

ICMR Task Force National Collaborative Study on Identification of High Risk Families, Mothers and Outcome of Their Off-springs with Particular Reference to the Problem of Maternal Nutrition, Low Birth Weight, Perinatal and Infant Morbidity and Mortality in Rural and Urban Slum Communities

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

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Summary

The 'National Collaborative Study on Identification of High Risk Families, Mothers and Outcome of their Offsprings' was initiated by the Indian Council of Medical Research in 1981 at the recommendation of its Task Forces on Nutrition, High Risk Pregnancies and Low Birth Weight with the following objectives:

Abstracted from the Report on this Collaborative Study published by the Indian Council of Medical Research, New Delhi, 1990. The Principal Investigators for this study were: New Delhi—S.K. Bhargava, Man Mohan, S.K. Das; Varanasi—V. Bhargava, Amod Prakash; Chandigarh—A.N. Gupta, A. Narang, G.I. Dhall; Madras—K. Bhasker Rao, S. Jayam; Calcutta—N.N. Roy Choudhary, S.P. Khatua; Hyderabad—Prema Ramachandran.

General

(i) To identify the families at greater risk from health and nutritional point of view from data on nutritional status, past morbidity and mortality experience of the mothers and children.

(ii) To study high risk urban slum and rural community ever married women of reproductive age period from prepregnant state to conception, and termination of pregnancy and relate the fetal outcome to social, environmental, maternal nutritional and biological factors.

(iii) To obtain information on utilization of available maternal and child health services during antenatal period of pregnancy, delivery and child birth, post partum period and for infant care.

(iv) To record the current social and cultural practices and taboos regarding pregnancy, labor, child birth and infant feeding practices.

Specific

(i) To prospectively study a cohort of pregnancies from high risk urban slum and rural communities from different regions of the country for recording vital rates for abortion, still birth, perinatal, neonatal and infant mortality and factors influencing them.

(ii) To develop "at risk approach" in delivery of perinatal and neonatal care from data obtained from the study.

(iii) To study the prevalence and causes and outcome of low birth weight infants.

(iv) To study the infant physical growth in the first year of life.

Methodology

The study was conducted at three urban slum centers at New Delhi, Calcutta and Madras and three rural centers at Hyderabad, Varanasi and Chandigarh. The two groups of cohort from urban slum and rural areas were chosen as these comprise the most vulnerable population of the country.

At each center, a population of approximately 30,000 was selected after careful consideration by the statistical division of the ICMR to provide uniformity in certain selective factors likely to influence the perinatal, neonatal and infant mortality and morbidity, outcome of pregnancies and birth weight of the infant. One of the major precondition for selection of the area of the study was that it should be served only by the usual health care delivery system and there should be no active intervention programme on maternal and child health by a Government and/or no Government Voluntary Health Agency.

A total of 17754 urban households (Madras 6170, Calcutta 5934, Delhi 5650) providing a population of 92914 and a total of 15409 rural households with a population of 96002 were included in the study. This population provided 18006 urban slum and 18548 rural eligible ever married women in reproductive age of 13-49 years to provide the cohort for the study.

Results

The study population had 92% Hindu, 4% Muslim and 4% other communities including Christians. A total of 73-79% of the urban and 66-68% of rural communities had nuclear families. The average family income was Rs. 600 or less in 90% urban and 63-84% rural areas. Almost 85% of urban slum population lived in single room

as against only 35% or less in rural. Protected water supply was available to 67% in urban and 3-62% in rural areas. Nearly half (45%) of urban and 83% of rural subjects were illiterate. The mean age at marriage for urban was 13.8 years. The consummation of marriage occurred at 16 years for urban and 15 years in rural women.

Seven thousand five hundred and twenty six women (3297 urban and 4387 rural) became pregnant during the study period. Nearly two thirds (68%) of urban (48.7% of the expectant women) had a pregravid weight of 45 kg or less and 12-15% had a height of less than 145 cm.

Almost 42% of urban and 38% of rural women worked outside home, 2-3.5% smoked, 5-11.2% chewed tobacco, and 13% of rural women consumed alcohol.

Almost 12% of the women had a bad past obstetric history with about 4% having had a post-partum hemorrhage and 1% or more fetal deaths.

Nearly half (51.7%) of urban and 33% of rural women had clinical moderate anemia. Only 5-6% had symptoms of urinary tract infection, 13% in rural and 5% in urban had toxemia and hypertensive disease of pregnancy, and 2-3% women had active bleeding during pregnancy.

Only 15.6% of urban and 1.5% of rural women had all the 5 scheduled antenatal visits. One third (33.7%) of urban and 56.6% of rural woman had 2 or less number of antenatal visits. Surprisingly, 11% of urban and 24.9% of rural women had no visits. The number of antenatal visits were not affected by distance, socio-economic status, type of family and parity of the women.

In about 97% the labor was spontaneous with 89.1% of the delivery in urban

cohort being normal as compared to 97.4% in rural. Anesthesia was required in 5.3% of urban and 1.8% of rural deliveries.

Only water was used for hand washing before deliveries in 18.6% of urban and 28.5% of rural cases. At birth, oropharynx of the infant was cleaned with fingers in 30.1% of urban and 65.7% of rural cases. Gauze was used in 53.5% urban as compared to 8.3% of rural births and suction was used in 6% of urban cases.

In 47.6% the umbilical cord was cut by unsterilized cutting instrument in rural births as against 23.8% of urban. Less than 2% used sterilized instrument for cutting the cord. Thread was the commonest method for tying of umbilical cord.

Of the 7865 pregnancies, 6727 resulted in live births. The abortion rate varied from 10.5-17.4 and still birth rate from 8-9 per 1000 births. The maternal death rate was 12-53/10000 amongst the live births.

Birth weight could be recorded between 54.5 to 94.4% of cases. The mean birth weight for Calcutta was 2.5 ± 0.5 kg, Delhi 2.7 ± 0.7 kg and 2.8 ± 0.5 kg for Madras. The corresponding figures for Chandigarh, Hyderabad and Varanasi were 2.8 ± 0.8 , 2.7 ± 0.6 and 2.8 ± 0.5 kg, respectively. Only 12.7% of the births in rural area were preterm, 78.5% term and 8.8% were post term. In the urban cohort 14.4% were preterm, 72.1% term and 13.5% were post term. Nearly one third (38.1%) amongst rural cohort had a birth weight of 2500 g or less as compared to 41.4% in urban areas.

Almost 20% of the infants in rural and 18.3% in urban area had failed to cry at birth or were blue or pale at birth.

The clothing, bathing and offering of first feed and type of first feed recorded differences between urban and rural and intra-centers.

The perinatal mortality rate for rural and urban areas was 61.6 and 52.0, respectively; the neonatal mortality being 58.1 and 39.7 and the infant mortality rate being 84.7 and 83.2, respectively.

Asphyxia as judged by no cry at birth was recorded in 11.8% of rural and 16.8% of urban births. Respiratory problems were recorded in 17.5% of rural and 22.5% of urban neonates. Superficial and deep infection were the other significant neonatal morbidity.

Amongst the causes of neonatal deaths, low birth weight appeared to be an underlying cause in approximately 16.8%. Significantly, neonatal tetanus was recorded in 18.5% of total births. Septicemia resulted in mortality in 6.5% and deaths due to asphyxia could be described in only 2.3% of the neonatal deaths.

Family income of less than Rs. 300/- per month, one room accommodation, maternal illiteracy, maternal height of 145 cm or less, low maternal pregravid weight were associated with adverse neonatal outcome. Besides abdominal girth of 80 cm or less and uterine height of 30 cm or less between 36-38 weeks of gestation, recorded a significant number of low birth weight infants. Prior history of fetal or neonatal death and birth interval of 2 years or less between two successive pregnancies were also associated with adverse outcome of pregnancy. Presence of even one factor increased the risk and the risk increased in linear fashion with increase in number of risk factors.

On multiple regression analysis, maternal age, parity, previous bad obstetric history, preterm birth, maternal anemia, previous preterm or low birth weight, birth interval and previous fetal and neonatal mortality and low birth weight provided significant factors.

CONCLUSIONS

The results of this study clearly established differences between urban slum and rural cohorts and also between intra-urban and intra-rural areas. These differences are seen not only in environmental but also in social customs, economic status, cultural practices, literacy and living conditions, *etc.* These factors, in particular, income and type of housing, type of family, age at marriage, consummation of marriage and maternal education have a direct bearing on pregnancy and its outcome. Almost all of these factors contribute directly or indirectly to causation of low birth weight, fetal loss, perinatal, neonatal and infant mortality. In general, rural cohort pregnancy outcome appeared to be better as compared to urban slum with lower low birth weight prevalence and perinatal and neonatal mortality. The association between these factors and cohort outcome also signifies the pregnancy outcome to be a complex rather than simple problem. It also indicates that sustained reduction in these vital rates would need not only medical but social interventions.

The result on perinatal, neonatal and infant mortality are consistent with those reported by other studies and reflect hardly any change in perinatal and neonatal mortality rates in past few decades. This suggests the failure of the existing health delivery system or its utilization by the community.

Almost 10-12% of the women in both the groups had bad past obstetric history. In the present pregnancy, a significant number suffered from anemia, bleeding during pregnancy, hypertension and toxemia and urinary tract infections. The obstetrical and pregnancy history thus suggested the need for adequate antenatal

care through repeated visits and a referral system for secondary and tertiary levels of care. The primary level services could easily identify and treat high risk factors such as anemia, urinary tract infections, *etc.* but toxemia, hypertension, bleeding during pregnancy and premature labor may necessitate comprehensive care at hospital level.

A significant proportion of cohort women were malnourished as reflected by body weight of 40 kg or less, height of 145 cm or less and mid arm circumference of 22.5 cm or less. The association of these factors with low birth weight suggests the use of these factors in early or even pre-gravid identification of high risk women in community. It also re-emphasizes the need to deal with nutritional status of young girls and women and health education for need to eat well during pregnancy.

An interesting and revealing aspect of this study was to identify the prevalence and influence of personal habits on pregnancy, fetus and infant. The two cohorts recorded significant differences in personal habits with regard to work, smoking, tobacco chewing, alcohol consumption, eating during pregnancy and lactation. The results clearly indicate that these factors may play a significant role in causation of low birth weight and high perinatal and neonatal mortality rates.

The results on perinatal care during pregnancy, delivery, neonatal care at birth and subsequently highlighted some of the reasons for the high morbidity and mortality rates amongst cohort women and their offspring. Thus almost 10-25% of the pregnancies were not registered even though the antenatal clinic was located in the area and the project staff regularly visited the families for LMP monitoring. These findings suggest the lack of community aware-

ness and perception on the importance of early pregnancy registration. The fact that less than 20% completed the recommended number of antenatal visits reflect the indifference or inability of the women to go for antenatal checkup. However, almost 75-85% pregnant women did visit the antenatal clinic once or more and this finding suggests the urgent need to have screening methods which could identify high risk pregnancy at the first contact or registration.

The observation on knowledge and attitude of the cohort women and health care practices by health functionary provided extremely valuable data. It showed that while pregnancies could have occurred unexpectedly yet the women preferred them to continue rather than opt for termination. The cohort women in both the groups knew precisely where they wanted antenatal care and delivery to occur. They also knew the person whom they expected to deliver these services. The fact that they preferred Dai to auxiliary nurse midwife or female multipurpose worker reveals their perceptions and expectations from providers of health care. The data thus suggests the need for the community to participate in decision making for determining their needs for their health care. It also questions the auxiliary nurse midwife or female multipurpose worker is the key person involved in antenatal, delivery or post natal care.

The practices of hand washing, sterilization of instruments, cutting of the cord, cord dressing and advice with regard to offering of first feed to neonate show the extent of knowledge and actual health care practices of the primary level health functionaries. It also points to poor training on these aspects and or need for retraining of the health worker.

The high perinatal, early late and total neonatal mortality is not surprising. The newborns hardly received any care at birth even for their primary needs such as adequate suction of oropharynx and warmth at birth or subsequently. There were no neonatal units to refer high risk or sick neonates. These and the lack of facility for care resulted in preventable morbidities and mortalities such as asphyxia, aspiration pneumonia, neonatal tetanus, septicemia, feeding difficulties *etc.* The results thus once again point to the urgent need in providing basic neonatal care at primary and secondary level. The results further suggest creation of referral services and linkages between domiciliary, health centre and at hospital levels.

The study once again confirmed the very high prevalence of low birth weight rate particularly in the slum population. The occurrence of 10-14% preterm births and with almost half of these occurring at 36 weeks suggest epidemiological studies on onset of early labor in our population. It should be considered as high priority areas as even delaying the births by one week would decrease the occurrence of preterm and low birth weight prevalence in our country.

Analysis for identification of selective but extremely high risk maternal factors has shown living room, spacing, bad past obstetric history, and maternal height to be most significant in the study groups associated with low birth weight and for perinatal and neonatal mortality. These factors are easy to identify at first contact, are few in number, and can be taught to any level of health functionary. Use of these factors in day to day maternal and child care could help in developing "at risk approach" in perinatal care.

The results also provided insight into

community behavior particularly with regard to utilization of the maternal and child health services. The utilization by both urban and rural cohort was abysmally low. This could be explained to some extent by the postnatal visit to mothers and infants by the health functionaries. Only Dai performed these visits to some extent. The other functionary hardly visited or provided postnatal care and services. The variation between expectation and actual happening with regard to antenatal, intranatal and postnatal care was yet another factor for poor utilization of these services.

RECOMMENDATIONS

The results of this study conducted prospectively from pregnant state to pregnancy and its termination in two types of high risk communities identifies several problems related to adverse outcome of pregnancy and suggest the urgent need for intervention programmes. The areas of proposed action are as follows:

1. The persistently high maternal, perinatal, early and late neonatal mortality rate are the result of a complex social environmental, biological and medical factors and need intervention at environmental, socio-cultural level and in delivery of health care. In general, environmental sanitation, hygiene and water supply need to be improved.

At socio-cultural level, community awareness as to the adverse influence of early marriage, consummation of marriage, successive pregnancies at intervals of less than 2 years, *etc.* is to be made through concerted efforts in public health education.

2. For improvement in delivery of health care, and its utilization by the community, it is necessary to involve community in

determining its own needs and priorities. The community should be asked specifically with regard to place where they would prefer health centre or clinics to be established. Similarly, their views and perceptions as to who should deliver care should be taken note of and not arbitrarily decided. Community participation of such a nature has been a successful method for delivery of health care.

3. In order to utilize the existing resources in a cost effective manner it is recommended that provision of the type and quality of maternal and child health services and in particular perinatal and neonatal care may be linked to existing mortality and morbidity rates, *e.g.*, perinatal mortality rate of 60 per thousand or more would need strengthening at primary level, 30-60/1000 at primary and secondary level and 30 or less at tertiary level.

4. Maternal, biological, nutritional, and personal social factors have been identified as important determinants of perinatal outcome. Action for improving the pregravid and pregnancy nutritional status of women and expectant women, therefore, needs to be accorded highest priorities for sustained benefits at community and Government level. Intersectoral approach between the Ministry of Social Welfare, Women and Child Development, and Health and Family Welfare, Information and Broadcasting and other related Government Departments is needed. It is only through persistent and co-ordinated efforts that awareness and sensitization of the population to harmful health care practices such as tobacco chewing, alcohol consumption, smoking, inadequate rest during pregnant state, myths about food during pregnancy, *etc.* can be achieved.

5. A positive effort for comprehensive

perinatal care with emphasis on early registration of pregnancy, repeated timely visits to antenatal clinics for identification of risk factors and their appropriate treatment and not merely on immunization against tetanus is to be made.

6. The study has identified simple, easily recognizable maternal and fetal risk factors which can be taught to all levels of health functionaries. It is suggested that these results be circulated widely for adoption of "at risk approach" at all levels of perinatal care. The adoption of "at risk approach" would naturally lead to development of referral system and linkages between domiciliary, health centre and hospital care. It is, therefore, necessary to initiate research and pilot studies on utilization of results of this study.

7. There is an urgent need to recognize development of appropriate, need based quality perinatal and neonatal services. At present, services are provided for antenatal care and delivery. These also fail to provide the basic essential needs and have not utilized presently available technologies for improving maternal and fetal outcome. If the current maternal, perinatal and neonatal mortality trends are to be accelerated, then a tiered system of primary, secondary and tertiary level perinatal and neonatal services with linkages at all the three levels has to be created. These should be provided with communication facilities and quick transportation mobile services. The prevalence of 10% women with bad obstetric history and 20% with one or another pregnancy complication supports this action.

8. The newborn care in the project areas was the most neglected part of health delivery system. This was consistent with the reported pattern from almost all parts of

the country. The result of such a neglect was demonstrated by this study with more than 70% of neonatal deaths occurring due to preventable causes of death. These causes include birth asphyxia and injury, low birth weight, feeding problems, aspiration, pneumonia, septicemia and diarrhea and neonatal tetanus. Provisions of neonatal care from domiciliary care to hospital level appears to be the prime need for reduction in neonatal morbidity and mortality. The type of care, the financial and manpower requirements, the physical space needs be researched for providing cost effective appropriate quality care. This should be regarded as one of the high priority areas for research.

9. One of the most crucial element persistently ignored by planners has been provision and development of health care system without determining the communities or users felt needs and its perception. The non-involvement of the community at conception and subsequently in execution of health care plans appeared to be a major factor contributing to non-utilization of maternal and child health services. If utilization of services by the community has to be improved significantly, then it appears mandatory that they must be involved at all stages of health planning. This would include from decision making to monitoring the services.

10. The health functionaries should be made accountable for not delivering their primary functions, e.g., the poor postnatal visit by all levels of health personnel. It would be ideal if they are made accountable to the community so that a direct communication is established between users and providers.

11. All important components of maternal and child care should be monitored. So

far the indicators used include mortality rates, and immunization provided to pregnant women and children. It is recommended that registration of pregnancies, the time at which pregnancy is registered, number of antenatal visits at different trimesters, hemoglobin level, delivery by trained person, place of delivery, utilization

of safe delivery kit, recording of birth weight, prevalence of asphyxia and aspiration pneumonia, *etc.* should also be included as indicators of perinatal and neonatal services. As no such indicators are presently available, development of indicators for perinatal and neonatal care could become future researchable issues.
