

DISTRICT AND BLOCK LEVEL PLANNING FOR HEALTH

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ABSTRACT

Need for district and block level health planning becomes much more explicit than before when the focus of developmental efforts is being geared towards decentralised planning. This paper, besides discussing the general framework, also draws upon the mini-experiments done by the social and health management scientists for initiating the process of village, block and district level health planning. Village health plans as a micro step towards block level health planning were attempted by the villages themselves in the Village Health Planning Workshop. Similarly, district health plans were formulated by district level officials. Problems and constraints of district health planning also form the part of discussion.

The presentation of this study is more like a comprehensive note than a well designed academic paper. However, it may give sufficient points for discussion and also raise some issues for further work in this area. Here, an attempt has been made to detail out the analytical frame for Block and District Level Health Planning; more so in the light of health as a strong lever for development and health as a positive assault on poverty in low income countries like India.

A brief mention has also been made about the hierarchy of health sector down to district and block level. It suggests the tentative stages, mechanism for planning and implementation of district and block level action plan for health and family welfare and the problems associated with such a decentralised planning efforts.

Of late, it appears that there has been a sudden spurt of interest at the highest policy making level in what is called democratic decentralisation. This, in effect, means 'revitalisation of the ideas of district and block level planning. These ideas as such have been recognised long back since the beginning of planning era in India. Although the Planning Commission has issued clear guidelines on district planning to the States in 1969, it did not remain an easy concept for operationalisation due to various reasons, the main being perhaps is the inadequacy of the planning machinery at the district and block levels. At least this is more true for health sector.

THE ANALYTICAL CONCEPTUAL FRAME

Meaning and Purpose of District Planning: Working Group of Planning Commission on District Planning in its report of May 1984 indicates that district

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planning in our view is a kind of area based sub-State planning and arises from the need to supplement the National and State plans with a more detailed examination of resources, problems and potentials of local areas (*i.e.*, districts) so that (investment) programmes more specifically tailored to the particular needs of each district which could be evolved and implemented.

In other words, district planning involves a developmental scenario at the district level consistent with the specific needs of the people and the growth potential of the area, etc. It is assumed that the district is a sub-State decision making unit, within the system of multi-level planning. In contrast to the National and State plans, the district plan would represent a district **multi-sectoral** package of area specific investment proposals and institutional arrangements suited in this context.

Meaning and Purpose of Block Planning: It is a well known fact that in the first and second five year plans, the thrust of policy was on attaining high rate of sectoral growth. In the third five year plan and thereafter - the emphasis shifted towards balanced regional development. Sectoral plans were made but these were not percolating downwards to reach the rural masses at block and village levels. This eventually gave rise to the concept of formulation of block level plans and Integrated. Rural Development Programmes. Plans were made to make it possible to plan out many such activities that required detailed immediate knowledge of local resources and requirements. Methodological advancement and application of various techniques also took place like National Institute of Rural Development's 'central place theory' to identify growth *foci* in the formulation of 'tahsil plan' of Ford Foundation's graphical methods for identifying service centres in a block or an attempt to apply 'location and allocation models' in the formulation of service Centre plans at 'tahsil' level.

According to the guidelines for block level planning issued by the Planning Commission (1979), block level planning has to be a 'spatial planning' where a systematic efforts can be made to locate facilities in a manner that all people can use them to the maximum advantage.

NEED FOR DISTRICT AND BLOCK LEVEL HEALTH PLANNING

As in case of general planning, the theoretical justification for district and block level health planning is based on the well known arguments for micro level planning. Theoretical arguments also hold good when we see that any National and State level plan programmes being macro in character cannot be substituted for a micro health plans formulated at the local levels. An intimate knowledge of local conditions and local requirements is very much needed for many health activities. The need for a district and block level health plan arises because:

- i. it serves as a guide for suitable locational decisions about health care services, facilities, investment, and resource tapping;
- ii. the national health policy objectives and programmes goals like "Health for All (HFA)" or significant moderation in mortality, morbidity and fertility within a

period of 12-15 years (if not rigidly by 2000 AD) will not be possible unless a detailed health planning right at and from within the block and district level is attempted;

- iii. it is in a district rather more emphatically in block level health planning lies the possibility of intensifying extension efforts for developing the result potentials by bringing their people in greater action;
- iv. taking the inherent points of selectivity of focus on most needy areas on one hand and percolating decentralisation on the other - the block and district level health planning will fulfill both the dimensions of Integrated Area Development *i.e.*, functional and spatial;
- v. spatial framework, in case of multi level health planning, *viz.*, at block feeded through village or village cluster health plans can be seen expressing the accessibility and distributional equity; and
- vi. spatial health planning - a planning from below and within - finding expression in block and district health plans is a 'HFA strategy' of locating services at places where they can be most effectively used by people who can be as close as possible to the health facilities.

EXPERIMENTS OF NIHFW

Village Health Planning Workshops - A Micro Step Towards Block Level Health Planning: It was a micro level health planning, where the village was the micro unit and the main strategy involved was people's participation. Further, it was an action experiment through holding village health programme planning workshops. With the initiative of village health committees through these workshops, the identification of local health and related problem was done. The health priority problems were identified and activities for their implementation were selected. Financial feasibility in terms of resources of the community and those from outside were worked out. Time schedules and division of responsibilities were also planned. Entire planning of work discussed at the Village Health Planning meetings by Village Health Committees has been given as under;

- i. Environmental Health.
- ii. Safe Drinking Water.
- iii. Personal Health and Hygiene.
- iv. Diseases,
- v. Intersectoral Activities.

Specific details of these have been given in the Appendices I, II and III.

Village Health Committees by themselves and also with the help of facilitator from NIHFW prepared the health proposals for their submission to the local panchayat and local health and administrative authorities.

In this way, the health planning at micro level of the village grew up gradually

and also made it possible to carry out the same in 33 other villages under this project from NIHFV. Villagers tried, faltered and at times failed but the process of health planning could develop which was more than a real gain as compared to various other health activities which were got accomplished. For fuller detail, the NIHFV report entitled 'People's Health: A Concern of the People' may be referred to.

District Health Plans Prepared by District Level Officials as a Part of Health Management Development Project of NIHFV: The experience of District Health Action Plans is also a project study experiment of NIHFV which needs a mention. It was through the 'Situational Analysis done by the concerned health officials of respective districts and based on the situational analysis they prioritised the health problems at District and Block levels. Later, the District Health Action plans were prepared and presented in workshop situations. The section plans were implemented, monitored and after their mid-term evaluation were presented in the final workshop organised by NIHFV. Their mechanism was based on the participation, and involvement of the concerned officials to build up a planning process as well as to see that health planning floats from within and not from below, with the resources and infrastructure keeping constant.

GUIDE POINTS FOR DISTRICT HEALTH PLANS

Planning Commission have also in their various reports reported in summary form the guidelines in respect of each programme to be planned through district level planning. District level officers are expected to prepare comprehensive notes analysing the problems and variety of conditions in different sub-regions setting for the long term perspectives/The guidelines through various working group reports in regard to health have been given as under:

- Medical and Public Health:*** 1. How do the medical facilities in the district in terms of doctor-population ratio and medical institution to population ratio compare with these ratios for the State as a whole?
2. Which of the blocks of the district are poorly served with medical/public health facilities?
3. What is the incidence of smallpox, malaria, filaria, trachoma, gastro-enteritis, hookworm and other communicable diseases in different sub-regions/blocks of the district? What corresponding medical/public health facilities/programmes exist to combat these? Are there any endemic areas for which special indoor/outdoor/mobile facilities need to be provided?
4. How do the medical/public facilities in the rural areas compare with their availability in the urban areas? Can health services in the rural areas be improved by better coordination, integration or reorganisation of the medical and public health personnel provided for different programmes? What is the strength of medical and public health staff sanctioned under different plan and non-plan schemes at the Primary Health Centres? Has a review been made of their workload? Would it be possible to take up additional programmes for environmental, sanitation, education or school health education by the

rationalisation of the workload and organisation of the available staff?

5. Are there any Taluk or Tahsil hospitals which could provide support to the Primary Health Centres by way of referral services? Which of the existing hospitals could be strengthened in order to provide these services?

6. Has any attempt been made in the past to provide/improve medical facilities through private contributions? If so, with what results? What measures could now be taken for this and what quantum of resources could possibly be mobilised during the next-one-year/five year period?

7. Are there any hospitals/public health centres which generally remain without medical officers? What are the reasons thereof and what remedial measures can be taken?

8. What has been the performance of the different blocks of the district in the last three years in the field of family planning? What difficulties, if any, were experienced in motivating the right type of people to adopt vasectomy, tubectomy and IUCD? To what extent private medical practitioners, vaidas, midwives and public leaders were involved in the programmes?

9. Have any attempts been made in the past to popularise everclean or water-seal type of latrines in the village/towns? If so, with what success? How can this programme be implemented in a more effective manner?

SUGGESTED METHODOLOGY FOR DISTRICT AND BLOCK HEALTH PLANNING

Guidelines by the Planning Commission in general, and various documents prepared by NIHFV and the ministry officials (some of them listed here in appendix) and the professional experience suggested that a fool proof and tailor made methodological details would prove to be too theoretical to work. How these have been tried in two non-conventional (if not totally innovative) manner by NIHFV through WHO Health Management Development Project (1984-87) and DANIDA innovative IEC Project have been described hereunder. The experience of health planning gained through these and many other projects have suggested that:

- i. People can make health plans for people.
- ii. People's health is people's main concern.
- iii. People can act as 'demand generator' for health and also a 'big reservoir' of participatory resources, meeting the health needs identified by them.
- iv. District and Block/PHC level health care projects planned by PHC/Block and district level functionaries by themselves were found having an inbuilt commitment for the fruition.

The methodological broad steps for the district and block level health planning emerged as under:

Formulation of the Major Village, Block and District Health Plans

- Collection and compilation of data for district health planning.
- Bringing out composite and comprehensive health situational profile of block and district in relation to basic health attainment objectives/goals.
- Formulating the main strategy and thrust of block and district health planning.
- Analysing the existing health care services and programmes with reference to health development strategies..
- Assessment of health care and related 'resources' - (machinery, infrastructure, technology) for allocation for various health programmes and projects at village, block, tahsil and district levels and their mutual linkages, horizontally and vertically,
- Clearly expressed statement of spatial dimensions of district/block level health plans.
- Working and translating the relationships, and links between Village → Block Tahsil → District micro level plans to macro plans of State and Nation.

PROBLEMS AND CONSTRAINTS IN BLOCK AND DISTRICT HEALTH PLANNING

Report of the Working Group on District Planning (1984) as well as various other documents and sources including the formal and informal discussions and meetings with the District Health Administrator and other district level health functionaries particularly those coming for the seminars, workshops and short orientation courses at NIHFV indicate that the District Health Planning in the strict sense of the term, hardly exists". However, wherever and in whatever 'skeleton form it is envisaged or formulated, it has found inherent constraints in its process. The reasons were 'techno-political' than managerial. So in reality, what has been observed at block and district levels is not the real planning process but the implementation of given targets in the form of action plans. Here, only a broad listing has been done for the known constraints and problems in multi-level micro health planning,

- Difficulty in getting block and district level health schemes proposed by the block/district health planning institutions - fully accepted in State health plans.
- Inadequate health planning machinery at' block and district levels, particularly lack of technical experts.
- Inadequate 'data base' for block and district health planning.
- Problems of 'disaggregating plan funds' to the district and particularly to block level, due to heavy liabilities of the State towards major projects for other sector.
- Conflicts (actual and likely) of authorities and control between District and Block Head Chiefs and Head of the Departments at State level.

These constraints and problems in general, are problems of decentralisation. It is not a easy task to make a block and district level planning to start, work and grow if it has to be seen as not merely creating some structure, positioning some functionaries or providing some facilities. As the Planning Commission puts it (1984) - 'it is infusing skills, weaponry and tactics into these structures endowing with functions, finances and powers and authorities, evolving procedures, methods and organising communication, and reciprocal interactions.

The district and block level health planning in real sense of the term has not been started or has remained 'non-starter' except in few experimental research projects, because all the essential elements or ingredients that the district and block level planning require do not exist as a total package.

STAGES AND MECHANISMS FOR DISTRICT/BLOCK ACTION PLAN FOR HEALTH

Awareness and some knowledge about the stages and the mechanisms of multi-level health planning have not been lacking amongst district and block level health functionaries whenever the researchers and faculty of NIHFV discussed with them during the operation of Health Management Development Project in various States in the country.

Even people were not found 'that total ignorant' and at least they knew (while getting assembled to draw a village health plan during village Health Planning Workshop organised by NIHFV during an Innovative IEC project in Datia, Gwalior and Sagar villages of Madhya Pradesh) that some broad stages are involved in making micro level health plans. However, neither the official functionaries nor the people were in a position to tell the stages and mechanisms for planning as listed. Appendix I suggests just for the purpose of enlisting comments. Appendix II also indicates a health development network for facilitating health planning.

ISSUES

The issues in relation to block and district level health planning are not much different from what are known for decentralised and multi-level economic planning in general. However, in multi-level health planning some issues are quite explicit and of fundamental nature.

Equity: The issue of equity is crucial, while making multi-level health plans from below and at block and district levels. This issue involves not only the 'area concept' or geographic dimensions, but also of great concern for different population groups: say, tribals, women, children and other weaker sections.

Allocations: There are issues which are purely financial or rather 'allocation issues' - in such a situation, where although health is a State subject, but, a large chunk comes to the States and later flows to districts and blocks in the form of 'Centrally Sponsored Schemes'. This becomes a big poser for multi-level health planning. Piper has to pay the tune for the one who pays.

Information Base: Although efforts are being made to develop a data base

through computerisation at district LEVEL AND below, at the moment 'ADEQUATE information base', which is required for facilitating planning from below and within the block and district, is lacking. Data even for vital events are not properly available.

Techno-managerial: Is block and district health planning a reasonable possibility for 'all levels of health care'-or it is suited to at the levels of primary health care. This is a techno-managerial issue, as the technical expertise for health planning is not available at block and district levels. Rather, the expertise is so centralised, that it is lacking in some cases even at State, levels. This issue is a complex one, which has connection with training, retraining of the functionaries and pertains to changing professional attitude of managers at all levels.

It is a good sign that some direct and indirect feel of 'Glasnost' is being noticed for the planning from below. This certainly will not remain an euphoria for block and district level health planning when the issues related to decentralisation - of resources, infrastructure, technology, information-base and above of all, the issues of imbalances and equity, etc., are taken care of at the policy level.

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आज जबकि सभी प्रकार की विकासात्मक गतिविधियों को विकेन्द्रीकृत आयोजनाकी और मोड़ा जा रहा है, तो ऐसी स्थिति में जिला तथा ब्लाक स्तर पर स्वास्थ्य संबंधी योजना बनाने की आवश्यकता का महत्व और अधिक स्पष्ट हो जाता है। प्रस्तुत लेख में आयोजना के सामान्य स्वरूप पर चर्चा करने के साथ-साथ समाजशास्त्रीयों तथा स्वास्थ्य प्रबन्ध वैज्ञानिकों द्वारा, गांव, ब्लाक और जिला स्तरों से स्वास्थ्य आयोजना की प्रक्रिया प्रारम्भ करने के बारे में किए गये छोटे-छोटे प्रयोगों पर भी प्रकाश डाला गया है। ब्लाक स्तरीय स्वास्थ्य आयोजना की दिशा में प्रारम्भिक कदम के तौर पर ग्रामीण स्वास्थ्य आयोजना कार्यशाला में स्वयं ग्रामीणों द्वारा ग्राम स्तरीय स्वास्थ्य योजनाएं बनाई गई थी। इस लेख में जिला स्तरीय आयोजना संबंधी समस्याओं और कठिनाइयों की चर्चा भी की गई है।

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APPENDIX -1

A TYPICAL WORK. PLAN AGENDA DISCUSSED AT THE VILLAGE HEALTH PLANNING MEETINGS

1. Environmental Health

- a. Need of Information, Education and Communication
- b. Plantation
- c. Smokeless. Chulhas
- d. Water Seal Latrines
- e. Compost Pits.
- f. Soakage Pits
- g. Paving of Roads
- h. Drainage
- i. Cleanliness of Village

2. Safe Drinking Water Supply

- a. Need of Information, Education and Communication
- b. Construction of New Wells
- c. Renovation of Old Wells
- d. Installation of Handpumps
- e. Provision of Tap Water
- f. Disinfection of Drinking Water Supply Sources
- g. Providing Safe Drinking Water in Schools

3. Personal Health and Hygiene

- a. Nail Cutting
- b. Oral Hygiene
- c. Cleanliness of Eyes and Hair etc.
- d. Personal Hygiene {particularly of ladies},
- e. Need of Information, Education and Communication

4. Diseases

- a. Scabies
- b. Worms
- c. Diarrhoea and Dysentery
- d. Malaria
- e. Immunisation
- f. Leucorrhoea
- g. Post-natal Fever and Other Complications among Ladies
- h. Malnutrition
- i. Guneaworm Eradication
- j. School Health
- k. Need of Information, Education and Communication
- l. T.B.

5. Intersectoral Activities

- a. Schools
- b. Playgrounds and Akhadas
- c. Electrification
- d. Sewing/Tailoring Classes for Women
- e. Raising of Funds for MCH Activities
- f. Swasth Bhavan
- g. Need of Information, Education and Communication

6. Others

- a. Village Sports Activities and Competition
- b. Village Cultural Activities and Competition
- c. Need of Information, Education and Communication

HEALTH DEVELOPMENT NETWORK

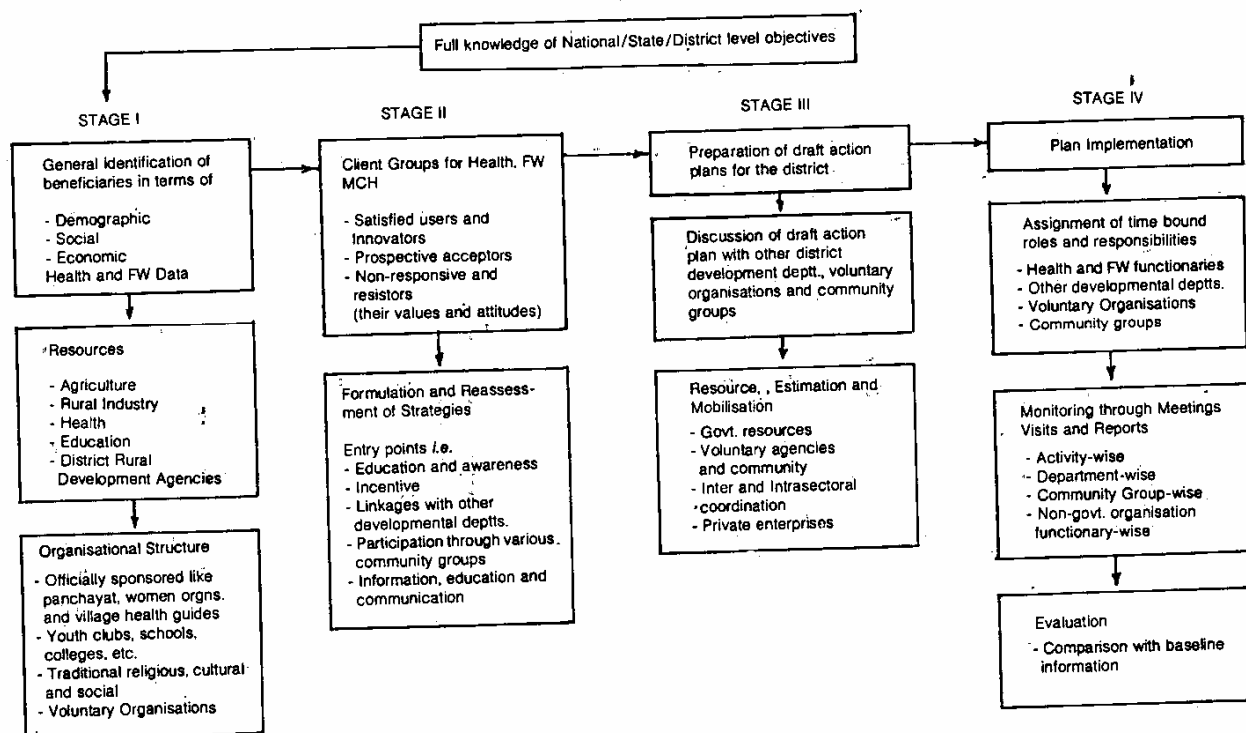
APPENDIX - II

HEALTH SECTOR

OTHER HEALTH RELATED SECTORS

Outside Health System	Health System		Ministries/Departments Institutions (National)
	Health Services Organisations and Infrastructure at different levels Central or National State/Provincial District C.D. Block Village	Managerial processes Policy Framing Strategy Formulation Resource Mobilisation Broad Programming Budgeting and Allocation of Resources Implementation - Activity Planning - Execution - Monitoring Control Evaluation Supporting Activities Communication (IEC) Training Services Self-care and Mutual Aid Research Coordination	
A. Voluntary Agencies B. Private Sector - Private Practitioners a. modern medicine b. traditional medicine C. Professional Bodies D. Community			1. Agriculture and Animal Husbandry 2. Education 3. Social Welfare 4. Industry - Drug - Food 5. Work and Housing - Water Supply - Sanitation - Housing 6. Rural Development 7. Information 8. Science and Technology International Agencies WHO, UNFPA, UNICEF, UNDP, FAO, ILO World Bank, and other Bilateral, Multilateral Multinational Agencies

**SUGGESTED STAGES AND MECHANISM FOR PLANNING, IMPLEMENTATION,
MONITORING AND EVALUATION OF DISTRICT ACTION PLAN FOR HEALTH, FAMILY
WELFARE AND MCH.**



SOME CORRELATES OF FERTILITY

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ABSTRACT

Interactions between nutritional status and fertility differentials were assessed. Indicators reflective of health and nutrition, socio-economic status, fertility and mortality were utilised at community and state levels in India and countries at the international level. Methods of correlation matrices, path coefficient analysis and multiple regression models of fertility rates were utilised. Findings revealed that: (1) Infant and toddler mortality rates were positively correlated with fertility; (2) Socio-economic indicators were inversely related with fertility and mortality; (3) Communities with better nutritional status were found with lower fertility, lower mortality and better socio-economic status than those with poor nutritional status; (4) Economic status and nutritional status were positively associated; (5) For given level of mortality, economic status or nutritional status were found to be positively correlated with fertility rates; and (6) Literacy status of population and newspaper circulation and mortality rates in vulnerable segments of the population were found to be more influential on variations in fertility.

Variations in nutritional status, socio-economic conditions and fertility rates have been observed between countries and population groups, states and regions in India. Fertility rates have been higher in developing countries and lower in developed countries. Growth of population has been very high in most of the developing countries. Smaller the family size, better is the health and nutrition of the family, mother and children. As a result, attempts were made to elucidate the causative factors associated with variations in fertility with the hypothesis that the degree of economic development has an inhibiting effect on fertility¹⁻³. Fertility rates were also found well correlated with health and sanitation facilities, mortality rates, resource availability and utilisation. There have been very few attempts recently made to assess the interrelationships between fertility, nutritional status and economic development. An attempt has therefore, been made with the data collected on various indicators of health and nutrition, economic development, resource availability and utilisation, to assess the determinants of variations in fertility at the community and state levels in India and countries at the international level.

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MATERIALS AND METHOD

Indicators of health and nutrition, socio-economic status, fertility and mortality chosen for the present study were provided in Table 1. Many of these indicators were found not available for many countries and states in India. Countries and states in India, for which the indicators chosen were available for the latest year, were chosen for assessing interactions between nutritional status, fertility, mortality and economic status. Countries and Indian states for which the data were available and taken for study were 40 and 15, respectively. Names of countries and Indian states included for analysis of the data are provided in Table 1 A.

Interactions of fertility were assessed with computations of correlation coefficients with all the indicators of socio-economic status, health and nutrition, and resource utilisation and manpower. Indicators of fertility taken were:

Birth Rate (BR): Number of live births per 1000 population per given latest year.

Total Fertility Rate (TFR): Average expected number of children born per woman as she passes through the reproductive age under the given fertility schedule.

Male Fertility Rate (MFR): Births per 1000 males of age 15 to 54 years.

TABLE 1
INDICATORS CHOSEN FOR STUDY

S. No.	Details of Indicators
1. <i>Demographic:</i>	<i>Total fertility rate, Birth rate, Male fertility rate:</i> Density, Death rate, Infant mortality rate. Toddler mortality rate by sex, Expectation of life at birth for males and females, Growth rate, Child-women ratio. Dependency ratio and sex ratio.
2. <i>Socio-economic:</i>	Literacy rates of males and females, Per capita gross national product, percentage of land under cultivation, Transport facilities of road length per 100 square kilometers of area, Newspaper circulation per 1000 population of 15 years or above, percentage of men and women in labour force.
3. <i>Health and Nutrition:</i>	Per capita daily calorie and protein intake, population per doctor. Population per hospital bed.

Note: 1. Those italics were taken as indicators of fertility.

2. Percentage of population above or below the poverty line available for Indian States was also taken as a socio-economic indicator.,.

TABLE1A

INDIAN STATES AND COUNTRIES CHOSEN FOR FERTILITY DIFFERENTIALS

S. No.	Names of the State/Countries
1. States	Andhra Pradesh. Assam. Bihar. Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh. Maharashtra. Orissa. Punjab, Rajasthan. Tamil Nadu, Uttar Pradesh and West Bengal.
2. Countries	Egypt. Canada. Cuba, Guatemala, Jamaica, Mexico, Trinidad and Tobago; USA, Chile, Venezuela, Bangladesh, India, Israel, Japan Kuwait. Malaysia. Pakistan, Philippines, Sri Lanka. Thailand. Austria Belgium, Czechoslovakia, Denmark, Finland, France, Greece, Hungary, Ireland, Luxemburg. Netherlands, Norway, Poland. Portugal, Spain. Sweden. Switzerland. United Kingdom. Australia, New Zealand.

The best set of variables related to these fertility indices was traced with the use of step-down multiple regression analysis. Step-down multiple regression analysis helps to trace the best combination of factors having significant contribution of explanatory variables. Coefficients of determination (R^2 or adjusted R^2) were found for each multiple regression model. The model with optimal R^2 adjusted and significant was chosen as the best one. Path coefficient analysis was carried out to find out the magnitude of contribution of each indicator in terms of direct and indirect or joint effects.

Appropriate tests of significance, namely, student's T, 'F' and ANOVA, whichever was feasible, were employed. Logarithmic transformations were also utilised to have the improvement of the models for the fertility indicators. Some fertility indicators were found to have better R^2 when logarithmic transformations were used.

Data available through community studies on health and nutrition of children and their parents, conducted at the Institute, were also utilised for assessing the factors associated with fertility. Population surveyed consisted of from urban and rural areas. Urban community study groups were selected from the twin cities of Hyderabad and Secunderabad. The rural group studied was drawn from the Ramannapet block in the Nalgonda district about 450 km from Hyderabad. The population mainly composed of Hindus and Muslims. The urban area contains large numbers of immigrants from other states of India. Most wage earners in the economically advantaged and middle income groups were of white-collar type, senior administrators and professional men, clerical and technically skilled workers. Overall level of education in both urban elite and urban middle groups was high, as is the proportion of university graduates. Urban poor consisted of unskilled workers with occupations of driving and domestic service, petty business like bicycle repair shops and roadside food stalls. Rural families are dependent on agricultural work, usually of subsistence kind with poor daily incomes. Illiteracy was common among

men and women of both rural and urban poor communities. Facilities of housing, electricity, piped water supply and sewage disposal systems were better and modern in urban elite and middle income group families than those of urban poor and rural Hyderabad. Details of sample covered have been shown in Table 2.

TABLE 2
SOME DEMOGRAPHIC, HEALTH AND NUTRITION INDICATORS OF
COMMUNITIES BY SOCIO-ECONOMIC STATUS

S.No.	Indicators	Urban Hyderabad		Rural Hyderabad	
		Urban elite	Urban middle	Urban poor	
1.	Number of mother-child pairs surveyed	663	994	980	1185
2.	<i>Number of years of education</i>				
	a. Male adults	16.6	14.0	6.8	5.9
	b. Female adults	13.9	10.2	3.1	35
3.	Number of children born alive	2.0	2.5	3.8	3.0
4.	Mortality rate among children per 1000 live births	48.0	74.0	111.0	100.0
5.	Percentage of children (0-3 years) with body weight -of 75 per cent or above Harvard standard	96.0	87.6	57.5	58.0
6.	<i>Percentage of population with Calorie-protein adequacy</i>				
	a. Pre-school children	85.4	87.1	55.0	38.0
	b. School children	82.7	61.3	61.6	51.8
	c. Adolescents	80.2	77.1	42.6	60.8
	d. Adults	94.9	94.4	59.9	71.8

- Note: 1. Vitamin and mineral nutrient adequacies were also found closely improved with socio-economic status.
2. Number of children born alive and those dead among them were collected retrospectively from each mother under study. Mortality rate was calculated as the ratio of number of children dead per 1000 live births (Reference 10.)

In order to define the extent of child loss, i.e., percentage of deaths among previous children in the economic groups studied, mothers were asked how many live children had been born to them and how many were still living. Mortality rates per 1000 live births were found and compared between economic groups (Tables 2 and 3).

Mother's health during last pregnancy was also assessed by retrospective clinical procedure and ranks were given as 1, 2 and 3 for very ill, ill and healthy, respectively.

Dietary surveys were conducted by oral questionnaire method for the previous 24 hours. Nutritive values were calculated using nutritive value of Indian foods, Three hundred and forty seven families consisting 50 of upper middle income groups, 73 of middle income groups, 53 of urban poor and 171 of rural Hyderabad were surveyed. Calorie protein adequacies in the diets for preschool children, school age children, -adolescents and adults were analysed and provided for comparison by socio-economic status of families.

RESULTS AND DISCUSSION

Results of analysis of data have been presented in Tables 2-13. Communities with better socio-economic status are found to have better calorie-protein adequacies, vitamin and mineral nutrient intakes and lower family size and reduced mortality rates. Literacy status was also found to increase with improved socioeconomic status as has been shown in Table 2. All the indicators are well-

TABLE 3
CORRELATION COEFFICIENTS BETWEEN NUMBER OF
CHILDREN BORN ALIVE AND SOME OTHER VARIABLES:
URBAN HYDERABAD

S. No.	Variables	Urban elite	Urban Middle	Urban Poor
1.	Number of years of education: Mothers	-0.369	-0.176	-0.398
2	Number of years of education:- Fathers	0.164	-0.066	-0.475
3.	Mortality rate among children per 1000 live births	0.318	0.150	0.275
4.	Mother's health during pregnancy	-0.029*	-0.451	-0.328
5.	Number of subjects surveyed	863	994	980

Note: 1. *Those marked with stars only are not significant ($P > 0.05$).

2. Mother's health was assessed with a retrospective clinical survey and ranks. Ranks given were: 1, 2 and 3 indicating very ill; ill and healthy clinical status, respectively.

correlated. Number of children born alive are positively correlated with mortality rate among live born and inversely correlated with literacy status. Overall, number of children born alive as well as mortality rates among new born were inversely correlated with the indicators of development among communities as has been given in Table 4. Same trend of differences in nutritional status, resource utilisation and fertility and mortality rates between developed and developing countries have been observed to exist as shown in Table 4. Developing countries have lower calorie-protein intakes, lower literacy, higher mortality and fertility rates and poorer disposable income than those observed in developed countries. Statewise data in India showed also that there were wide variations between regions in fertility and mortality rates, expectations of life at birth, health and nutritional status, resource utilisation, transport, health and communication facilities. States like Kerala and Haryana were found with better situation than many other States. Uttar Pradesh, Bihar, Rajasthan, Orissa were observed with indicators far below than the average figures of India.

Correlation matrices between all indicators were found and given in Tables 5-7. All the indicators of fertility, mortality, nutrition, health, resource utilisation, socioeconomic status and literacy status were well correlated. Fertility rates were positively correlated with mortality rates. Fertility and mortality indicators were inversely correlated with indicators of socio-economic development, resource utilisation and health and nutrition. Mostly, similar results were found between various countries and states in India. All the fertility indicators - male fertility rate, total fertility rate and crude birth rate, were found well correlated with other

Table 4
SOME DEMOGRAPHIC, NUTRITION AND HEALTH INDICATORS OF INDIA
AND OTHER COUNTRIES

S.No.	Indicators	India	Bangladesh	Pakistan	U.S.A.	Sweden	United Kingdom
1.	Birth rate	332	46.8	43.1	15.9	11.3	13.1
2.	Total fertility rate (TFR)	4.5	5.0	7.0	1.8	1.6	1.8
		105.0	124.0	115	10.9	7.0	10.2
3.	Infant mortality rate (IMR)	17.0	15.0	14.2	0.9	0.3	0.5
		2.3	2.4	3.0	0.8	0.4	0.2
4.	Toddler mortality rate (TMR)	2056	1837	2180	3641	3146	3249
5.	Percentage of growth rate	49.7	39.7	56.4	105.6	88.8	90.1
6.	Per capita daily intake of						
	a. Calories						
	b. Proteins (g)						

TABLE 5
CORRELATION COEFFICIENTS OF FERTILITY WITH SOME
INDICATORS

S.NO.	Indicators	Correlation Coefficients			
		Countries		States	
		BR	TFR	BR	TFR
1.	Infant mortality rate	0.8891**	0.8350**	0.8222**	0.8211**
2.	Femate expectation of life at birth	-0.8180**	-0.7894**	-0.6163**	-0.7362**
3.	Male expectation of life at birth	-0.7851**	-0.7473**	-0.4846	-0.5721**
4.	Percentage of growth rate	0.9108**	0.6930**	**6.4955	0.3822
5.	Death rate	0.0719	6.1201**	0.7551**	0.7634**
6.	Density	0.1187	0.1334	-0.3957	0.2835
7.	Female literacy rate	-0.8323**	-0.8734**	-0.7254**	-0.7962**
8.	Male literacy rate	-0.8510**	-0.8721**	-0.6533**	-0.7729**
9.	Per capita income	-0.6676**	-0.6299**	0.0207	0.0165**
10.	Transport	0.3465*	0.3573*	0.1270	0.2622
11.	Per capita energy consumption	-0.7923**	-0.7126**	-0.4466*	-0.5927*
12.	Percentage of workers	-0.5804**	-0.5509**	-0.2196	-0.1088
13.	Population per hospital bed	0.6362**	0.5337**	0.8158**	0.7702**
14.	Population per doctor	0.6634**	0.5679**	0.3143	0.3865
15.	Calories	-0.7462**	-0.6377**	0.3743	0.3351
16.	Proteins	-0.6961**	0.5716	0.5483*	0.4438

Note: 1. Those marked with stars are significant. *P < 0.05; **P < 0.01

BR=Birth rate; TFRs=Total fertility rate

TABLE 6
CORRELATION COEFFICIENTS OF FERTILITY WITH SOME OTHER
INDICATORS: COUNTRIES

Indictators	Density	Infant mortality rate	Gross national product (income)	Newspaper circulation	Per capita energy consumption	Male fertility rate	Birth rate	Total fertility rate
Density	1.0	0.2506	-0.3392*	-0.2518	-0.3103	0.1223	0.1187	0.1334
Infant mortality rate		1.0	-0.8018**	-0.8570**	-0.7776**	0.8640**	0.8891**	0.8350**
Gross national product			1.0	0.8000**	0.8871**	-0.6686**	-0.6696**	-0.6299**
Newspaper circulation				1.0	0.8650**	-0.8260**	-0.8304**	-0.7993**
*Per capita energy consumption					1.0	-0.7309**	-0.7293**	-0.7126**
Male fertility rate						1.0	0.9775**	-0.9426**
Birth rate							1.0	0.9299**
Total fertility rate								1.0

Note: 1. Those marked with stare are only significant *p < 0.05; **P < . 0.01.
2. Number of countries studied were 40.

TABLE 7
CORRELATION COEFFICIENTS OF FERTILITY WITH SOME OTHER
INDICATORS: STATES

Indicators	Density	Infant mortality rate	Per capita income	Literacy rate	Percentage Increase in per capita energy consumption	Male Fertility	Birth rate	Total Fertility rate
Density	1.0	-0.3795	0.0173	0.4731	0.2692	-0.4899	-0.3957	-0.2835
Infant mortality rate		1.0	0.0285	-0.6798**	0.4212	0.7484**	0.8220**	0.8211**
Per capita income			1.0	0.1152	0.1532	-0.0232	0.0207	0.0165
Percentage of literacy rate				1.0	-0.3996	-0.6939**	-0.7696**	-0.8495**
Percentage of increase in per capita energy consumption					1.0	0.2490	0.4466	0.5927*
Male fertility						1.0	0.9004**	0.8163**
Birth rate							1.0	0.9315**
Total fertility								1.0

Note: 1. Those marked with stars are only significant. *P< 0.05;
 **P < 0.01.

2. Number of States studied were 15.

indicators. All these three fertility indicators were also well correlated as shown in Tables 6 & 7. Number of children born alive were inversely correlated with educational level and health status of mothers as has been presented in Table 3.

Best set of indicators related to fertility rates arrived at by step-down multiple regression analysis with order of importance at state level and international level have been provided in Tables 8 to 12. Results showed that infant mortality rate and per capita national income were positively correlated with fertility rates. Newspaper circulation or literacy rates, density and per capita energy consumption were inversely correlated with fertility rates. Results were more or less similar with countrywise data as well as statewise data of India. Only the order of relationship of the indicators was different for varied fertility indicators.

TABLE 8
BEST SET OF REGRESSION MODELS OF FERTILITY WITH SPECIFIC
VARIABLES – COUNTRIES

S.No. Details	Multiple regression models		R ² (%) adj.	R ² (%)	d.f.	F' ratio
1	2	3	4	5	6	7
1. Demography	A.-0.875+0.187 IMR+child-woman ratio +2.776 growth/rate + 0.7793 male toddler mortality rate -0.839 female toddler mortality rate -0.008 dependency ratio+0.017 sex ratio		92.7	94.1	7.32	72.32
	B. 5.356+0.020 IMR+0.374 growth rate -0.001 density+0.072 death rate -0.004 sex ratio +0.002 child- woman ratio -0.001 dependency ratio		82.0	85.2	7.32	26.34
	C. 61.900+0.014 child-woman ratio -1.245 female expectation of life at birth -0.044 dependency ratio,+ 7.84 growth rate+0.716 male toddler mortality rate+0.072 sex ratio		84.2	86.6	6.33	35.53
2. Socio-economic	A. 77.649-0.395 male literacy - 0.005 newspaper circulation - 0.127% land under cultivation - 0.228 % men in labour force -0.136 transport -1.046 agricultural land per capita		85.6	87.8	6.33	39.72
	B. 7.734-0.043 female literacy - 0021 % land under cultivation - 0.0006 newspaper circulation - 0.319 agricultural land per capita - 0.021 .transport		84.4	86.4	5.34	43.19
	C. 215.621-0.831 female literacy - 0.017 newspaper circulation - 0.504% land cultivation -7.816 agricultural land per capita -0.677% men in labour force		81.8	84.1	5.34	36.09

3. Health and Nutrition	A. 55 077-0.011 calories*-0.004 population per bed	58.6 60.8	2.37	28.64
	B. 6.745-0.001 calories+0.004 population per bed	40.9 43.9	2.37	14.48
	C. 200-113-0.041 calories* 0.008 population per bed	47.5 50.2	2.37	18.65
4. All indicators	A'. 98.483-0.419 male literacy -0.985 death rate+0001 population per doctor-0.228% men in labour force -1.236 male expectation of life at birth +0760 female expectation of life at birth* 0.136 IMR -1.242 female toddler mortality rate -0.054% land under cultivation -0.142 transport+0983 male toddler mortality rate*+0.107 calories	91.8 94.3	12.27	37.57
	B. 15661 -0.116 male literacy -0.001 population per bed+0.0003 population per doctor -0.078 death rate40.017 IMR+0.018 proteins - 0.072 female expectation of life at birth-t-0.029 female literacy+0001 GNP -0.0002 newspaper circulation -0.070 male toddler mortality rate	90.8 93.4	11.28	35.98
	C. 386.989-1.243 male literacy -0.008 newspaper circulation -0.355% land under cultivation -1.476 male expectation of life at birth -0.654% men in labour force+0.002 population per doctor -0.010 population per bed +0.035 density -1.378 death rate.	83.9 87.7	9.30	23.65

Note: 1. A= Birth rate; B = Total fertility rate; C= Male fertility rate; IMR Infant mortality rate

2. All the 'F' ratio values are significant *P <0.001

Stepwise multiple regression models showed that male literacy, newspaper circulation, per capita intake of calories, population per hospital bed and per capita national income to be the best set of indicators related with fertility differentials. Specifically, female literacy rate, newspaper circulation among socio-economic variables and the percentage of land under cultivation and agricultural land per capita resources available and utilised were the good sets related with fertility differentials.

Studies of other researchers, also showed that infant mortality rate and per capita income have direct correlation and newspaper circulation and density have inverse correlation with variations in fertility rates. Because of the relationship of many factors with fertility, the direct or indirect effects could not be understood with correlation matrices. Multiple regression procedure could provide an order of importance of variables in explaining the variations in fertility rates.

TABLE 9
BEST SET OF REGRESSION MODELS OF FERTILITY WITH SPECIFIC
VARIABLES: STATES

S.No. Details	Multiple regression models	R ² (%) adj.	R ² (%)	d.f.	'F' ratio
1. Demography	A. -44.789+0.121 IMR+0.646 growth rate +0.732 male expectation of life at birth +0.037 sex ratio -0.469 female expectation of life at birth	84.3	89.9	5.9	16.03
	B. 1.967+0.039 child mortality rate 0.035 growth rate+0.016 IMR+0.035 death rate	85.5	89.6	4.10	21.61
2. Socio-economic	A. 52.266-0.283 female literacy 0.336% workers -27.092 transport	64.2	71.9	3.11	9.38
	B. 7.008-0.051 female literacy -0.040% workers	63.8	68.9	2.12	13.31
3. Health and Nutrition	A. 22.213+0.004 population per bed +0.304 proteins -0.007 calories	84.8	88.1	3.11	27.09
	B. 2.108+0.0008 population per bed +0.014 proteins	61.2	66.7	2.12	12.03
4. All Indicators	A 15.827-0.006 calories+0.003 population per bed+-0.201 proteins +0.089 I MR -0.126 population below poverty line+0.289 growth rate+0.073 female literacy -0.001 per capita income+0.036% villages electrified	95.0	98.2	9.5	30.33
	B. 4.359+0.034 child mortality rate -0.020 female literacy rate -0.029% workers	86.0	89.0	3.11	29.73

Note: 1. A = Birth rate; B-Total fertility rate; IMR = Infant mortality rate ,
2. All the F' ratio values are significant ('PL 0.05)

TABLE 10
STANDARDIZED MULTIPLE REGRESSION MODELS OF FERTILITY -
COUNTRIES

S. No. Fertility rate	Standard multiple regression models	R ² (%) adj.	R ² (%)	d.f.	'F' ratio
1. Male fertility rate	0.6954 IMR -0.2910 newspaper circulation - -0.0972 density 0.2862 GNP per capita -0.2225 per capita energy consumption	77.1	80.1	5.34	27.31***

2. Birth rate	0.7916 IMP. -0.2474 newspaper circulation+0.3179 <i>GNP per capita</i> - 0.1002 Density -0.2929 per capita energy consumption	81.6	84.0	5.34	35.64***
3. Total fertility rate	0.7135 IMR -0.3173 per capita energy Consumption+ 0.4242 <i>GNP per capita</i> -0.2507 newspaper circulation	72.7	75.5	4.35	27.00***

Note: 1. Models correspond to fertility rates with data for countries. Log transformations were used for all variables.

2. All the 'F' ratio values are significant. ***P<0.005

IMR=Infant mortality rate: GNP= Gross national product or per capita income.

TABLE 10A
STANDARDIZED MULTIPLE REGRESSION MODELS OF FERTILITY - STATES

S. No.	Fertility rate	Standardized multiple regression models	R ² (%) adj.	R ² (%)	d.f.	'F' ratio
1.	Male fertility rate	A. 0.5126 IMR -0.2980 literacy rate -0.1414 density -0.0490 per capita energyconsumption+0.0065 <i>PCI</i>	45.1	64.7	5.9	3.30
		B. 0.5115 IMR -0.3426 literacy rates	56.0	62.3	2.12	9.93
2.	Birth rate	A 05155 IMR -0.3562 literacy rate + 0.0978 per capita energy consumption -00584 density + 0.0330 PCI	63.5	76.5	5.9	5.87
		B. 0.5556 IMR -0.17B0 literacy rate	71.8	75.8	2.12	18.82
3.	Total fertility rate	A. -0.5467 literacy rate+0.4050 IMP +0.1757 per capita energy consumption + 0.0809 density +0.0396 <i>PCI</i>	81.2	87.9	5.9	13.06
		B. -0.4926 literacy rate+0.3885 IMR +0.2322 per capita energy consumption	84.1	87.5	3.11	25.67

Note: 1. IMR= Infant mortality rate; PCI= per capita income

A. Model with five predictor variables, B: Model with best set of predictor variables

2. All the 'F' ratios are significant (P< 0.05). Log transformations were user for all variables.

TABLE 11
BEST SET OF REGRESSION MODELS OF FERTILITY WITH SPECIFIC
VARIABLES - COUNTRIES

S.No.	Details	Regression models	R ² (%)	R ² (%) adj.	d.f.	'F' ratio
1	2	3	4	5	6	7
1. Demography	A.	3.1228 + 0.1268 IMR-+0.0266 child-woman ratio+ 1.9024 growth rate	93.2	92.6	3.36	163.40
	B.	1.1687+0.0263 IMR+0.5601 growth rate	82.4	81.5	2.37	86.66
	C.	156.3895+0.1097 child- woman ratio - 1.8036 expectation of life at birth per female	83.3	82.3	2.37	91.98
2. Socio- economic	A.	79.138 - 0.399 male literacy - 0.004 newspaper circulation - 0.090% land under cultivation - 0.313% men in labour force	86.9	85.4	4.35	58.12
	B.	7.409 - 0.042 female literacy - 0.019% land under cultivation - 0.005 newspaper circulation - 0.317 per capita agricultural land	85.7	84.1	4.35	52.52
	C.	184.232 - 0.814 female literacy -0.020 newspaper circulation -0.574% land under cultivation - 9.203 per capita agricultural land	83.4	81.5	4.35	44.08
3. Health and Nutrition	A.	55.0767 - 0.0114 calories+0.0040 population per bed	60.8	58.6	2.37	28.64
	B.	80780 - 00017 calories	40.7	39.1	1.38	26.05
	C.	223.9316 - 0.0482 calories	48.6	47.3	1.38	35.95
4. All indicators <	A.	105.39 - 0.487 male literacy - 0930 death rate+0.001 population per doctor - 0.337% men in labour force -1.209 expectation of life at birth per male - 0.807 expectation of life at birth per female	91.6	90.1	6.33	60.10
	B.	15.66 - 0.092 male literacy - 0.001 population per bed+0.0007 population per doctor -0.078 death rate	88.3	86.9	4.35	65.85
	C.	386.99 - 0.904 male literacy - 0.015 newspaper circulation - 0.454% land under cultivation - 1.642 male expectation of life at birth	83.2	81.3	4.35	43.39

Note: 1.A: Birth rate; B = Total fertility rate, male; C - Male fertility rate; IMR = Infant mortality rate.

2.All the "F" ratio values are significant (P< 0.001); stepdown regression procedure was adopted.

3.All partial regression coefficients are significant (P<0.05).

TABLE 12
BEST SET OF REGRESSION MODELS OF FERTILITY WITH SPECIFIC
VARIABLES- STATES

S.No.	Details	Multiple regression models	R ² (%)	R ² (%) adj.	d.f.	'F' ratio
1. Demography	A. 13.3326-V0.0960 IMR- +0.3501 growth rate		82.8	80.0	2.12	28.91
	B. 2.3300 +0.0456 child mortality rate		82.6	81.3	1.13	61.85
2. Socio-economic	A. 52.266 - 0.283 female literacy -0.333% workers -27.092 transport		71.9	64.2	3.11	9.38
	B. 5.6205 -0.04B8 female literacy		63.4	60.6	1.13	22.51
3. Health and Nutrition	A. 22.2132+0.0037 population per bed +03036 proteins -0 0065 calories		88.1	64.8	3.11	27.09
	B. 2.1081 + 0"0008 population per bed + 0.0136 protein		66.7	61.2	2.12	12.03
4. All indicators	A. 32.1888-0.0077 calories+ 0.0034 population per bed+- 0.2267 proteins +0.0515 IMR - 0.1613 population below poverty line		95.3	92.7	5.9	36.41
	B. 4.3588+0.0336 child mortality rate -0.0203 female literacy - 0.0288% workers		89.0	86.0	3.11	29.73

NOTE: 1. A: Birth rate; B= Total fertility rate; d.f. = degrees of freedom.
2. ALL 'F' values are significant (p<0.001); Step down multiple regression procedure was adopted.
3. ALL partial regression coefficients are significant (p<0.05)

Foetal death rates were observed higher among population with poor socio-economic status than those observed with better socio-economic status. They were found more among women with higher parity. Nutritional status of individuals were correlated. Multiple regression analysis utilized showed that elimination of the effect of infant or child mortality rates, educational level and other factors the per capita income has been observed to be positively correlated. Fertility rate might have been increased with improvement in economic status for a given level of education and mortality rates. Economic status and nutrient intakes and economic status and anthropometric measurement reflective of nutritional status of male and female positive influence of economic and nutritional status on the increase in fertility.

Per capita intake of calories and proteins at country level were negatively

correlated with fertility indicators. Multiple regression analysis indicated that calorie intake was negatively related and protein intake positively related with fertility rates. Intake and requirement of calories vary by the degree of work and activity of the population. Protein requirements were found to be the same for individuals irrespective of variation in activity. Due to variations in occupational status and activity of population, it was possible to find calories having negative relationship and protein intake*having positive relationship with fertility indicators.

Some of the Indian states like Kerala though better, have percentage of population below poverty line more than some other states. Calorie and protein intakes were also lower in states like Kerala, Indicators of educational status and health or transport facilities were found better in these states than others. As a result, variation in the fertility was observed better explained by other indicators than calories or proteins. Statewise model also showed that higher the percentage of population above poverty line, higher was the fertility rate, when the effect of other variables were kept constant as has been shown in Table 9. Both statewise and country wise multiple regression models derived showed positive influence of economic status on fertility. Similar finding was also noted by other scientists'. The advantage of multiple regression approach compared to simple correlation was also noted by workers.

Direct and indirect effects of each indicator on variations in fertility rates assessed by path coefficient analysis have been provided in Table 13. Direct effects as well as indirect effects were found dominant. Infant mortality rate and literacy rates were seen to have more direct effect and the other indicators to have more indirect effect. .Socio-economic status and nutritional status were positively correlated. Socio-economic status and nutritional status were inversely correlated with fertility and mortality. For a given level of mortality, economic status or nutritional status were seen positively correlated with the fertility as have been shown in Tables. 10 and 10A.

TABLE 13
RELATIVE CONTRIBUTIONS OF FACTORS - DIRECT AND INDIRECT
EFFECTS ON FERTILITY VARIATIONS (PATH ANALYSIS) =
COUNTRIES STATES

S. No. States	Variables	Countries					
		Total fertility rate	Male fertility rate	Birth rate	Total fertility rate	Male fertility rate	Birth rate
1.Direct effects							
a.	Infant mortality rate	20.0	23.5	27.6	16.1	36.9	34.3
b.	Newspaper circulation or literacy rate	2.3	4.1	2.7	29.2	12.4	16.3
c.	Per capita income	6.3	4.0	4.5	0.2	0.1	0.2
d.	Per capita energy consumption	4.2	2.4	2.0	3.0	0.3	1.2
e.	Density	0.2	0.5	0.4	0.6	2.8	0.4
Subtotal		33.0	34.5	37.2	49.1	52.5	52.4

2. Indirect effects

a. Infant mortality Vs. Per capita income	17.9	15.5	17.8	0.1	0.1	0.1
b. Infant mortality Vs. Newspaper circulation	11.7	16.9	14.8	29.5	29.1	32.1
c. Infant mortality Vs. Per capita energy consumption	14.1	11.7	11.6	5.9	3.0	5.5
d. Per capita income Vs. Per capita energy consumption	9.1	5.5	5.3	0.2	0.1	0.1
e. Per capita income Vs. Newspaper circulation	6.2	6.5	5.5	0.5	0.1	0.4
f. Others	1.0	9.4	7.8	14.7	15.1	9.4
Sub total	67.0	65.5	62.8	50.9	47.5	47.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
3. Coefficient of determination (R^2)	75.9	80.1	84.0	87.5	64.7	76.4

सारांश

इस लेख में पोषण स्तर तथा प्रजनन विभेदकों संबंधी अन्तःक्रियाओं का आंकलन किया गया था। इस आंकलन के लिए भारत में सामुदायिक तथा राज्य स्तरों पर, और अन्तराष्ट्रीय स्तर पर विभिन्न देशों के संदर्भ में स्वास्थ्य एवं पोषण, सामाजिक-आर्थिक स्थिति, जनन दर तथा मृत्यु दर संबंधी प्रेक्षक संकेतकों का उपयोग किया गया था। इसके लिए सहसंबंध आव्यूह विधि, "पथ गुणांक विश्लेषण विधि", तथा प्रजनन दर संबंधी "बहुक ह्रास मॉडल का प्रयोग किया गया था। प्राप्त निष्कर्षों से निम्नलिखित तथ्य सामने आते हैं: 1— नवजात एवं अन्य शिशुओं की मृत्यु दर तथा प्रजननशीलता में सकारात्मक सह-संबंध पाये गये थे, 2— सामाजिक-आर्थिक संकेतकों और प्रजननशीलता तथा मृत्यु दर में प्रतिलोमी सह-संबंध पाए गए थे, 3— जिन समुदायों का पोषणात्मक स्तर निम्न था उनकी

तुलना में बेहतर पोषणात्मक स्तर वाले समुदायों में जनन दर तथा मृत्यु दर कम पाया गया था, और उनकी सामाजिक-आर्थिक स्थिति भी उनसे बेहतर पाई गई थी, 4- आर्थिक स्तर तथा पोषणात्मक स्तर में सकारात्मक सह-संबंध पाए गये थे, 5- मृत्यु दर आर्थिक स्थिति स्तर अथवा पोषणात्मक स्तर का जनन दर में सकारात्मक सह-संबंध पाया गया था, तथा 6- जनन दर में होने वाले परिवर्तनों पर जनसंख्या के भेद्य वर्गों में साक्षरता स्तर तथा समाचार पत्रों के प्रसार और मृत्यु दर आदि पक्षों का महत्वपूर्ण प्रभाव होना पाया गया था।

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**CORRELATES OF MORBIDITY AND PATTERNS OF MORTALITY IN
URBAN SLUMS OF DELHI: PART I**

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ABSTRACT

A survey was conducted on morbidity and mortality patterns in four urban slums of Delhi. Load of morbidity/sickness of any kind was estimated for 2 points of time, viz., during the last one month including the day of survey and chronic sickness lasting for over three months. Sickness was studied for 2 groups of population: the first being children of less than 6 years of age and the second population of 6+ years of age. Load of sickness was estimated from 11 to 15 per cent at any given point of time. Fever has been identified as the major cause of sickness (40 to 60 per cent) followed by digestive disorders (16 to 25 per cent) and respiratory disorders (15 per cent) for both groups of population. Maximum sickness was registered in slums having the poorest sanitary conditions and maximum of people living below poverty line. Important correlates of morbidity were identified as: low educational level, poor hygienic status of the families, poor environmental sanitation and low per capita income. Maximum number of deaths was due to respiratory infections (20 percent) followed by fever and diarrhoea (17 percent each).

In India, of the total population of 792 million in (1988) 185 million (23 %) live in urban areas; out of these 185 million people, over 70 per cent live in sub-human conditions. The number and proportion of such people, who are deprived of all basic health services, have increased enormously in recent years.

Although the health indices in the urban areas appear to be better than the rural areas, the population of slums live in severe unhygienic conditions where health and nutrition status of the people remain far worse than that of rural people. Some of the cardinal factors that keep the health status of urban slums at a low level can be identified as: poor housing, overcrowding, poor environmental sanitation, lack of potable water supply and drainage system, child labour and lack of education, neo-riches with altered social values, unemployment in youth, juvenile delinquency and similar maladies. Before the Governmental health services are able to cope with the fast growing population, another cluster of slums is created for which no health service is made available for years to come.

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Health Care Delivery System in Urban Areas: The health care delivery system in urban areas, particularly in large cities, consists of hospitals, dispensaries and maternal and child health (MCH) centres, run by;

- a. Government, State/Central;
- b. Municipal Corporation;
- c. Other organisations, such as Central Government Health Scheme, Employees State Insurance Corporation, Industrial Undertakings, Voluntary Organisations, etc.;
- d. Private individuals/bodies (nursing homes/clinics etc.)

The Urban Family Welfare Centres are usually attached to institutions run by the Government/Municipal Bodies/Voluntary Organisations. Most of these institutions are predominantly located in areas where density of poor and lower middle class families is somewhat low. Moreover, these institutions do not have proper outreach services. Hence, this vulnerable group of people, mostly needing family planning and health care services, tends to get neglected.

Growth of Slums in Delhi: In Delhi, the growth of population had been much higher than was predicted, resulting in the emergence of slums, unauthorised constructions and squatter colonies. The number of such families increased from 1,270 in 1951 to 1,60,000 in 1977. At present, there are over 2 lakh squatter families (10 to 18 lakh population) and more than 600 unauthorised colonies. Of the 70.0 lakh population of Delhi, nearly 36.0 lakh (53 per cent) live in unauthorised colonies and notified slums which can broadly be classified in four groups, *viz.* the unauthorised colonies, notified slum areas, planned/developed squatter colonies and jhugi/jhompri clusters.

Health Services in Delhi: Metropolis of Delhi has three Municipal Corporations (MCD) and being a Union Territory - a Delhi Administration or Directorate of Services. The Delhi Administration runs the general health services, while the MCD and New Delhi Municipal Corporation (NDMC) provide the MCH and FP services through the Urban Health and Family Welfare Centres. The sanitation and control of communicable diseases and other surveillance activities are the responsibilities of MCD and NDMC. There are four medical colleges with 1000-1500 bedded hospitals in addition to voluntary hospitals and private practitioners. Despite the multiplicity of the services and a strong private sector in the field of medical care, there does not seem to be a fair distribution of services between the rich and the poor, central and out-skirts of Delhi.

In the present study, an attempt has been made to identify the health problems of urban slum dwellers in origin, their magnitude and health implications.

OBJECTIVES

The specific objectives of the study were:

- i. to undertake a situational analysis of morbidity, and social problems in selected slums of Delhi;

- ii. to identify correlates of morbidity; and
- iii. to assess the: availability of medical and family welfare services and their utilisation.

The results of the study have been presented in four parts:

- i. the first part identifies the correlates of morbidity and the patterns of mortality in urban slums;
- ii. the second part deals with maternal and child health status and health care pattern in urban slums;
- iii. the third part examines the availability and utilisation of health care facilities in urban slums; and
- iv. the fourth part deals with-policy implications and key issues in delivery of primary health care in urban slums.

MATERIALS AND METHOD

The study was carried out in the months of July to December, 1984. In order to get a fair representation of a poorly socio-economic population, four representative slum areas of Delhi were selected randomly, *viz.*, Mangolpuri, Seelampur, Nehru Place and Ballimaran, representing slums "broadly classified as resettlement colonies, unauthorised jhugi jhompri clusters (J.J. clusters), construction site clusters and declared slums of old Delhi, respectively. Sample for the survey was chosen by the cluster sampling technique.

Operational Definitions: A person was considered sick if he/she expressed sickness of any kind during last one month including on the day of survey. Those reported to have been sick for more than three months and continue to suffer were considered as having chronic sickness. Load of sickness "was studied for two groups of population, *viz.*, children years of age and population of 6years of age.

Data Collection: Data were collected on demographic, socio-economic, environmental sanitation conditions, the prevailing morbidity and mortality pattern and the utilisation of services.

CHARACTERISTICS OF SLUMS/POPULATION

Availability of Facilities in Slums: Mangolpuri slum was provided with a Maternal and Child Health and Urban Family Welfare (MCH&FW) Centre and Integrated Child Development Service Scheme (ICDS). The slums of Seelampur and construction site did not have any of the Government/civic facilities. The fourth slum at Ballimaran was an ancient densely populated area with pucca houses and with laid out sewer-system and more representative of an urban area, rather than an urban slum (Table 1).

Running tap water facilities were available mostly to construction site squatters (73.9%) and Ballimaran population (67.0%), while hand-pumps were more often used in Seelampur (80.4%) and Mangolpuri (50.8%). Electricity facilities were

available mostly in Ballimaran (96.6%) and Mangolpuri (65.3%). Ninety-eight per cent population of construction sites and 56.5, per cent of Seelampur (J.J. colony)

were defecating in open areas. Excepting Ballimaran, in all the three slums the disposal of refuse and water was in open area/open drains (Table 1).

Characteristics of Population: The sample population of the combined slums was 5,911, with 3,284 (56%) males and 2,627 (44%) females, residing in 1200 households. Over half of the families residing in these households were living under very poor hygienic conditions with a maximum of 75 per cent in Seelampur slums. About 25 per cent of the population was below 6 years of age. Literacy rate (5+age) for males and females was 68.6 per cent and 43.5 per cent, respectively. School attendance in the age group 5-15 years was 68 per cent males and 59 per cent females. The main occupation both for males and females was skilled and unskilled/manual jobs with 45 per cent males and 59 per cent females from the total employment of 57.4 per cent males and 7.0 percent females, respectively, engaged in such jobs. Unemployment was maximum among youths in the age group of 15-24 years (38.3%) as indicated in Table 1.

RESULTS AND DISCUSSION

Sickness: Data were collected on sickness during the last one month and for chronic sickness (3+ months) the results have been presented and discussed in Tables 2 and 3.

Sickness Among Population of 6+ Years of Age: (i) **Sickness during last one month:** Over 11 per cent (512) of the population was sick during last one month with 10.9 per cent (268) males and 12.2 (244) females. Fifty-seven per cent of the sickness was due to fever alone followed by digestive disorders (16.5 per cent). Contribution of rheumatic diseases, respiratory diseases and skin diseases was in the vicinity of 6 per cent each. Age-group 25-34 years, had the highest prevalence rate of sickness (12.9 per cent), followed closely by age-group 45-59 (12.0%) and 6-14 years (11.8%). Sickness was in the vicinity of 10 per cent in age-group 15-24 and 35-44 years.

ii. **Chronic Sickness (3+months):** Over 5 per cent (228) of the population was suffering from chronic sickness, with 4.7 per cent (117) males and 5.6 per cent (111) females. Respiratory disorders were the most common (43.6%) followed by skin diseases (14%), rheumatic diseases (12.8%) and tuberculosis (10%). As expected, prevalence rate of chronic sickness was highest among elders of 45-59 years age group (17.2%) and 60+ years age (23.7%).

Sickness Among Children of 6 Years of Age: (i) **Sickness during last one month:** Over 14 per cent (204) of the children were reported sick during last one month with 14.6 per cent (120) males and 13.4 per cent (84) females. Prevalence rate by age revealed that every fifth infant was sick, giving a rate of 23.6 per cent. In the age group 1 -4 years, 12 to 15 per cent of the children were sick. Over 45 per cent of the sickness was due to fever that comprised unqualified fever (33.3 per cent), malaria fever (5.3%), and fever with rash/measles (6.9%). Diarrhoea/diarrhoeal dehydration contributed about 24.9 per cent. Other contributing sicknesses were: digestive disorders (8.5%), respiratory disorders (8.0%), and skin diseases (6.3%).

TABLE 1
HOUSEHOLD AND POPULATION CHARACTERISTICS OF URBAN SLUM
DWELLERS OF DELHI

Sl.No.	Characteristics	Mangol- puri	Seelam- pur(JJ colony)	Slums Construction site cluster Nehru Place.	Balli- maran	Study area (combined slums)
1.	Total population covered	1439	1962	776	1734	5911
	- Males	614	1053	435	982	3284
	- Females	625	909	341	752	2627
2.	No. of children (0-6 yrs. age)	345	556	183	367	1451
	% to total population	24.0	28.3	23.6	21.2	24.5
3.	No. of families	300	400	200	300	1200
4..	% population below poverty line	22.1	46.3	32.3	19.4	28.9
5.	% Literates (5-f-age)					
	- Male	785	47.3	75.5	78.7	68.6 74.0+
	- Female	38.7	29.9	36.4	75.3	43.5 53.6+
6.	% children going to school					
	- Male	82.7	45.3	78.5	71.1	67.9 83.6 +
	- Female	60.9	42.2	70.0	72.1	59.1 53.6+
7.	% Households:					
	a. Using water through:					
	- Running Taps	49.2	19.6	73.9	67.0	47.8
	- Handpumps	50.8	80.4	26.1	33.0	52.2
	b. Having electricity	65.3	11.4	-	96.6	44.1
	c. Defaecating in open space	5.7	56.5	98.0	0.3	36.6
	d. Disposing refuse in open space	85.7	97.5	99.5	6.0	72.0
	e. Disposing water in open drains/field	87.0	98.0	99.5	6.7	72.7
8.	% male population (14+yrs) engaged in gainful activities	- 50.8	62.6	65.0	54.2	57.4 57.0*+
9.	% youths (15-24 yrs) unemployed	48.4 (93)	33.6 (122)	47.5 (40):	33.8 (157)	38.3 (412)

NOTE: Figures in parenthesis indicate number.

The above estimates are derived by using the poverty line of Rs.75 per month (at 1977-78 prices) corresponding to minimum daily calorie requirement of 2100 in urban areas.

TABLE 2
MORBIDITY PATTERNS IN URBAN SLUMS OF DELHI AMONG POPULATION OF
6+YEARS OF AGE

Sl. No.	Characteristics	Mangol - puri	Seelam- pur JJ colony	Construction site cluster Nehru Place	Balli- maran	Study area (combined slums)
1.	Total population	1094	1406	593	1367	4460
2.	Prevalence of sickness (%)					
	a. During last one month: n	110	191	65	146	512
	Prevalence Rate (%)					
	by age					
	6-14	9.6	13.2	12.6	11.8	11.8
	15-24	5.2	13.5	13.7	8.5	10.1
	25-34	12.8	16.6	10.4	10.1	12.9
	35-44	10.8	10.5	7.5	11.2	10.4
	45-59	7.9	14.0	9.1	13.6	12.0
	60+-	11.5	3.1	-	8.1	7.2
	All ages	10.1	13.6	11.0	10.7	11.5
	b. Chronic sickness n	62	80	26	60	228
	Prevalence Rate (%)					
	by age					
	6-14	1.7	2.9	5.6	0.2	2.0
	15-24	4.6	4.4	6.9	0.3	3.4
	25-34	6.7	4.9	2.6	3.4	4.6
	35-44	6.5	8.1	2.2	8.8	6.8
	45-59	15.9	17.4	13.6	18.4	17.2
	60 +	23.1	15.6	-	32.4	23.7
	All ages	5.7	5.7	4.4	4.4	5.1
3.	Major cause of sickness (%)					
	a. During last one month: n	110	191	65	146	512
	- Fever unqualified/Malaria	62.0	43.5	69.8	63.4	57.4
	- Digestive Disorders	11.0	23.8	15.8	14.4	16.5
	- Respiratory Disorders	3.0	10.0	3.2	6.0	6.4
	- Rheumatic Diseases	9.0	5.4	3.2	6.0	6.1
	- Skin Diseases	7.0	7.5	4.8	1.5	5.2
	- Others	8.0	9.8	7.2	8.7	8.6
	b. Chronic Sickness: n	62	80	26	60	228
	- Respiratory Disorders	41.8	48.2	17.4	51.2	43.6
	- Skin Diseases	10.9	10.0	47.8	4.0	14.0
	- Rheumatic Diseases	10.9	6.6	13.0	24.4	12.8
	- Tuberculosis	9.1	16.7	8.7	2.4	10.4
	- Others	27.3	18.5	13.1	17.1	19.6

(ii) **Chronic sickness (3+months):** A total of 1.3 per cent (19) children were having chronic sickness with 1.8 per cent (15) males and 0.6 per cent (4) females. Of the 19 chronically sick children, 36.8 per cent (7) were due to polio paralysis alone; other important ailments were: digestive disorders (26.3%), respiratory disorders (10.5%), tuberculosis (5.3%) and rickets (5.3%). The rate of chronic sickness increased gradually with increasing age.

TABLE 3
MORBIDITY PATTERNS IN URBAN SLUMS OF DELHI AMONG POPULATION OF 0-6 YEARS OF AGE

Sl. No.	Characteristics	Mangol-puri	Seelam-pur JJ colony	Construction site cluster Nehru Place	Balli-maran	Study area (Combined slums)
1.	Total Children	345	556	183	367	1451
2.	Prevalence of sickness (%)					
	a. During last one month n	34	98	20	52	204
	Prevalence rate (%) by age					
	1	29.6	22.2	25.0	19.4	23.6
	1-2	9.9	22.0	10.0	8.7	12.6
	2-3	4.5	15.9	12.9	24.3	14.9
	3-4	8.6	16.3	17.6	12.5	13.5
	4-5	1.7	14.6	6.9	11.1	9.7
	5-6	4.0	8.5	11.1	12.0	8.5
	All ages	9.9	17.6	10.9	14.2	14.1
	b. Chronic Sickness n	8	7	1	3	19
	Prevalence rate (%) by age					
	-1	3.7	-	-	-	0.9
	1-3	0.7	1.3	1.1	1.2	1.1
	3-6	2.8	1.8	-	1.2	1.6
	All ages	2.0	1.3	0.5	1.1	1.3
3.	Major causes of sickness (%)					
	a. During last one month n	34	98	20	52	204
	-Fever (unqualified/Malaria/fever with rash/chickenpox)	40.0	42.6	61.1	48.1	45.5
	- Diarrhoeal/Dehydration	16.0	25.5	22.3	26.8	24.9
	• Digestive Disorders	12.0	8.5	-	9.6	8.5
	- Respiratory Disorders	12.0	6.3	16.6	5.7	10.0
	- Skin Diseases	-	11.7	-	1.9	0.3
	- Others	20.0	5.4	100.0	5.9	6.8
	b. Chronic Diseases	8	7	1	3	19
	- Digestive Disorders	28.6	42.9	-	-	26.3
	- Respiratory Disorders	-	28.6	100.0	-	10.5
	- Polio	57.1	14.3	-	50.0	36.8
	- Tuberculosis	-	-	-	25.0	5.3
	- Rickets	14.3	-	-	-	5.3
	- Others	-	14.2	-	25.0	15.8

Impairment/Disability: Information on impairment/disability for each member of the household was collected according to the guidelines and definitions of disability adopted by the National Sample Survey Organisation in their (36th round) survey in 1981-82 and the following impairments were recorded: (i) totally blind, (ii) blind with one eye, (iii) lame, (iv) polio paralysis (Table 4).

i. The most commonly found impairment in the study area was polio paralysis (2.0 per 1000 population). The other impairments in descending order of importance were: totally blind (1.2), lame (0.9), and blind with one eye (0.7). No sex-wise differential was observed.

ii. Impairment rate was highest in Mangolpuri, 7.6 per 1000 population followed by Ballimaran 5.7, Seelampur 5.6 and construction site clusters 3.9.

TABLE 4
DISABILITY PATTERNS IN URBAN SLUMS OF DELHI

Sl. No.	Characteristics	Mangol-puri	Seelam-pur JJ. Colony	Construction site clusters Nehru Place	Balli-maran	Study area (combined slums)
1.	Total population	1439	1962	776	1734	5911
	Number Disabled	11	11	3	10	35
3.	Disabled per 1000 population	7.6	5.6	39	5.7	5.9
4.	Type of disablement (%)					
	(a) otally blind	2.1	-	2.6	1.1	12 (7)
	(b) Blind with one eye	07	1.0	1.3	-	0.7 (4)
	(c) Lame	3.4	0.6	-	1.7	0.9 (5)
	(d) Polio paralysis	07	1.5	-	2.3	2.0(12)
	(e) Mentally retarded	07	1.5	-	0.6	0.8 (5)
	(f) Deaf/Dumb	-	1.0	-	-	0.3 (2)
5.	Disabled due to polio in 0-5 years of age	-	-	-	-	4.8 (7)

Note: Figures in parenthesis indicate number.

Expenditure: Average expenditure incurred in the combined slums worked out to Rs.19.4 per sickness reported during last one month with Rs.16/- each in Mangolpuri and construction sites, and Rs.21 /- each in Seelampur (JJ colony) and Ballimaran.

Average expenditure incurred per month by each chronically sick person worked out to Rs.46.5, with a maximum of Rs.64/- in Mangolpuri and minimum of Rs.38/- in construction sites.

Hospitalisation: Forty-six cases were hospitalised giving a hospitalisation rate of 2.9 per cent. Average duration of hospitalisation was 12 days with a maximum of 19 days in Seelampur (J.J. colony) and a minimum of 4 days in construction site

clusters. Maximum hospitalised cases were due to digestive disorders including diarrhoeal dehydration (26.1%), followed by problems of gynae/child birth, etc., (19.6%). Of the 46 hospitalised cases, 41.3% (19) were cured, 32.6% (15) could not be cured and 26.1 per cent (12) died. Mean expenditure per patient hospitalised worked out to Rs.2907- for the combined slum with a maximum of Rs.6107- in Mangolpuri and minimum of Rs;169/- in Seelampur (J.J. colony).

Mortality: A total of 48 deaths were reported from the combined slums in the past one year. Of the total of 48 deaths, over one-fifth (22.9%) were attributed to respiratory infections, 16.7% each to fever and diarrhoea/vomiting etc., 6.3% to tetanus and 4.1% each to chronic cough, injury, child birth/complications of pregnancy. Some 25% deaths were due to other causes including undiagnosed cases. Leading causes of deaths in different slums were diarrhoea/vomiting in Mangolpuri (33.3%) and construction site clusters (33.2%), fever in Seelampur (28.6%) and respiratory infections (40.0%) in Ballimaran. Maximum number of deaths due to miscellaneous causes/undiagnosed causes were reported from Ballimaran (46.6%).

TABLE 5
MORTALITY PATTERNS IN URBAN SLUMS OF DELHI

Sl. No.	Characteristics	Number/Percentage
1.	Population	4460
2.	Children (6 years of age)	1451
3.	Total Deaths	48
	- under 1 year of age	19
	- one or more years of age	29
4.	Cause(s) of death: (%)	
	- Fever (unqualified)	16.7
	- Diarrhoea/Vomiting	16.7
	- Chronic cough	4.1
	- Injury	4.1
	- Child birth/complications of pregnancy	4.1
	- Respiratory infections	22.9
	- Tetanus	6.3
	- Others (including undiagnosed cases)	25.1

NOTE: Indices are based on small sample size and are meant to give the magnitude of the problems only.

The level of indicator of mortality for 1983-84 (last one year preceding the survey) has been used for discussion here. The pooled estimate for combined slums reflected 48 deaths giving a death rate of 8.8 per 1000 population.

Seelampur (J.J. Colony) had the highest crude birth rate of 11.5, followed by 9.3 in Ballimaran, 7.8 in construction site clusters and 4.9 in Mangolpuri. Infant deaths

constituted 39.6% (19) of all deaths. The mortality rates may be interpreted with caution as the study had a small number of deaths.

Infant mortality rate (IMR) for the combined slums worked out to 86 per 1000 live births. It was enormously high (208.3) in Construction Site Clusters, 89.3 in Seelampur (J.J. Colony), 63.8 in Mangolpuri and the lowest of 26.3 in Ballimaran. The IMR was higher in all other slums except Ballimaran and Mangolpuri than the national level of urban IMR of 62.5 for 1981.

In the combined slums, a total of 10 neonatal deaths and 12 post-neonatal deaths had occurred giving a neo-natal death rate of 31.7 per 1000 live births. Three still births and two maternal deaths were reported giving a still birth death rate of 13.6 and maternal death rate of 9.0 per 1000 live births (national 2-4/1000 live births).

Correlates of Morbidity: Results emerging from situational analysis of the slums indicated that the morbidity depends on a number of factors related to location of slums, the availability of basic facilities, the environmental sanitation, the demographic and socio-economic characteristics of the people, and the approach/access to different health/medical care and social facilities. Some of the variables constituting these factors may be controlled by certain changes in policies, administrative decisions and actions, while there are others which can be partly controlled by certain deliberate efforts.

.An attempt was made to find out the extent of contribution made by some of these variables to total morbidity in general and some common diseases such as: fever, diarrhoeal diseases, respiratory infections, etc., in particular for both the groups of population viz., population of 6 +years of age and population under 6 years of age. For this purpose, data was subjected to stepwise regression analysis with morbidity as dependent variable and 26 other variables as independent variables.

The stepwise regression procedure selected 6 significant independent variables out of 26, of whose contribution was found to be significant at 5 per cent level of confidence. The details of the stepwise regression results for the two groups of population are given as under:

(i) **Population of 6+years of age:** Of the 26 independent variables studied, four variables contributed to 77.8 per cent morbidity in general for the population of 6 or more years of age. The variable source of treatment was the first to enter with highest correlation coefficient and 26 per cent morbidity was attributable to this single variable. Hygiene status of the family was the next to enter, contributing 25.8 per cent to morbidity. Facilities for disposal of waste household water and refuse contributed 15.9 per cent, and per capita income below poverty line (Rs.75/- per month) was responsible for 10.1 per cent of variability (Table 6).

*NOTE: Mortality indicators have been worked out on very small sample size and are meant to give the magnitude of the problems only.

TABLE 6
CORRELATES OF MORBIDITY AND THEIR CONTRIBUTION

Sl. No.	Characteristics	% Contribution
1.	Population – 6+ Years of age	
	General Morbidity:	
	- Source of treatment (poor or no treatment)	26.0
	- Poor hygiene status of the family	25.8
	- Lack of facilities for disposal of waste household water/refuse	15.9
	- Per capita income below poverty line (£Rs.75 p.m.)	10.1
		77.8
2.	Population < 6 years of age	
	a. Fever:	
	- Low economic status of the family	34.0
	- Low educational status of the parents/family	27.4
	- More distance of source of treatment	19.9
		81.3
	b. Respiratory Infections:	
	- Low economic status of the family	32.5
	- Low educational status of the parents/family	29.0
	- More distance of source of treatment	22.8
		84.3
	c. Diarrhoeal Diseases:	
	- Poor environmental sanitation conditions	28.7
	- Source of drinking water	23.4
	- Low educational status of the parents/family	10.1
	- Poor hygiene status of the family	9.0
		71.2

As regards specific morbidity, 10 per cent of the fever was attributed to poor hygiene status of the family. Over 8 per cent respiratory infections were ascribable to source of treatment (poor or no treatment). Similarly, 8 per cent diarrhoea was attributed to poor hygiene status of the family.

(ii) **Population <6years of age:** For children £6 years of age, 34 per cent fever cases (unqualified fever and malaria fever) were ascribable to "low economic status of the parents", 27.4 per cent to "low educational status of parents" and 19.9 per cent to "distance of source of treatment".

As regards respiratory infections, 32.5 per cent variability were ascribable to "low economic status of the parents", and 22.8 per cent to "distance of source of treatment".

Similarly, 28.7 per cent diarrhoeal diseases were ascribable to "poor environmental sanitation conditions", 23.4 per cent to "source of drinking water" and 10.1 per cent to "low educational status of parents".

It can be inferred that nearly 78 per cent morbidity in general can be controlled to a large extent among population of 6+years of age by (i) providing basic medical facilities in the slum areas; (ii) by improving environmental sanitation conditions; and (iii) by raising economic status of the people living therein. Among children, 81 per cent fever, 84 per cent respiratory infections and 71 percent diarrhoeal diseases can be largely prevented by providing (i) nearby medical and health care facilities; (ii) by raising literacy level of the parents, (iii) by improving economic and hygienic conditions of the families, and (iv) by improved environmental sanitation conditions in the slums.

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दिल्ली के चार शहरी स्लम क्षेत्रों में रूग्णता दर तथा मृत्यु दर की शैली के बारे में एक सर्वेक्षण किया गया था। रूग्णता दर/अवस्थता दर के परिणाम का आंकलन दो समय बिन्दुओं के आधार पर किया गया था, अर्थात् सर्वेक्षण के दिन सहित अन्तिम एक माह की अवधि में, तथा जीर्ण रूग्णता के संदर्भ में तीन महीनों से अधिक अवधि तक 1 रूग्णता संबंधी अध्ययन जनसंख्या के दो विभिन्न वर्गों में किया गया था: पहले वर्ग में छः वर्ष से कम आयु के बच्चों को रखा गया था तथा दूसरे छः वर्ष से अधिक आयु के बच्चों के बारे में अध्ययन किया गया था। उक्त आंकलन के अनुसार किसी भी समय बिन्दु पर रूग्णता परिमाण ग्यारह से पन्द्रह प्रतिशत पाया गया था। दोनों जनसंख्या वर्गों में रूग्णता का सबसे प्रमुख कारण ज्वर पाया गया था। दोनों जनसंख्या वर्गों में रूग्णता का प्रमुख कारण ज्वर पाया गया था (चालीस से साठ प्रतिशत), उसके पश्चात इस क्रम में पाचन संबंधी विकृतियाँ (सोलह से पच्चीस प्रतिशत) तथा श्वसन विकृतियाँ (पन्द्रह प्रतिशत) आती थी। जिन स्लम क्षेत्रों में स्वच्छता की स्थिति सर्वाधिक निम्न स्तर की थी तथा जहाँ अधिकांश लोग गरीबी रेखा से नीचे जीवनयापन कर रहे थे उन क्षेत्रों में रूग्णता दर भी सबसे अधिक दर्ज की गई थी। रूग्णता दर को प्रमुख रूप से प्रभावित करने वाले पक्ष इस प्रकार से थे: निम्न शैक्षिक स्तर, परिवारों में निम्न स्वच्छता स्तर, पर्यावरण में स्वच्छता की कमी और प्रति व्यक्ति आय निम्न स्तर। मृत्यु का प्रमुख कारण श्वसन संक्रमण (20 प्रतिशत) पाया गया था तथा इस क्रम में इसके पश्चात ज्वर तथा अतिसार रोग (प्रत्येक सत्रह प्रतिशत) प्रमुख कारण के रूप में पाए गये थे।

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KAP OF HIGH SCHOOL GIRLS REGARDING MENSTRUATION IN RURAL AREA

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ABSTRACT

Menstruation is a normal physiological phenomenon. Even the parents, especially the mothers, do not educate their daughters about the various aspects of menstruation like age and its onset (menarche), occurrence of various changes in its duration, maintenance of hygiene during the periods, and making the girls aware of all these as well as educating and motivating them to take it lightly. This leads to undue fear, anxiety and certain wrong ideas/attitudes in the minds of adolescent girls. The present study tries to highlight the same. Due to the inclusion of sex education as a part of formal education, especially in the high school classes, it has become all the more important.

Most women regard the physiological process of menstruation as an unclean state segregating themselves from the normal activities and generally this very idea is promoted by the mothers, relatives and friends. Further, this discourages the girls from leading a social life especially during their days of menstruation, due to the effect of wrong ideas in the young adolescent minds. In order to know the attitudes and practices during menstruation, this KAP study was undertaken.

MATERIALS AND METHOD

The study was undertaken by interviewing all the school girls (unmarried) studying in class ten (aged 13-16 years). There were four girls high schools in the rural field practice area of Dayalpur Centre, located about 60 km. south of All India Institute of Medical Sciences, New Delhi. A total of 65 girls, who participated in the study, were interviewed and the responses were entered in a predesigned proforma.

RESULTS

The distribution of school girls who participated in the study as per their age and age at menarche has been shown in Table 1. It is evident that about 50 per cent of girls were aged 15 years at the time of menarche. It corresponds to the usual menarchal age of 11 to 14 years with an average of 13 years.

Of the total of 65 girls, 43.1 per cent had regular periods and 30.8 percent had irregular periods during the first three months of their menstrual life while the rest (26.1 %) did not respond to this question. The duration of menstrual cycle was upto

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TABLE 1
DISTRIBUTION OF STUDY GIRLS BY AGE AND AGE AT MENARCHE

Age (years)	No. of girls (%)	Age of Menarche	
		Np.	Percentage
13	2(3.08)	5	7.69
14	12 (18.46)	26	40.0
15	32 (48.23)	11	16.93
16	15 (24.08)	3	4.61
Could not be ascertained/ did not respond	4 (6.15)	20	30.77
Total	65 (100.0)	65	100 00
Mean age	15.2 years	14.27 years	

five days among half of the school girls as shown in Table 2. This corroborates with the usual duration of menstrual bleeding of 3-5 days (normal extremes being 1 -8 days). The duration and the amount of blood flow for any individual are fairly constant. During the first three menstrual cycles 32.3 per cent were dysmenorrhoeic while 44.6 per cent did not experience pain during the cycles. No response could be elicited from about a quarter of girls. In order to get relief from dysmenorrhoea, 13.8 per cent took hot fluids to drink like hot tea, whereas. 9.2 per cent took medicines and the rest did not take anything.

TABLE 2
DURATION OF MENSTRUAL CYCLES AS REPORTED BY RESPONDENTS

Duration (Days)	No.	Percentage
3	11	16.93
4	11	16.93
5	11	16.93
6	4	6.15
7	4	6.15
8	2	3.08
No response	22	33.83

Average - 4.65 days

About a half (46.15%) had either scanty or average menstrual loss while only 20.0 per cent had heavy loss as replied by the girls. The rest (33.85%) did not respond.

Different varieties of materials were used by the school girls during menstrual cycles, the commonest being cloth (56.9%) as has been shown in Table 3. Only 3.1 per cent used cotton, whereas 40.0 per cent did not specify the material used. The use of such material was advised by a friend most commonly (41.5%) followed by mother (10.8%). Self-initiative was taken by 16.9 per cent of school going girls under study as evident from Table 4. The material used during menstrual bleeding was clean in 70.8 percent and not clean in 9.2 per cent. Only one girl affirmed the use of any type of material (clean/unclean) whichever was easily available. However, 18.4 per cent did not respond to the question, as depicted in Table 5. The material was used upto seven days.

Among restriction of activities during menstruation, bathing and school-going was withheld by 46.1 per cent, entry into the kitchen by 78.4 per cent and playing was withheld by 83 per cent of school-going girls as evident from Table 6.

Half of the girls agreed that menstruation was good while 2.5 per cent disagreed and the rest did not respond. Only 1.1 per cent did not take any extra precautions during menstruation.

DISCUSSION

Menstruation is a phenomenon unique to the females. The occurrence of regular menstruation is an indirect evidence that the female is not pregnant. Since, it is a physiological phenomenon, the emphasis should be given to take it lightly without causing any fear or anxiety in the girl's mind. This should be done as soon as the girl attains menarche, if not before.

Since, the school girls form an organised cluster which is easily approachable, an effort should be made to educate them regarding menstrual hygiene so that they can disseminate the same-knowledge to their friends, as they feel shy in asking the same from the relatives. These topics should be covered during the formal sex education in detail, to prepare them intellectually and emotionally for menstruation, so as to make a significant dent in their attitudes and practices.

TABLE 3
MATERIALS USED DURING MENSES

Materials	No.	Percentage
Cloth	37	56.92
Cotton	2	3.08
No response	26	40.00

TABLE 4
ADVICE TO THE STUDY GIRLS AS REGARDS USE OF MATERIALS
DURING MENSES

Advised by	No.	Percentage
Friends	27	41.54
Close relatives*	13	20.00
Self	11	16.93
No response	14	21.54

*Close relatives includes mother, sister and bhabhi

TABLE 5
TYPE OF MATERIALS USED AMONG RESPONDENTS

Materials used	No.	Percentage
Clean*	46	70.77
Unclean	6	9.23
Any	1	1.54
No response	12	16.46

*Cleanliness as thought by them

TABLE 6
ACTIVITIES CARRIED OUT BY GIRLS DURING MENSES

Activities carried out	No.	Percentage
Bathing	35	53.85
School going	35	53.85
Playing	11	16.73
Kitchen	14	21.54

Lkkjk'k

मासिक धर्म एक सामान्य शारीरिक क्रिया है। यह देखा गया है कि माता-पिता भी, विशेष रूप से माताएं, अपनी लड़कियों को मासिक धर्म संबंधी विभिन्न पक्षों जैसे इस क्रिया के प्रारम्भ होने (रजोदर्शन) की आयु तथा मासिक धर्म की अवधि में होने वाले विभिन्न परिवर्तनों, और इस अवधि में स्वच्छता बनाए रखने के बारे में जानकारी नहीं देते हैं। और न ही उन्हें इन सब बातों से अवगत करने के लिए शिक्षित और प्रेरित करते हैं कि वह इसको गम्भीरता से न लें। इससे किशोरावस्था में लड़कियों के मन में अनावश्यक भय, चिन्ता तथा कुछ गलत विचार/अवधारणाएं उत्पन्न हो जाती हैं। वर्तमान अध्ययन में इन्हीं बातों पर प्रकाश डालने का प्रयास किया गया है। औपचारिक शिक्षा, विशेष रूप से कक्षाओं में प्रदान की जाने वाली शिक्षा में सेक्स शिक्षा को सम्मिलित कर लेने से इस विषय का महत्व और भी बढ़ जाता है।

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