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Future Health Systems
Innovations for equity

FHS India Research Brief
October 2013
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How healthy are the children of the Indian Sundarbans?

Findings from the first Sundarbans Health Watch

Over one third of children between 0-5 years of age are chronically malnourished in the Patharpratima block of the Indian Sundarbans.

UKaid
from the British people

IIHMR JAIPUR

The health situation of children in the Indian Sundarbans couldn't be more precarious. Facing chronic malnutrition as well as a high prevalence of easily preventable but highly communicable diseases, access for children to health services in the region is complicated by the rough terrain and the winding tidal rivers of the deltaic region. Increasingly frequent climatic shocks, such as flooding and cyclones, threaten to tip the balance and create an even more difficult health situation for all – but especially children – in the Sundarbans.

The key question is, what can be done to improve the health situation of children in the Sundarbans, a region with a population of roughly 4.5 million people? To tackle this, FHS designed a series of studies into a representative block in the Sundarbans – Patharpratima – to get a better picture of the health problems being faced, the current state of the health system, and how people access and make decisions about accessing those services.

This briefing starts by outlining the several methodologies employed in the study. It then considers both the demand and supply sides for child-centred health services in the block. It concludes with recommendations for beginning to repair the fractured health system there.

Future Health Systems is a research consortium working to improve access, affordability and quality of health services for the poor. We are a partnership of leading research institutes from across the globe working in a variety of contexts: in low-income countries (Bangladesh, Uganda), middle-income countries (China, India) and fragile states (Afghanistan) to build resilient health systems for the future.

Table 1: Nutritional status of children (0-5 years) (N = 1332)

		Percentage of undernourished children					
		Stunted		Wasted		Underweight	
		< -2 SD	< - 3 SD	< -2 SD	< - 3 SD	< -2 SD	< - 3 SD
Total		35.2	11.7	25.2	8.6	38.6	12
Sex	Male	35.5	12.9	25.2	8.3	37.6	11.6
	Female	35	10.5	25.3	8.9	39.6	12.5
Location	Deltaic	32.9	11	23.9	7.6	37.5	10.7
	Non-deltaic	38.5	12.8	27.2	10	40.2	13.9
Age	0-12 months	18.3	4.9	21.7	6.5	18.9	5.9
	13-24 months	41.3	15.1	17	8.5	33.2	8.9
	25-36 months	45.8	13.5	27.3	10.4	48.9	16.1
	37-60 months	37.6	13.5	30.9	9	49	15.5
Self-perceived poverty*	Poor	43.8	16.4	25	5.8	44.2	14.4
	Less poor	33.6	10.9	25.3	9.8	37.5	11.6

* *Poor: those who reported to have no full square meal every day or any day during the last seven days, Less poor: those who reported to have a full square meal every day during the last seven days*

Methodology

Four parallel surveys were conducted in 30 randomly selected villages in the Patharpratima block of South 24 Parganas district in spring 2012. Of the roughly 331,000 in the block, around 12% are children aged 0-5. The block was selected because it reflects a mix of deltaic and non-deltaic habitations as well as a mix of ethnicities – with scheduled castes, scheduled tribes, and religious minorities comprising almost 40% of the population. It is also one of six blocks of 19 in the Indian Sundarbans identified as most vulnerable to climatic shocks (IIHMR, 2010).

Surveys conducted include: A household survey covering about 1200 households selected through a two-stage stratified sampling; An exit interview of 253 outpatients in selected government facilities and Rural Medical Practitioner (RMP) clinics; In-depth interviews with selected RMPs; and In-depth interviews with facility-in-charge of government health and nutrition care facilities. The studies were supplemented with: a mapping of formal and informal health care providers; a rapid ethnographic study in two villages; and several case studies on RMPs and their clients.

The demand side: Health status of Sundarbans' children

The study collected basic health information of 1503 children six years old and under from across the block. Families in the deltaic regions faced significantly higher economic and climatic difficulties. A large majority (80%) of households in the block lived in rudimentary earth and thatch houses (*kuccha*), which provide little protection against climatic shocks. Many of the families surveyed were farmers (64%), while a small number (5%) collected items from the forest.

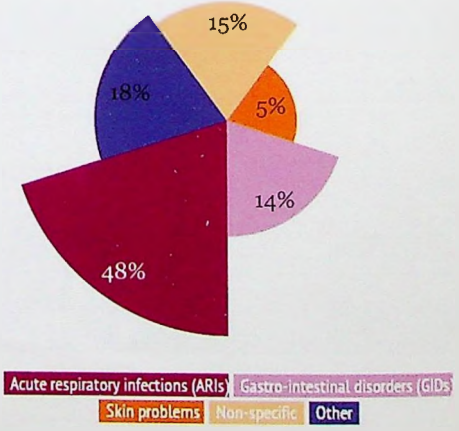
There were two areas of disease burden for the children of the Sundarbans: under-nutrition, and acute communicable diseases.

Nutrition

Over one third of children between 0-5 years of age are chronically malnourished (i.e. stunted or wasted), with that rate nearly doubling for girls between the ages of 1-3 years old (Table 1). Rates of acute under-nutrition (i.e. low weight for age) are similar, with 39% of children between 0-5 years old underweight.

Children in the 1-3-years-old age range are suffering most, with nearly half of those stunted, as compared to 18% of children under 1 year old. Surprisingly, rates of under-nutrition are lower in the deltaic regions – perhaps because they have been more supported by non-governmental organisations (NGOs). The weight of the mother was a strong predictor of child under-nutrition, which is worrying given that mothers with a body-mass index (BMI) below 18.5 comprised a little over a third of sampled households.

Figure 1: Distribution of cases of under-five moribity based on reported symptoms (N= 1030)



Disease prevalence and incidence

The vicious cycle of under-nutrition and morbidity, especially for children, is well established. And this block of the Sundarbans is no different. About two-thirds of the children sampled had suffered from at least one ailment in the last thirty days.

The most common diseases reported for children by their mothers (see Figure 1) were acute respiratory infections (ARIs) and gastro-intestinal disorders (GIDs). This is consistent with confirmed diagnoses of hospitalisations of children during the same period.

This represents a worse situation than the rest of the district (which sits outside of the Sundarbans) and the state of West Bengal. The proportion of children in the block who had at least one fever during the two weeks prior to the survey was almost ten percentage points higher than the state or the district averages (DLHS-3). The incidence of diarrhoea was also considerably higher in the block compared to the state average from DLHS-3, even though the survey was carried out in a relatively low-prevalence season (April- May).

There was also significant reporting of cases of skin diseases and rashes (5%). This may be related to the increasing salinity of the tidal streams, as reported in the Bangladeshi Sundarbans (CCC, 2009).

The supply side: Health services in the Sundarbans

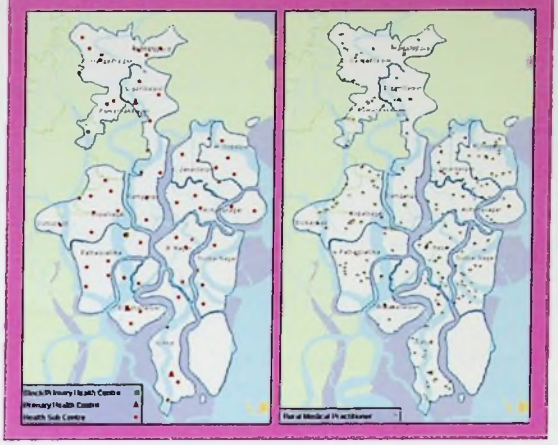
This section details the availability of health services in the Patharpratima in both the public and non-state sectors. Figure 2 shows their geographic distribution. Most services are sought from and provided by the non-state sector in the block. A lack of infrastructure is a major reason for this. Those living in the deltaic regions of the block would need to walk, take boats and buses to reach the nearest public facilities, a journey that can be prohibitively expensive.

Public sector services

The public health care system in the block delivers preventive and curative services at multiple levels and through outreach workers such as Auxiliary Nurse and Midwives (ANM), Accredited Social Health Activists (ASHA), and Anganwadi Workers (AWW). Facilities range from sub-centres (SCs), to primary health centres (PHCs), and block-level primary health centres (BPHC).

The SCs in the block are the only facility type adequate in number, based on the Indian Public Health Standard (IPHS). The shortage of frontline workers (ANM, AWW, ASHA) is also obvious (Figure 3) – about 28% of the required staff were not available at the time of the survey. The Indrapur PHC, located in the southernmost deltaic *gram panchayat* of the block, was running without a doctor at the time of the survey.

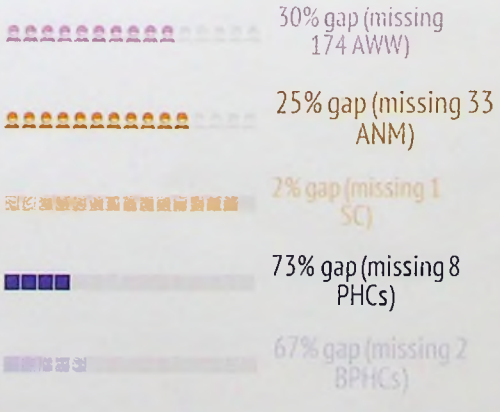
Figure 2: Mapping of health services in Patharpratima



Beyond staffing, the quality of care in the facilities was highly dependent on infrastructure (e.g. consistent electricity supply and number of beds). The BPHC in Madhavnagar is the apex health care unit in the block. Serving 331,000 across 17 islands, it is chronically over-subscribed, forcing a substantial portion of sick children to travel out of the block for treatment.

Overall, the survey indicated that, while preventative measures were mostly sufficient, curative services for children were lacking.

Figure 3: Availability of health workforce and facilities in Patharpratima block (actual compared to IPH Standards)



Parallel services

With the gap in public services, a number of parallel services have sprung up in the block, comprised of both informally trained rural medical practitioners (RMPs) and NGOs.

Rural Medical Practitioners (RMPs)

The mapping found 376 RMPs in the block, about one for every 900 people – many more than the one trained doctor. This helps explain why RMPs were the first port of call for child health services for over 85% of people in the block.

RMPs don't tend to have formal training, but over 60% indicated some past experience working with qualified professionals. This has led to questions on quality of care given by these providers. The survey found that, for example, 35% of the child patients were given medicines with no physical examination (compared to 13-16% in of public facilities). Previous studies have indicated good knowledge by RMPs of modern medicines and their purposes, but their ability to properly diagnose and the incentives to rationally prescribe these drugs is lacking. They often over-prescribe antibiotics and steroids, which can provide short-term relief but not a long-term cure.

Non-government Organisations (NGOs)

There are many NGOs operating in the Sundarbans, but few work exclusively on health. NGO initiatives can be broadly classified as: (1) Public-Private Partnerships (PPP), based on a contractual agreement between the state government and select NGOs, and (2) donor-assisted initiatives, where an NGO implements a specific project. Two important examples in the first category include: (a) mobile health clinics (MHC), and (b) community-based delivery centres (CDC). For the latter, a good example is Terre des Hommes' Special Nutrition Units (SNU). Across both categories, the uptake of NGO services is far below the estimated need.

Priority issues to address in the Sundarbans health system

1. **Malnutrition and curative care:** While coverage of antenatal care and immunisation are comparatively strong in the Sundarbans, there is an urgent need to address malnutrition and curative care for common ARIs and GIDs for children. This is particularly true for children aged between 1-3 years olds to support them through the critical first 1000 days.
2. **Infrastructure gaps:** Within the public health system, infrastructure does not currently meet Indian Public Health Standards. Where facilities do exist, they do not have consistent electricity access, which is particularly problematic for cold storage of medicines and vaccines. Outside of the health system, access to care is challenging owing to a lack of transportation infrastructure. Projects, such as private-public partnerships, that address these gaps should be prioritised.
3. **Disaster risk management and climate change adaptation:** The Sundarbans is particularly vulnerable to climatic shocks like flooding and cyclones. More projects that work to build resilience in the health system to these changes are required. Existing projects, such as one installing flood-resistant toilets that stop the spread of disease, are strong starting points. These projects should make use of local innovative knowledge and include strong community participation.
4. **Integrate parallel health sector:** Integrating parallel services into the health system, either directly (e.g. through formal referral mechanisms) or indirectly (e.g. through involving parallel service providers in decision-making processes) is critical – as are projects that improve the quality of care given by informal providers (e.g. through training and franchising).

1. Climate Change Cell (2009) *Climate change and health impacts in Bangladesh*. Dhaka, Bangladesh: Climate Change Cell, Department of Environment, MoEF. Retrieved from: http://bit.ly/13jYtJM
2. IIPS (2010). *District-Level Household and Facility Survey (DLHS-3), 2007-08: India*. Mumbai, India: IIPS.
3. IIHMR (2010) *Health care in the Sundarbans (India): Challenges and plan for a better future*. Kolkata, India: Future Health Systems. Retrieved from: http://bit.ly/FHSind
4. IIHMR (2012) How Healthy are the Children of the Indian Sundarbans? Sundarbans Health Watch, Series 1. Kolkata, India: Future Health Systems. Retrieved from: http://bit.ly/16ri3Ra

This briefing was prepared by Barun Kanjilal, Jeff Knezovich and Shibaji Bose and is based on research from the *The Sundarbans Health Watch Report, Series: 1*, which was compiled by the the entire FHS India team.

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Future Health Systems
E: fhs@jhsph.edu
T: @futurehealthsys
W: www.futurehealthsystems.org

Legislative, Administrative Measures taken by Government for Children

Legislative Measures :
(inclusive of measures undertaken by State Governments)

1. The Andhra Pradesh Primary Education Act, 1961.
2. The Assam Elementary Education Act, 1962.
3. The Assam Students and Juvenile Smoking Act, 1923.
4. The Apprentices Act, 1961.
5. The Beedi and Cigar Workers (Conditions of Employment) Act, 1966.
6. The Bengal Juvenile Smoking Act, 1919.
7. The Constitution of India.
8. The Children (Pledging of Labour) Act, 1933.
9. The Child Labour (Prohibition and Regulation) Act, 1986.
10. The Code of Criminal Procedure, 1973.
11. The Citizenship Act, 1955.
12. The Delhi Primary Education Act, 1960.
13. The Employment of Children Act, 1938.
14. The Factories Act, 1948.
15. The Hindu Marriage Act, 1955.
16. The Hindu Adoptions and Maintenance Act, 1956.
17. The Hindu Minority and Guardianship Act, 1956.
18. The Himachal Pradesh Compulsory Education Act, 1961.
19. The Indian Majority Act, 1875.
20. The Indian Penal Code, 1860.
21. The Infant Milk Substitutes Feeding Bottles and Infant Foods Act, 1992.
22. The Immoral Traffic (Prevention) Act, 1956.
23. The Juvenile Justice Act, 1986.
24. The J and K Juvenile Smoking Act, 1986.
25. The Karnataka Compulsory Primary Education Act, 1961.
26. The Karnataka Prevention of Juvenile Smoking Act, 1911.
27. The Mines Act, 1952.
28. The Merchant Shipping Act, 1958.
29. The Motor Transport Workers Act, 1981.
30. The Maharashtra Vaccination Act, 1964.
31. The Maharashtra Regulation of Use of Pre-natal Diagnostic Techniques Act, 1990.
32. The Madhya Pradesh Vaccination Act, 1968.
33. The Madhya Pradesh Primary Education Act, 1961.
34. The Marriage Law (Amendment) Act, 1981.
35. The Plantations Labour Act, 1951.
36. The Punjab Primary Education Act, 1960.
37. The Punjab Vaccination Act, 1953.
38. The Probation of Offenders Act, 1958.
39. The Rajasthan Primary Education Act, 1964.
40. The Rajasthan Prevention of Juvenile Smoking Act, 1950.
41. The Rajasthan Vaccination Act, 1957.
42. The Registration of Births and Deaths Act, 1969.
43. The Special Marriage Act, 1956.

Administrative Measures :

1. Balwadi Nutrition Programme.
2. Early Childhood Education Programme.
3. Creches and Day Care Centres Service Programme.
4. Integrated Child Development Service.
5. Integrated Education for Disabled Children Programme.
6. Special Nutrition Programme.
7. Wheat Based Nutrition Programme.
8. Non Formal Education exclusively for Girls.
9. Child Survival and Safe Motherhood.
10. Universal Immunisation Programme.
11. National Policy Resolution for Children, 1974.
12. National Plan of Action for Children.
13. National Plan of Action for Girl Child 1991-2000 AD

Management of Infantile Colic

Persistent crying is common in babies in the early months of life[1] and parents usually worry. Almost one-third of normal infants are said to cry for more than three hours a day in their first three months. In most no underlying cause is evident and their discomfort is attributed to colic ('infantile colic', 'evening colic' or '3 month colic') in which the baby has paroxysmal episodes of inconsolable crying associated with drawing up the legs, sometimes with abdominal distension and passing wind.

CAUSES

It is generally assumed that the symptoms originate in the gut but their cause remains a mystery[2].

Disturbance of digestion : Babies with colic seem to produce excessive flatus and may produce abnormal amounts of colonic gas. In one study of 122 healthy newborn infants given a feed of lactose containing human or formula milk[3], those with colic produced more hydrogen in their breath than those without, suggesting that colonic carbohydrate fermentation differed in colicky children. However, a second study found no difference in breath hydrogen levels between colicky and non-colicky infants[4].

If lactose fermentation does contribute then colic might improve if the child's diet were made lactose-free by giving either soya based, or casein hydrolysate, milk. A double-blind cross-over trial compared the effect of a soya formula for a week with a standard formula milk. In 11 of 19 infants with colic, symptoms were less on soya milk and then relapsed when challenged with a standard cow's milk formula[5]. In a second controlled trial babies were fed casein hydrolysate for four days, alternating with cow's milk. Children improved on the first change to casein hydrolysate, but the effect of changing formula diminished with time and the groups no longer differed by the third change of formula. The effect was difficult to reproduce and marked day-to-day variations occurred independently of the type of formula used[6]. A third study compared soya milk with hydrolysed casein in 60 infants with infantile colic. Thirty-two of the children who had been identified as having symptoms unchanged or worse on soya milk were improved on hydrolysed casein. Eleven of these children reacted to cow's milk at 6 months of age with symptoms including diarrhoea, vomiting and rashes as well as colic[7].

Intestinal spasm : is another suggested cause for colic. A prospective study from Sweden found that infants who latter developed colic were likely to have higher levels of motilin (a prokinetic gut hormone) than the controls in cord blood and in later blood samples, but the results overlapped[8].

Psychological factors : Distressed infants almost inevitably heighten parental anxiety and although family tension may exacerbate the problem, it seems an unlikely primary cause of colic[12].

MANAGEMENT

Infantile colic is a transient self-limiting condition in an otherwise healthy and thriving child. Parents seeking help to relieve the child's obvious distress are often given a bewildering array of advice[9].

Parental support : Once colic has been diagnosed, it is important to reassure the family that the baby is normal, that the condition is common and that it gradually resolves. Some babies appear to benefit by being carried around[10], others by being put in their cots. Regular contact, support and reassurance may be all that is necessary.

Dietary manipulation : For bottle-fed infants it is tempting to change the baby's milk to a lactose-free form [5,6]. For breast fed children the mother could try a diet without cow's milk[11]. These changes are only worth trying where the child is particularly fretful. When they are effective substantial improvement occurs within a week. If the child is helped it is important to tell the parents that the child's symptoms were not due to an 'allergy' and that this improvement does not presage a lifelong milk 'allergy' problem[12].

Drug treatment : Various mixtures are sold to the public ('gripe mixtures', 'colic drops' etc.) These mixtures contain sodium bicarbonate with other ingredients such as dill oil, caraway oil and tincture of ginger; they no longer contain alcohol. Two over-the-counter preparations. Dentinox colic drops (DDD Ltd.) and Infacol (Pharmax), contain activated dimethicone (simethicone), Infacol is the only prescribable drug specifically licensed for infantile colic.

Activated dimethicone is non-toxic and not absorbed. It is said to act by altering the surface tension of mucus so allowing entrapped gas bubbles to coalesce and be more easily released by mouth or anus. Dimethicone can relieve symptoms of indigestion in adults[13].

A British study compared dimethicone 20 mg four times a day with placebo in 26 infants. Eleven of these infants with troublesome night crying received a double dose (40 mg) in the evening. Each treatment was given for a week in random order and the parents kept diary cards. By the fourth day in the dimethicone group the episodes of crying were fewer and less severe[14]. A Swedish study compared the effects of activated dimethicone with a matching placebo in 27 infants in a double-blind cross-over study, for a week, with a five day 'wash out' period. The babies were given dimethicone 28 mg before each feed. The parents kept 24-hour records of behaviour and were interviewed at home with periods of observation on two occasions. Two-thirds of the infants improved during the treatment period in both the dimethicone and placebo groups[15].

CONCLUSION

Infantile colic is a common, transient, self-limiting problem which distresses babies and worries parents. Reassurance of the parents may suffice, but should be coupled with advice on careful attention to the child's preferred posture. If these fail it may be worth trying a diet without cow's milk for the breast feeding mother or a lactose-free milk feed for the bottle fed child. Perhaps a short course of activated dimethicone might also be tried.

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[*In our country activated dimethicone is available as* DIMOL SUSPENSION (*Wallace*) *containing 200 mg of the drug/5 ml — DDD*]

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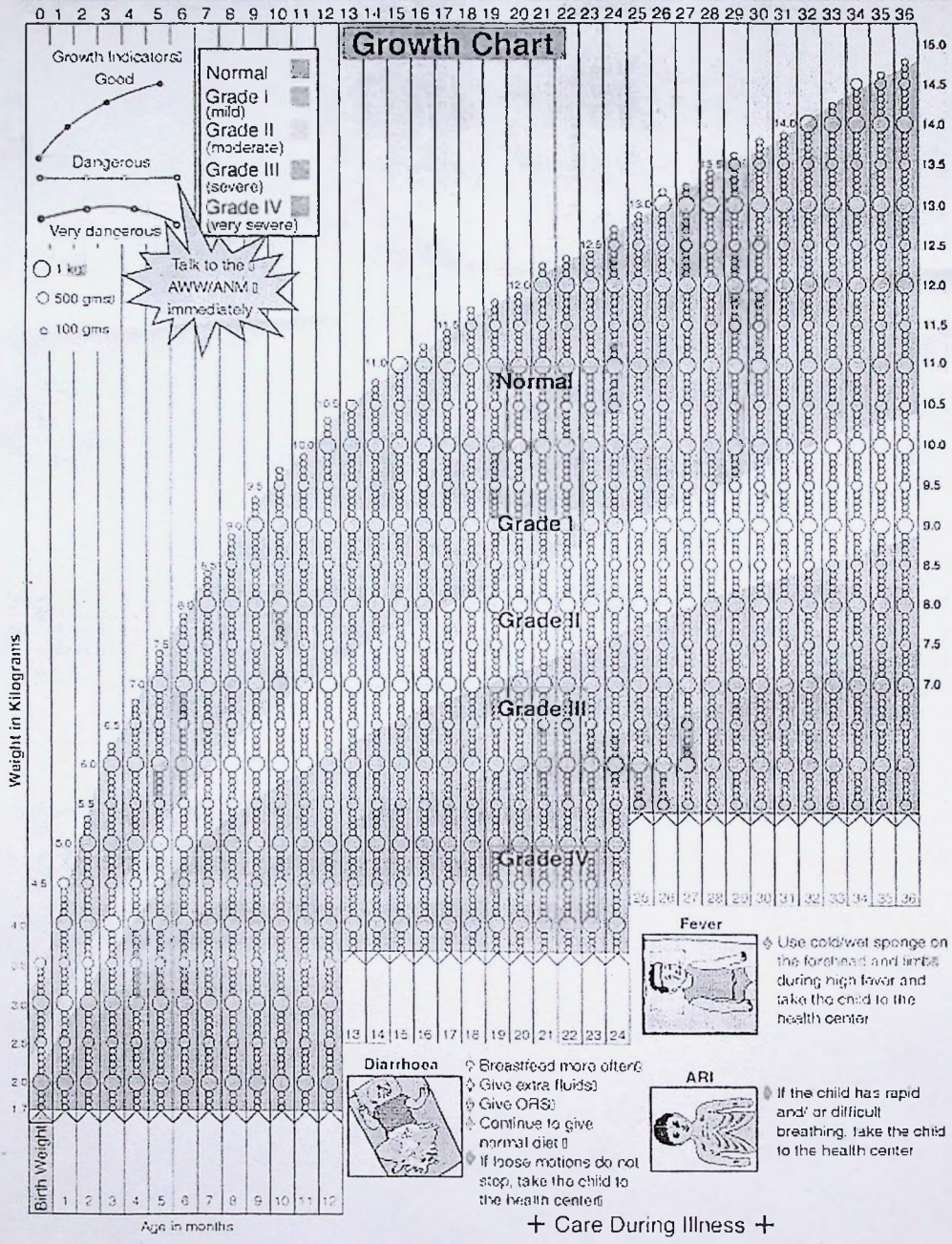

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170, ಗಾಯತ್ರಿಪುರಂ, 2 ನೇ ಹಂತ, ಮೈಸೂರು-11

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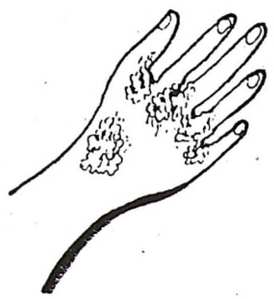
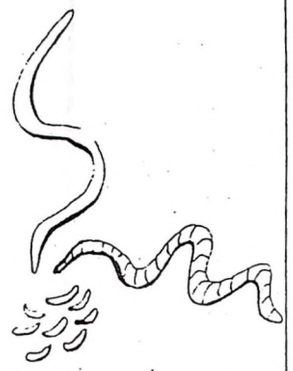
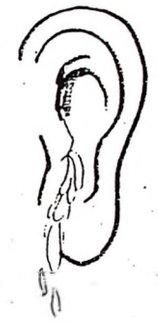
FEVER बुखार  ಜ್ವರ ಜ್ವರ	DIARRHOEA दस्त  ಬೇಧಿ	SKIN INFECTION खुजली  ಕಜ್ಜಿ	WORMS. पेट के कीड़े  ಹೊಟ್ಟೆಕುಳಿ	COLD सर्दी - जुकाम  ನೆಗಡಿ	EAR - DISCHRGE कान बहना  ಕಿವಿ ಸೋರುವಿಕೆ	EYE PAIN आँख में दर्द  ಕಣ್ಣು ನೋವು
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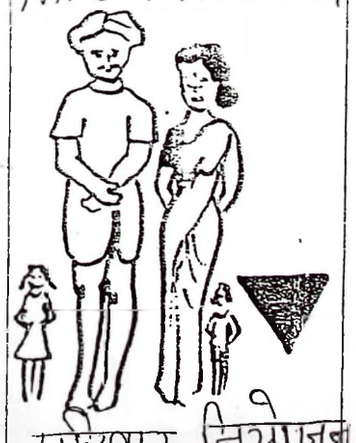
VITAMIN -A DEFICIENCY विटामिन A की कमी  ವಿಟಮಿನ್ A ಕೊರತೆ	VITAMIN-B DEFICIENCY  ವಿಟಮಿನ್ B ಕೊರತೆ	NUTRITION FOOD पौष्टिक ही भोजन  ಪೌಷ್ಟಿಕ ಆಹಾರ	TUBERCOLOSIS टी.बी  ಕ್ಷಯರೋಗ	LEPRACY कुष्ठ रोग  ಕುಷ್ಠರೋಗ	FAMILY PLANING परिवार नियोजन  ಕುಟುಂಬಯೋಜನೆ	HEALTH SCIENCE स्वास्थ्य विज्ञान  ಆರೋಗ್ಯವಿಜ್ಞಾನ

EARLY CHILD DEVELOPMENT AND THE BRAIN –
THE BASE FOR HEALTH, LEARNING AND BEHAVIOUR

J. F. Mustard – World Bank, April 10, 2000

I will first review the evidence concerning the relationship between the early years of life and health, learning, and behaviour throughout the life cycle from a historical perspective. I will then review evidence from biological studies, cross-sectional studies, longitudinal studies, randomized trials of early child initiatives to support early child development, observational studies, and animal studies. The weight of all this evidence is compatible with the importance of the early years in establishing a base for competence and coping skills throughout the life cycle.

Slide 1

One of the striking changes in Western countries has been the effect of the Industrial Revolution on the health of populations in Western countries. This slide from Fogel's work shows the decline in mortality in France following the start of the Industrial Revolution. Both he and Thomas McKeown, among others, have tried to assess what caused this remarkable decline in mortality.

Slide 2

McKeown concluded that direct public health measures accounted for about 25% of the reduction in mortality rate and, by exclusion, the rest was largely related to improved nutrition resulting from the gradual improvement in prosperity resulting from the Industrial Revolution. His conclusion was controversial, but Fogel, in a broader assessment of Western countries, also concluded that better nutrition was the main factor and he also found that as the mean heights of populations improved so did life expectancy improve. Since nutrition during early childhood (including in utero) has a major effect on adult height, he reasoned that conditions during early childhood affected the risks for health problems in adult life. There were obviously other changes besides improved nutrition that affected early child development during this period such as family size. But the historical evidence shows a relationship between economic growth and health that is not due to health care or more conventional public health.

Slide 3

Being an economic historian, Fogel also concluded that a large part of the economic growth during the Industrial Revolution was a consequence of the better quality of the population. He estimated that this might account for as much as 50% of the economic growth in the United Kingdom. The historical evidence shows a clear relationship between economic prosperity and the

health and well-being of populations and the effect of the quality of the population on economic growth.

An unresolved question from the historical evidence is how early life affects health and well being in later life is, what biological pathways are involved and how do the conditions of early child development affect these pathways?

Slide 4

The importance of these questions for all societies is set out in the recent report to the British government on inequalities in health. The Acheson report reviewed the evidence and concluded, as this slide shows, that conditions of early childhood had a major effect on the mental and physical health problems of adult life in developed countries. They also found that health care was of limited importance in changing the inequalities in health. Early life experience appeared to be an important contributor to inequalities in health in adult life.

Slide 5

In terms of the biological pathways that are involved: our increasing understanding of organ development in the early years and how the brain as a master control organ affects all aspects of body function through pathways that affect the endocrine system, the immune system, and mental processes is

providing clues about what is going on. One has to suspect that brain development in early childhood is a factor influencing health, learning and behaviour throughout the life cycle. I would now like to briefly review this and related evidence.

Slide 6

I will review the evidence from five different approaches to the study of early life and its effects on competence and coping skills and health throughout the life cycle. These areas are:

1. Biological
   Neuroscience
   Neuroendocrinology
   Neuroimmunology

2. Animal studies

3. Cross-sectional and longitudinal studies of human development

4. Randomized trials of interventions to improve early child development

5. Observational studies

BIOLOGICAL STUDIES

Slide 7

This slide is a summary of some aspects of the control or regulatory function of the brain. It does not show the sympathetic nervous system pathway which is important. For this presentation, I will focus on the Hypophysis - Pituitary - Adrenal Gland axis. We now have some evidence about its development in early life and its effects on brain function and other important pathways such as the immune system, sometimes referred to as the neuro - immunology pathway or psycho neuro immunology pathway, PNI. Basically, sensory stimuli to the brain from internal body systems and the external world in early life affects the control pathways that determine sterol production from the adrenal gland. The sterol levels and their duration in the blood affect all body systems and organs including the brain. The brain regulates sterol levels in the blood through the hippocampus hypophysis interaction. Settings in the brain for the balance between the response of the HPA axis to stimuli and circulating levels of sterols are set during the early period of brain development in animals. Thus, we have evidence that shows one aspect of early brain development which through the response to sensory stimuli influences a wide range of functions such as the brain, immune system, and the cardiovascular system throughout life.

Slide 8

Since our response to the world in which we live is driven by how our sensing pathways work and how the different parts of the brain respond to these stimuli, the development of these pathways in respect to the sites in the brain that process the signals has become of considerable interest. The neurons in the different parts of the brain develop their function in relation to the quality of the sensory stimuli they receive during early life. The work on vision has shown that there is a critical period during the early stages of development, when the brain is most sensitive to the wiring and sculpting of the neurons in the occipital cortex of the brain which receives and processes the signals from the eye. Despite some different interpretations of this work, one of the neuroscientists whose work is in this field summarizes the effects of total deprivation of signals from both eyes in early life on the development of normal vision. We now know that this relationship holds for other sensory pathways such as sound and touch. We know relatively less about the development of neural pathways to other parts of the brain that affect our responses to stimuli such as arousal, emotions, behaviour, and aspects of cognition. It would appear that there are also periods during development when similar processes (development of other neural pathways) are occurring in respect to other functions of the brain and some of these will occur, at least in part, after the development of the sensing pathways.

It seems that different parts of the brain have different periods for development and some functions develop at a later period than the sensory systems.

ANIMAL STUDIES

Slide 9

Although we resist attempts to apply knowledge from animal biological experiments to the development and function of our brain, we should always keep in mind that much of the understanding of human physiology and disease and its treatment comes from animal studies. Some reservation about the relevance of animal studies to humans is sensible, but to ignore this information is a mistake, partly because you can only begin to understand certain biological systems through animal studies. Fortunately, mammals have neurons in their heads that are similar to those in our heads (we have more of them) and they have sensing systems and HPA sterol systems similar to our own. Finally, they are the only approach available to examine early brain development and the effects throughout the life cycle. None of us live long enough to study human life cycles by direct observation. There is substantial data from studies in mice, rats, and monkeys.

Slide 10

The rat data shows a number of interesting observations that relate developmental neurobiology to function. This slide summarizes some of the benefits to rat pups given an early rat pup development centre with the involvement of the mother. In contrast to rat pups not given a centre for "play based learning", these animals as adults had more neurons, more connections (outcome of brain wiring and sculpting), and performed better in tests of rat competence as adults. We also know from other studies that rat pups that are intensively licked by their mothers in early life, set control points in the hippocampus for the HPA axis that provides a balanced response to stimuli (lower sterol levels to stressful stimuli). Again, these animals have improved wiring and sculpting of the neurons in their head and sustain their coping skills in adult life much better than rat pups that are not licked as intensively by their mothers. So much for rats. Let me now briefly turn to the work with non human primates which involves a number of groups. In this presentation, I will specifically refer to the work of Steve Suomi and his colleagues at NIH in Bethesda.

Slide 11

This slide summarizes some of the effects of poor "mothering" during the first 6 months of life on young Rhesus monkeys.

1. They show increased anxiety and depression as adults (behaviour).
2. They show excessive alcohol consumption if given access to alcohol.
3. They show impulse aggression and violent behaviour.
4. Females tend to be poor mothers.
5. Predisposed to high circulating sterol levels during development.

Slide 12

This slide summarizes some of the biological changes in poorly nurtured Rhesus monkey infants.

1. High sterol levels to mild stress (stimulation).
2. Chronic deficits in serotonin metabolism.
3. Disrupted circadian rhythms for sterols.

Slide 13

This slide shows the effect of good nurturant mothers on the development of genetically high risk Rhesus monkey infants.

1. Precocious in their exploratory patterns.
2. Females become very nurturant mothers.

3. Rise to top of social group dominance hierarchy.
4. Robust immune response.

These animal studies support the argument that early life influences brain development and cognition, behaviour, and biological pathways that affect health in later life. I will now turn to evidence from human studies.

HUMAN STUDIES

Slide 14

In the presentation of the material it will be important to be comfortable with the concepts of gradients when health and measures of cognition and behaviour are plotted against socioeconomic status (SES). SES is a composite index of measurement like income, occupation, education. I would emphasize two important points from the studies in the developed world. The gradients tend to be linear, meaning there is no poverty threshold, that the cause of the gradients is not genetic, and the association with socioeconomic status does not imply direct causality. The other point, as we go through this material it will become obvious that in countries like Canada, the greatest number of children in difficulty are in the middle class. The challenge is to try and understand the pathways by which socioeconomic factors affect development, health, learning, and behaviour. I will argue that our improved understanding of biological

pathways, that I have briefly introduced you to, are important in determining causality.

Slide 15

This slide shows the gradient in health at age 33 for the children born in the UK in March 1958 in relation to social class at birth. Social class 1 and 2 are the top of the social economic structure and social class 5 is the bottom of the social structure. Self-rated health at this stage in life is known to be a good predictor of chronic physical and mental health problems in later life. The psychological distress measure is related to subsequent mental health problems. Obviously, circumstances after birth affect outcomes at age 33. Power and Hertzman have split this into latency and pathway effects and show the importance of the latency effects. Barker has shown the latency effect on health in adult life of poor pregnancies.

Slide 16

This slide shows for the 1958 birth cohort that there is a gradient in educational qualification by social class, reading by parents, and stability of families as reflected by separation of parents by divorce. The key point is we are beginning to see that the gradients in health and education show a similar relationship to social class at birth and that one of the factors that may be influencing this is

parental support. Obviously reading has a large effect on the development of verbal skills in early life and also appears to affect other pathways in brain development. We now know from this and other longitudinal studies that about one third of females brought up in dysfunctional families in the first years of life will show signs of depression in their thirties.

INTERVENTION STUDIES

Slide 17

There are a number of intervention studies that initiatives that enhance early child development, enhance outcomes at later stages of development. The first of these is the Grantham-McGregor study in Jamaica about the benefits of early child development initiatives on the development of stunted children at birth in relation to a control group. The study group was randomized into 4 groups: no enhanced support; improved nutrition; enhanced nurturing or stimulation; and a group given both improved nutrition and stimulation. Over the two year period, the group given no support showed poor development; the groups given either improved nutrition or stimulation improved about equally, and the group given both, equaled the control group at two years. This study shows the value of both nutrition and stimulation on development in the early years. Obviously, good water and nutrition are important in early child

development. Unfortunately, we do not know whether this intervention had long-term effects.

Slide 18

The Carolina or Abecedarian project shows an effect of an early child development initiative in a poor African-American population. The children were randomized into two groups: one, an early child development program starting shortly after birth continuing until the children entered school; and the other, a control group not given the program. This study showed gains in cognition (including IQ), in education performance, and behaviour, still manifest at age 21. The effect on IQ is of interest since a recent review of this subject concluded that the circumstances of the first year of life affect IQ.

Slide 19

The well known High Scope Study has provided evidence from a randomized study of an early child development initiative starting at age three and continuing until the children entered the school system at age six. At ages 18 to 20, the children given support showed better school performance and fewer behaviour problems. This slide summarizes the gains of the intervention group at age 27. In this assessment, we are

beginning to see the effects on mental health - fewer women in the intervention group were in programs for "educable mental impairment". This study did not have a sustained effect on IQ, perhaps because the program was started after the first years.

Slide 20

We do know, however, that programs designed to enhance skills in mathematics around ages 4 to 5, have an effect. This shows the results of work by Case and colleagues to improve performance in mathematics through an initiative called Right Start (the cognitive weight of numbers). Children in a poor socioeconomic neighborhood were randomized into an intervention group and a control group. The children given the special preschool intervention program, at age 9 surpassed in the school system, children in a middle class school.

Slide 21

Studies of early child development programs in other parts of the world are beginning to show similar effects. This slide summarizes the results from an examination of early child development programs in Brazil. The results are compatible with the studies I have just reviewed.

OBSERVATIONAL STUDIES

Slide 22

Observational studies show the benefits of good support in the early years of life . One of the most recent, concerns the adoption into British Columbia families of Romanian orphanage children shortly after birth with those adopted after many months or years from these orphanages with very poor environments for early childhood development. The children adopted after a longer period in the orphanage appear to be similar in development to Canadian born children in middle class families and show significant behavioral problems and lower IQ's than the children adopted early. Megan Gunnar, who studies the HPA axis in children, has found that the children adopted late have significantly higher sterol levels. If you remember the animal experiments, the early years have a major effect on the control of the sterol pathway which, among other things, affects brain development.

Slide 23

Megan Gunnar in reviewing the stress sterol pathway and early childhood came to the conclusion that caregivers and parents have a very powerful effect on the development of this pathway in early life.

Slide 24

An important observational study was carried out by the Stanford economist, Vic Fuchs, who looked at the relationship between an index of early child development at the time children enter the school system and the performance of children in grade eight math. Each of the points on this slide represents a US state. The early child index was called readiness to learn. Clearly, the states with the best measure of early child development do best in mathematics. Fuchs concluded that if you wish to substantially improve mathematics outcomes, investment in the preschool is probably equally important to the investment in schools.

Slide 25

This summarizes what we now know about early brain development and a variety of functions in terms of sensitive or critical periods. One of the questions often asked, is it all over after the first few years. The answer is no, but you probably do not establish the same base for brain function later on that you can establish in the early years. You can, in Emmy Werner's phrase "overcome the odds", later on but it is difficult.

Slide 26

It seems likely that the steepness of SES gradients in literacy and mathematics found among countries and within countries reflect, at least in part, the quality of early child development. This slide shows the gradient for youth literacy against parents' education among a number of countries. The high performing countries have a very flat gradient and these are countries that do have good early child development programs. Theoretically, all countries should be able to establish high performance, less steep gradients. Doug Willms will say more about this tomorrow.

Slide 27

We have some interesting observations from within Canada. This material is from a report prepared by the Reference Group for the Ontario government's Minister for Children, our chair for this session, Margaret Marland. The report's title was "Reversing the Real Brain Drain".

Slide 28

We were able to secure a preschool measure of early child development on a proper sample of all Ontario's children. This slide shows what we found for verbal skills. The vertical axis is percentage of children below the standard (% with low receptive vocabulary) and the horizontal scale is

a socioeconomic measure. Again, we have a gradient which is linear. A larger number of children at the poor end of the SES scale on the left are in difficulty, but close to 10% at the high end of the SES scale (on the right) are not doing well. This also shows that Canada's wealthiest province is not doing as well as the rest of Canada where the gradient is curvilinear. This assessment of verbal skills correlates with later measures of development including literacy performance.

Slide 29

Thus, it is not surprising that the gradient of youth literacy for Ontario is steeper than for the three Prairie provinces and Quebec. Obviously, if Ontario is to improve literacy, it will have to do something about early child development for all social classes.

Slide 30

The recommendation we gave to the Minister was to establish, in partnership with communities, involving the public and private sector, early child development and parenting centres sensitive to early child and brain development. You will note from this chart that we would like these centres to begin their support before the child is born because of the importance of the in utero period.

Slide 31

Our minister is here because she understands the importance of this for her own community and understands the enormous importance for the developing world. Her goal is to give the early years of human development (tier 1) the same importance as the later years. The plan she is developing to introduce in the province of Ontario is a direct steal from the World Bank's work and I close with Mary Young's comments in your 1996 report. This is relevant to all societies, rich and poor.

"Because learning begins at birth, and even before, the starting point for involving families in early child development programs must be as early as possible ... Knowledge and understanding of programs is no longer the constraint facing early child development. Rather, transforming this knowledge into action is the major limiting factor in implementing early child development programs and requires the combined support of governments, non-government organizations, the private sector and the media. The challenge to care for society's youngest members is not just a challenge for a single country or continent; it is a challenge for the entire world community."

MEETING EMOTIONAL NEEDS OF CHILDREN

What Parents can do?

DOCTORS are often asked what constitutes good emotional health of a child. This is a difficult question to answer. Teachers and parents know much more about them. To get over such problems, the responsibility lies not with the doctors alone; it rests more with those who are the custodians of child's emotional and physical development, viz., the parents and to some extent the teachers.

Building the faculties and personality of a child is more of parents' responsibility. But the job is not simple. While some parents say, "be strict", others think "let the child have his way". And to make matters worse a newspaper or a magazine advocates a third line of action.

To tell the truth, no parent needs to carry in his hand a reference book on child development which will help him what to expect of a particular child at a particular age in a particular situation. Nevertheless, it does help parents to know something about the child they are dealing with.

Guidance helps

Children learn by parents' repeated guidance and help. Parents must learn to handle unacceptable behaviour until children can grow up sufficiently to behave the way their parents would like them to do.

Apparently abnormal traits commonly observed in children below five years of age are: restlessness and excitability, (2) day-dreaming, laziness, lack of concentration; (3) general anxiety, timidity, and shyness; (4) specific fears, seeing horrid faces, (5) poor bladder control, bed wetting, (6) nervous habits, nail biting, (7) cruelty, aggression, outbursts of anger, (8) speech difficulty, (9) food fads, (10) temper tantrum, (11) frequent crying, babyish behaviour, (12) lying and stealing, (13) headache, stomach pain and constipation, (14) disobedience, and (15) obsession.

While such traits should not go unnoticed; they need not cause alarm. Such signs are not necessarily signs of neurosis and maladjustment. Most of the children do have minor forms of obsessive compulsions. Many cannot resist counting shops while passing through market side. Yet all such children would not necessarily become neurotics. Certain traits like thumb-sucking and nail-biting are regarded as reflections of frustrations in suckling. Deprivation of breast-feeds or sudden weaning are causation for deviant behaviour.

....2

Abnormalities: A passing phase

Apparent abnormalities in children are a passing phase. Symptoms of emotional disturbances fade out gradually with growing age in majority of children. Younger children showing such symptoms have more changes of recovery from emotional upsets than older children with similar troubles. Speech difficulties disappear slowly. Anti-social behaviour like stealing, cruelty and aggression pass off quickly, whereas specific fears like seeing horrid faces are transitory. Lack of power of concentration and day-dreaming seems to be resistant to change.

Fundamental needs

Why deviant or abnormal behaviour? The answer is simple. Every child has fundamental needs both organic and emotional. The former are for living and growing while the latter are for developing and maturing. Some of the most important emotional needs are: (1) love and affection, (2) security, (3) recognition, (4) Friendship and company, (5) acceptance and belonging, (6) achievement and success.

A child's first need is parents' love. This has no substitute. The child needs to know that he is wanted and there are people who care about him. In school, he wants that the teacher and other pupils like him.

Feeling of security develops in the child a sense of personal adequacy to meet different situations and problems while insecurity tends to generate tension and anxiety. It is through love, success and belonging at home and school that a child gradually develops an inner security that enables him to cope with newer challenges that confront him as he grows.

Each child has a desire to be recognized, admired and taught. similarly, every child desires to experience certain amount of success in areas which to him are important. A child likes company. In school situation, group membership becomes important to the child He wants to belong to one group or another and make friends. His desire for belonging becomes stronger at adolescence and he wants to learn how to get along with others.

All these fundamental needs and their adequate fulfilment are essential for the emotional health of the child. Failure to meet meet these needs in the right way creates behavioural problems. A child who receives too much recognition may become self-centred. On the other hand a child who is denied recognition may become discouraged and develop feelings of inferiority.

....3

A child who is adored and over-protected may be spoiled and have difficulty in getting along with other pople, while a child who is deprived of love and affection may feel unwanted, lonely, defensive and unhappy. Therefore, it is essential that the fundamental needs of a child are fulfilled, without making him overprotected. Only this way can he be expected to blossom into a promising adult with the capacity to face the challenges of life.

Source: SWASTH HIND - November 1980.

PUBLIC HEALTH PERSPECTIVE. TRADITIONAL SYSTEMS OF HEALTH CARE AND MAJOR DISEASES OF CHILDHOOD

BACKGROUND — Public Health Perspective:

The ultimate objectives of Public Health practice are the promotion of health, the prevention of disease and the prolongation of life. Neither health nor disease is static or stationary. Behind every condition of health or disease is the phenomenon of constant alteration.

The disease process in man depends on the characteristics of disease AGENTS (living or non-living), the characteristics of man (the HOST), and man's response to disease producing stimuli arising in the ENVIRONMENT, or within man.

This concept of Agent, Host and Environment is the basis of Epidemiology, which provides an orderly means of describing what is known about the 'natural history' of a disease and a scientific methodology for filling gaps in knowledge in the natural history.

The natural history of a disease is considered in two phases for preventive purposes.

The preliminary interaction of potential agent, host, and environmental factors in disease production is termed the period of pre-pathogenesis.

The period of Pathogenesis is the course of the disorder from the first interaction with disease provoking stimuli to the changes in form and function, or, until equilibrium is reached, or recovery, defect, disability or death ensues.

Primary prevention is the term for procedures that may be accomplished in the period of Pre-pathogenesis. These are measures designed to promote general optimum

P.T.O.

health or by specific protection of man against disease agents or the establishment of barriers against disease agents in the environment.

Secondary Prevention may be accomplished by in the period of pathogenesis, early, by prompt diagnosis and adequate treatment and later to prevent sequelae and limit disability.

Tertiary Prevention may be accomplised by rehabilitation, when defect and disability have been fixed.

They are not static or isolated phases of prevention but form a continuum corresponding to the natural history of any disorder. Within these three phases of prevention, there are at least five distinct levels at which preventive practices may be applied, depending upon the completeness of knowledge of the natural history. They are,

1. Health Promotion - intended to strengthen the host by improving the general health and quality of life of individuals and communities. It is thus an ideal, a striving for perfection into which many practices naturally fit.

2. Specific Protection - is prevention in its conventional sense, and comprises measures to intercept the causes of disease before they involve man. This level of prevention has been exploited to a great extent in disease prevention.

3. Early Diagnosis and Treatment: ~~The objects~~ the obvious objectives are, (a) to prevent spread to others if the disease is a communicable one, (b) to cure or arrest

the disease process in order to prevent complications or sequelae, and, (c) to prevent prolonged disability.

4. Disability limitation: is to prevent or delay the consequences of clinically advanced disease. Only delayed recognition due to incomplete knowledge of disease processes serves to separate this level of prevention from the previous level.

5. Rehabilitation: - is more than stopping a disease process; it is also the prevention of complete disability after anatomic and physiologic changes are more or less stabilized. Rehabilitation is defined by W.H.O. as "the combined and co-ordinated use of medical, social, educational and vocational measures for training or re-training the individual to the highest possible level of functional ability" and at enabling the disabled and handicapped to achieve social integration.

Primary prevention is at levels one and two; Secondary prevention at levels three and four, and, Tertiary prevention at level five.

~ Traditional Medicine (Non-Allopathic Systems)

W.H.O. defines Traditional Medicine as "... the sum total of all the knowledge and practices, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing".

The Alma Ata Declaration specifically recognised traditional medical practitioners as relevant for Primary Health Care. Medical pluralism is practised in most countries of the world. Traditional medicine is used by a significant number of people as the only health resource available or as a substitute for, or complement to allopathic services.

"Traditional medicine" does not define a unified homogenous practice. Formalised medical systems exist, as also informal folk practices. The Government of India officially recognises formalised systems like Ayurveda, Siddha, Unani, Yoga, Naturopathy, Homoeopathy and Tibetan Medicine apart from Allopathy. Acupuncture is gaining acceptance in urban India, and is also used in the rural areas of North-East India.

The National Health policy statement of 1989 clearly states -- "The country has a large stock of health man power comprising of private practitioners in various systems, for example Ayurveda, Unani, Siddha, Homoeopathy, Yoga, Naturopathy etc,. This resource has not so far been adequately utilised.

---- planned efforts should be made .... to integrate especially in regard to preventive, promotive and public health objectives."

There are about 500,000 practitioners of traditional medicine in India, and their qualifications range from university doctorates, through certificates awarded in private schools, to skills and knowledge acquired after several years of apprenticeship to established practitioners. There are 108 colleges of indigenous medicine, and a statutory National Central Council directs their activities, controls standards of training, education and practice, and awards recognition status, which is necessary for employment in the public health services.

Major Diseases in Childhood:

UNICEF's "State of the World's Children 1988" reports one death in every three in the world as that of a child under 5 years of age; Four million deaths due to Diarrhoea, three million due to Measles, Tetanus and Whooping cough and 200,000 permanent disabilities due to polio, while Acute Respiratory ~~illnesses~~ Infections claim a further 2 to 3 million under fives.

The under-five mortality rate (U5MR) is the principal indicator used by UNICEF to measure levels of, and changes in the well being of children. U5MR is the number of children who die before the age of five years for every 1000 live births.

According to UNICEF's "State of the World's Children 1989," more than one-third of all the world's child deaths occur in just three South Asian Countries, Bangladesh, Pakistan and India. They are ranked 24th, 34th and 39th respectively among 131 countries listed in the descending order of their 1987 U5MRs.

In India, nearly 4000 children die of dehydration and 500 are crippled by Polio every day. The annual attack rates of Tuberculosis is 8 per thousand in under fives, carrying a mortality rate of 80 per 100,000.

The 1981 Sample Survey showed that 0.23 to 0.25 million infants died of neonatal tetanus. The annual reported incidence of Diphtheria averages at 25,000, while nearly 30,000 cases of Pertussis are reported annually inspite of difficulty in estimation due to ill-defined symptomatology and poor reporting. Measles has the highest morbidity and mortality among the vaccine preventable diseases which account for death in 10 children every minute and disability in 10 more Measles alone is responsible for 1/3rd of these deaths. Acute Respiratory infections account for 14.3% of deaths during infancy and 15.9% between 1 to 5 yrs of age.

The Expanded Programme of Immunization to prevent these major causes of morbidity and mortality in children is based on the concept of providing 'herd immunity' by vaccinating over 85% of children.

Present status:

In addition to problems in the E.P.I. of India like programme acceptance & implementation, there are other lacunae.

The evidence of protective effect of B.C.G. vaccine against tuberculosis is conflicting. It shows a wide variation (0–80%) in various studies. Neonatal B.C.G. is said to offer 50-60% protection against childhood tuberculosis, more so against its disseminated forms.

DPT against Diphtheria, Pertussis and Tetanus is contraindicated in severe reactions after the first dose, and in infants with progressive neurological disease or with uncontrolled seizures.

One of the main problems of Oral Poliovaccine in India is the inadequate seroconversion (only 64%) rates seen after 3 properly spaced doses. Five doses of potent OPV is known to raise this to 90-95%, but is impractical as a public health measure/policy, due to (a) non-availability of such large number of doses of OPV, and (b) High drop-out rates – 25 to 30% between any two doses of vaccine. Cases of "vaccination failure" or paralytic disease has been shown to be rising all over the country, out of proportion to the vaccination coverage.

Ten percent of pre-school deaths and 2% infant deaths in India, are caused by measles, despite a vaccine which is 95% effective in prevention.

From the above, it appears that prevention at level two (Specific protection) is inadequate, and also, the concentration of attention on the "Agent" of disease is misplaced, at least in the Indian context.

Socio-economic conditions and undernutrition (said to contribute to 1/3rd of all deaths) usually take the blame. UNICEF argues that in practice, U5MR is the best available single indicator of social development overall, as most of the factors which it distils are as indicative of the meeting of the essential needs of all human-beings as they are of the particular well being of children.

The prevailing World economic situation is such today that in many nations, social advance is trying to walk up an economic escalator which has begun to travel downwards. ~~The Health experts of an African country has~~

Thus, Health care can only be made sustainable by the lesser developed countries themselves. But, if their per-capita incomes continue to decline, then any progress will be eroded if not completely compromised.

In this context, traditional medical practices and an integrated approach encompassing all levels of prevention lend themselves to improve public health, and child survival.

The formalised systems of traditional medicine satisfy the basic requirements of any scientific system, viz:

a) They are based on a sufficiently large body of observational data,

b) A sufficiently elaborate theoretical framework to classify data, exists.

c) The ~~basis of~~ legitimisation of theory is based on Observation.

Yet, there is not sufficient recognition or critical appreciation of its contemporary value.

Prior to the formulation of the Declaration of Alma Ata, Dr. Mahler said : "For far too long, traditional systems of medicine and "modern" medicine have gone their separate ways in mutual antipathy. Yet are ~~their~~ not their goals identical ... to improve the health of mankind and thereby the quality of life? Only the blinkered mind would assume that each has nothing to learn from the other."

Most of the recent interest and activities of specially established research centres on traditional medicine have concentrated on the scientific testing and evaluation of traditional pharmacopoeia. This represents ~~at~~ an attempt to validate traditional medicine through use of "Western Scientific" criteria.

This can be an unfortunate focus if it ignores, or de-emphasizes, other aspects of traditional medicine which may be more significant relative to the improvement of an integrative and improved Primary Health care service. Equally distressing is the pre-occupation with utilization of the huge man-power base of traditional medicine practitioners in the health care system which has a bias towards interventions which are "Allopathic" dominated. This enforces a thinking process alien to these practitioners.

A viable, productive alternative could be the integration of the "Knowledge" base of these systems which is basically the "human resource" of the past. It does not mean accepting any practice uncritically. But, it does imply a recognition that there are values and benefits, as well as shortcomings and dangers, in both allopathic and traditional practices.

The understanding of, and contact with traditional medicine may, in juxtaposition, enable us to be constructively critical of the prevailing health services model which has been challenged as only a partial, or as a truncated health care system.

Medical pluralism in post-independant India has meant in reality a somewhat 'anarchic' development of different systems. Efforts at dialogue and integration invariably get caught up in 'Philosophical', 'Conceptual' or 'Technical' problems.

A public health perspective can overcome such difficulties which come into play especially when focus is on an individual with a particular health problem.

Proposed Study :-

Considering the above background, this study proposes to take a Public health perspective to explore traditional systems of Health care listed below for major diseases in Childhood.

OBJECTIVES

1. To collate available information on viewpoints of non-allopathic systems on major causes of childhood morbidity & mortality
2. To classify this information on the basis of the five levels of prevention, viz. Health promotion, Specific protection, Early Diagnosis and Treatment, Disability limitation and Rehabilitation.
3. To understand the concepts of Agent, Host and Environment in these systems
4. To identify areas of further study and implementation for better child health.

DEFINITIONS FOR PURPOSES OF STUDY

CHILD :- Under five years of age.

MAJOR CAUSES/DISEASES OF CHILDHOOD

1. Malnutrition and deficiencies of Iron and Vitamins A & D.
2. Communicable diseases
   a. Tuberculosis
   b. Polio
   c. Diphtheria
   d. Pertussis
   e. Tetanus
   f. Measles

   ] Immunizable diseases (vaccine preventable)

3. Diarrhoeal diseases
4. Acute Respiratory Infections and Chronic E.N.T. problems.
and 5. Helminthic infections

NON-ALLOPATHIC SYSTEMS OF HEALTH CARE.

The organised systems of health care prevalent in India

a. Ayurveda
b. Siddha
c. Unani
d. Yoga
e. Naturopathy
f. Homoeopathy
g. Tibetan Medicine.
h. Acupuncture
and i. Non-homogenous practices like Home remedies / local practices.