	25	2	8.0	15	0	(0)	27	1	3.7
60	29	2	10.0	19	0	(0)	25	1	4.0
All ages	427	22	5.2	208	10	4.8	295	15	5.1

The prevalence of night blindness showed a decline in all the three groups at the end of the trial. In the placebo group it declined from 4.2% at the start of the trial to 2.8% at the end of the trial and in the vitamin 'A', 100,000 I.U. quarterly group from 5.8% to 2.9%. However, in the vitamin 'A', 200,000 I.U. biannually group it showed the maximum decline from 4.4% to 0.3%.

In the case of Bitot's spots, though there was a sharp decline in its prevalence at the end of the trial, from 12.0% to 5.2% in the placebo group, 13.6% to 4.8 in 100,000 I.U. and from 12.2% to 5.1% in 200,000 I.U. group, there was no difference in response between the placebo group and the two vitamin 'A groups.

Incidence of occular signs during the trial :

The data was further analysed to see if the three groups showed any significant differences in the fresh occurrence i.e. incidence of night blindness and Bitot's spots during the trial period of 12 months. For this, the results on the persons in the three groups who had been surveyed both at the start and at the completion of the trial were used. The results of the analysis are presented in Table 4 and 5.

TABLE 4 : Comparison of night blindness by regimen in persons included both in the initial and final surveys.

	Placebo			Vit. A : 100,000 I.U. Quarterly			Vit. A : 200,000 I.U. Biannually		
	Final Survey			Final Survey			Final Survey		
Initial Survey	Positive	Negative	Total	Positive	Negative	Total	Positive	Negative	Total
Positive	0	16	16	0	11	11	0	13	13
Negative	5	315	320	4	184	188	1	269	270
Total	5	331	336	4	195	199	1	282	283

TABLE 5 : Comparison of Bitot Spots by regimen in persons included both in the initial and final surveys.

	Placebo			Vit A : 100,000 I.U. Quarterly			Vit. A : 200,000 I.U. Biannually		
	Final Survey			Final Survey			Final Survey		
Initial Survey	Positive	Negative	Total	Positive	Negative	Total	Positive	Negative	Total
Positive	12	32	44	4	25	29	5	26	31
Negative	4	288	292	5	165	170	8	244	252
Total	16	320	336	9	190	199	13	270	283

336 persons in the placebo group, 199 in the vitamin 'A', 100,0000 I.U. given quarterly and 283 in the vitamin A, 200,000 I.U. given biannually were available for this analysis.

Considering night blindness, 320 of the 336 in the placebo group, 188 of the 199 in the vitamin A 100,000 I.U, group and 270 of 283 in the vitamin A 200,000 groups did not have this symptom at the start of the trial. 1.6 per cent in the placebo group, 2.1 per cent in the vitamin A 100,000 I.U. group, and 0.4 percent in the vitamin A 200,000 group developed night blindness during the trial. This strongly suggests that vitamin A 200,000 I.U. given at six monthly intervals is most effective in preventing the occurrence of night blindness.

4 of 292 (1.4%) in the placebo group, 5 of 170 (2.9%) in the vitamin A 100,000 I.U. group and 8 of 252 (3.2%) in the vitamin A 200,000 I.U. group had fresh occurrence of Bitot's spots during the 12 months of the trial. Differences are statistically not significant (Table 5).

Table 6 presents the frequency of side effects in the placebo and the vitamin A group. 3.2 per cent persons in the 200,000 IU biannual dose group, 2.0 percent in 100,000 I.U. quarterly group and 1.2 per cent of the placebo group. Nausea, vomiting and headache were equally seen in all the three groups, giddiness was more frequent in vitamin A group, diarrhoea and pain abdomen were exclusively recorded in the group receiving vitamin A.

TABLE 6 : Frequency of side effects in the placebo and Vitamin A Groups.

	Placebo			Vit. A 100,000 (I.U) Quarterly			Vit. A 200,000 (I.U) Biannually		
Age (Years)	Number inter-viewed	Persons with side effects No.	%	Number inter-viewed	Persons with side effects No.	%	Number inter-viewed	Persons with side effects No.	%
5—14	122	1		100	1		109	4	
15—24	35	0		36	0		45	1	
25—34	27	1		32	1		39	1	
35—44	19	0		27	2		22	0	
45—54	14	1		23	1		24	1	
55—64	15	0		16	0		18	1	
65 or over	10	0		15	0		17	1	
All ages	242	2	1.2	249	5	2.0	274	9	3.2

Discussion

The present study reveals that the prevalence of occular signs of vitamin A deficiency is significantly reduced by biannual administration of 200,000 I.U. or quarterly administraation of 100,000 I.U. of vitamin A acetate in oil. Further there is strong suggestion that biannual dose of 200,000 I.U. of vitamin A is superior to other regimens used in the present study to the decrease of the prevalence rate of night blindness in the population.

A few studies in the literature have suggested the value of biannual oral administration of 200,000 I.U. of vitamin A for the prophylaxis of occular signs in preschool children.[5,6,7] Government of India had introduced "Prophylaxis against blindness in children due to vitamin A deficiency" in Fourth Five Year Plan[2]. Under this scheme children in the age group of 1-5 years are given oral dose of 200,000 I.U. of vitamin A in oil at 6 monthly intervals. The six monthly administration of vitamin A is to continue till the children attain five years of age. Interim reports from two States—Kerala and Mysore are available. In Kerala, 4913 preschool children (1-3 years age group) were examined for occular signs of vitamin A deficiency (signs not specified). Vitamin A, 200,000 I.U. in oil was administered at 6 months interval. 4752 of these children were available for re-examination. The prevalence of occular signs during the base line survey was 6% and 1 year latter, after the two doses had been administered it fell to 1.3%. In Mysore State, of 1285 children, had base line data regarding the prevalence of occular signs of vitamin A deficiency. 600 children, most of whom had received two doses could be re-examined at the end of one year. The prevalence of conjuctival xerosis and Bitot's spots amongst these 600 children fell to 2.4% as against 6.5% found before the programme was initiated. In a similar study carried out in Indonesia, involving 473 preschool children, the incidence of occular manifestation was found to be 25% of the pretreatment prevalence at the end of 6 months following the administration of an oral dose of 200,000 I.U. of retinyl palmitate in emulsion form[7].

Field experience from India and Indonesia seem to support the prophylactic value of biannual administration of 200,0 0 I.U. of vitamin A in oil. Present study was different from earlier field trials in several important respects. People from all age groups instead of only the preschool children were included in the trial as prevalence of occular signs in the population older than 5 years of age was significantly higher and the evaluation of clinical signs in this group was relatively easier than preschool age children. Night blindness and Bitot's spots instead of xerosis and Bitot's spots, were selected as the occular signs for assessment of vitamin A deficiency. Associated systemic and eye diseases which could be responsible for these occular signs were carefully excluded by expert ophthalmologists and physicians involved in this study. Status of protein-nutrition of other studies from India has not been mentioned but from the general pattern of distribution of malnutrition in the country it is expected that about 30% of the preschool children could be suffering from protein-calorie malnutrition. In contrast, the population studied by us had adequate intake of protein and calorie and any significant protein calorie malnutrition was quite uncommon.

Studies from National Institute of Nutrition, India have indicated that massive dose of vitamin A was most effective when given to 1-2 year old group and was least effective when given initially to 4-5 years old children[8]. No explanation for the lack of responsiveness in older children have been given. Olson has suggested that this "may possibly be caused in part by greater resistance of older eye lesions to therapy, reduced dosage of vitamin A per kilogram given to older children and poorer absorption due to more extensive parasitic infestation in older children[9]." The present study however does not show any evidence of lack of responsiveness in older children or adult population. Vitamin A prophlaxis proved equally effective in all age groups.

Two studies from Vellore, South India reported the failure of massive oral dose therapy for prophylaxis of vitamin A deficiency.[3,10] It was observed that a single oral dose of 100,000 ugm of vitamin A in oil could maintain adequate blood levels for 15 weeks and by the end of 25th week 10 of the 14 children had serum value less than 15 ug per 100 ml.[3] In yet another study from same centre it has been shown that 50 000 ug vitamin A in oil failed to offer any clinical or biochemical advantage for children on a moderate carotene diet[10]. 2 of the 12 children showed conjunctival xerosis at 10 weeks and all but 3 serum levels were below 15 ugm/100 ml at 18 weeks. The investigators suggested ; "The effect of repeated massive doses given at short intervals on the maintenance of serum levels of vitamin A deserves study. By staggering the dose toxic symptoms may be avoided and liver stores may be replenished[3]". Clinical effectiveness of 100,000 I.U. of vitamin A in oil given every 3 months for 4 doses was compared to biannual dose of 200,000 I.U. in the present study. Staggering the massive dose to quarterly period failed to offer any advantage over the biannual dose. In fact, there is strong suggestion that biannual dose is more effective in prevention of the prevalence of night blindness compared to quarterly dose. Conclusions of the Vellore study are primarily based on serum vitamin A levels and such dubious occular signs as conjunctival wrinkling and xerosis. In fact none of the subjects in both these studies were reported to have developed Bitot's spots or night blindness. Lack of correlation between the serum levels and occular signs of vitamin A deficiency is well known[11].

Most unexpected finding of the present study is significant decrease of prevalence of occular signs in the group which received peanut oil as placebo. The design of the present study was such that nutrition education, particularly, in relation to vitamin A was given to the whole population by group meetings and face to face contacts. It was realised that unless people were explained all about the project and the benefits of vitamin A administration it may not be possible to get their good cooperation. Further, night blindness in this population was a repeated phenomenon and many people knew how to cure it by local remedial measures. It is possible that placebo group showed decline in the prevalence of occular signs of vitamin A deficiency because they knew how to take advantage of local remedial measures and nutrition education further helped them in this respect. Since educational factor was equally common to all the group it is likely that it also had an important effect in the other groups, receiving biannual and quar-

terly doses of vitamin A. This emphasises the value of control group in such field trials. Commenting on two successful studies of massive dose prophylaxis of vitamin A deficiency carried out at National Institute of Nutrition in India, Pereira and Begum noted, "In both these reports however, no controls were included, so that it is difficult to eliminate the influences of seasonal variation of dietary intake and the results cannot be attributed solely to the ingestion of large doses of vitamin A."

Prevalence study alone fails to unequivocally establish the prophylactic value of massive dose of oral vitamin A administration. Incidence study, further supports the clinical advantage of biannual dose compared to the placebo and quarterly vitamin 'A' dose. During the trial period from amongst the persons who had no night blindness at the beginning of the trial, 1.6 per cent of the placebo group, 2.1 per cent of the quarterly but only 0.4 per cent of the biannual dose group developed this symptom, which strongly suggests that 200,000 I.U. vitamin A given at six monthly interval is effective in preventing the occurrence of fresh cases of night blindness. Similar trend is however not seen in reference to the occurrence of Bitot spots.

W.H.O. has yet not accepted massive, biannual vitamin A administration as a policy for prophylaxis of vitamin A subnutrition. Present study confirms the value of 200,000 I.U. of vitamin 'A' acetate in oil in prophylaxis of prevalence and incidence of vitamin A deficiency in rural community. Since there was no significant evidence of protein malnutrition in the population, the results are more relevant in reference to the direct effect of the administered dose of vitamin A. Nutrition education component seems to have a significant effect on the results of the present study.

We feel that if vitamin A is made available at the subcentres of health delivery structures and appropriate nutrition education is given to the population, most of the persons on their own will like to demand it for prophylaxis of some apparent ocular features such as night blindness. Adequate emphasis on nutrition education and easy availability of vitamin A dose, till local dietary sources are well developed may be considered key factors for mass prophylaxis and treatment of vitamin A subnutrition. Side effects of either 200,000 I.U. or 100,000 I.U. vitamin A intake are insignificant, minor, transient and reported by less than 3 per cent of the population.

Acknowledgements

We are extremely grateful to Prof. V. Ramalingaswami, Director, All India Institute of Medical Sciences. who initiated this collaborative study and actively guided it at different stages. We are grateful to Prof, L.P. Agarwal, Chief Organiser, Dr. Rajendra Prasad Centre for Ophthalmic Sciences, who offered the help and cooperation of expert ophthamologists in evaluation of occular signs. We are also grateful to the Director of Health Services, Haryana, for the facilities provided for this field study. The financial assistance from Messers Roche Products Limited is thankfully acknowledged. Finally, we thank all the interns, who were posted to the field area and helped in conducting the study.

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII No. 3,
July—September 1979

A STUDY OF HEALTH STATUS OF PRIMARY SCHOOL CHILDREN IN HAZRATBAL AREA (KASHMIR)

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It is an accepted fact that the school age is a dynamic period of the physical growth and development : when the children undergo mental, emotional and social changes, the need of health guidance should therefore be maximum during this period. The school age children by and large constitute, what may be regarded as a disciplined population easily accessible for health appraisal and health restoration under an organised health service. An essential pre-requisite for such a programme of services is an authentic information on the existing health and disease status of the school going children, which can serve as a foundation on which the edifice of a comprehensive school health programme can be laid.

The present health survey was thus aimed to obtain the basic data about the health status of the primary school going children in in an area of Kashmir, which holds good for the valley of Kashmir only, situated at a height of about 5,500 ft. above sea level and having a distinct socio-cultural milieu.

Material and Method

The survey covered 845 primary school children attending all the primary schools or primary departments of middle and high schools in and around the Hazratbal area, falling within the field practice area of Hazratbal Centre of Government Medical College, Srinagar.

The children were interviewed and examined according to a predesigned proforn a covering information on the socio-economic status, the environmental background, the state of health and the nutrition of the children.

Anthropometric measurements of height weight and mid-arm circumference were taken as described by jelliffe, 1966. Estimation of haemoglobin was done in the school by the Sahli's acid haematin method.

In each case stool examination was done for ova of ascaris lumbricoides, and the gradation of the worm load was done after Beaver, 1950.

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2. Associate Professor.
3. Associate Professor.
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5. Demonstrator.

Observations and Discussion

Out of the total 845 primary school children examined, 516 were boys and 329 were girls (Table 1). The age ranged from 4 to 14 years. Maximum number of children were between 6 to 11 years of age. The mean age for the boys was 7.9 (± 2.17) years and for the girls was 8.8 (± 2.42) years.

TABLE—1 : Distribution of children according to their age and sex.

Age in years	Boys		Girls		Total	
	No.	Percent	No.	Percent	No.	Percent
Below 4 years	19	3.68	4	1.2	23	2.72
4— 5 years	38	7.36	22	6.69	60	7.10
5 — 6 years	35	6.78	20	6.08	55	6.51
6— 7 ,,	82	15.89	40	12 16	122	14.44
7— 8 ,,	87	16.86	35	10.64	122	14.44
8— 9 ,,	96	18.66	57	17.32	153	18.11
9—10 ,,	58	11.24	40	12.16	98	11.60
10—11 ,,	58	11.24	48	14.59	106	12.54
11—12 ,,	31	6.01	34	10.33	65	7.69
12—13 ,,	11	2.13	16	4.86	27	3.19
13—14 ,,	1	0.19	13	3.95	14	1.66
Total	516	100.00	329	100.00	845	100.00

On the basis of their average monthly income, 17 (2.01 percent) children belonged to social class I (Rs. 800/- and above), 184 (21.78 percent) children to social class II (Rs. 401/- to 800/-), 580 (68.65 percent) children to social class III (Rs 151/- to 400/-) and 64 (7.57 percent) children to social class IV (Rs. 50/- to 150/-).

525 children had provision of piped water supply and only 37 children had sanitary latrines at home.

1. *Anthropometric measurements*

1.1 Height :

The average values of height in boys and girls covered in this study are presented in the Table 2.

The height for age of boys as compared with the corresponding values of Indian children (ICMR 1971), an urban locality Alambagh in Lucknow (Koshi etal 1970), and a rural locality in Lucknow, Sarojini Nagar (Malaviya et al 1969) indicates that the values in the present study exceed the All India averages upto the age of 8 years and thereafter there is little difference. The average values of Alambagh and Sarojini Nagar studies are comparable with the present study, there being negligible difference.

The height for age of girls, as compared

TABLE—2 : Age wise average values of height of Boys and girls in centimters

Age in years	Boys	Girls
4 years	103.40 ±8.43	102.38 ±12.25
5 ,,	111.83 ±9.50	104.34 ± 8.96
6 ,,	113.04 ±9.83	111.68 ± 7.96
7 ,,	116.19 ±9.52	113.93 ± 7.94
8 ,,	119.01 ±8.54	119.70 ± 8.73
9 ,,	122.05 ±8.07	121.82 ± 7.73
10 ,,	129.01 ±8.07	124.65 ± 7.75
11 ,,	129.46 ±6.31	127.88 ± 9.58
12 ,,	138.70 ±5.97	131.28 ±10.64

with the similar values of Indian children (ICMR 1971), Alambagh and Sarojini Nagar also shows similar trend upto the age of 8 years and thereafter lags behind to the average Indian values.

1.2 Weight :

The average values of weight in boys and girls covered in the study are shown in Table 3.

TABLE—3 : Age wise average values of weight of Boys and Girls in Kg.

Age in years	Boys	Girls
4 years	12.83±2.15	12.56±1.94
5 ,,	15.03±3.11	15.18±4.46
6 ,,	17.27±3.46	16.81±3.10
7 ,,	19.01±2 99	13.11±4.96
8 ,,	20.24±3.46	19.71±2.23
9 ,,	21.87±2.98	21.13±3.28
10 ,,	24 12±4.73	22.30±1.78
11 ,,	24.32±2.67	24.21±4.43
12 ,,	27.51±4.48	24.92±6.32

The average weight for age of boys as compared to the ICMR (1971), Koshi et al (1970) and Malaviya et al (1969) shows that the weight in the present study exceeds the All India averages upto the age of 10 years, while the Alambagh values are higher upto the age of 9 years as compared to the present study. The Sarojini Nagar values show little differences with us.

The weight for age in case of girls as compared with other values shows that the values in the present study exceed All India averages upto the age of 9 years and later All India averages exceeding the values in the present study. Again, Alambagh and Sarojini Nagar values being comparable with little difference.

1.3 Mid-arm circumference :

The average values of mid-arm circumference for boys and girls are presented in table 4.

TABLE—4 : Mid-arm circumference in boys and girls in centimeters.

Age in years	Boys	Girls
4 years	15.83±0.88	15.81±1.22
5 ,,	15.79±1.23	15.18±1.21
6 ,,	15.26±1.23	15.41±1.20
7 ,,	15.43± .27	15.70±2.40
8 ,,	15.45±1.20	15.82±1.08
9 ,,	15.96±1.15	16.37±1.21
10 ,,	16.14±1.00	16.24±1.28
11 ,,	16.13±1.20	16.11±1.43
12 ,,	16.55±1.39	16.96±1.65

The mid-arm circumference values of the present study, when compared with the corresponding values of Jellife (1966) and the study of Alambagh it reveals that the trend is similar in both the sexes, while the values of the present study stand at the lowest level, showing very little increase in the muscle mass over the years. The difference with respect to other values increases steadily with the advancing age, the value of W.H.O. remaining consistantly at the higher level. This may suggest the presence of protien gap in the dietery intake of these children under study.

2. *Defects detected*

The sexwise distribution of defects detected (tables 5 and 6) on clinical examination

TABLE—5 : Showing the sexwise distribution of No. of defects present in the children

No. of defects	Boys		Girls		Total	
	No.	Percent	No.	Percent	No.	Percent
Single Def.	187	36.24	74	22.49	216	33.88
Two def.	79	15.31	32	9.72	111	13.13
3 def.	42	8.12	24	7.29	66	7.81
4 def.	15	2.90	3	0.91	18	2.73
5 def.	6	1.16	1	0.30	17	0 83

TABLE—6 : Showing the prevalence of morbidity in primary school going children (boys and girls).

Morbidity	Male		Female		Total	
	No.	Percent	No.	Percent	No.	Percent
Conjunstivitis	—	—	1	0.30	1	0.19
Blepharitis	—	—	1	0.30	1	0.19
Ear Wax	37	7.17	17	5.17	54	6.39
Ear Discharge	22	4.26	12	3.65	34	4.02
Rhinitis	56	10.85	22	6.69	78	9.23
Congested throat	7	1.36	—	—	7	0.83
Enlarged tonsils	57	11.05	40	12.16	97	11.48
Sub-mandibular gland enlargement	43	8.33	26	7.90	69	8.16
Cervical gland enlargement	28	5.43	1	0.30	29	3.43
Dental caries	158	30.62	66	20 06	224	26.51
Ascariasis*	475	92.05	321	97.57	796	94.20

* cases that are positive for ascaris ova

revealed that the defect free children in our study were 44.97 percent, as compared to other studies, whose percentage of defective children were higher. Mukherji et al (1960) reported 32.80 percent childern with defects. Pal 1966) observed 33 percent children with one or more defects. Gill et al (1969) reported 4.3 defects per defective child. In the study of Koshi et al (1970), there were 96.8 percent children with one or more defects. The average number of defects per defective child in our study was 1.8. The commonest defect observed was dental caries (26.51%) being more in boys than girls (30.62% boys and 20.06 percent girls). The high rate of dental caries in our children could be explained by a generally poor orodental hygiene. It is possible that the girls are being cared more than boys by their mothers and the boys are free to move outside to use more edibles. Various figures from other authors are : Pal (1966) observed 48 percent children with dental caries, Malaviya et al (1970) reported 50.77 percent childern, Rao et al (1974) reported 40 percent childern, and Indira Bai et al (1976) reported 10 3. percent children with dental caries among school children. It is interesting to note that we did not find a single case of dental mottling in our children, indicating absence of fluorosis in Kashmir. The figures from other studies are : Gill et al (1969) found mottling in 16.4 percent children, Malaviya et al (1969) reported 20.7 percent mottling and Koshi et al (1970) found dental mottling in 13.7 percent school children. This also corroborates with the fact that no case of fluorosis has been reported from Kashmir so far. 8.16 percent children had submandibular lymphnode enlargement and 3.43 percent children had cervical gland enlargement. Enlargement of tonsils among 11.45 percent children was found in the study. Ray et al (1971) observed 7.95 percent tonsilitis and Dhingra et al (1977) found enlarged tonsils among 5.6 percent children.

3. *Haemoglobin level*

The mean haemoglobin values were lower in girls as compared to boys (12.17 $\pm$0.91 gm% and 11.80$\pm$1.01 gm% for boys and girls respectively). The average haemoglobin value for both the sexes was 12.05$\pm$ 0.96 gm%. Koshi et al (1970) found 11.8 gm. haemoglobin in primry school children and Prakash et al (1973) in a study of primary school children reported mean haemoglobin level of 10.8-12.6 gm percent, being relatively lower in girls.

4. *Personal hygiene*

The overall personal hygiene was unsatisfactory among 454 (53.7 percent) children out of 845 children examined. The percentage of unsatisfactory hygiene was more among boys than girls.

5. *Ascariasis*

The prevalence of ascariasis was almost universal, 94.20 percent (Table 7). All the age groups had infestation. Majority of children had mild to moderate ascaris infestation (33.50 percent mild and 48.64 percent moderate respectively) and 102 (12.10 percent) children had severe infestation (ova count more than 100 per smear of 2 mg stools). Boys and girls were equally affected. However Wani (1970 found 80.7 percent ascaris infestation in Kashmir and Gill et al (1969) in their study

TABLE—7 : Showing the degree of ascaris infestation in different sex groups (standard ova count).

	Degree of infestation								
			Light		Moderate		Heavy		Total
	NIL		Below 20		20—100		above 100		
Sex	No.	Percent	No.	Percent	No.	Percent	No.	Percent	
Boys	41	7.94	178	34.50	242	46.90	55	10.66	516
Girls	8	2.43	105	31.91	169	51.37	47	14.28	329
Total	49	5.80	283	33.50	411	48.64	10	12.10	845

have shown 0.8 percent prevalance. In Bombay hospitals the reported percentage is 10-25 percent (W.H.O. 1964).

Summary

A study of health status of primary school children aged 4-14 years (516 boys and 329 girls) attending all the Primary Schools and Primary departments of Middle and high school, falling within the field practice area of P.H.C. Hazratbal was conducted.

Average height values indicate that the gain in height exceeds All India averages upto 3 years in boys and 9 years in girls, and thereafter it lags behind. In respect of the weight values, the weight is fairly comparable to national averages, in fact showing tendency to lag after 10 years in boys and 9 years in girls. Mid-arm circumference in either sex is much behind the WHO standards.

55.03 percent of the children examined were suffering from one or more defects. Average number of defects per defective child was 1.8. Dental caries was the commonest defect (26.51 percent), next in order was enlarged tonsils (11.48 percent).

Average haemoglobin value was lower among girls as compared to boys.

Personal hygiene was unsatisfactory among 53.7 percent children, being more common among boys.

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3
July—September, 1979

OBSERVATIONS ON ECONOMIC IMPACT OF PARALYTIC POLIOMYELITIS IN CHILDREN

S. N. Basu* and A. L. Saha**

Introduction

Paralytic Poliomyelitis draws more attention than other communicable diseases because it often leads to disability, the effect of which on the nation, on the family and on the individual needs no emphasis. Thus the cost of treatment, cost of long term maintenance and Public Welfare Schemes, loss of projected income in future life have to be taken into consideration. In almost every country, the restoration of the Physically Handicapped to useful life is now accepted on principle. The physical handicap usually adversely affects educational opportunities which consequently may be an important factor for unemployment. Apart from physical and psychological impact of paralysis on the child, the economic and social consequences of paralytic poliomyelitis upon the child and its parents surely deserve a sympathetic approach and deep appreciation of the problem. Childhood itself represents the non-productive phase of life (Winslow, 1951). Sickness and disability will further add to the economic drain and adversely affect his future employment opportunities. In this study an attempt has been made to assess the cost of treatment in one hundred paralytic poliomyelitis patients along with the income and occupation of their parents.

Material and Methods

This study has been carried out at the B. C. Roy Polio Clinic and Hospital for Crippled Children, Calcutta in collaboration with the Department of Epidemiology, All India Institute of Hygiene and Public Health, Calcutta. The B. C. Roy Polio Clinic and Hospital for Crippled Children, Calcutta has been the only hospital of its kind dealing with paralytic poliomyelitis in the Eastern India and patients are usually referred to this hospital by different Institutions and private practitioners.

Only frank paralytic poliomyelitis patients were selected for this study and the diagnosis was based on clinical grounds as history, physical findings, follow up study, muscle power assessment, electrical reactions of muscles and CSF study when deemed necessary.

For studying the economic impact, it was decided as a preliminary step to restrict to one hundred paralytic poliomyelitis patients

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who attended the hospital for a fairly long period (duration of illness and treatment exceeding one year). The initial plan was to select equal number of patients from each of the years, so that the findings could be representative. Accordingly, it was arbitrarily decided to select 5 cases for each of the years from 1954 to 1973. But due to non-availabity of adequate number of patients of the years 1954 and 1958, the distribution could not be maintained uniformly. Many of the old cases of the previous years, either recovered or otherwise discontinued treatment, so that selection of the cases had to be restricted to those who continued attending the hospital in 1973. The parents and the guardians of the patients were initially explained the idea in details and then were asked to furnish an actual account of the cost incurred on their patients. The cost included the cost on medicines (including modern or scientific, homeopathic, indigenous etc.), fees of doctors, cost on extra-diet, transport and appliances. The cost on transport included that for attending hospital and that for attending school provided that the transport was essential on account of disability. The cost incurred on each patient by the hospital authority was subsequently computed. The cases were selected on a random basis to avoid an element of bias.

Observations and Analysis of Data

As stated earlier, this study was based on one hundred paralytic poliomyelitis patients attending the hospital in 1973. The distribution of these patients according to the year of their first attendance to the hospital is shown in Table 1.

TABLE—1 Distribution of one hundred paralytic poliomyelitis patients from whom the economic impact could be studied—according to the first attendance to the hospital.

Year (first attendance)	No. of patients	Year (first attendance)	No. of patients
1954	4	1964	6
1955	4	1965	3
1956	1	1966	4
1957	5	1967	8
1958	2	1968	4
1859	7	1969	7
1960	4	1970	3
1961	9	1971	5
1962	6	1972	6
1963	5	1273	7
Total 100 patients from 1954 to 1973			

The occupation of the parents of the patients studied in this series is presented in Table 2.

TABLE—2 Occupation of the parents of the patients in whom cost of treatment was studied

Occupation of parents.	Number of patients.
Nil	1
Service	59
Business	22
Cultivation	5
Teacher	2
Labourer (skilled)	4
Labourer (unskilled)	3
Professionals (Doctors, Engineers, etc)	4
	Total: 100

It was observed that service or salaried group comprised the largest number in this series.

Table 3 shows the family income per month of the families from which patients were brought to the hospital.

TABLE—3 Number of patients in different family income groups

Family income per month	Number of patients
Nil.	1
Rs. 100 or less	2
,, 101—200	26
,, 201—300	26
,, 301—400	17
,, 401—500	10
,, 501—1000	15
,, 1000 & above	3
	Total : 100

It was seen that family income of 55 per cent of patients was under Rs. 300 per month. The per capita income of the families is presented in table 4.

TABLE—4 Number of patients in different income groups.

Per capita income per month.		Number of patients.
Nil		1
Rs. 1—100		88
,, 1— 10	Nil	
,, 11— 20	3	
,, 21— 30	13	
,, 31— 40	15	
,, 41— 50	23	
,, 51— 60	6	
,, 61— 70	6	
,, 71— 80	9	
,, 81— 90	3	
,, 91—100	10	
,, 101—200		8
,, 201—300		2
,, 301 & above		1
		100

It was observed that 88 patients came from families whose per capita income varied between Rs. 11 to Rs. 100 per month.

The proportion of income spent due to paralytic poliomyelitis was studied and presented in Table 5.

TABLE—5 Percentage distribbution of expenditure due to paralytic poliomyelitis in relation to income

Percentage of income spent	Number of cases/families
0—10	56
11—20	29
21—30	9
31 & above	6
	Total : 100

Except in one case, who came from a family which had no income and was totally dependent on relatives, expenditures incurred on treatment varied between 1 and 82.2 per cent of income. In one case the family sold his landed property to meet the cost of treatment. However, in the majority (84 per cent) the proportion of income spent on treatment varied between 1 and 20 percent Most of the parents/guardians repeatedly expressed their difficulty about the financial burden imposed due to the disease. Some were in debt for providing treatment. Many while submitting the return prayed reimbursement of the cost from the Government or for some form of help.

While computing the money spent by the

hospital authorities, the following facts were taken into consideration :

A)	Salaries of personnel	Rs. 162,848.80
	Diet, bedding, clothing	Rs. 17,302.57
	Medicine, Medical and surgical requisites	Rs. 10,782.35
	Rent, municipal taxes etc.	Rs. 254.04
	Other charges 'Liveries, electricity, office expenses etc.)	Rs. 8,424.73
	Travelling allowance to staff	Rs. 74.16
	Total money spent for running the hospital for the year 1973	Rs. 199,686.65
B)	Number of patients treated in 1973 New and old	26232
	Number of new patients	2617
	Total number of indoor admission	233
	Total patient-days	8791

It was observed that on an average the parents/guardians spent Rs. 503 per patient per year and the hospital authorities had to spend Rs. 576 per patient per yer in the out-patient department. For an indoor patient the hospital authorities had to spend Rs. 10 per patient per diem or Rs. 3650 per patient per year.

It was observed that the hospital authorities spent Rs. 4.20 for a patient in the out-patients department per day. It has been a custom in the hospital to direct the parents/guardians to bring their patients to the hospital about thrice a week. On that basis the yearly cost was calculated (Rs. $4 \times 3 \times 4 \times 12$) as Rs. 576 per year.

Thus the cost per patient in the out-patient department totalled Rs. 1079 or 1080 per year (Rs. 503 + 576) and indoor department Rs. 3650 + Rs. 503 or Rs. 4153 or Rs. 4150 per patient per year.

These costs were computed on actual money spent and yearly change in money values has not been taken into consideration

Discussion

In the recent past, there has been a growing interest in medical economics all over the world. However, the information published in one country is usually not comparable to another as the conditions might be so different (Abel-Smith, 1963). In this study, only the actual money spent on some patients could be considered and the loss of income in future life, which could otherwise be earned if there was no disability, was left out of the purview. Even while reviewing the cost by the hospital authorities, it must be admitted that the standard of hospital care, especially rehabilitaion services, has been far from ideal. Thus the cost of medical care would have gone up if the hospital services were of better quality.

In developing countries like India, where unemployment poses to be a great problem, physically handicapped persons have rather more gloomy future. However, rehabilitation of these physically handicapped persons may have to be accepted as a socio-medical activity. (World Health Organisation, 1973).

The time-honoured axiom, 'Prevention is better than cure', has to be accepted by all. Apart from avoiding personal suffering, it

has been observed to be economical. In the U.S.S.R., it has been calculated that 66 roubles were saved for every rouble spent during the 11-year national poliomyelitis vaccination programme (World Health Organisation, 1973). In Germany, it has been observed that every dentschmark spent for polio vaccination purposes saved 90 dentschmark (Schumacher, 1973). In Bombay, India, the cost per case of paralytic poliomyelitis has been calculated to be about Rs. 450 and the loss by unemployment and disability to be Rs. 4000 a year per patient (Jhala, 1962 as quoted by Gharpure, 1962). In this study, the cost per patient in the out-patient department was approximately Rs. 1080 per year and in the indoor department Rs. 4150 per year. Proper preventive measures would save this exorbitant expenditure on a rather easily preventable disease.

Summary and Conclusion

Approximately Rs. 500 per year per patient on an average have been spent by the parents/guardians, who came mostly from the economically hard pressed section of the people. This was a great burden compared to their income. It has been calculated that the hospital authority had to spend Rs. 576 per year per patient attending the out-patients department and Rs. 3,650 per year per patient admitted to the indoor department. Thus, a total of about Rs. 1,080 was spent per year per patient attending the out-patients department and Rs. 4,150 per year per patient admitted to the indoor department. The cost would be greatly multiplied if the loss by future unemployment and disability is taken into consideration. This great monetary loss can be averted by preventing the disease by polio vaccination as has been done in most countries of the World. In addition, this will save the lives of many children and avoid suffering of innumerable children and their parents.

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INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3,
July — September, 1979

BOOK REVIEW

New WHO Publication

Environmental Health Criteria 8 : Sulfur oxides and suspended particulate matter.

Published under the joint sponsorship of the United Nations Environment Programme and the World Health Organization, Geneva, World Health Organisation, 1978 (ISBN 92 4 154068 0). 108 pages. Price : Sw. fr. 10. French edition in preparation.

The publication, the eighth in the series on Environmental Health Criteria, reviews and evaluates available information on the biological effects of sulfur oxides and suspended particulate matter, including suspended sulfates and sulfuric acid aerosols, and provides a scientific basis for decisions aimed at the protection of human health from the adverse consequences of exposure to these substances.

On a global scale, the emissions of sulfur compounds into the atmosphere from natural sources are about equal to those from man-made sources. The former occur from volcanoes, forest fires, soil marshes and tidal flats, and the latter principally from coal burning and to a lesser extent, from such sources as the combustion of petroleum products, petroleum refining and nonferrous smelting. Domestic and motor vehicle sources have a disproportionate effect on concentrations in the immediate vicinity because the pollution is emitted close to ground level.

In this book, attention has been concentrated on the effects of inhalation, the most important route of exposure and consideration has been limited to sulfur dioxide, sulfur trioxide, sulfate ions, and particulate matter primarily resulting from the combustion of fossil fuels.

The vast literature on these pollutants has been carefully evaluated and selected according to its validity and relevance for assessing human exposure, for understanding the mechanisms of the biological actions of pollutants and for establishing environmental health criteria, providing over 300 references.

Following a summary of the major issues and recommendations for further studies, the book reviews the chemical properties of the substances and the analytical methods involved ; their sources in nature and elsewhere ; their dispersion, environmental transformation, concentration and exposure ; and their metabolism. The effects of sulfur oxides and suspended particulate matter are considered in both animals and man and the work concludes with an evaluation of the health risks to man from exposure to these substances.

The volume takes into consideration the views expressed by national institutions collaborating with the WHO Environmental Health Criteria Programme and the comments obtained from the Food and Agriculture Organization of the United Nations Industrial Development Organization, the World Meteorological Organization, the International Atomic Energy Agency, the Commission of European Communities, and some nongovernmental and Industrial organizations.

The publication will be of interest to departments of the environment and of health protection, to national regulatory agencies, occupational and public health workers and to plant engineers involved in energy production and other technological processes in which these pollutants may be involved.

Addendum

Family Welfare, History, Method and Practice

by Dr. Ranjit Dutta

Published by and available at—Mrs. Arati Dutta

BE 31, Salt Lake City, Calcutta, 700 064

175, pages, date of publication 2.10.1977

Price—Rs. 20/-

(A review of the above book has already been published in Volume 23, No. 1, January—March, 1979 issue of this Journal).

INDIAN JOURNAL OF
PUBLIC HEALTH
Vol. XXIII, No. 3,
July—September 1979

NOTES & NEWS

Unique O-T-C sleep aid to be marketed by pfizer division

A new non-prescription sleep aid, recently cleared for marketing by the U.S. Food&Drug Administration, will be made available within the next few weeks by Pfizer Inc., New York, the company announced on June 29, 1979.

The active compound, doxylamine succinate, differs chemically from all such products previously available. The product, effective in single-tablet dose, will be marketed as Unisom. It is only over-the-counter sleep aid which has a New Drug Application approved by the FDA.

Clinical studies with doxylamine, begun in May, 1976, showed the compound to be highly effective, Pfizer said. Controlled double-blind studies, analyzed statistically demonstrated that patients were asleep in significantly less time after being given doxylamine than after receiving an identical-looking placebo tablet.

Pfizer's New Drug Application to the U.S. F.D.A. was submitted on August 12, 1977, and was approved as an original application pioneering the use of doxylamine as a night-time sleep aid.

ASSOCIATION'S NEWS

It is a great pleasure to inform our members and readers that the Indian Public Health Association has been selected to host the 3rd International Congress of the World Federation of Public Health Associations, Geneva. This selection has come through a secrete ballot election where India got the highest number of votes.

It is most likely that the International Congress will be held in February/March, 1981 at Calcutta. Incidentally, 1981 also happens to be the SilverJubilee Year of the Indian Public Health Association. Active cooporation and help from all members of the Assoc ation are solicited.

P. N. Khanna
General Secretary

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Age	Vaccination	
Pre-natal		
16—20 weeks	Tetanus toxoid	1st dose
20—24 weeks	Tetanus toxoid	2nd dose
36—38 weeks	Tetanus toxoid	3rd dose
Children		
3—9 months	Smallpox Vaccine BCG Vaccine Diphtheria-pertusis-tetanus (Triple vaccine)—3 doses at an interval of 1—2 months ; Polio (Trivalent oral vaccine)—3 doses at an interval of 1—2 months.	
9—12 months	Measles vaccine—one dose	
18—24 months	Diphtheria-pertussis tetanus (Triple vaccine)—booster dose. Polio (Trivalent oral vaccine)– booster dose.	
5—6 years (school entry)	Diphtheria-tetanus (Bivalent vaccine)—booster dose Typhoid (Monovalent or Bivalent vaccine)—one dose. After an interval of 1—2 months the typhoid vaccine—one dose	
10 years	Tetanus toxoid—booster dose. Typhoid (monovalent or bivalent vaccine)—booster dose	
16 years	Tetanus toxoid—booster dose Typhoid (monovalent or bivalent vaccine)—booster dose.	

Pre-natal : When mothers are registered late in pregnancy, at least two doses of tetanus toxoid should be given. For a mother who has been immunized one booster dose of tetanus toxoid should be given in subsequent pregnancies preferably four weeks before the expected date of delivery.

Children : Ages indicated are considered to be the best times. However, if there is any delay in starting the first dose of triple vaccine the ages may be adjusted accordingly. It should be the aim to ensure that a child receives smallpox, BCG, DPT and polio vaccination, where available before it reaches one year of age. The different vaccines indicated against the various age groups can be given simultaneously ; for example, BCG, triple vaccine and polio vaccine ; smallpox, triple vaccine and polio, etc.

When typhoid vaccine is being given for the first time two doses at an interval of 1—2 months require to be given.

Published by Prof. A. K. Chakraborty, the Managing Editor of Indian Journal of Public Health, the official organ of the Indian Public Health Association, 110, Chittaranjan Avenue Calcutta -73 and printed at Suroopa Trading, 9/8, K. C. Ghosh Rd., Calcutta-50.

Registered with the Registrar of the Newspapers in India under 8502/57

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