TRIBAL HEALTH BULLETIN

ISSN 0971-4677

A Biannual Publication on Tribal Health (Published Simultaneously in English & Hindi)

Vol. 13, No. 1 & 2
January & July 2007

Socio-Cultural and Environmental Perspectives on Morbidity and Mortality pattern of the Scheduled Tribes

- Salil Basu

Challenges of Imparting IEC for Prevention of Hereditary Sickle Cell Disorders, β-Thalassemia Syndrome and G-6-PD deficiency in India

- R. S. Balgir

Socioeconomic and Demographic Characteristics of Tribes of Uttarakhand, India

- Manju Rani, Ravendra K. Sharma

Food Habits of the Garo tribe of Meghalaya

- Natasha R. Marak

Prevalence of Post Partum Complication and Treatment Seeking Behaviour in Bihar

- Rajiv Ranjan, Sulabha Parasurman

Spousal Perspectives on Fertility Preferences: Differentials in Ideal Family Size

- Nizamuddin Khan, Usha Ram

Regional Medical Research Centre for Tribals
(Indian Council of Medical Research)
Jabalpur

INFORMATION FOR CONTRIBUTORS

Tribal Health Bulletin, a biannual publication on Tribal Health, publishes original papers, review articles, notes and communications on various aspects of Tribal Health.

Authors should submit the typescripts in triplicate (one original and two copies) neatly typed in double space with a wide margin of at least 4 cm on each side. Authors may also submit papers in electronic format. The research papers should include (i) title page with a running title (ii) abstract (iii) nomenclature of symbols used (iv) tables/figures typed/drawn on separate sheets along with their captions in serial order as they appear in the text. The text should be styled under the headings of Introduction, Methodology, Results, Discussion, Acknowledgment and References. Experimental investigation papers must state in the Material and Methods section that 1) informed consent was obtained from all human adult participants and from parents or legal guardians of minors, with the name of the appropriate institutional review board having approved the project (wherever applicable). 2) the maintenance and care of experimental animals complies with the guidelines for the human use of laboratory animals (wherever applicable). The title page should include: title of the article, name(s) of author(s) and affiliation(s),and the contact person to whom communications should be sent. The title should be brief, clear and should provide broad indication of the content of the paper. An abstract of about 200 words for research papers and about 150 words for review articles should be provided along with the paper. References to already published literature should be numbered consequently in order of their citation in the text and should be placed at the end of the text as follows.

For periodicals - Author(s) surnames with initials offirst name, year of publication in brackets, complete title of the paper, name of the journal in full, volume number along with the number in bracket, first and last page of the paper.

For books / monographs - Author(s) surname with initials, year of publication in brackets, title, edition, name of the publisher, place of publication, first and last page.

Examples of citation are given below:

Journal Article

- Elina Hemminki. (2002) : When research knowledge is unwelcome: Studying the health effects of. in vitro fertilization. Health Service Journal. 7 (1) : 4-9

Book/Monograph

- Handy, C. B. (1986) : Understanding organization. 3rd edn. London:Penguin.

Chapter from a Book

- Gupta, Dinesh K. (2000) : A focus on customers: Imperative for managing quality in Library and information services. In delivering service quality: Managerial challenges for the 21st century, edited by M. Raghavachari and K'v. Ramani. Macmillan, New Delhi, 401 06.

Articles should be sent together with a certificate that the contribution is the own original work of author(s) and has not been published or sent for publication elsewhere. Contributors are requested to send their articles, manuscripts, review material to the Editor, Tribal Health Bulletin, Regional Medical Research Centre for Tribals (ICMR), Nagpur Road, P.O. Garha, Jabalpur - 482003 (M.P.), India.

Email : bulletin_rmrct@yahoo.com

Editor-in-Chief : Dr. Neeru Singh
Editor : Dr. T. Chakma
Assistant Editor : Dr. J. Roy
Cover designing : Dr. R.C.Mishra

Editorial Board

Dr. V.G.Rao Scientist F
Dr. R.B.Gupta Scientist E
Dr. K.B.Saha Scientist D
Dr. R.K.Sharma Scientist C

Regional Medical Research Centre for Tribals, Jabalpur

A Biannual Publication on Tribal Health (Published Simultaneously in English & Hindi)

Published by the Editor,
Tribal Health Bulletin,
Regional Medical Research
Centre for Tribals (ICMR),
Nagpur Road, P.O. Garha,
Jabalpur-482 003 (M.P.), India.
Ph. : +91-761-2370800, 2370818
Email : bulletin_rmrct@yahoo.com
www.rmrcticmr.co.in

TRIBAL HEALTH BULLETIN

Vol. 13 Nos.1& 2 January & July 2007

- **Socio-Cultural and Environmental Perspectives on Morbidity and Mortality pattern of the Scheduled Tribes**
  Salil Basu 01
- **Challenges of Imparting IEC for Prevention of Hereditary Sickle Cell Disorders, β - Thalassemia Syndrome and G-6-PD deficiency in India**
  R. S. Baigir 14
- **Socioeconomic and Demographic Characteristics of Tribes of Uttarakhand, India**
  Manju Rani, Ravendra K. Sharma 23
- **Food Habits of the Garo tribe of Meghalaya**
  Natasha R. Marak 42
- **Prevalence of Post Partum Complication and Treatment Seeking Behaviour in Bihar**
  Rajiv Ranjan, Sulabha Parasurman 50
- **Spousal Perspectives on Fertility Preferences: Differentials in Ideal Family Size**
  Nizamuddin Khan, Usha Ram 64

Statements and opinions expressed and published in the *TRIBAL HEALTH BULLETIN* are solely of author(s)/contributor(s). The Editorial Board disclaim any responsibility for the accuracy of statements made by the authors(s)/contributor(s). Proper citation should be made if any part of the article published in the bulletin is quoted.

ANUSHKA OFFSET# 4083404

SOCIO-CULTURAL AND ENVIRONMENTAL PERSPECTIVES ON MORBIDITY AND MORTALITY PATTERN OF THE SCHEDULED TRIBES

Salil Basu *

Abstract : *Tribal population groups of India inhabit widely varying geo-climatic conditions and are exposed differently to the various climatic and environmental stresses and strains. All diseases manifest themselves in interaction with the environment. Delineation of the causative factors behind disease requires in-depth investigations into the socio-cultural and biological milieu of the population groups. It may include diverse factors such as sanitation, hygiene, parasitic load, mating-pattern, preferential marital alliances, nutritional pattern, health seeking behavior, genetic markers etc. Various factors affecting health and diseases in a particular population group may vary from one group to another. The principal causes of morbidity are: (a) Infective and parasitic diseases (communicable diseases); (b) Nutritional Deficiencies; (c) Non-communicable diseases; and (d) Diseases associated with Genetic Disorder.*

The present paper is an attempt to examine the various socio-cultural and environmental issues associated with tribal sexuality, morbidity and mortality pattern of tribal communities in different states of India. With the help of available data from Census 2001,Sample Registration Scheme(SRS), NSSO, NFHS-2(1998-99),NFHS-3 (2005-06),State Health Documents, Health Statistics, Statistical Reports/Book References etc, a situational analysis of characteristics of scheduled tribes has been generated. Various socio-cultural, environmental and anthropological issues are delineated and a holistic approach is developed for analysis and interpretation of the morbidity and mortality data.

RATIONALE

As we all know, tribal population groups of India inhabit widely varying geo-climatic conditions and are exposed differently to the various climatic and environmental stresses and strains. All diseases manifest themselves in interaction with the environment. Delineation of the causative factors behind disease requires in-depth investigations into the socio-cultural and biological milieu of the population groups. It may include diverse factors such as sanitation, hygiene, parasitic load, mating-pattern, preferential marital alliances, nutritional pattern, health seeking behaviour, genetic markers etc. Various factors affecting health and diseases in a particular population group may vary from one group to another.

The principal causes of morbidity are: (a) Infective and parasitic diseases (communicable diseases); (b) Nutritional Deficiencies; (c) Non-communicable diseases; and (d) Diseases associated with Genetic Disorder.

* Founder and Executive Director, Foundation for Research and Development of Underprivileged Groups (FRDU),I - 1628 Chittaranjan Park, New Delhi -110019. E.mail : frduindia@gmail.com

One of the major problems of tribal groups concerns their health and sickness. For certain reasons, the disease and sickness, prevalent in tribal societies, have not received adequate attention and services. Responsibility of this situation can be attributed to both providers of health services (generally outsider – their attitude, behaviour, commitment etc.) and tribal groups themselves – their life style i.e. custom, practices and above all their compulsions on which they hardly have any control. Life-style–cultural practices including subsistence, diets, occupation, habits, ceremonial/ritualistic customs, other cultural practices and environment, influence the susceptibility to certain diseases.

The disease profiles of tribal population preponderantly indicate diseases like malaria, tuberculosis, sexually transmitted diseases (STD) including reproductive tract infections (RTI) and genetic diseases (sickle cell anemia, G-6-PD red cell enzyme deficiency etc)[1-6] Recent addition in the list of fatal diseases faced by tribals are HIV/AIDS, as evidenced by the State of Rajasthan. Further scientific research has already pointed out a close linkage of HIV/AIDS with TB.

From an overview of the distribution pattern of tribal groups, it becomes evidently clear that they inhabit hostile terrains. Invariably these areas are highly endemic zones for malaria and other infectious diseases. Due to the absence of safe drinking water, proper sanitation and hygiene, coupled with primitive health practices, a number of diseases breed obviously leading to higher mortality and morbidity rates.

A critical review clearly establishes that most of the studies have laid emphasis on specific aspects rather than taking a holistic view. The information on fertility, mortality and morbidity data is extremely inadequate, without any information on whether socio-cultural and biological correlates affect the above parameters directly or indirectly. The inadequacy of this vital information on tribal groups has always been felt by health policy planners.

It is imperative that such data are required for planning effective health care strategies in tribal areas of the country. Particularly it becomes more important in groups that tend to under-utilize the available health care facilities.

Aim of the Study

The present paper is an attempt to examine the various socio-cultural and environmental issues associated with tribal sexuality, morbidity and mortality pattern of tribal communities in different states of India.

METHODOLOGY

With the help of available data from State Health Documents, Health Statistics, Statistical Reports/Book References etc, a situational analysis of characteristics of scheduled tribes has been generated.[7-12] Various socio-cultural, environmental and anthropological issues are delineated and a holistic approach is developed for analysis and interpretation of the data.

RESULTS AND DISCUSSION

Communicable Diseases:

Based on the available studies and reports, the following communicable diseases have been found to be prevalent in high frequency in different tribal areas of India.[13-19]

Yaws

Yaws is a chronic non-venereal disease

caused by Treponema Pertenue. The disease is mostly confined to the tribals who live in the Agency areas of Orissa and Andhra Pradesh (Roy Burman, 1986)[12]. It has also been reported from Tripura and Madhya Pradesh.[20] The infectious cases for Yaws both late and early accompanied with necrotizing ulcers and bone pains etc. were observed among tribes of Jagdalpur and some other districts of erstwhile Madhya Pradesh in 1977 by a team of specialists from Pt. J.N.M. Medical College, Raipur

Tuberculosis

It is reported that originally in tribal areas, there was no trace of this disease or it existed only in a small degree. But later on, however, as a result of the contacts with non-Adivasis, this disease has increased in different tribal areas (i.e. Madhya Pradesh, Gujarat, Maharashtra, Bihar, Rajasthan, Himachal Pradesh, West Bengal, Tripura). Malnutrition has also been found to be one of the contributing factors. All tribes referred to tuberculosis as TB & none had any extensive knowledge about tuberculosis indicating it's relatively recent origin in tribal communities. A social assessment of Tuberculosis Study was carried out in tribal dominated districts of Gujarat, Bihar, Himachal Pradesh, West Bengal.[13]

Malaria

As most of the tribal areas abound in forests and get heavy rainfall, malaria is widespread in these areas. 40% of malaria cases are reported from the tribal areas. Out of all malaria from tribal areas, 60% are reported to be due to *plasmodium falciparum* (NICD, 1993). A Social Assessment study was carried out in tribal dominated malaria prone in seven districts (i.e.Srikakulum (AP), Dungarpur (Rajasthan), Panchmahal (Gujarat), Gadchiroli (Maharashtra), Gumla (Bihar), Surguja (MP) (now in Chattisgarh) and Mayurbhanj (Orissa).[21] In addition, an Eco-Epidemiological Study of Drug Resistance to Anti-malarial was carried out in *plasmodium falciparum* (Pf) tribal infected areas – Mandla and Durg districts of Madhya Pradesh, supported by Pfizer Limited and DGHS, Govt. of India).[22]

Drug resistance to anti-malarials is becoming one of the major problems in malaria control. Drug resistance with higher percentage of Pf is largely confined to hard core, hilly and forested areas in tribal dominated 100 districts of 7 states. About 60% of the total deaths due to malaria are reported from these tribal areas. Orissa and Madhya Pradesh are at the top of the list with respect to incidence rate and Pf percentage.

The epidemiological background of TB and Malaria can be well explained in tribal livelihood i.e. subsistence economy- under nourishment/malnourishment, environment inside the dwelling and outside.

Leprosy

The incidence of leprosy is high among Mikir Hills of Assam. Scheduled tribes of Bihar, Madhya Pradesh, Orissa, Uttar Pradesh, Tripura, Laccadive and Minicoy Islands.

Sexually Transmitted Diseases in Tribal Areas:

Tribal Sexuality

Early research on tribal sexuality of India conducted by Verrier Elwin (1964) makes it evident that there was considerably more sexual freedom and less male dominance in sexual and marital relationships amongst tribal communities. It was also made

evident that tribal groups had varied sexual practices. Elwin discussed about "Village dormitories" or "Ghotul"(among Muria tribes) in which youth lived and slept together. Muria had a simple, innocent and natural attitude to sex. In the "Ghotul", this was strengthened by the absence of any sense of guilt and the general freedom from external interference.[23-24]

Infections of the female genital tract are numerous and widespread. They constitute a large part of low grade morbidity among women contributing to a continuous and physically draining fatigue (UN,NY,1984). These infections are closely related to inappropriate care or poor hygiene in connection with child birth, abortion or menstruation. They include the sexually transmitted diseases which are most prevalent in various tribal groups i.e. Andamanese, Todas of Nilgiri hills, Khasas of Jaunsar Bawar (U.P.), Kondhas of Orissa, tribal groups of Madhya Pradesh, Rajasthan, Mysore, Laccadive and Minicoy Islands. The disease is generally the result of contacts of tribals with non-tribals.[25-33]

HIV/AIDS

The threat of HIV/AIDS infection is also intricately intertwined in tribal culture (attitude and custom) and with tribal livelihood- low socio-economic status. Compared to other population groups, tribal communities by and large are more liberal to sex. Social factors such as livelihood compulsions and poverty, tribal expanded network of communication(roads and rail links) and transport, industrialization and mining activities, temporary population migration to the work site, have contributed to an increased tribal and non tribal contacts, opportunities for indulgence in sex, sexual exploitation of tribal female workers,thereby increasing the chances of STD and HIV/AIDS infection (D/H&FW(M) Govt.of Rajasthan,2003, Naik et al, 2005, Mamta Report,2005.[34]

Additionally, other common communicable diseases which are found in high frequency among various tribal groups from different tribal areas are upper respiratory infections, skin infection, gastro-enteritis, hellimenthiasis, trachoma, fevers of unknown etiology etc.

Non-Communicable Diseases

Very little information is available about the prevalence of non-communicable diseases in tribal population. Studies carried out by NIN (Rao et al., 1986) among the tribals of Sarguja, Jhabua and Bastar districts of Madhya Pradesh showed high incidence (53.9 per cent) of Goitre (Enlarged thyroid gland) in tribals of Sarguja district. Eye condition like cataract, corneal opacity etc. were found to be in high frequencies (20.3 per cent) in Bastar district. Cases of dental caries (5.1 per cent) were noted in Jhabua. A few instances of cardiovascular diseases like hypertension, valvular heart diseases were clinically found in Jhabua, Sarguja and Bastar.

Non-Communicable Diseases as reported from NFHS-3 data, 2005-2006 may be mentioned here.[35]

While comparing the reported incidence of diseases among Schedule Caste and Schedule Tribe, it has been observed that:

a) Schedule Tribes (both female and male) showed relatively much lower frequencies of diabetes as compared to Scheduled castes.

b) But asthma cases were reported in higher frequency both among female

and male schedule tribes as compared to schedule castes

c) In the case of goitre incidence, there is not much difference among female ST & SC whereas much higher frequency was observed among male STs.

Nutrition and Anemia

Nutritional anemia is a major problem for women in India and more so in the rural and tribal belt. Anemia is characterized by a low level of hemoglobin in the blood.

This is particularly serious in view of the fact that both rural and tribal women have heavy workload and anemia has a profound effect on psychological and physical health. Anemia lowers resistance to fatigue, affects working capacity under conditions of stress and increases susceptibility to other diseases. Anemia in young children is a serious concern because it can result in impaired cognitive performance, behavioural development, co-ordination, language development, scholastic achievement as well as increased morbidity of infectious diseases (NFHS-3, 2005-06). The anemia situation has worsened over time for both women and young children i.e. the prevalence of anemia for ever married women has increased from 52% in NFHS-2 to 56% in NFHS-3. (See Table NFHS-3, 2005-06)

Percentage of children (age 6-35 months), the prevalence of anemia increased from 74% in NFHS-2 to 79% in NFHS-3 especially in rural areas.

The highest prevalence of anemia in children is found in Bihar (78%), Madhya Pradesh and Uttar Pradesh (74% each), Haryana (72%), Chhattisgarh (71%) [NFHS- 3, 2005-06].

Maternal malnutrition which is quite common among the tribal women is also a serious health problem, especially for those who have many pregnancies too closely spaced, and reflects the complex socio-economic factors that affect their overall situation.

The nutritional status of pregnant women directly influences their reproductive performance and the birth weight of their children, a factor that is crucial to an infant's chances of survival and to its subsequent growth and development. Nutrition also affects lactation and breast feeding which are key elements in the health of infants and young children and a contributory factor in birth.

According to NFHS-3, 2005-2006 data, children belonging to scheduled castes, scheduled tribes or other backward classes have relatively high levels of under nutrition according to all three anthropometric indices of nutritional status i.e. Height–for–age, Weight– for-height and Weight-for-age. Children from scheduled tribes have the poorest nutritional status on almost every measure and the high prevalence of wasting in this group (28%) is of particular concern.

Studies carried out by NIHFW among the Gond (Muria and Madia), Bhatra, Halba tribal groups of Bastar district, Madhya Pradesh showed following trends (Basu et al., 1989, 1993):

a) The average protein calorie intake was found to be much less in the Gond children as compared to Bhattra and Halba children.

b) Higher frequencies of Bitot's spot. Angular stomatitis and motling of teeth were found among Gond children as compared to Bhattra and Halba children.

c) Muscular wasting was noticed to be higher in Gond children as compared to Bhatta children.

Data on the nutritional deficiency disorders among other tribal groups are scarce. Multidisciplinary and comprehensive studies providing information on habitat, local food products, determinants of malnutrition, dietary practices, economic and social system and its relationship with nutritional status are urgently required. To evolve a suitable strategy to overcome the nutritional deficiencies among the tribals and to promulgate preventive and promotive health care, the various socio-economic concomitants and cultural variants have to be taken into consideration.

Fluorosis (Genu Valgum) and Human Health

Fluorosis is an important clinical and public health problem, there are several million people in India exposed to drinking water sources with high fluoride content. Currently, 20 of the 30 States/Union Territories have been reported as being endemic for fluorosis. The presence of excessive quantities of fluoride in drinking water is accompanied by a characteristic sequence of changes in teeth, bone and periarticular tissues leading to a variable degree of locomotor disability and neurological impairment. Studies carried out by RMRCT, Jabalpur among tribals of Mandla district of Madhya Pradesh revealed a high prevalence of Genuvalgum (51.1%) and Dental fluorosis (74.4%).[36-37]

Genetic Disorders

Genetic disorders have been found to occur in high frequency among various tribal groups and scheduled caste population. There are two genetic disorders namely sickle cell anemia and G-6-PD red cell enzyme deficiency which have been found to occur in rather high frequencies in scheduled tribes and scheduled caste populations. Both male and females are equally affected in the case of sickling whereas males are more affected than females in G-6-PD deficiency cases. Both these genetic disorders have profound health implications in terms of morbidity for the affected persons.

Sickle Cell Disease (HbSS) and Sickle Cell Trait(HbAS)

Sickle Cell Disease is a haemolytic anemia (shortened life span of red cell) leading to severe and often fatal anemia. The disease is further characterized by enlarged spleen, painful crisis, organ damage, impaired mental functions, increased susceptibility to infection and ultimately early death under certain conditions. The patients tend to have shorter trunk with long legs, chronic leg ulcers and an overall aesthetic (weak) built. The sickle cell disease has been found in 72 districts of Central, Western and Southern India (DST Technical Report, 1990). There are more than 35 tribal population groups showing a frequency of more than 19 percent. It is estimated that approximately, a staggering 50 lakh individuals are carriers (heterozygote) among the tribals (DST Report, 1990). Prevalence rate upto 40% of heterozygous form [sickle cell trait (HbAS), has been reported in some tribes i.e. Adiyan of Kerala, Irula, Paniyan, Mulukurumbha of Nilgiri hills, Gonds of Raipur (Basu, 1993, 1994) in a protective adaptation with malaria.[38-40]

The prevalence of consanguinity plays a significant role for higher frequency of sickling in the tribal belt.

Glucose-6-phosphate Dehydrogenase Red Cell Enzyme Deficiency

Glucose-6-phosphate dehydrogenase is an important enzyme of the red blood cells and its deficiency is inherited as an X-linked trait. Males who carry the gene show full expression, but expression in female heterozygotes vary widely. Glucose-6-phosphate dehydrogenase enzyme deficiency is one of the most common defects of inherited red cell enzyme which renders individuals vulnerable to drug induced haemolytic anemia. Deficiency of enzyme concerned in red cell metabolism results in sensitivity to sulpha and anti-malarial drugs such as primaquine phosphate and also by the ingestion of broad bean "Vicia Fava". More than 150 million people are known to be suffering from this defect all over the world, thus exerting a great strain on the preventive facilities of public health departments.

Investigations in India have shown that the frequency distribution of the G-6-PD enzyme deficiency is seemingly, connected with the prevalence of falciparum malaria. It has been suggested that G-6-PD deficiency confers some resistance in falciparum malaria and this has stimulated surveys in various populations under different ecological settings.

About 13 lakhs G-6-PD deficient are present in tribal population (DST, 1990). The prevalence is especially high among the tribes and scheduled castes of Madhay Pradesh, Chhattisgarh, Maharashtra, Tamil Nadu, Orissa, Rajasthan, Assam (more than 15%) especially in hyper endemic malaria zones.

Basu, et al, (1989) while carrying out intensive investigations among the different Bastar tribal groups of Madhya Pradesh/ Chhattisgarh and primitive tribal group of Phulbani district of Orissa found G-6-PD deficiency (using fluorescent spot test) in varying frequencies. Quite high frequency of G-6-PD deficiency was found among the Bhattras (19%), followed by Marias (17%), Ghotul Murias (13%) in males and 1.84% in females was observed among primitive Kutia Kondh tribal group of Phulbani district, Orissa.[41-46]

It may be noted that the frequency distribution of G-6-PD deficiency among the tribal population gradually becomes higher and higher from South to North, North-East through Western and Central India (Das, 1985).

Genetic burden study of red cell enzyme glucose-6-phosphate dehydrogenase deficiency in two major scheduled tribes of Sundargarh district, Northwestern Orissa, India.[19]

Data on prevalence of G-6-PD deficiency in indigenous tribal people of Orissa are limited. This study was carried out with the aim of field evaluation of the incidence/ prevalence of G-6-PD deficiency in two tribal populations, Bhuyan and Kharia of Orissa. It was found that the overall deficiency of enzyme was high in both Kharia (24.9%) and Bhuyan (16.9%). The frequency of G-6-PD deficiency was recorded to be 22.5, 16.8 and 13.7% in Paraja, Paik and Paudi Bhuyans, respectively in Sundargarh District, Orissa. The deficiency was higher in Dhelki Kharia (30.4%) in comparison to Dudh Kharia (20.4%). The deficiency of 30.4% in Dhelki Kharia tribal community reported from

Orissa is the highest in India. The genetic burden of G-6-PD deficiency is very high in these tribal populations of Orissa, which may result in a high degree of morbidity, mortality and neonatal wastage. From clinical point of view, anti-malarials should be administered with caution in malaria-endemic tribal populations.

MORTALITY PATTERN AMONG SCHEDULED TRIBES- MATERNAL MORTALITY IN INDIA: 1997-2003 – SAMPLE REGISTRATION SYSTEM (SRS)

Reduction of maternal mortality (MMR) is one of the major challenges to improve the overall quality of life.An attempt has been made through the Sample Registration System (SRS) - a large, ongoing, low-cost and long-term measurement system to provide the levels and trends in maternal mortality across the country during the period 1997-2003.

The findings brought out in the Report suggest that level and trend of maternal mortality in the country has substantially declined \ by nearly 24 per cent during 1997-2003. However, a lot will need to be done to achieve the ultimate goal set in this regard.

The significant results of the study are as under:

- About two-thirds of maternal deaths occur in a handful of the states - Bihar and Jharkand, Orissa, Madhya Pradesh and Chhattisgarh, Rajasthan, Uttar Pradesh and Uttaranchal (the Empowered Action Group or EAG states) and in Assam.
- The maternal mortality ratio (MMR) - the number of maternal deaths per 100,000 live births has declined from 398 (95%CI 378-417) in 1997-1998 to 301 (95%CI 285-317) in 2001-2003.

Infant Mortality Rate

Infant mortality rate is considered as one of the most sensitive indicators of health status of a society.

Although scheduled tribes have a lower infant mortality rate (62) than scheduled castes (66), the under five mortality rate is higher among scheduled tribes (96) than among scheduled castes (88). Other Backward Classes (OBCs) have lower mortality than scheduled castes or scheduled tribes, but have higher mortality than other castes at all childhood ages. Overall, the under-five mortality rate is 23 percent higher among OBCs than among the population in the general category.(NFHS-3, 2OO5-06).

According to Registrar General Ministry of Home Affairs, 1973, the infant mortality rates in tribal population of different states of India have been found to vary from a minimum of 36/1000 in Kerala to a very high rate of 168/1000 in Uttar Pradesh. Very high infant mortality rates (more than 140/1000) have been observed in the tribal population belonging to the states of Andhra Pradesh, Gujarat, Madhya Pradesh and Uttar Pradesh. But very little information is available on individual tribes about IMR and its etiological factors. Investigations carried out among the tribal groups of Bastar district (Basu, 1986) showed a very high rate of infant mortality among Bhattras (148.56) followed by Murias (123.35) whereas Marias (85.44) and Halbas (92.78) from the same area displayed relatively lesser frequencies. Similar inter-tribe variation of IMR was observed in several tribes inhabiting the same area of Andhra Pradesh (range 68.00 to 213.33/ 1000) (Malhotra, 1986). These inter-tribal

differences of IMR from the same geographical area need further in depth investigation.

Reproductive Wastage

Data on reproductive wastage among tribal population are meager. Collection of this sensitive information was found to be difficult in tribal situation, mostly these information's were underreported. The incidence of abortion was reported to be 2.5 per cent among Muria and 0.2 per cent among Bhattra mothers (Basu et al. 1986), 7.50 per cent in Zemi women of Nagaland (Chouduri et al., 1971, cited from Malhotra, 1986). The incidence of still-births was found to vary from 0.09 per cent in Kola of Tamil Nadu to 7.4 per cent in Mishings of Assam (Malhotra, 1986).

Child bearing and Maternal Mortality among Scheduled Tribe

Child bearing imposes additional health needs and problems on women - physically, psychologically and socially. Maternal mortality was reported to be high among various tribal groups but no exact data could be collected. The chief causes of maternal mortality were found to be unhygienic and primitive practices for parturition. For example, it was observed that among Kutia Khondhs (Basu et al./1990), the delivery was conducted by the mother herself in a half squatting position holding a rope tied down from the roof of the hut. This helped her in applying pressure to deliver the child. In complicated labour, obviously it might lead to maternal as well as child mortality. Similar crude birth practices were found to exist in other tribal groups like Kharias, Gonds, Santals, etc.

Perinatal Mortality (NFHS-3, 2005-06)

The Perinatal mortality rate is the sum of the number of stillbirths and early neonatal deaths divided by the number of pregnancies of seven or more months' duration. Although Perinatal mortality is an extremely sensitive indicator of health status of the population, high quality data on Perinatal mortality are difficult to obtain because of under reporting of stillbirths and infant deaths at age 0-6 days. For India, Perinatal mortality is estimated to be 49 deaths per 1000 pregnancies lasting seven or more months (including live births and still births) during the period 2001 – 2005. As per the Sample Registration System, the Perinatal mortality rate was 35 during 2002-2005. Thus, NFHS-3 has captured more stillbirths and early neonatal deaths than the SRS.

A Comparative State of different Reproductive Child Health (RCH) indicators for the SCs/STs against the rest of the population is given below:

Health Indicators	Scheduled Castes (SC)	Scheduled Tribes (ST)	Rest of Population
IMR	83.0	84.2	61.8
Under 5 Mortality	119.3	126.6	82.6
Total Fertility Rate (TFR)	3.15	3.06	2.66
% Children Under Weight	53.5	55.9	41.1
Children with anemia (NFHS-3)	78.9	79.8	72.7
% Children with ARI	19.6	22.4	18.7
% Children with Diarrhoea	19.8	21.1	19.1
% Women with anemia (NFHS-3, 2005-2006)	58.3	68.5	51.3

Source: NHFS-2 (1998-99) and NFHS-3 (2005-06)

Salient Points to be deduced

- Almost all the health indicators in STs are observed to show relatively higher figures as compared to rest of population. Similar is the case with SC population

- However, while comparing Scheduled Castes and Scheduled Tribe population with respect to health indicators, scheduled tribes show relatively higher values.

- Tribals have poor access to health services and there is also under utilization of health services owing to social, cultural and economic factors.

- Urgent attention need to be given for effective coverage of tribal areas under basic health services with the help of trained, cultural and socially oriented health providers towards tribal culture.

REFERENCES

1. Basu, Salil (1986): Genetics, Socio-Cultural and Health Care among.Tribal Groups ofJagdalpur and Konta Tehsils of Bastar District, Madhya Pradesh (In) A.K. Kalla and K.S. Singh (eds.), Anthropology, Development and Nation Building, Concept Publishing Company, New Delhi.

2. Basu, Salil., Kshatriya, G.K., (1989): Fertility and Mortality in Tribal Populations of Bastar District, Madhya Pradesh. Biology and Society, 6 : 110-112.

3. Basu, Salil (1992): Health and Culture of the Underprivileged Group of India, in : Alok Mukhopadhyay (ed.). State of India's Health, Voluntary Health Association of India. New Delhi.

4. Basu, Salil (1993): Health Scenario and Health Problems of the Tribal Population in India. In Mrinal Miri (ed.). Continuity and Change in Tribal Society. Indian Institute of Advanced Study, Shimla.

5. Basu, Salil (1999): Genetic disorders and Health Care. Shri Kala Prakashan Publishers, Delhi.

6. Patnaik SM (2002): Community Norms on Sexual Behaviour-A Preliminary Study of tribes of Kharkhand, Chattisgarh and Uttaranchal, Chapter 5, pp 1-9, 2002.

7. Census of India, (1981): General Population and Population of Scheduled Castes and Scheduled Tribes, Series-1, Paper-2, Government of India, New Delhi.

8. Census of India, (1991): Paper-1 of 1992, Final Pupulation Totals, Registrar general and Census Commissioner of India, New Delhi.

9. SAmple Registration System (SRS): 1997-2003, Maternal Mortality in INDIA (MMR).

10. National Sample Survey Organisation (1991): Government of India, A Report on Living Conditions on Tribals and Non-Tribals of Tribal Areas No. 380.

11. International Institute of Population Studies (2007): National Family Health Survey, India (NFHS-2) 1998-99, Ministry of Health & Family Welfare, Government of India.

12. Roy Burman, B.K. (1986): Morbidity and Nutritional Status of the Scheduled Tribes of India, In : B. Chaudhari (ed.) Tribal

Health, Socio-Cultural Dimensions, pp. 85-98, Inter-India Publications, New Delhi.

13. Basu Salil (1995): Social Assessment Study: Perception, Attitude, Experience of Tribal Communities vis-a-vis the Role of Health Providers for the Acceptability and Demand for tuberculosis Treatment in Tribal Areas (World Bank Aided Project Report).

14. Regional Medical Research for Tribals (ICMR), Technical Bulletin, Jabalpur, 2003, 2004, 2005, 2006.

15. Mukherjee, D.P., Nandy, S.K., (1986) Anthropology of tribal health - The Case of the Asur in Netarhat Plateau. In : B. Chaudhury (ed.). Tribal Health : Soco-Cultural Dimensions, pp. 247-258. Inter-India Publications, New Delhi.

16. Swain, S., Jena, S.C., Singh, P., (1990): Morbidity Status of the Kondha Tribes of Phulbani (Orissa), In : B. Chaudhury (ed.). Cultural and Environmental Dimension of Health, pp. 177-191, Inter-India Publications, New Delhi.

17. Report of the Commissioner for Scheduled Castes and Schedulated Tribes (1986): Twenty Eighth Report, 1986-87.

18. I.C.M.R. Bulletin (2003): Health status of primitive tribes of Orissa, 33(10) Indian Council of Medical Research Bulletin.

19. R.S. Balgir, (2007):Genetic burden of red cell enzyme glucose-6-phosphate dehydrogenase deficiency in two major Scheduled Tribes of Sundargarh district, Current Science, 92(6): 768

20. Saxena V.B., Darbar B.S,. Jain M.K., (1978): Resurgence of Yaws, A Preliminary Report from Jagdalpur District, Madhya Pradesh, India, Indian Journal Preventive Social Medicine, 9 (2).

21. Basu Salil (1996): Need for Action Research for Health Development among Tribal Communities of India, South Asian Anthropologist, 17(2): 73-80.

22. Basu Salil (1998): supported by Pfizer Limited and DGHS, Govt. of India

23. Elwin, V. (1961): Nagaland Research Department, Advisors Secretariat, Shillong.

24. Basu,S.K.,et al., (1993): Study of Socio-Cultural, Demographic Characteristics, Maternal and Child Health and Sexually transmitted diseases among the polyandrous Jaunsaries of Jaunsar - Bawer, Dehradun (Mimeo NIHFW).

25. Basu, S.K. et. al., (1983): Socio-Cultural Dimensions, Demographic Features, Maternal and Child Health Care Practices and Sexually Transmitted Diseases n Santals of Mayurbhanj District, Orissa (Mimeo, NIHFW).

26. Jindal,A., Kshatriya, G.K., (1990): The Determinants of Health Seekinq Behavior Among Tribal Populations of Bastar District, Madhya Pradesh, South Asian Anthropologist 11,1-6

27. Basu, S.K., Kshatriya, G.K., Jindal,A, (1988): Fertility and Mortality Differentials Among the Tribal Population Groups of Baster District, Madhya Pradesh. Human Biology, 600 :407-416

28. Basu, S.K. (1996): 'Health Status of Tribal

Women in India', In Amar Kumar Singh and M.K. Jabbi (Ed.). Status of Tribal in India, Health, Education and Employment, Council for Social Development, Har Anand Publications, New Delhi.

29. Basu, S.K. (1996): 'Health and Socio Cultural Correlates ii' Trible Communities', (In) R.S. Mann (edited) Tribes of India: Ongoing Challenges, M.D. Publications Pvt. Ltd., New Delhi

30. Basu, S.K., Kshatriya, G.K. (1989): Fertility and Mortality Tribal Bastar District, Madhya Pradesh, India Biology and Society, 6,100-112,

31. Basu,S.K., A. Jindal, (1990): Genetic and Socio-Cultural Determinants of Tribal Health : A primitive Kutia Khondhs Tribal Group of Phulbani District, Orissa. ICMR Final Report, NIHFW, New Delhi.

32. Chetlapalli et al., (1991): 'Estimates of Fertility and Mortality n Kutia Khondhs of Phulbani District, Orissa, Journal of Human Ecology, 2(1), 117-20.

33. Chaudhuri, B., (1986): Medical Anthropology in India with special reference to tribal population, in : B. Chaudhuri (ed.). Tribal Health, Socio-Cultural Dimensions. Inter-India Publications, New Delhi.

34. D/H&FW [M] Govt. of Rajasthan [2003]: Bhasin, V [2004], Gupta, N., Pal, p. Bhargava M., Daga, M [1992]: Naik et al [2005]; Mamta Report [2005].

35. International Institute of Population Studies (2007): National Family Health Survey, India (NFHS-3) Vol-2, 2005-2006, Ministry of Health & family Welfare, Government of India.

36. Chakma, T., Rao, P.V., Meshram, P.K., Singh, S.B., Tiwari, R.S. (2000): Endemic genuvalgum and other bone deformities in two villages of Mandla district in Central India. Fluoride 33, 187-95

37. Chakma, T, Singh, S.B. Godbole S, Tiwary R.S. (1997): Endemic fluorosis with Genu valgum syndrome in a village of district Mandla, Madhya Pradesh. Indian Pediatr.: 34:232-6

38. Basu, S.K. (1994): The State of the Art - Tribal Health in India, In: Salil Basu (ed.). Tribal Health in India, Manak Publications Pvt. Ltd., New Delhi.

39. Basu, S.K. (1985): Population Genetics and Environmental Studies among the tribal population of India : Consideration of Approaches for promotion of Health Care: Issues and Future Strategies, NIHFW Technical Report 8.

40. Basu, S.K., Kshatriya, G.K. (1993): Fertility and Mortality Trends in Dudh Kharia Tribal Population of Sundergarh district, Orissa, Paper presented at the International symposium on Human Genetics and Variation and XVIII Annual Conference of Indian Society of Human Genetics held at Osmania University, Hyderabad, January 1993.

41. Basu, S.K.(1994): Tribal Health in India. Manak Publishers Pvt. Ltd., New Delhi.

42. Bardhan, A., Sinha, S.K., K. Gopinath, Brahmbhatt, A.K., (1989): A diagnostic study of factors responsible for lesser or no utilization of health facilities among the

Bhils of Madhya Pradesh, PAC Report, (Mimeo), National Institute of Health & Family Welfare, New Delhi.

43. Banerjee, D., (1982): Poverty, Class and Health Culture in India, Vol. 1, New Delhi, Prachi Prakashan.

44. Guha, B.S., (1935): The Racial Affinities of People of India. Census of India 1931, Vol. 1, Part III B, Government Press, Shimla.

45. Haque, M. (1990): Height weight and nutrition among the six tribes of India. In L.B. Chaudhury (ed.). Cultural and Environmental Dimensions on Health, PP. 192-206. Inter-India Publications, New Delhi.

46. Prasad, R.R., (1988): Tribal Development in India - Strategies and Programmes, Journal of Rural Development, 7(1), 81-103.

CHALLENGES OF IMPARTING IEC FOR PREVENTION OF HEREDITARY SICKLE CELL DISORDERS, b-THALASSEMIA SYNDROME AND G-6-PD DEFICIENCY IN INDIA

R S Balgir*

Abstract : *Hereditary hemolytic disorders like hemoglobinopathies, thalassemia syndrome and glucose-6-phosphate dehydrogenase (G-6-PD) enzyme deficiency are important genetic and public health problems in India. The sickle cell anemia especially affects 60-70 million people all over the world. The victims include the growing children, adolescent girls, pregnant women and a large chunk of ignorant people. Inherited disorders of hemoglobin cause high degree of hemolytic anemia, jaundice, painful crisis, etc. and are responsible for high infant morbidity and mortality, maternal mortality and fetal wastage in India. However, practically no step has been taken towards imparting information, education communication, (IEC) and genetic counseling to the vulnerable individuals, families and communities in India. This article is the first attempt for providing relevant information on IEC, mode of transmission, and preventive measures for genetic disorders such as sickle cell hemoglobinopathy, thalassemia syndrome and G-6-PD deficiency in India.*

INTRODUCTION

Genetic disorders differ from medical afflictions because of the high risk of recurrence of anomaly in other family members and, subsequent impact on the family life. This impact is also dependent on the educational level, psychosocial mindset, economy, transport and communication facilities, availability of health care and practices, and many other aspects of the community behavior. In India, mothers usually get the blame for poor reproductive outcome, whether it is infertility or a handicap in the child. The problem gets further compounded, if the woman by chance found to be the carrier of a disease. Genetic counseling is a communication process directly related to client or the patient. Prevention of genetic diseases is a recently emerging concept for disease management and is considered equivalent to the technological services. The main objectives of the genetic counseling are:

1. To bring awareness of genetic diseases in the society,
2. To offer information for prevention and control of genetic diseases through screening, carrier detection and prenatal diagnosis, and
3. To proffer information for clinical aspects, prognosis and treatment of the disease.

On many occasions, it has been observed

* Scientist-F & Head, Department of Biochemistry, Regional Medical Research Centre for Tribals (ICMR), Nagpur Road, Jabalpur-482 003, (M.P.) E-mail: balgirrs@yahoo.co.in

that mainly the ignorance of parents is responsible for the birth of a defective child.[1,2] The birth of a child with thalassemia major or sickle cell disease brings mental stress on parents, family members, and society and also on the health care system. Treatment strategies such as blood transfusion, iron chelation therapy, stem cell or bone marrow transplantation, etc., although available in India, but add to economical, psychological and social burden and stress.[3] Since about 60-70% of the families in India come from the low-income strata, to give proper treatment to affected children is beyond their means. Bone marrow or stem cell transplantation is so expensive in India that the most of the parents cannot afford it.[1]

Therefore, the prevention is the only "mantra" (solution), which can ultimately control the birth of a thalassemia major or sickle cell anemia child. Thus, the genetic counseling comes into the picture that is, a technology that is economical, less stressful and ultimately plays the significantly key role in prevention and further spread of genetic diseases in the family and the communities.

Genetic counseling is generally given to the following categories of the people:

- Individuals, families, relatives and to the high risk communities like Punjabi Khatri,
- Sindhi, Lohana, Agharia, Khoja, Jain, and many scheduled castes and tribes, etc.
- Parents and relatives of thalassemia major or sickle cell disease child.
- Carriers or traits of sickle cell and thalassemia who have/do not have family history of sickle cell disease or thalassemia major.
- Couples at high risk (husband and wife being both carrier)
- Married and unmarried individuals with trait status.
- Voluntary social workers, educational institutes and welfare organizations

Genetic counseling should be given in different languages keeping in mind the educational and economic background, marital practices, social and cultural status, customs and traditions, psychological aspects, social attitude and perception of the individual and family.

This article aims at imparting the basic information, education and communication (IEC) in the genesis and concept building about some common hereditary hemolytic disorders like sickle cell disease, thalassemia major and glucose-6-phosphate dehydrogenase (G-6-PD) enzyme deficiency and about their mode of transmission, signs and symptoms, prevention and control strategies in vulnerable communities in India.

What is a Hereditary Disease ?

Every characteristic of our body, such as eye or hair color, height, shape of the face, or hemoglobin production, is determined by genetic material called "genes" which are inherited from our parents.[4] At the time of conception, a person receives one set of genes from the mother and a corresponding set of genes from the father. We inherit two genes for every characteristic, one from each parent. We have two genes that control the hemoglobin in our red blood cells. The usual type of adult hemoglobin is called Hb A. Most of us have two genes for Hb A, so we are said to be Hb AA.

Transmission of recognizable characteristics to descendants is termed as heredity. Any non-contagious defect passed on from parents to children is called hereditary disease. Hereditary diseases follow a specific mode of inheritance like dominance, recessive, sex-linked, polygenic, etc. All human tissues like blood, semen, urine, sweat glands, etc. carry these hereditary messages generation after generation through a number of genes located on different chromosomes, i.e. sex chromosomes (germ-line) and autosomes (somatic transmission). Human blood is one of them.

What contains Human Blood ?

Human blood mainly composed of red blood cells, white blood cells, platelets, plasma, food particles, etc. Red blood cells are small biconcave discs. The outer surface of red cells is elastic and is made up of cell membrane and inside part (cytoplasm) contains hemoglobin and a number of enzymes. Ranges of normal hemoglobin levels are: adult males (13-18%), adult females (11-16%) and children (10-14%). In normal individuals, the fraction of adult hemoglobin (Hb A) is about 94-95%, followed by A2 fraction (1-3.5%), and fetal hemoglobin (Hb F) about 1-2%.

What are the enzymes and why are they important?

Enzymes are biological catalysts help in chemical reactions in the red blood cells. Red cells need energy for their survival from 90 to 120 days in the circulation and to perform various functions. This energy is liberated during metabolism of glucose. Every step is catalyzed by a specific enzyme in the pathway of glucose metabolism. There are about 21 such enzymes. If any of these enzymes is absent or defective, the whole process of metabolism of red cells is disturbed or gets disrupted.

What is Hemoglobin?

Human red cell containing red pigment is called Hemoglobin. Hemoglobin carries oxygen from heart to different parts of human body and collects carbon dioxide and other waste gases. Human hemoglobin is composed of two parts: Heme - Iron; Globin - protein containing amino acids has specific sequence. The hereditary disorders of hemoglobin may be classified into two broad groups: the hemoglobinopathies and the thalassemias. Hemoglobinpathies are characterised by the production of structurally defective hemoglobin due to any change in amino acid sequence. Thalassemias are characterised by a reduced rate of production of normal hemoglobin. Any change in amino acid sequence leads to abnormal hemoglobin variant like sickle cell hemoglobin Hb S (Glutamic acid replaced by Valine at 6th position), Hb E (Glutamic acid replaced by Lysine at 26th position), Hb D (Glutamic acid replaced by Glutamine at 121st position), etc. A normal person has three types of hemoglobins: adult hemoglobin (Hb A): 94-95%, fraction of adult hemoglobin (Hb A2): 0.1-3.5%, and fetal hemoglobin (Hb F): 1-2%. Disproportionate production of any of the above three types of hemoglobins leads to thalassemia.

What is Thalassemia?

Thalassemia is an inherited disorder of hemoglobin passed on from one generation to another. There are three forms of thalassemia:

1. **Thalassemia Major** (Cooley's Anemia or Homozygous condition)

2. **Thalassemia Minor** (Trait, Carrier or Heterozygous condition)

3. **Thalassemia Intermedia** (It is just like Thalassemia Major but comparatively less severe)

Thalassemia Major: A child born with thalassemia major is normal at birth, but within a few months of life becomes pale due to lack of hemoglobin (blood), which sustains life. The child cries excessively, becomes irritable and repeatedly gets attacks of fever, cold and cough and infections. Appetite is poor, frequent vomiting and loose motions. Retarded growth of the child is common. Even blood building tonics or injections do not help and child becomes pale (anemic). Diagnosis of the disease can be confirmed with specific investigations before any blood transfusion.

Thalassemia Minor : Persons suffering from thalassemia minor are perfectly healthy just like normal individuals but pass this trait to their children. However, some of them have mild anemia. Most of the people do not know that they have thalassemia minor or trait. Only the special blood test can detect the carrier state. All children with thalassemia major have their carrier parents.

How is Thalassemia Transmitted?

1. If one of the parents is normal and other has thalassemia minor, there is 50% chance of each pregnancy for thalassemia minor child, but none of the children will have thalassemia major.

2. If both the parents have thalassemia minor, there is

   i). 25% chance of each pregnancy for thalassemia major child

   ii). 50% chance of each pregnancy for thalassemia minor child

   iii). 25% chance of each pregnancy for normal child.

3. Thalassemia major persons are unable to contribute to the next generation.

If any of the family members is suffering from thalassemia, the testing of blood of other family members for thalassemia is highly essential.

Can Thalassemia Major be treated ?

Treatment for children with thalassemia major is life long blood transfusion at the interval of 15-30 days depending upon the condition of child. It is better to maintain 5-10 g/dl hemoglobin level. Due to repeated blood transfusions, iron gets deposited in the vital organs like heart, liver, kidney, pancreas and endocrine glands, which damages them. To remove this extra iron overload and to save the life of child from ill effects, specific iron removing drugs (Iron chelator, Kelfer) are available, but are costly and beyond the reach of common man. However, with these drugs the life span of the child can be prolonged. With repeated blood transfusions, the child generally dies at the end of second decade of life. Apart from heavy expenses, the child and parents have to undergo mental agony and physical sufferings. There is no permanent cure of thalassemia major. However, with repeated blood transfusions the life can be prolonged. During the course of repeated blood transfusions (15-30 days) to the thalassemia major children, the possible threat of AIDS and/or Hepatitis infection cannot be ruled out in the Indian setting. Bone Marrow/stem cell transplantation (of patient's own) from own brother or sister is curative treatment, at present, available in

selective Centres/Institutes in India, but this treatment costs around Rs.9-17 lacs.

How to prevent the birth of Thalassemia Major ?

Looking at the extra-ordinary exorbitant cost and efforts required to nurture a thalassemia major child, there should be more emphasis on prevention of birth of thalassemia major child. The prevention of birth of thalassemia major children is possible by following methods:

1. Detection of carrier status before marriage
2. Prevention of marriages between the carriers
3. By providing Genetic Counseling advice to thalassemia minor cases.
4. If both the partners are having thalassemia minor, then they should restrict the childbirth to minimum and should undergo prenatal diagnosis during each pregnancy (within 10-12 weeks of conception). Facilities for diagnosis of fetus are available in selected places in India.[4]

What is a Sickle Cell Disease ?

A carrier of sickle cell means that you have one gene for the usual type of hemoglobin (A), and one for a sickle type called Hb S. You are AS, sickle cell trait or heterozygous. People who are AA or AS are completely healthy. When a child is being formed it inherits one gene for hemoglobin from each parent. From a parent who is AS it can receive either a gene for Hb A or one for Hb S. However, if the child inherits two genes for Hb S, he/she will have sickle cell anemia or sickle cell disease (SS). Thus, a sickle cell disease is abnormal hemoglobin variant which takes the shape of a sickle in the absence of oxygen.

What are signs and symptoms of Sickle Cell Disease ?

The signs and symptoms of sickle cell disease are variable. A child born with sickle cell disease has sometimes hand and foot swollen. Within a few months of life, the child becomes weak and pale due to lack of hemoglobin (blood), which sustains life. The child suffers from vaso-occlusive episodes with body ache, joint pains, abdominal pains, jaundice, weakness, fatigue, recurrent fever, spleenomegaly, hepatomegaly, growth retardation, etc.

The child cries excessively, becomes irritable and repeatedly gets attacks of fever, cold and cough and infections. Appetite is poor, frequent vomiting and loose motions. Child does not grow properly. With advancement of age, the demand for blood increases, resulting in spleenomegaly as well as hepatomegaly. Due to infarction, pain in long bones, ribs, spine, joints, and abdomen and body muscles is common in these cases. In adolescent girls, menarche is delayed for 2-3 years. Even blood building tonics or injections do not help and child becomes paler (anemic). Diagnosis of the disease can be confirmed with specific investigations before any blood transfusion.

If any of the family members is suffering from sickle cell disease, the testing of blood of other family members for sickle cell disease is highly essential.

How is Sickle Cell Disease transmitted ?

1. If one of the parents is normal and other has sickle cell trait, there is 50%

chance of each pregnancy for sickle cell trait child, but none of the children will have sickle cell disease.

2. If both the parents have sickle cell trait, there is
   i) 25% chance of each pregnancy for normal child
   ii) 50% chance of each pregnancy for sickle cell trait child
   iii) 25% chance of each pregnancy for sickle cell disease child.
   iv) 75% chance of getting each pregnancy with sickle cell defect.
3. Only a few sickle cell disease persons are able to contribute to the next generation.
4. Sickle cell disease associated with beta-thalassemia is called sickle cell-beta-thalassemia disease, which is not uncommon in India.

Sickle cell disease can be present in association with other abnormal hemoglobins such as Hb C, Hb E, Hb D, Hb Q or alpha- or beta-thalassemia depending upon the carrier parents.

Can Sickle Cell Disease be treated ?

Treatment for children with sickle cell disease is life long blood transfusion at the interval of 15-30 days depending upon the level of fetal hemoglobin, interaction with alpha-thalassemia, and other nutritional conditions of child. It is better to maintain 5-10 g/dl hemoglobin level. Due to repeated blood transfusions, iron gets deposited in the vital organs like heart, liver, kidney, pancreas and endocrine glands, which damages them. To remove this extra iron overload and to save the life of child from ill effects, specific iron removing drugs (Iron chelator, Kelfer) are available, but are costly and beyond the reach of common man. However, with these drugs the life span of the child can be prolonged. With repeated blood transfusions, the child generally dies at the end of second or 3rd decade of life. Apart from heavy expenses, the child and parents have to undergo mental agony and physical sufferings. There is no permanent cure of sickle cell disease.

How to prevent the Sickle Cell Disease?

The methods of prevention of sickle cell disease are the same as for Thalassemia.

Points to remember

1. Every year 15,000 children with thalassemia major are born in India alone.
2. One thalassemia major child requires about 15-20 bottles of blood every year in India.
3. This blood disorder is common in Brahmins, Karans, Scheduled Castes and Scheduled Tribes in Orissa and among Punjabis, Bengalis, Sindhis, Marwaris, Muslims, etc in India.Caste/ Tribe endogamy and marriages among blood relatives increase the chances of thalassemia major or sickle cell disease.
4. It is believed that the defect of thalassemia originated in Mediterranean Sea belt and was brought to India from Greece by Alexander the Great and his army.
5. There was a high incidence of thalassemia among Greeks, Turks, Cypriots and Italians, which has been brought down by suitable interventions.

6. There are several states of India like Western and Southern part of Rajasthan, Gujarat, Maharashtra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Chhattisgarh, Jharkhand, Southern Uttar Pradesh, Southern Bihar, Southern West Bengal and Tea Garden Areas in North-Eastern Region of India, which fall in the sickle, cell belt. Therefore, people residing in these areas must get their blood tested before the marriage finalised.
7. If mother is AS (Carrier for sickle Cell gene) and father is also AS (Carrier for sickle Cell gene), in this case in every pregnancy, there is a chance of one in four to be SS (Sickle Cell Disease) child to be born to this couple. Therefore, during first trimester of the pregnancy, you can know whether your child would be a normal, carrier or diseased one (Prenatal Diagnosis). Facilities for the detection of abnormality are available in Mumbai, Kolkata, New Delhi and other selected places in India.
8. Persons suffering from sickle cell disease generally have loss of appetite. They don't take balanced food and also not in sufficient quantity. They should be given balanced food like green vegetables, grains, milk, egg, chicken as well as citrus fruits like lemon, oranges, amla, etc. The wheat germ paste or "chutney" ameliorates the severe conditions.
9. Children suffering from sickle cell disease have anemia. They feel tired and look weak or pale. Some children show white or yellow retina and suffer from Jaundice. When the red cells are destroyed rapidly, it leads to anemia.
10. A child may get infection easily, which causes fever. Sickle cell patients are unable to fight with the infectious agents like normal individuals. In this case, please consult the doctor immediately.
11. When there is a blockade of arteries (infarction), there is a pain in bones, joints and muscles. To avoid this, keep the body warm and take rest. Take adequate quantity of water or other liquids till your urine comes out white like water. Inadequate consumption of liquids leads to yellow colour and thickening of urine. If the colour of your urine is red or extremely pale, please consult your doctor.
12. The children suffering from a sickle cell disease can play and go to school like normal children, but they should avoid doing hard exercise in the sun or at high altitude.

What is G-6-PD enzyme ?

The glucose-6-phosphate dehydrogenase (G-6-PD) enzyme is one of the most important enzymes in the red cells, which protects the red cells from oxidative damage. It is an x-linked inherited enzyme in humans.[5]

What happens to a person who is deficient of this enzyme ?

A person who is deficient in this enzyme sometimes suddenly gets severe anemia and jaundice after exposure to certain infections or after taking certain drugs or medicines. Generally, the neonates deficient of this enzyme have risk of developing severe jaundice. Some patients also excrete black urine after taking certain drugs.

Is G-6-PD deficiency inherited ?

This enzyme deficiency is a sex-linked hereditary disorder present at birth and cannot be corrected during the lifetime of an individual. Gene is located on the X chromosome. Males have only one X chromosome, the other being Y chromosome, however, females have two X chromosomes, therefore, deficiency is expressed in hemizygous (XY) condition in males and heterozygous or homozygous condition in females depending upon the number of X chromosome carrying defective gene. XO stands for deficiency of G-6-PD enzyme and X stands for normal enzyme activity.

1. If a G-6-PD deficient man marries a woman without defective gene, all his daughters will have only one defective X from father and one normal X from the mother. In this case, all daughters will be carriers and all sons will be normal.
2. If the mother is a carrier of G-6-PD deficiency and father is normal, then some of the daughters could be carriers and some of the sons could be deficient. As female carriers have only one defective X chromosome and one normal X chromosome, they will have intermediate levels of enzyme activity. Only males have severe G-6-PD deficiency due to absence of enzyme.
3. In a rare occasion, a G-6-PD deficient man marries to a G-6-PD carrier woman, then
   - Some daughters could have both defective X chromosomes and have severe G-6-PD deficiency.
   - Some daughters could have one defective X chromosome and have intermediate level of deficiency.
   - Some sons could have one defective X chromosome and have severe level of deficiency.
   - Some sons could have normal X chromosome and normal G-6-PD enzyme activity.

How to determine a carrier or deficient status ?

There are several screening methods available for the detection of G-6-PD deficiency like Fluorescent spot screening method, Dichloro-phenol-Indo-phenol (DCIP) method, etc. These tests are carried out in specialized laboratories.

What A G-6-PD deficient person should do?

You should inform and consult your nearest medically qualified doctor about your being G-6-PD deficient status before taking any sort of medicine or sulpha drugs like antimalarials. A doctor is aware of this problem and will suitably prescribe you the relevant medicine or drug. A list of drugs is available with your local doctor.

IS G-6-PD deficiency quite common in your community ?

It is very common in certain communities where the marriages take place among blood relatives. Generally, two deficient persons should avoid marrying for the benefit of their future generation.

Precautions

1. Drink sufficient quantity of water, tea, milk or liquid during summer season to avoid dehydration.
2. Protect yourself from severe cold or hot

conditions. In winter, wear sufficient woolen clothes. In summer, do not spend too much time in the sun.

3. Avoid hard exercise and overloading work.
4. Use ORS or local sharbat during dehydration.
5. Take rest under critical situation (pallor, jaundice, fever, vomiting, pains) and take paracetamol and sufficient liquid. In case of emergency, consult your local doctor immediately.

The sickle cell anemia and beta-thalassemia[6] are important inherited blood disorders with multi-system problems and shorten life span of individuals. They impose a heavy genetic load on innocent tribal communities and governmental health care machinery.[7] These diseases have no cure but can be prevented. The people should be made aware of the right kind of information and treatment based on the facilities available. There is a need for mass awareness. Prevention can be possible once awareness spreads. There is an increased demand for the prevention and alleviation of the sufferings of the affected people especially the poor tribals in India.

ACKNOWLEDGEMENTS

The author is grateful to Dr. V.M. Katoch, Secretary, Department of Health Research, Government of India and Director General, Indian Council of Medical Research, New Delhi for continuous encouragement and providing the necessary facilities.

REFERENCES

1. Balgir, R.S. (1999): Control and prevention of genetic load of hemoglobinopathies in India. National Medical Journal of India, 12: 234-238.
2. Balgir, R.S. (2000): The burden of hemoglobinopathies in India and the challenges ahead. Current Science, 79: 1536-1547.
3. Balgir, R.S. (1999): Medical genetics in clinical practice in India. Current Medical Trends, 3: 567-572.
4. Balgir, R.S. (2004): Health care strategies, genetic load, and prevention of hemoglobinopathies in tribal communities in India. South Asian Anthropologist, 4: 189-198.
5. Balgir, R.S. (2007): Genetic burden of red cell enzyme glucose-6-phosphate dehydrogenase deficiency in two major scheduled tribes of Sundargarh district in Northwestern Orissa. Current Science, 92: 768-774.
6. Balgir, R.S. (2006): Clinical genetics and hematological profile of sickle cell cases in twenty families of Orissa. Indian Journal of Hematology & Blood Transfusion, 22: 45-52.
7. Balgir R.S. (2007): Infant mortality and reproductive wastage associated with different genotypes of hemoglobinopathies in Orissa, India. Annals of Human Biology, 34:16-25.

SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF TRIBES OF UTTARAKHAND, INDIA

Manju Rani*, Ravendra K. Sharma*

Abstract : *The tribes comprise the most neglected section of our society, who have been economically exploited and socially discriminated for ages. This embarrassing situation has been largely responsible for their current abject poverty, illiteracy and overall backwardness. The intensity of problems of different tribes can be understood from their socio-economic and demographic profiles. Socioeconomic differences between different tribal communities also bring out some insights of existing poverty and disparities. The paper discusses the social, economical and demographic aspects of Scheduled Tribes of Uttrakhand state.*

The state of Uttrakhand was created by combining the hilly districts of Uttar Pradesh in November 2000. There are five different notified tribes of Uttarakhand and all these tribes were enumerated in Census 2001. The total population of Uttarakhand state was 84.89 lakhs and out of which 2.56 lakhs (3%) was tribal population as per Census 2001. The Tharu is the largest tribe of Uttrakhand, which account for one-third of total tribal population, followed by Jannsari (32.5%), Buksa (18.3), Bhotia tribes (14.2). Ranji tribe is the least in number. Most of the tribes are residing in rural areas (93.8%), however, about one-fourth of Bhotia's tribal population is living in urban areas. Majority of tribal population inhabit in four districts, viz. Udham Singh Nagar (43%), Dehradun (38.8%), Pithoragarh (7.5%) and Chamoli (4.1%) only. The sex ratio among scheduled tribes of Uttrakhand (950) is considerably poor as compared to the national average of Scheduled Tribes (978) in India. However, Bhotias registered more females than males (1049) and Ranjis have least females (833). In year 2001, about 63% of tribal population of Uttrakhand state was literate as compared to 72.0% of state average. But literacy was relatively much higher among Bhotia (86.4%) and Tharu (82.3%) tribes. Overall, Ranjis are the most socio-economic deprived tribe in the state.

BACKGROUND

The Scheduled Tribes, the most neglected section of our society have been subjected to economic exploitation and social discrimination for ages. The age old exploitation and repression of the tribal have cut them from the mainstream of the socio-economic development. This sorry state has been largely responsible for their abject poverty, illiteracy and overall backwardness. Due to geographical isolation they have been alienated from the rest of the community as a result of which they have been forced to lead a life of economic and social subjugation. An idea of the enormity of the problems facing Scheduled Tribes (ST) can be gathered from the demographic profile which

* Lecturer (Sr. Scale),Dept. of Economics, Government Degree College,Chhaprauli, Baghpat (U.P.) E-mail: ranimanju@gmail.com

** Scientist-C, Regional Medical Research Centre for Tribals (ICMR), Jabalpur

indicates that India has the largest tribal population in the world (84.32 millions). According to the Census 2001, tribal groups constitute 8.2 percent of total population of the country, i.e. one tribal man for every thirteen Indian.[1] The tribal population in India is more than the population of the France or United Kingdom and is about four times that of Australia.[2]

Further, the census data also revealed that ST children between the ages of 0-6 years constituted about 20% of total ST population. This means that about one-fifth of their population belongs to most vulnerable and formative age groups. This needs a larger investment in the areas of education, nutrition, health, etc. Areas inhabited by tribal constitute a significant past of the backward areas of the country. It is estimated that predominated tribal areas comprise about 15 percent of total geographical area of the country.[3]

A tribe is a group comprising families, alone, or generations, having its own customs, occupying a specific geographical territory, and being independent of, or having little contact with, the dominant national society of the country in which they live.[4] The United Nations declared the 1993 as the international year of the indigenous pople, that is, the aborigines as the original inhabitations of the land. With this the 1993 became the landmark in the struggle for human rights by indigenous people all over the world.[2] The Constitution of India, in its article 14 (4), 46, 244 (i) and 339 promises special care for the educational and economic interest of the Scheduled Tribes and protection form social injustice and economic exploitation special provisions meant for the administration and control of scheduled areas and tribal terrains.[5] Based on these constitutional provisions specific policy enunciations for tribal development have been incorporated in the strategy of economic development in our Five Year Plans.[6]

Eradication of poverty and rising the standard of living of weaker section (Scheduled Castes & Schedules Tribes) have been the most important objectives of the country's economic planning. In the initial years of planning it was presumed that the economic growth would by itself ensure that benefits would reach the poorer sections of the population which is commonly known as the 'trick- ling down' or percolation theory. However, this could not actually happened and planners realised that unless specific plans/ programmes/ schemes were formulated in respect of the poorer sections of the society, especially STs, the objective of eradication of poverty through economic planning would not be achieved.[7] Different tribal groups are living in different geographical regions and in different degree of economic and social backwardness. They are scattered along the length and breadth of the country, from the Himalayas to the Indian Ocean and from the Arabian Sea to the Eastern Frontiers. They live generally in inhospitable terrain where productivity of the land is low and their hamlets are found in the interior forest areas along with the hill streams. There are no communication facilities between the different isolated tribal groups, as well as between the tribal and the world at large.[8] Some of these communities, particularly in the North-Eastern states are far ahead of the general educational level in the country, but on the other end, there are communities which are still at a pre-literate level.[9] This

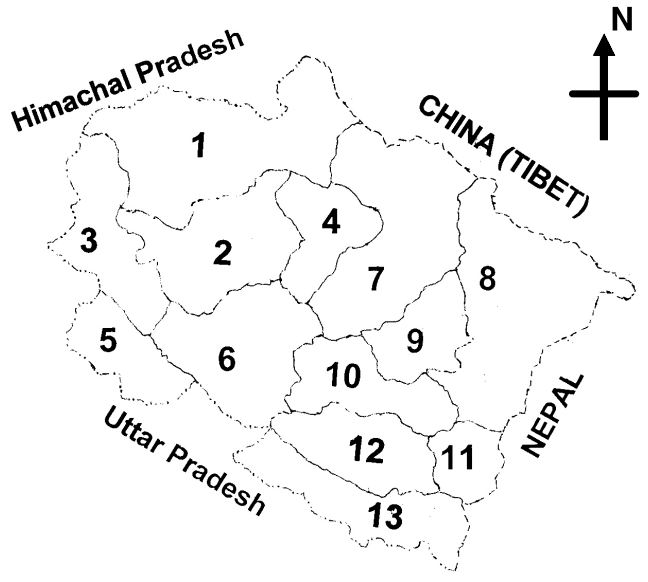
paper discusses the social, economical and demographic aspects of tribes of Uttrakhand state- a totally hilly state in northern India. Inter-regional tribal variation and inter-tribes variations are investigated to study the disparity among different tribes of a small state. Most of the statistics discussed in the paper is taken from Census 2001 publications and the term tribes and Scheduled Tribes are used as interchangeable throughout the paper.

Uttrakhand – A Profile

Hilly region of Uttar Pradesh state were curved out on 9th November 2000 as a new state Uttrakhand. State is heavily forested and extremely hilly region in Central Himalayan zone. It is located between latitudes 29°5' -31°25'N and longitudes 77°45' - 81°E covering a geographical area of 53,485 km^2. The Tons river separates the region from Himachal Pradesh in the north-west, while Kali river separates it from Nepal in the east. Starting from the foot hills in the south the region extends up to the snow-clad peaks of the *Himadri*, marking the Indo-Tibetan boundary.[10] The region being situated centrally in the long sweep of the Himalaya forms a transitional zone between the per-humid eastern and the dry to sub-humid western Himalaya (Fig 1). The region comprises of two administrative units *viz*., Garhwal (North-West portion) and Kumaon (South-East portion).

Agriculture sector plays an important role in the economy of Uttrakhand in terms of production and supply of off-session vegetables, temperate fruits, forest products and several other resources including manpower resources. Many pilgrimage places *viz*., Kedarnath, Badrinath, Gangotri and Yamunotri and

Fig 1: District Map of Uttarakhand



Map may not be up to the scale

Districts	
1	Uttarkashi
2	Tehri Garhwal
3	Dehradun
4	Rudraprayag
5	Haridwar
6	Garhwal
7	Chamoli
8	Pithoragarh
9	Bageshwar
10	Almora
11	Champawat
12	Nanital
13	Udham Singh Nagar

immense potential for adventure tourism makes this region a great potential area for tourism based industry. Uttarakhand with its vast natural resource base, large forest cover and enormous power potential holds the potential of being one of the most prosperous states in the country. The state domestic product during 2001-02 was around USD 1647 millions with a per annum growth rate of 4.4 per cent during 1993-94 to 2001-02. The high level of literacy and existence of large number of good quality educational institutions, research and training institutes and institutes of excellence indicate the abundant availability of quality human resource base.[11]

Scheduled Tribe Population in India

Total Indian population has increased form 439.24 million in 1961 to 1027.02 million in 2001. The ST population has increased from 29.88 million to 84.33 million during the same period. The proportion of ST population to total population has increased form 6.8% in 1961 to 8.2 % in year 2001. This reflects that the tribal population over the period has increased at a higher rate as compared to total population (Table 1). Tables 2 shows that the distribution of scheduled castes and scheduled tribes population in Northern Indian States/union territories as per Census 2001. About one-fourth (24.4%) of total Indian population is residing in these northern states. These states comprise about 32% of total Indian SC and 2% of total ST population. There is no specified tribe in states/UTs like Chandigarh, Delhi Punjab and Haryana. Overall less than one percent (0.7%) of 250.74 million inhabitants residing in northern states was classified as tribal population in Census 2001. About 11%, 4% and 3% of total population of Jammu & Kashmir, Himachal Pradesh and Uttarakhand respectively was classified as tribal population in the last population census.

Table 1: Decadal Growth of Tribal Population in India, 1961-2001

Years	Population (in million)	ST Population (in million)	% ST Population	Decadal Growth rate (%)	
				Total Population	ST Population
1961	439.24	29.88	6.80	--	--
1971	548.16	38.02	6.94	2.48	2.72
1981	665.29	51.63	7.76	2.14	3.58
1991	846.30	67.76	8.08	2.72	3.12
2001	1027.02	84.33	8.21	2.14	2.45

Sources: Census of India, 2001[1]; Census of India, 1991[12]

Table 2: Scheduled Castes and Scheduled Tribes population in North Indian States, 2001

Indian State/ Union territory	Total population	Schedules Castes		Scheduled Tribe	
		Population	%	Population	%
INDIA	**1,027,015,247**	**166,635,700**	**16.2**	**84,326,240**	**8.2**
Chandigarh	900,914	157,597	17.5	--	--
Delhi	13,782,976	2,343,255	17.0	--	--
Haryana	21,082,989	4,091,110	19.4	--	--
Himachal Pradesh	6,077,248	1,502,170	24.7	2,44,587	4.0
Jammu & Kashmir	10,069,917	770,155	7.6	11,05,979	11.0
Punjab	24,289,296	7,028,723	28.9	--	--
Uttar Pradesh	166,052,859	35,148,377	21.2	1,07,963	0.1
Uttarakhand	8,479,562	1,517,186	17.9	2,56,129	3.0
Northern India	**250,735,761**	**52,558,573**	**21.0**	**1,714,658**	**0.7**
% of Indian Pop.	24.4	31.5		2.0	

Scheduled Tribes and their regional distribution in Uttarakhand

Uttarakhand is divided into two geographical administrative regions, viz. Kumaon and Garhwal. As per census 2001, out of 8.49 million state population 3.56 (42%) was recorded in Kumaon region and 4.92 million (58%) in Garhwal region. The overall sex ratio was higher (980) in Kumaon region compared to the Garhwal region (950). One-fourth of state population lives in urban areas. But Garhwal region (27.4%) is relatively more urbanized compared to Kumaon region (23.2%). Nanital (35.3%) and Udham Singh Nagar (32.6%) are most urbanized districts of Kumaon region, while Dehradun (52.9%) and Hardwar (30.8%) of Garhwal region are more urbanized districts. More than half of the Dehradun district population living in urban areas, whereas only 1.2% population of Rudraprayag district reside in urban areas (Table 3). The decadal growth rate also indicates the regional disparities in the population growth, the population of Nanital district has grown by 33% during 1991-2001, followed by district Udham Singh Nagar (27.8%), Hardwar (26.3%), Dehradun (24.7%) and Uttar Kashi (22.7%). Whereas it was far lesser as compared to state average (20.6%) in districts Almora (3.1%) and Garhwal (3.9%). About 37% of total population was classified as workers in 2001 census and the proportion of workers was comparatively higher in Kumaon region (38.5%) than that in Garhwal region (35.8%).

Table 3: Regional distribution of Uttrakhand population and its basic characteristics

Districts	Total population	Sex ratio	Growth rate (%)	Urbanization (%)	Total Workers(%)
Kumaon Region	**35,65,383**	**980**	--	**23.2**	**38.5**
Almora	6,30,567	1146	3.1	8.6	46.3
Begeshwar	2,49,462	1105	17.6	3.1	47.6
Udham Singh Nagar	12,35,614	902	27.8	32.6	31.7
Nanital	7,62,909	906	32.9	35.3	36.6
Pithora Garh	4,62,289	1031	10.9	12.9	43.0
Champawat	2,24,542	1021	9.2	15.0	40.2
Garhwal Region	**49,23,966**	**950**	--	**27.4**	**35.8**
Chamoli	3,70,359	1016	13.5	13.7	44.5
Dehradun	12,82,143	887	24.7	52.9	31.2
Garhwal	6,97,078	1106	3.9	12.9	38.7
Hardwar	14,47,187	865	26.3	30.8	29.4
Rudraprayag	2,27,439	1115	13.4	1.2	44.9
Tehri Garhwal	6,04,747	1049	16.2	9.9	43.8
Uttar Kashi	2,95,013	941	22.7	7.8	46.1
Uttrakhand	**84,89,349**	**962**	**20.6**	**25.7**	**36.9**

Note: Complied & computed from Census of India, 2001[13]

About two-third population (64%) of the state is residing in five districts only, viz. Hardwar (17.0%), Dehradun (15.1%), Udham Singh Nagar (14.6%), Nanital (9.0%) and Garhwal (8.2%). Tribal population is not uniformly distributed within the state and it is more concentrated in few districts. About 9% of Udham Singh Nagar population was classified as scheduled tribes, followed by districts Dehradun (7.8%), and Pithoragarh (4.2%). However, about 82% of total tribal population is residing in Udham Singh Nagar (43%) and Dehradun (39%) districts only (Table 4). The proportion of tribal population to total population was even less than one percent in Almora, Begeshwar, Champawat, Garhwal, Rudraprayag and Tehri Garhwal districts.

Five different population groups are notified as scheduled tribes in Uttarakhand and all were enumerated in census 2001. A brief ethnographical description about these tribes is given in appendix 1. Out of these five notified scheduled tribes in Uttarakhand, Buksas and Ranjis are classified as primitive tribes. The primitive tribes are most backward tribes having a declining or stagnant population, low level of literacy, pre-agricultural level of technology and are economically

Table 4: Scheduled tribes population and its distribution in Uttrakhand state, 2001

Districts	Total population	% of dist. Pop. in state pop.	Scheduled Tribe Pop.	% ST Pop. in dist. Pop.	% Dist. ST Pop. in total ST Pop.
Almora	6,30,567	7.4	878	0.1	0.3
Begeshwar	2,49,462	2.9	1,943	0.8	0.8
Chamoli	3,70,359	4.4	10,484	2.8	4.1
Champawat	2,24,542	2.6	740	0.3	0.3
Dehradun	12,82,143	15.1	99,329	7.8	38.8
Garhwal	6,97,078	8.2	1,594	0.2	0.6
Hardwar	14,47,187	17.0	3,139	0.2	1.2
Nanital	7,62,909	9.0	4,961	0.6	1.9
Pithora Garh	4,62,289	5.4	19,279	4.2	7.5
Rudraprayag	2,27,439	2.7	186	0.1	0.1
Tehri Garhwal	6,04,747	7.1	691	0.1	0.3
Udham Singh Nagar	12,35,614	14.6	110,220	8.9	43.0
Uttar Kashi	2,95,013	3.5	2,685	0.9	1.0
Uttrakhand	**84,89,349**	**100.0**	**256,129**	**3.0**	**100.0**

Note: Computed from Census of India, 2001[13]

backward. They become the most vulnerable sections among the scheduled tribes and priority is required to be accorded for their protection, checking the declining trend of their population and their development.[14] The most of the tribal population of the state belongs to Tharu and Jannsari tribal groups and residing in the Udham Singh Nagar and Dehradun districts. The district wise distribution of tribes shows that Bhotias are predominating tribal group in Almora, Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi districts. Tharus are predominating in Champawat, Teri Garhwal, and Udham Singh Nagar districts. Similarly Buksa is a leading tribe in the districts Garhwal, Hardwar and Nanital. The Jannsari is the important tribal group of Dehradun district (Table 5).

Socio-Demographic characteristics of tribes of Uttarakhand:

Age-sex distribution of tribal population - an important demographic indicator is shows in Table 6. Age distributions differ among different communities of any region mainly because of differences in the levels and trends of fertility. A population with persistently high fertility, for instance, has a large proportion of children and a small proportion of aged persons. Age distribution of tribal population in Uttrakhand shows that concentration of population in younger age groups (less than 15 years) is higher among tribes as compared to non-tribal population. Overall about 11% of total population was in 0-4 years age group and relative figures for non-tribal and tribal population was 10.5% and 12.6%

Table 5: Distribution of Important tribes in districts of Uttarakhand

Districts	ST Pop	Major Tribe (s)
Almora	878	Bhotia (89.9)
Begeshwar	1,943	Bhotia (98.5)
Chamoli	10,484	Bhotia (97.2)
Champawat	740	Tharu (57.7), Bhotia (27.7)
Dehradun	99,329	Jannsari (82.7)
Garhwal	1,594	Buksa (75.4)
Hardwar	3,139	Buksa (92.1)
Nanital	4,961	Buksa (59.4), Bhotia (24.3)
Pithora Garh	19,279	Bhotia (96.7)
Rudraprayag	186	Bhotia (54.3), Tahru (17.0)
Tehri Garhwal	691	Tharu (39.7), Jannsari (31.3)
Udham Singh Nagar	110,220	Tharu (76.7), Buksa (31.3)
Uttar Kashi	2,685	Bhotia (66.4), Jannsari (25.5)
Uttrakhand	256,129	Tharu (33.5), Jannsari (32.5)

Note: Complied & computed from Census of India, 2001[13]

respectively. Similarly the proportion of population in age groups 5-9, 10-14 age groups was higher among tribal as compared to non-tribal communities. On the other hand, the proportion of elderly population (60+ years) was higher among non-tribal communities (8.0%) in comparison of tribal population (6.3%).

The Tharu (33.4%) and Jannsari (32.5%) are two most populated tribal groups of the state. Another 18.2% and 14.2% tribal population was classified as Buksa and Bhotia tribe respectively. Only 517 persons were reported from Ranji tribes. Sex ratio among tribes (950 females per 1000 males) of the state is relatively poor as compared to the state's over all sex ratio (962). The sex ratio was favorable to females in Bhotia tribe (1049) and it was much disgraceful in Ranji (833). The child sex ratio (0-6 years) of 955 among tribal population of state was little bit better than the overall tribal sex ratio (950). Though the Ranji tribe has the highest proportion (23.8%) of child (0-6 years) population but it has worst child sex ratio (757). On the other hand, Bhotia tribe who has least proportion of child population (12.8%) and highest over all sex ratio (1049), has appalling child sex ratio (939). This poor sex ratio in some tribes, particular in small tribe like Ranji is matter of serious concern and Government should interfere immediately with appropriate

policy and programme of stop further descend in sex ratio, especially in child population. Most of the tribal communities reside in rural and hilly terrain, but about 6 percent of their population resides in urban areas. Bhotia tribe is the most urbanized tribe of Uttarakhand – one fourth of the Bhotias population resides in the urban areas. About 9 percent of Ranjis and 4 percent of Jannsaris also lives in urban areas (Table 7).

Table 6: Age distribution of Scheduled Tribe and Non-Scheduled Tribe Population in Uttarakhand

Age Groups	Proportion of Population of		
	Total (%)	Non ST (%)	ST (%)
0-4	10.9	10.5	12.6
5-9	12.6	12.2	14.3
10-14	12.9	12.7	13.6
15-19	11.0	11.0	10.8
20-24	8.7	8.9	8.2
25-29	7.4	7.4	7.2
30-34	6.4	6.5	6.2
35-39	6.2	6.2	6.1
40-44	5.1	5.2	4.8
45-49	4.4	4.5	4.1
50-54	3.6	3.7	3.3
55-59	2.8	2.9	2.5
60+	7.7	8.0	6.3
Age not stated	0.2	0.2	0.1
All ages	100	100.0	100
Total Population	922085	731239	190846

Note: Computed from Census of India, 2001[13]

Education among Tribes

Uttarakhand has the historical advantage in the education, state is known for it good schooling and have many national and international reputed Schools, College, Universities and Research Centre. Government has made various efforts through its Five Year Plans to make the education available for all sections of communities. During 2002-03, state of Uttarakhand was amongst the few states with 100 per cent trained teachers in all the levels of education. A key factor going in Uttarakhand's favour in attracting services and industrial investments is its significantly high level of literacy. The overall rate of literacy in the state jumped up to 72.3 per cent in 2001 from 57.7 per cent in 1991.[11]

Table 7: Socio-demographic characteristics of tribes of Uttrakhand

Tribes	Total Population	% ST Pop.	Sex ratio	Sex ratio (0-6 yrs)	% Urban	%(0-6yrs) Pop
Bhotia	3,64,38	14.2	1049	939	25.8	12.8
Buksa	46,771	18.3	928	958	0.8	19.1
Jannsari	83,262	32.5	918	962	3.8	18.1
Ranji	517	0.2	833	757	8.9	23.8
Tharu	85,667	33.4	963	958	1.9	15.6
All ST	**2,56,129**	**100.0**	**950**	**955**	**6.2**	**16.7**

Note: Computed from Census of India, 2001[13]

Both males and females literacy rates are higher in the state as compared to country's averages. Over all about 63.2% scheduled tribe population was literate as compared to 71.9% non-tribal population.[13] The gap between tribal and non-tribal literacy rates was greater among older age groups, whereas no such differences was observed in children aged 7-14 years (Fig. 2). According to 2001 Census, about 14.2, 12.2 and 10.4 percent of non-ST population respectively in age groups 20-29, 30-39 and 40-49 were graduates or above educated as compared to 7.6, 5.4 and 3.0 percent ST population respectively in these age groups. Overall 6.6% non-ST population was graduate or higher educated compared to 2.7% tribal population. Unfortunately this gap remains prevalent even in younger age groups (Fig.3).

The overall literacy rates may not provide whole picture of education status in the state, thus the proportion of population currently attending schools are computed which shows the recent scenario and trend in the education. Fig 4 shows the proportion of tribal and non-tribal children aged 6-24 years attending the schools/institutions in year 2001. Almost equal proportion of tribal and non-tribal children aged 6-14 were attending schools. But about 55% of tribal children aged 15-19 years were attending schools in comparison of 61% non-tribal children.

Among scheduled tribes of state, 63.2% of the tribal population was literate, which was well above the national average of Scheduled tribes (47.1%). However the literacy rates among the Scheduled Tribes of the state are lower as compared to overall state literacy rates. Nevertheless, male and female literacy rates of 76.4% and 49.4% respectively suggest the existence of wider gender gap within tribal population. Bhotia with 79.9% literacy rate are well ahead of the other tribes. Literacy rates are relatively lower for Buksa and Ranji tribes, Ranjis are most educationally deprived tribe of Uttarakhand (Table 8). But gap between males and females literacy rates was highest among Buksas (33.6%), followed

Fig 2: Percentage of Literate Population by age groups

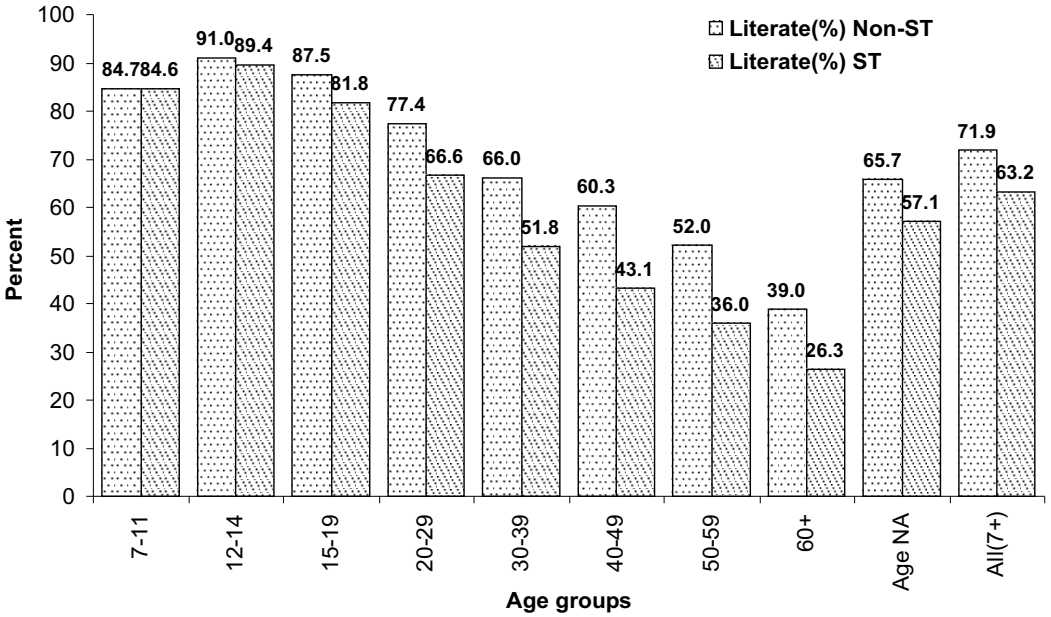
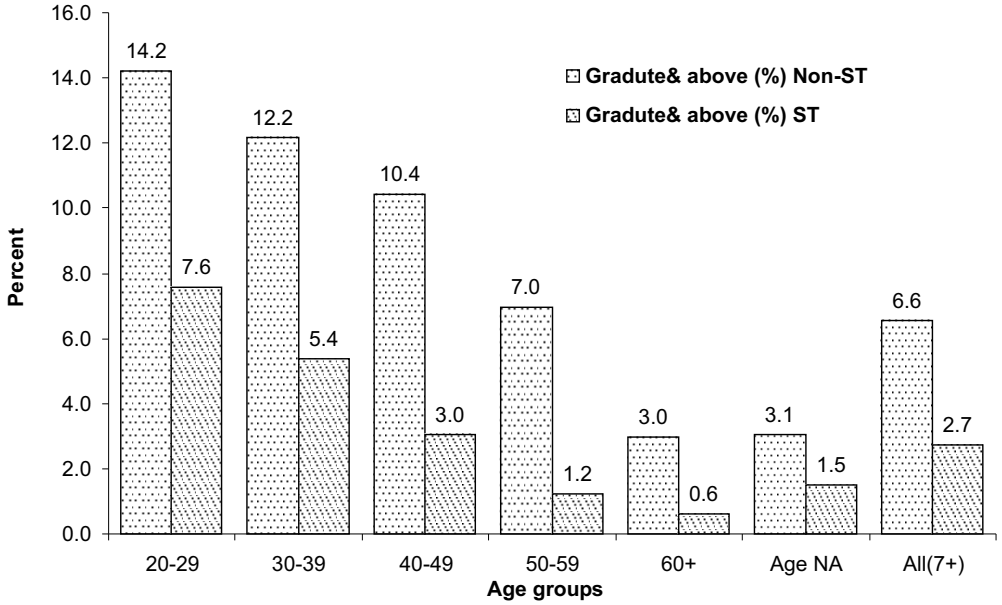


Fig 3: Proportion of graduate and above educated population by age groups



by Tharus (27.3%) and Jannsaris (26.9%) and Bhotias have lowest gender gap in literacy (22.4%).

Work Participation Rates among tribal population:

Uttarakhand is a pre-dominantly rural state

with population usually concentrated in the valleys and mountain slopes. Given the terrain of the state and favourable climatic conditions, agriculture continues to be the major source of income for more than three-fourths of the state's population.[11] However, inadequate production in the agricultural fields, increase in population, increasing demand on natural resources and lack of alternative employment opportunities within Uttarakhand together are responsible for out-migration of the men-folk from the villages to cities within State and outside State. In the absence of men, customarily entire burden of managing household comes on the ladies of the house.[15]

In 2001 Census, 41.1% of the STs were recorded as workers, which is lower than the 49.1% aggregated national level for STs. Among these 41.1% workers, 30% were main workers and 11.1% were marginal workers. The work participation rate was higher for males in comparison of females. While about half of ST males were counted as workers, only 32% females were recorded as workers. Most of the males worked as main workers, whereas more and more females were reported as marginal workers. Among tribal groups, Bhotia had highest work participation rates and it was lowest for Buksa. Ranji had the highest proportion of marginal workers among total workers (Table 9).

Fig 4: Proportion of children (6-24 yrs) attending school

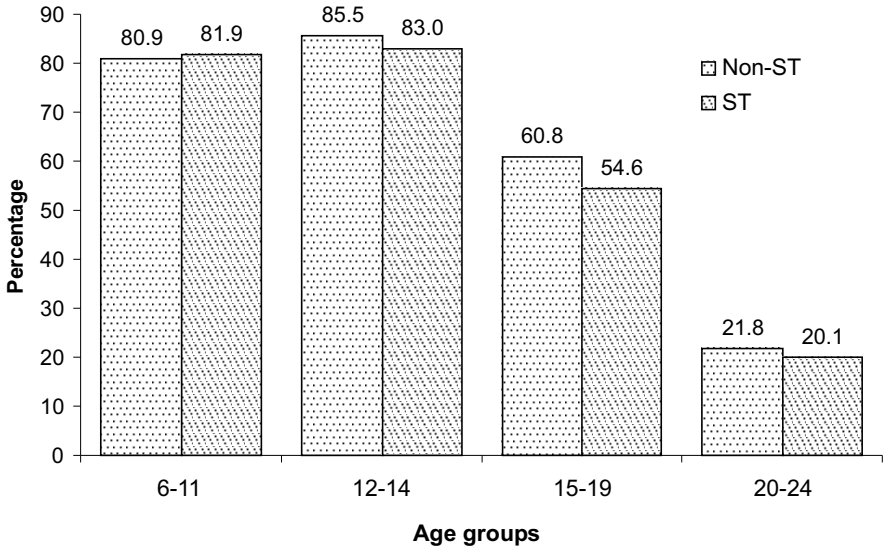


Table 8: Literacy in tribes of Uttarakhand

Tribes	Literacy (7+ years)		
	Male	Females	Persons
Bhotia	91.5	69.1	79.9
Buksa	66.0	32.4	49.9
Jannsari	71.7	44.8	58.9
Ranji	47.2	22.5	35.8
Tharu	80.4	53.1	67.0
All ST	**76.0**	**49.4**	**63.2**
Uttarakhand	**84.0**	**60.0**	**72.0**

Table 9: Tribe wise workers, main and marginal workers Uttrakhand, 2001

Tribes	%Total workers			%Main workers			%Marginal workers		
	P	M	F	P	M	F	P	M	F
Bhotia	43.1	44.9	41.5	30.5	35.9	25.4	12.6	9.0	16.0
Buksa	34.9	51.2	17.2	24.3	40.8	6.6	10.6	10.5	10.7
Jannsari	42.6	50.0	34.6	35.3	45.4	24.2	7.4	4.6	10.4
Ranji	41.6	46.1	36.2	16.1	21.6	9.4	25.5	24.5	26.8
Tharu	42.2	51.0	33.1	28.0	43.0	12.4	14.2	7.9	20.6
All ST	**41.1**	**49.9**	**31.9**	**30.0**	**42.3**	**17.1**	**11.1**	**7.5**	**14.8**

Among the main workers, about 68% tribal workers were reported as cultivators. It postulates that more than three-fourth tribal workers (67.9% cultivators + 7.7% agricultural labourer) were engaged in agriculture and most of them were cultivators i.e. had own agriculture land. About 5% workers were engaged in household industries and 19.2% were classified as 'Other Workers'. This demonstrates that relatively good number of Uttarakhad's tribal population is engaged in Other Works, i.e. salaried/waged jobs. The Jannsaris and Tharus are predominantly cultivators.

Among total main workers, 80.6% Jannsaris and 78.5% Tarus workers were recorded as cultivators. The proportion of agricultural labourer was highest (28.3%) among Buksa, followed by Ranji (10.8%). Thus it is important to note that about 30%

of Bhotia's workers were engaged in primary sector and about 29% and 42% of them were engaged in household industries and other salaried jobs (Table 10). This explored the vivid differences in the economic conditions of different tribes of the State. Bhotias has definitely advantages over other tribes of the state.

ratio (757). Though there are no major differences in literacy in tribal and non-tribal population, but within tribal communities a vast gap exists. Similarly a considerable gender gap prevails in education among different tribes. Buksas have highest work participation rate (WPR) for males but have least WPR for females. The Jannsaris and

Table 10: Occupational distribution of main workers, 2001

Tribes	Total Main workers	% Distribution of main workers			
		Cultivators	Ag. Labourer	Household Industrial	Others
Bhotia	11,128	28.8	0.7	28.9	41.7
Buksa	11,372	54.1	28.3	1.5	16.1
Jannsari	29,352	80.6	1.8	1.3	16.3
Raji	83	67.5	10.8	0.0	21.7
Tharu	24,005	78.5	8.5	0.8	12.2
All ST	**76,961**	**67.9**	**7.7**	**5.2**	**19.2**

CONCLUSION

The above analyses explored that tribal population is not uniformly distributed in Uttarakhand state, most of the tribal population is concentrated in Udham Singh Nagar & Dehradun districts only. Bhotias are mostly scattered through out the state, while Ranjis and Jaunsaris are concentrated in few pockets. As expected, the proportion of younger cohorts was higher among tribal population as compared to that in total state population, but Bhotias have lowest proportion of younger population among tribes. Though the over all sex ratio among tribes is low, but it was highest in Bhotias (1049) and least in Ranjis. The Ranjis, who have its 25% population in age group 0-6 years, have very poor child sex

Tharus are two major landholding tribes in the state, but Bhotias -another landholding tribe, have highest participation in non-agricultural sectors. Conclusively, Bhotias are socially, economically and demographically more advantageous among five different tribal groups of the state. But overall, poor sex ratio among tribal population, especially child sex ratio is a matter of serious concern and needs immediate interventions. Vast differences among tribes in respect to literacy, WPR, and occupational distribution show the need of tribe specific development plan strategies, such establishment of tribe specific development authorities.

REFERENCES

1. Census of India.(2001). Total Population of Uttaranchal. New Delhi: Registrar General and Commissioner of India.
2. Patil, V.T. (1999): Foreword. In TS Naldu (ed) Strategic Planning for the Future Development of the Tribes in India. Pondicherry: Pondicherry University, Centre for Future Studies.
3. Government of India (1985). Tribal Development – A Statistical Profile. Backward paper on Tribal Development, No. 12. New Delhi: Ministry of Home Affairs.
4. Robert Goodland et. al. (1982). Tribal People and Economic Development. New York: World Bank (The International Bank for Reconstruction and Development).
5. Alexander Verghese V. (1983). Tribals and Sub-Plans Seminar, Feb. 1983. 33.
6. Maurya, B.P. (1975). Development of the Tribals. Co-operative New Digest, Vol. 24, Jab.
7. Government of India (1994). Report of National Commission for Scheduled Castes and Scheduled Tribes. New Delhi: Ministry of Human Resources Development (downloaded from http://education.nic.in/cd50years/g/S/I6/0SI60401.htm)
8. Naldu,T.S. (1999):The Preamble. In T. S. Nadu (ed) Strategic Planning for the Future Development of the Tribes in India. Pondicherry: Pondicherry University, Centre for Future Studies.
9. Sharma, B.D. (1982): Administration for Tribal Development. Occasional Paper on Tribal Development – 20. New Delhi: Government of India, Ministry of Home Affairs.
10. Rao, K.S., Nandy, S.N. (2001): Land use pattern and population pressure in Uttaranchal. ENVIS Bulletin: Himalayan Ecology & Development, 9(1).
11. IBEF (2004): Indian States - Economy and Business: Uttranchal. Gurgaon: Indian Brand Equity Foundation. (downloaded from www.ibef.org).
12. Census of India. (1991): Paper 2 of 1992-Final Population Totals: Brief analysis of Primary Census Abstract.
13. Census of India. (2001): Uttaranchal: Data Highlights: The Scheduled Tribes. (downloaded form www. censusindia.gov.in).
14. Government of India. 2007. Scheme of Development of Primitive Tribal Groups (PTGs) (Government Order No. F.No.22040/58/2007-NGO), New Delhi: Ministry of Tribal Welfare (Downloaded from http://tribal.nic.in/writereaddata/mainlinkFile/File1082.pdf).
15. USSP. (2006). Uttarakhand – State Plan 2007-08. Dehradun: Uttranchal Sabi Ke Liya Shiksha Parishad (USSP). Sarva Shiksha Abhiyaan, State Project Office (downloaded from www.gov/ua.nic.in/ssaua/).
16. Mohanty, P. K., (2004): Encyclopaedia of Primitive Tribes of India. Vol. 1. Delhi: Kalpaz Publication.
17. Crooke, W. (1896): The Tribes and Castes of the Northern-Western India, Calcutta: Government Printing Press (Reprinted in 1975, Delhi: Cosmo Publication), Vol. IV.

18. Kumar, Satinder. (2000): Encyclopaedia of South-Asian Tribes. Vol. 1. Delhi: Anmol Publication Pvt. Ltd.

19. Nag, N.G., Roy Burman, B.K. (1974): A Scheduled tribe in Uttar Pradesh. Part V-B (IV), Vol. 1, Census of India. 1971. Delhi: Manager of Publication.

20. Majumdar, D.N. (1962): Himalayan Polyandry Structure, Functioning and Culture Change. A Field Study of Jaunsar Bawar. Calcutta: Asia Publishing House.

21. Kumar Satinder. (2000): Encyclopaedia of South-Asian Tribes. Vol. 4. Delhi: Anmol Publication Pvt. Ltd.

22. Kumar Satinder. (2000): Encyclopaedia of South-Asian Tribes. Vol. 9. Delhi: Anmol Publication Pvt. Ltd.

23. Mohanty, P. K. (2004): Encyclopaedia of Primitive Tribes of India. Vol. 2. Delhi: Kalpaz Publication.

24. Das, J.C. (1983): The Raji of the Himalaya: An Anthropological Study. Calcutta: Anthropological Survey of India.

25. Kumar Satinder. (2000c): Encyclopaedia of South-Asian Tribes. Vol. 10. Delhi: Anmol Publication Pvt. Ltd.

Appendix-1: Brief ethnography of the tribes of Uttarakhand

1. Buksa/Bhoksa: Buksa tribe is classified as a primitive tribe in Uttrakhand and Uttar Pradesh states. Buksa are also known as Mehre or Mehra in Uttrakhand and Uttar Pradesh states. Buksa's are Mongolod.[16] The common surnames are Singh and Chowhan. According to a legend Buksas came from Dakhin[17], while others have specifically stated that they migrated from Delhi[18]. Nag and Roy Burman (1974) trace the etymology of the word Bhoksa to the legend of their conquering the bhakshi (cannibals) in the terai, they become Bhoksa – the killers of bhakshi.[19] A section of Bhoksa also claims descent from the royal family of Raja Jagatdeo, a famous warrior of Rajasthan. Other believes that their ancestor was Udaijit, a Panwar Rajput. Many of them consider themselves to be Kushvanshi Rajputs.[18]

They are mainly found in Nainital, Dehradun, Gharwal districts of Uttarakhand and Bijnore district of Uttar Pradesh. They speak Hindi language and use Devanagri script for writing. They are non-vegetarian and they are fond of rice, dal and fish and they use liquor beverages. The Buksas are mainly agriculturists but most of them are marginal farmers. They sow crops like wheat, rice, gram, barely etc. Animal husbandry is their subsidiary occupation which they adopted recently.[16, 18]

The Buksas are divided in many exogamous clans (got) and inter-clan marriage is prohibited. Adult marriage is common and most of marriages are arranged through negotiation, but marriage by elopement and service are also reported. Junior sororate and junior levirate marriages are allowed. The post-marital residence is patrilocal. Bride price is customary and they are monogamous. Divorce and re-marriages are allowed. Both nuclear and extended families exist in the community. The vermilion mark, toe-rings and a nose stud are symbols of married women.[16] They are mainly

following Hindu religion and worship several gods and goddesses as well as their deities like Bhumiya, the village and regional deities. They have their traditional community council known as the biradari panchayat. This council, however, has been relegated to a secondary position after the introduction of the statutory village council.[16]

2. Bhotia: A generic term for several groups of people inhabiting the ranges the snowy peaks of the Himalayas. They are also known as Shauka, Monpa, Rankas and Rongpa and Rang.[18] Bhotias are popularly believed to have originated from the term bhot or more correctly bod which means Tibet. Ancient Sanskrit literature referred to the region where they lived as Bhotantik, that is, the area touching the border of bhot. Those who reside in Uttrakhand believe that the name Bhoti is derived from the word bhot, wrongly elucidated area, now inhabited by the community. Historical accounts state that they are the descendants of the Bhil Kirat or the Mon Khmer who entered India from the eastern direction.[18]

In Uttrakhnad, the Bhotia are one the earliest inhabitants of the Kumaon and Garhwal hill. They speak various dialects of the Bhotia language which belong to the Tibeto-Burman family of languages. They are conversant with Indo-Aryan languages such as Hindi, Nepali, Kumaoni and Garhwali. They use the Devanagari script. Bhotia are a landholding community. They are non-vegetarians and eat meat, their staple food include rice, wheat, pulse, vegetables, fruits and roots. Both men and women smoke tobacco or beedis and consume alcoholic beverages. They have traditional occupation of trading and play major role in export of musk, borax, tails of yaks, herbs and hides. Weaving, agriculture and goat rarring are their secondary occupations. Many of them are now in salaried jobs.[18]

They are divided into eight sub-groups on the basis of religion, territory, occupation and dialect. These sub-groups are again divided into several clans and lineages. They practice endogamy at territorial level and exogamy at the clan/lineage level. Marriages are mainly arranged through negotiation and they are monogamous. Some of them practice cross-cousin marriage, while sororate and junior levirate are practiced by all. Most of the groups follow the price of bride price, in term of both cash and kind. The vermilion mark, a necklace and a nose ring (nath) made of gold are the marriage symbols among some of the Bhotia subgroups. Most of them profess Hinduism, in 1981, 89.26 percent of them follow Hindu religion. The Nanda Devi is their main deity along with clan/village deities.[18]

3. Jaunsari: The word Jaunsari is came from the region Jaunsar Bawar in Uttra Pradesh. Thus Jaunsari is a blanket term which embraces various groups, namely the people enjoying a high social status like the Brahman and Rajput or Khasa and the lowly placed castes comprising various occupational groups, who share the appellation, Kolta. The communities like Kolta and Bajgi represent the non-Aryan stoke of the hills.[20, 21]

They are mainly found in Dehradun district of Uttrakhand and speak in Jaunsari which belongs to the Pahari group of Indo-Aryan stock of the hills. They use Devanagari script. They are primarily dependent on agriculture and partially on animal husbandry. The Jaunsari manufacture woolen blankets (pankhi), woolen rugs (numda), snow-shoes (khurshay) and such items from wool procured from domestic sheep.

The Junsari society is primarily divided along caste lines and is stratified. The most important social unit which regulates marriage is lineage. The earlier practice of child marriage is largely replaced by adult marriage. The traditional form of marriage was fraternal polyandry, where brothers used to share one wife, which has declined in favour of monogamy. Cases of polygynandry were also common. The symbol of a married woman is a nose-ring. The systems of bride price as well as dowry are prevalent, dowry being a recent practice in the community. Both joint and nuclear families exist. They are followers of Hinduism - according to 1981 census 99.99 percent of them were Hindu. Their main deity is Mahsu and other deities are Kali, Nag, Parsuram and Kaplaveer. They have a traditional socio-political institution, the sayanachari, which is responsible for social control at the village level. There is a higher office of the sadrsayna, who perform the task of solving conflicts and disputes unresolved at the village council level.[21]

4. Raji/Ranji: Ranji is another primitive tribe of Uttarakhand state. They are also described as Ban Rawat, Ban Raji or Ban Manush, and until recently they were a community of nomadic hunters and gatherers[22]. They mainly use 'Singh' as their surname.[23] They are also found in the contiguous areas of Nepal across the river Kali. The claim themselves as Rajput and trace their descent from the federal royalty of Askot and call them as Raji, meaning royal people.[24] Crooke (1896) stated that the Raji or Rawat were found in Askot, and in small numbers along the lower Himalayan ranges of Kumaon. He was also of opinion that they were servants of the King of Katpur, who expelled them from his kingdom.[17]

They are mainly found in Pithoragarh, Almora and Chamoli districts of Uttrakhand. They speak Jangali language, which belong to Tibet-Burman family of languages. They speak Indo-Aryan language, Kumaoni, with others and use devnagari script. They are non-vegetarian and eat meat, fish and eggs. Their staple food comprises wheat, maize and rice, supplemented with roots and tubers. Smoking tobacco is a common habit among them. Land and forests are the primary economic resources of the Raji, and all families own some amount of land. Most of them are engaged in agriculture, animal husbandry, tailoring and some other occupations. Earlier they were dependent on dahya cultivation and the making of vessels out of wood for their livelihood. Their traditional occupation of hunting and gathering is now their secondary occupation.[22, 23]

The Rajis are divided in number of exogamous patrilineages called rath. Different ways of acquiring spouses are negotiation, elopement, exchange and intrusion. Mo-

nogamy is norm, however levirate, sororate and cross-cousin marriages are practiced. Divorce and remarriage are permitted. Post-marital residence is patrilocal. Pendulous nose-ring (bulaki) is used by married women as a symbol of marriage.[22] Men mostly wear loin cloth. Nuclear family predominates, followed by the extended type. The important rites observed are related to the naming of a baby, marriage and death. The Raji religion is a mixture of their traditional faith and local forms of Hinduism. More than 99 percent are Hindus and their deities are of three types, some are for the entire community, some are of lineage and others of village levels. The traditional council of elders (sayana panchayat) is headed by the pradhan, and the council helps to resolve their disputes.[23]

5. Tharu: Tharus live close to the Nepal border and are widely dispersed in the districts of Uttar Pradesh and Uttrakhand. Crooke (1896) has written that Tharu trace their origin to Rajput forefathers, who fled from the great battle described in the epic Mahabharata. They derived their name from the thithurna, meaning to quake[17]. While others claim them to be migrants from the Thar desert in Rajasthan and some say that these are descendants of the children that were born out of the liaisons between the Rajput women and their servants who fled the Muslim invades.[25]

In Uttrakhand they are mainly found in Udham Singh Nagar and Tehri Garhwal districts. Their mother tongue of Tharus belongs to the central group of the Indo-Aryan family of languages. They use Hindi for inter-group communication and use Devnagari script for writing. The Tharu are non-vegetarians and eat pork. Their staple food consists of wheat, rice and pulses. Mustard oil is used as the cooking medium. Some alcoholic drinks are also popular among them. The Tharu are a landholding community with individual proprietorship of land. They did hunting and gather food in the past, but presently they depend on settled cultivation. They made baskets of different sizes and shapes for their use and their women make their own dresses. Agricultural labour, government and private services and animal husbandry are the other means of their livelihood.[25]

They are divided into three endogamous groups, namely Rana, Katheria, and Dangura, which are further subdivided into a number of exogamous lineages. Marriages are generally fixed through negotiation and bride price is paid in cash. Earlier they practice child marriage, but now they follow adult marriages. Monogamy is the rule but divorce and re-marriage are also permissible. Junior sororate and junior levirate marriages are also permissible among them. Tharu is a patrilocal society. Bangles and toe-rings are the marriage symbols of the marriage. They prefer to lives in nuclear families. These people worship the Hindu deities but more often worship Hanuman. They have traditional community council to maintain social control. The head of this council is elected by a voice vote.[25]

FOOD HABITS OF THE GARO TRIBE OF MEGHALAYA

Natasha R. Marak*

Abstract : *The nutritional status of a community is the sum of the nutritional status of the individuals who form that community. The study was carried out in all the three districts of Garo Hills. Hundred samples in the age group of 20-30 yrs were randomly selected from six villages. In the study it was revealed that the Garos were shorter and weighed less compared to their Indian counterparts. It was also observed that farming was the major occupation of the people. The staple food of the Garos was rice. The study revealed a high consumption of rice, roots & tubers and meat. Intake of green leafy vegetables, milk and fats/oils were lesser than the recommended allowance. It was seen that the Garos consumed adequate amounts of calories, protein, carbohydrate and vitamin C. Their diet was however deficit in vitamin A and iron. The consumption of meat and oil increased with an increase in family income. Soda based dishes were a part of the Garo custom. This leads to destruction of nutrients in the diet. The Garos consumed three meals a day consisting of rice and a dish. The traditional practices and customs of the Garos are deep rooted like any other tribal society. Mass awareness and intervention by various governmental agencies is needed to combat ignorance and faulty food habits.*

INTRODUCTION

Food consumption is influenced by many factors such as socio-economic status, culture, religion, education, ignorance, food beliefs and habits. Food habits and food beliefs are among the oldest and most entrenched aspects of any culture.[1] There are about 400 tribal groups in India constituting about 8 percent of the country's population. Studies in tribal foods and nutrition have only recently been receiving interest.[2] Three different tribes: Khasi, Jaintia and Garos dominate the demographic profile of Meghalaya.[3] While referring to the various customs of the Garos, one will find that the customs and practices of the Garos are fast changing with the change of times. As in other parts of India, Garo society also felt the impact of Christianity and western civilization at the beginning of the 19th century. The British annexation of Garo Hills and the subsequent works of waves of Christian Missionaries coupled with the introduction of English education had direct influence upon the social customs, traditional beliefs, customary laws and practices of the Garos. Christianity is mainly responsible for direct effect on the Garo culture, customs, traditions and indigenous laws.[3] A detailed study among the Garos has not been carried out. This topic was designed to bring to light the food habits and food beliefs of the Garos.

* Asst. Professor, Dept. of Food Sc & Nutrition, College of Home Science, Central Agricultural University, Tura, Meghalaya-794001 E-mail: natasha.marak@gmail.com

METHODOLOGY

The study was conducted in all the three districts of Garo Hills, namely, the West Garo Hills, the East Garo Hills and the South Garo Hills. Two villages from each district were randomly picked. Approximately five percent of the total population of each village was taken as sample size of the village. Random sampling was done using three digit random numbers. The total sample size of the study population thus amounted to 100. Survey method was adopted in order to collect data from selected respondents with the help of a pre-tested schedule. The data was collected using 24 hour dietary recall method. Information related to dietary pattern, food habits and food intake was also collected.

The respondents were asked to provide information regarding the menu as well as ingredients and amounts used for meal preparation. Socio-economic parameters such as occupation, education, family type and size, income etc were gathered.

RESULTS

Socio-Economic profile

During the study a total of 100 samples in the age group 20-30 years were covered from the three districts of Garo Hills. Out of these, 69 were females and the rest were males, 78 were married and 22 single. Socio-economic parameters revealed that the majority of the Garo tribe followed farming as an occupation (71%), came from nuclear families (60%), had 5-7 members in the family, had an educational qualification till middle school (43%) while an approximate one-fifth of the population were illiterate. Thirty two percent of the study population had some form of social participation and seventy three percent had mass media exposure. Majority of the villagers (58%) still used river water for drinking purposes, some without boiling it. The relationship between the food intake to factors such as per capita income and educational qualification is shown in table 1 & 2.

Table-1 : Food intake according to per capita income (Rs/month)

Food Items	Per-capita income Rs/month)			RDA*
	<500	500-999	≥1000	
Cereals	511.32±17.62	618.10±45.8	583.75±27.55	440
Pulses	6.91±0.19	4.89±2.23	22.5±4.43	45
G.L.V.	71.76±24.33	56.30±14.2	59±24.4	100
Other Veg	43.97±9.2	42.5±6.99	26.25±11.03	40
Fruits	0	0	5 ±2.34	30
Roots & Tubers	212.5±23.6	171.30±20.88	108.25±33.53	50
Milk	48.52±9.55	51.08±8	57.5±12.23	150
Meat/ Eggs	30±3.64	45.32±6.17	74.5±11.22	30
Oil/Fats	7.35±1.69	9.6±1.39	10.75±2.27	25
Sugar	10.73±0.67	10.32±0.42	11.25±0.68	20

*Source - ICMR 1990;[4] F (cal) = 82; F (2, 18) = 3.55; Significant $P \leq 0.05$

Table- 2 : Food intake according to educational qualification

Educational qualification / Food Groups(g)	Illiterate	Up to Middle School	High School & above	RDA*
Cereals	506.76 ±31.7	635.88 ±49.3	538.37 ±12.8	440
Pulses	12.35 ±6.33	6.62 ±2.5	10.375 ±3.32	45
G.L.V.	105 ±41.1	60.81 ±17.9	45.25 ±11.02	100
Other Veg	48.53 ±12.35	40.58 ±8.52	35.12 ±5.93	40
Fruits	0	0	2.5 ±2.5	30
Roots &Tubers	181.47 ±38.8	161.27 ±21.03	181.25 ±24.4	50
Milk	35.29 ±14	45.34 ±7.6	65 ±8.6	150
Meat/ Eggs	31.18 ±6.58	42.56 ±7.56	55.87 ±8.5	30
Oil/Fats	9.12 ±2.83	7.90 ±1.3	10.07 ±1.71	25
Sugar	8.82 ±0.8	10.46 ±0.54	11.62 ±0.41	20

* Source - ICMR 1990 [4]
F (cal) = 99.52; F (2, 18) = 3.55; Significant, $P \leq 0.05$

From statistical analysis, it is evident that the calculated value of F at 2 and 8 degrees of freedom and 5 percent probability level is greater than the table value of F. Therefore it is concluded that there is significant difference in the food intake of families as their income level increases.

In the case of educational qualification (table 2) of the respondents, it was seen that there was a positive increase in the food consumption level as families become more educated. From statistical analysis, it is evident that there is significant difference in food intake as the families become more educated.

Food intake : In this study, the calorie intake (Table 4) of the Garo females was seen to be adequate in accordance with the daily recommended allowance but the mean calorie intake of the Garo males was seen to be a little deficient when compared with the recommended allowance.

Table 3 : Average food intake of the Garos

	Females		Males	
Food stuff (g)	**Average intake**	**RDA***	**Average intake**	**RDA***
Cereals	569.02±3.66	350	588.06±5.4	475
Pulses	7.97±0.26	55	11.61±0.75	65
Green leafy Vegetables	61.37±1.25	125	63.71±3.52	125
Other Vegetables	36.15±1.09	75	47.74±1.68	75
Fruits	1.44±0.97	30	0±0	30
Roots & tubers	169.13±1.53	75	180.64±4.78	100
Milk&Milk products	48.55±0.72	100	58.06±2	100
Meat/fish/egg	48.47±0.721	30	40.32±1.51	30
Oil/fat	8.33±0.65	40	10.81±0.37	40
Sugar	10.7±0.58	30	10.48±0.12	40

* Swaminathan (20042)[5]

Table 4 : Average daily nutrient intake of the Garos

Nutrient	**Males**			**Females**		
	N	Mean intake	RDA*	N	Mean intake	RDA*
Calories(Kcal)	31	2620.097±13.6	2875	69	2395.7±6.2	2225
Protein(g)	31	67.26742±0.97	60	69	62.75±0.32	50
Carbohydrate(g)	31	571.2974±2.84	-	69	521.6±1.31	-
Iron(mg)	31	24.14903±0.22	28	69	28.34±0.09	30
Vitamin A(µg)	31	597.4768±30.3	2400	69	522.34±15.86	2400
Vitamin C(mg)	31	149.0887±4.6	40	69	124.9±2.07	40

* Swaminathan (2004)[5]

Table- 5 : Foods avoided/recommended by the Garos

	Malaria	**Jaundice**	**Fever**	**Headache**	**Pregnancy**
Foods avoided	Dry fish, meat, mestapat, Soda.	All yellow foods, meat(except smoked), fish (big variety)	Dry fish, soda based dishes, sour foods, meat	Bottle gourd, broad beans, pumpkin	Egg, pine-apple, pumpkin, papaya, chillies
Foods recommended	Boiled vegetables, dal	Green vegetables, star apple (carambola) , sugar cane, citrus fruits	Boiled vegetables, dal	Boiled vegetables , boiled potato, dal	_____

Common beliefs of the Garos:

- Combination of pine-apple and milk is poisonous.
- Water after consuming sour foods causes diarrhoea.
- Eating conjoined foods during pregnancy bears twins.
- No sour foods, raw salt, oil, onion for deep wounds.
- Beef aggravates body pain, especially joint pain.

Table 6(a) : Forms of addiction in females N = 69

Form of addiction	n	Percentage
Betelnut	14	20.28
Tobacco	2	2.89
Betelnut and tobacco	2	2.89
No addiction	51	73.91

Table 6(b) : Forms of addiction in males N = 31

Form of addiction	n	Percentage
Betelnut	7	22.58
Tobacco	2	6.4
Betelnut and tobacco	9	29.03
No addiction	13	41.9

From tables 6(a) and (b) it was seen that thirty seven percent of the study population had some form of addiction and the most common being chewing betelnut (20.28 percent in females and 22.58 in males). Chewing of betelnut along with tobacco was high in males with 29.03 percent and was found to be low in females with 2.89 percent. Consumption of locally made rice beer or 'bitchi' was almost non-existent among the study population.

DISCUSSION

This study has been designed to study not only the food habits of the Garos but also the influence of socio-economic factors on their nutritional status.

In table 1 comparison of the food intake and the income of the study population revealed that consumption of meat, milk, fats and oils increased with an increase in family income. Consumption of meat, milk, fats and oils was also seen to be more by the better educated respondents of the study population (table2) and also among the non farming group of people i.e. businessmen, government servants etc as compared to RDA. A similar finding was reported by Agrahar and Pal (2005) in a study of the Khasi tribals where consumption of flesh foods was higher than the RDA.[6]

Nature's law is still predominant both in the social customs and food habits. In most tribal areas, the food availability and consumption pattern depend upon natural resources and the pattern varies from one tribal system to another. The Garos of Meghalaya are also no exception to this rule for they have their own distinct dietary and food consumption pattern. The Garos consume three meals in a day. They are not in the habit of taking breakfast. A typical

food pattern of the Garos consists of a cup of tea in the early morning (around 6:00 a.m.) then, a proper meal with rice and a dish (around 7:30 - 8:00 a.m.) after which they go off to the fields for work. They take along a few utensils where they cook a meal. After they return from the fields they take a cup of tea with a snack like tapioca, sticky rice etc. They have their dinner usually before dark. In tables 3 and 4 it was seen that the staple food of the Garos was rice with hundred percent of the study population confirming a daily intake of cereals (rice). Tribals consumed pulses only occasionally as it is not grown widely. A majority (43%) of the study population was seen to consume pulses only 1-2 times a week. The mean daily intake of pulses of the Garos was only 7.97± 0.26 in females and 11.61 ± 0.75 in males which is much lesser than the recommended allowance. A similar finding was reported by Bhasin and Jain(2007) in their study on the Biology of Tribal groups of Rajasthan.[7] Kumari and Singh (2002) also reported pulse consumption to be lesser than the RDA[8] among the schedule castes of Bihar. Whatever little amounts of pulses were being consumed was due to external influences that have crept into the local food habits.

Green leafy vegetables are both cultivated and edible greens found in the wild abundantly due to which the consumption was seen to be more frequent with majority (83%) consuming green leafy vegetables 4-6 times a week. The mean daily intake of green leafy vegetables of the study population was 61.37 ± 1.25 in females and 63.71 ± 3.52 in males. Unconventional foods gathered from the forests were found to be a major source of green leafy vegetables for the Garo tribes. The consumption of fruits was found to be negligible during the study period.

The Garos are very fond of tubers like potatoes, colocasia, sweet potatoes and yam which are included in every meal that is eaten and a mean value of 169.13 ± 1.53 in females and 180.64 ± 4.78 in males is consumed everyday. The Garos are a tribe which is fully non-vegetarian in their food habits. The mean consumption of meat (48.47 ± 0.721 in females and 40.32 ± 1.51 in males) was higher than the recommended daily allowance (30gms/ day). Dry fish is an intrinsic part of the Garo diet and is consumed at almost every meal however small the amount may be.

Forty four percent of the study population consumed milk daily with tea. The mean daily consumption of milk was 48.55 ± 0.72 in females and 58.06 ± 2 in males which was seen to be far less than the recommended allowance of 100 ml per day. The consumption of milk products was nonexistent. This finding is similar to a study by Agrahar and Pal (2005) where it was reported that the consumption of dairy products among the Khasi tribals was virtually non-existant, only in rare occasions milk was consumed with tea.[1] Using oil as a cooking medium is not a common practice. A majority (36%) used oil only 2-4 times a week. The most common method of cooking local dishes is by using sodium bicarbonate or more commonly 'karchi' which is the liquid filtered from the solution made with the ashes of burnt banana stem. The use of sugar by the study population (10.7g ± 0.58/day in females and 10.48g ± 0.12/day) was seen to be only with tea. They consumed an average of 3-4 cups of tea a day.

In this study, the calorie intake of the Garo females (table 4) was seen to be adequate in accordance with the daily recommended allowance but the mean calorie intake of the

Garo males (table4) was seen to be a little deficient when compared with the recommended allowance. This could be justified by the fact that the Garo society is matriarchal with no gender bias within a family and thus an equal distribution of food among the family members inspite of the fact that the requirement of the males are higher due to the heavy outdoor work that they are engaged in.

From Table 4 it was found that the protein and carbohydrate intake of the Garos was adequate. The iron intake of the Garos was seen to be deficient most probably due to a lesser intake of green leafy vegetables. Their diet was also seen to be deficient in vitamin A. A similar finding was reported by Laxmaiah et al (2007) among tribals of Andhra Pradesh.[9] The study also revealed a high intake of vitamin C, about three times more than recommended.

On application of t-test no significant difference was found in the mean intake of nutrients of both males and females and the recommended dietary allowance.

Food habits and food beliefs are among the oldest and most entrenched aspects of any culture. Food prejudices and false beliefs are known to impediment in the way of adequate nutrition. The traditional beliefs of the Garos are deep rooted. Inspite of setting up of health centers, most of the tribals still turn to the local medicine man or "Oja" as locally known, to cure certain illnesses. According to the 'Oja's" prescription, one has to adhere to a strict dietary regimen, failing which the medicines fail to work. Certain kinds of foods are still avoided during a particular disease condition and some especially eaten. For example, during jaundice all kinds of yellow foods are not eaten. Even meat other than smoked meat is avoided; big variety fishes are also avoided in the belief that these foods aggravate the disease. Instead, foods such as vegetables, star apple, sugar cane and fruits are especially eaten for speedy recovery. In the case of fever, dry fish, soda based dishes, sour foods and meat are avoided as they aggravate the condition and instead boiled vegetables and dal is eaten. Similarly for headaches and migraines vegetables like bottle gourd, broad beans pumpkin are avoided and boiled vegetables, other than the ones mentioned above are eaten; also boiled potato and dal are eaten instead. The Garos do not have foods that are specially consumed during pregnancy and lactation. It is a common practice among the Garos to allow a pregnant woman to eat whatever food her heart desires. However certain kinds of food such as eggs, pineapple, pumpkin, papaya and chillies are avoided in some villages during pregnancy. It is believed that these foods may lead to spontaneous abortion and still births. In a similar study among the tribals of Purnia District by Rao and Tuhina (2003) it was found that these tribals still followed their food fads and fallacies which could be a factor for poor nutritional status.[6]

Smoking of meat and fish is a common practice among the Garos with sixty nine percent confirming smoking of meat and fish and especially fish regularly. Smoked food items are locally known as "gran". The Garos not only preserve meat and fish but also a variety of vegetables like pumpkin, colocasia stem, bottle gourd etc. For vegetables such as these a special rack made out of bamboo is placed above the cooking area, so that the vegetables are preserved by means of smoke and heat from the burning firewood. This is locally

known as "onggare". Green leafy vegetables such as colocasia leaves, mestapat (locally grown green leafy vegetable), cauliflower leaves, cabbage, are first washed and dried in the sun and then crushed and put in a bottle or wrapped up in banana leaves. A more popular item commonly preserved by the Garos is bamboo shoots. Bamboo shoots can also be dried in the sun and preserved or they are simply cut and stored in a bottle for fermentation. Thus when the harvest is bountiful the excess produce is preserved.

At the end of the study it can be concluded that certain socio-economic factors like income, occupation and their cultural practices and beliefs does influence the nutrition of the Garo tribe. Mass awareness and intervention by various governmental agencies is needed to combat ignorance and faulty food habits.

AKNOWLEDGEMENT

I would like to thank Mrs. Blessibon R. Marak, District Agriculture Officer, South Garo Hills, Mr. Gopal Sharma, District Ariculture Officer, West Garo Hills, Mr. Steward Momin, Executive Engineer (Irrigation), East Garo Hills, Dr. Croozie Sangma, in-charge CHC, Asanang, Dr. Debajit Rudra Sangma, CHC, Ampati and Marchien Brady Marak for their kind cooperation while carrying out my study. I also thank the Headman, President and Secretary of all the villages under study for their help and cooperation.

REFERENCES

1. Girijamma et al (2001). Nutritional composition of traditional supplementary foods consumed by Gujarathi lactating women. The Indian Journal of Nutrition & Dietitics. 38, 307.
2. Rao, T.V.R.K., Tuhina Vijay. (2003):. Studies on food habits and nutritional status of the tribals of Purnia District of Bihar. The Ind. J. Nutr. Dietet, Indian Journal of Nutrition & Dietitics. (2003), 40, 218.
3. Marak, L.R.(2000): Garo customary laws and practices. Akansha Publishing House, New Delhi
4. Indian Council of Medical Research (1990), Nutrient Requirement and Recommended Dietary Allowance for Indians, Hyderabad
5. Swaminathan. M. (2004): Essentials of Food and Nutrition-volume-2. Bapco, The Bangalore Printing and Publishing Co. Ltd. 134
6. Agrahar-Murugkar, D., Pal, PP. (2005): Food consumption pattern of the tribals of Meghalaya and its relation with socio-economic factors. The Indian Journal of Nutrition & Dietitics. 42, 71.
7. Bhasin, M.K., Jain Shewta (2007): Biology of Tribal groups of Rajasthan, India. Anthropologist 9(3): 165-175
8. Kumari, S., Singh, S. (2002): Food consumption pattern of the Schedule Caste adults in rural area of Samastipur District (Bihar). The Indian Journal of Nutrition & Dietitics, 39, 453
9. Laxmaiah A., Mallikharjuna K., Harikumar R., Arlappa N., Venkaiah K.,Brahman G.N.V. (2007): Diet and Nutritional Status of tribal population in ITDA Project areas of Khammam District of Andhra Pradesh. Journal of Human Ecology, 21(2) : 79-86

PREVALENCE OF POST PARTUM COMPLICATION AND TREATMENT SEEKING BEHAVIOUR IN BIHAR

Rajiv Ranjan, Sulabha Parasurman***

Abstract: *The maternal morbidity research in Bihar is measly available. In this paper an attempt is made to identify the reported symptoms of post delivery complications among the currently married women of Bihar in relation to their selected characteristics. DLHS-2 data on Maternal Morbidity is used for this paper A total of 18,177 women (who were given live/still births during three years preceding the survey) were analyzed.*

It was observed that women who belong to North East region of Bihar had a higher prevalence of post partum complication and lowest in the South west region. Women had a higher risk of post partum complication that had 1-2 antenatal check-ups, assisted deliveries, home deliveries, occurred complication during antenatal and natal compared to their counter. The place of delivery and reproductive health problems are significantly associated with the post partum complication. Irrespective of all the reasons, the treatment seeking behaviour is higher for those who have three or more problems. It means in the case of post natal problems also women use to go for treatment after the accumulation of their problems. It may be due to lack of awareness about the programme and low education as well.

INTRODUCTION

Maternal morbidity, as indeed reproductive morbidity in general, is an outcome not only of biological factors, but also of women's poverty powerlessness and lack of control over resources. So, also malnutrition, infection, early and repeated childbearing and high fertility play an important role in poor maternal health conditions in India. And, finally lack of access of health care, along with the poor quality of delivery system and its responsiveness t women's needs exacerbate maternal morbidity.

As in the most of the developing world, post partum haemorrhage remains the leading cause of maternal death. In 1993, about 23 percent of all maternal deaths in rural areas caused by haemorrhage. A similar pattern was revealed in earlier studies Bhatia (1993).[1] A recent community study in Maharashtra attributes 31 percent of all maternal deaths to post partum haemorrhage; and 5 percent to ante partum haemorrhage, Ganatra et, al. (1996).[2] Haemorrhage, most commonly caused by retention of placenta after delivery (normally the placenta is expelled 30 minutes of birth) and failure of the uterus to contact and close down the blood vessels after delivery, is difficult to predict and kills rapidly in the absence of relatively sophisticated facilities. As most of the maternal deaths are believed to occur during the puerperium, so are most maternal morbidities likely to arise at that time, linked to events occurring during delivery, Fauveau et al., (1988).[3] Whereas sepsis and

* State Operation Research Advisor, Futures Group International, Uttrakhand

** Professor and Head, Department of Population Policies and Programme, International Institute for Population Sciences, Mumbal.Email:rajiviips@gmail.com

haemorrhage are the most frequent cause of maternal death in the puerperium, however, the pattern may different for morbidities. Much less is known about the magnitude and causes of serious morbidity related to pregnancy than is known about maternal deaths. A small study in India estimated that there are 16.5 episodes of serious illness related to pregnancy and child birth for every maternal death, Datta et, al., (1980).[4] However, more recent estimates suggest that the number of acute morbidities related to childbirth may be much higher, Koblinsky et. al., (1993).[5]

In India, particularly in rural areas , few women have access to antenatal care, high risk cases go undetected largely by untrained attendants in unhygienic conditions and knowledge of health and nutrition needs during pregnancy and the post natal period are poorly understood. Some hospital based studies and community based studies show lack of seeking antenatal services as a risk of pregnancy outcomes, Melrose, (1984)[6]; Bose, (1987a,b) [7]; Gortmaker, (1979) [8]; Greenberg, (1983) [9]; Gould and Le Roy, (1988) [10]; Kwast et, al., (1989) [11] and Bhatia, (1993) [1]. According to Prual et. al.,(2000)[12] the main direct causes of severe maternal morbidity in West Africa were hemorrhage, obstructed labor, eclampsia, and sepsis.

Post delivery complication (or postnatal problem) includes, high fever, severe headache, lower abdominal pain, foul smelling vaginal discharge, excusive bleeding (which may result from premature separation of the placenta, trauma to the abdomen and genital region or various pathological lesions of the cervix), and convulsion.

DATA AND METHODS

Data used for this paper is explored from the District Level household Survey under Reproductive and Child Health for Bihar. At the field level data collected by Population Research centre (PRC), Patna and the International Institute for Population Science is the nodal agency. The survey covered all the districts of the state and union territories in India in two phases, each phase covered half the number of districts in the state. Systematic multi-stage stratified sampling design has been adopted for data collection.

In all, there were 37 districts in Bihar. During Phase- I, 18 districts were covered from June 2002 to July 2003 and the remaining 19 districts were covered during Phase-II from June 2004 to June 2005. In each district, 40 primary sampling units (rural / urban frame survey blocks) were selected with probability proportionate to the size (PPS) sampling design. The Census (1991)[13] data were used as the frame of reference. The distribution of the number of rural and urban primary sampling units was made on the basis of the percentage of urban population in the district. However, a minimum of 12 urban primary sampling units were selected in case the percent urban was low in a district. The target sample size in each district was set at 1,000 complete residential households from 40 selected primary sampling units. In the second stage, within each primary sampling unit, 28 (rather than 25) residential households were selected with circular systematic sampling procedure in order to take care of expected non-response (around 10%).

The analysis and results pertain to all currently married women who were

interviewed. Structured interview schedules were used. From each woman, information on her background and reproductive health status was collected. The background characteristics include the age of the women; her education in terms of years of schooling, birth history and parity. Information on caste and religion were ascertained from the head of the household.

Data of regional level Household Survey of Bihar (2002-04)[14] has been used to analyze the regional differentials of postpartum complication and treatment seeking behaviour. The data of RCH indicators was computed based on the regions. The criteria of classification or region are based on NFHS-2, (1998-99).[15] NFHS has classified the region on the basis of geographical boundaries, hence the districts are grouped by geographical region. Thirty-seven districts of the state was grouped into 6 regions of Bihar state shown below;

North West : Gopalganj, West Champaran, East Champaran, Saran and Siwan

North Central: Darbhanga, Madhubani , Muzaffarpur, Saharsa, Samastipur, Sheohar, Sitamarhi, Supaul and Vaishali

North East : Araria, Katihar, Kishanganj, Madhepura,and Purnia

South West : Bhojpur, Buxar, Kaimur, Patna and Rohtas

South East : Banka, Bhagalpur, Jamui, Khagaria, Lakhisarai, Munger and Sheikhpura

South Central : Aurangabad , Begusarai , Gaya , Jehanabad , Nalanda and Nawada

The analysis in the present study is carried out by using cross-tabulation methods and chi-sqaure test was applied to measure the significance level. The objective of the study are -

1. To examine the levels and differentials of reported post partum complication in different regions of the state.
2. To examine the interrelationship among maternal morbidity.
3. To assess demographic, socio-economic correlates of post partum morbidity.
4. To understand the health care practices associated with morbidity conditions.

RESULTS AND DISCUSSION

Table 1 shows demographic and socio-economic indices by district and region of Bihar. According to Census (2001)[16] the population of Bihar is 83 million. Bihar has recorded 28.6 percent of decadal growth rate and sex ratio is 919 female per 1,000 male. Among the region and districts, it was found that highest decadal growth rate is in North East region and Sheohar district under North central region with 36.2 percent has the highest decadal growth rate whereas Munger district with 18.6 percent has the lowest decadal growth rate of the total population during 1991-2001. The sex ration is more favourable in North West region with 959 female per 1000 male, followed by South Central 929 female per 1000 male and lowest in the South West region 897 female per 1000 male. In two districts, Siwan (1031) and Gopalganj (1001) the sex ratio is favourable to women while Munger (872), Patna (873), Bhagalpur (876) Seohar and Khagria (885), Sitamarhi (892), East Champaran (897) and Buxar (899) has the sex ratio

Table 1: Demographic and socio-economic indices

(District wise demographic and socio-economic indices, Bihar)							
	Demographic indicators			Socio-economic indicators			
District/region	Pop[1]	%DGR[2]	SR[3]	%urban	%SC/ST	%FLT[4]	%BPL*
East Champaran	3.9	29.3	897	6.4	13.1	24.3	54.1
Gopalganj	2.2	26.1	1001	6.1	12.7	32.2	37.6
Saran	3.2	26.4	966	9.2	12.2	35.8	54.1
Siwan	2.7	24.8	1031	5.5	11.9	36.9	51.0
West Champaran	3.0	30.4	901	10.2	15.8	25.1	47.4
North West#	**15.1**	**27.4**	**959**	**7.5**	**13.1**	**30.9**	**48.8**
Darbhanga	3.3	30.9	914	8.1	15.5	30.8	60.0
Madhubani	3.6	26.1	942	3.5	13.5	26.2	72.4
Muzaffarpur	3.7	26.7	920	9.3	16.0	35.8	55.9
Saharsa	1.5	33.0	910	8.3	16.4	25.3	14.2
Samastipur	3.4	25.6	928	3.6	18.6	31.7	19.5
Sheohar	0.5	36.2	885	4.1	14.4	23.9	69.8
Sitamarhi	2.7	32.6	892	5.7	11.9	26.1	67.1
Supaul	1.7	30.0	920	5.1	15.1	20.8	74.6
Vaishali	2.7	26.4	920	6.9	20.8	36.6	41.1
North Central#	**23.2**	**29.7**	**915**	**6.2**	**15.8**	**28.6**	**52.7**
Araria	2.2	31.8	913	6.1	15.0	22.4	80.3
Katihar	2.4	30.9	919	9.1	14.6	23.8	49.1
Kishanganj	1.3	31.5	936	10.0	10.2	18.6	58.0
Madhepura	1.5	29.5	915	4.5	17.7	22.1	55.4
Purnia	2.5	35.2	915	8.7	16.7	23.4	70.0
North East#	**9.9**	**31.8**	**920**	**7.8**	**14.8**	**22.1**	**62.6**
Bhojpur	2.2	24.6	902	13.9	15.7	41.8	55.3
Buxar	1.4	29.0	899	9.2	14.7	39.9	46.6
Kaimur	1.3	30.6	902	3.2	25.0	38.8	15.4
Patna	4.7	30.2	873	41.6	15.7	50.8	48.1
Rohtas	2.5	27.7	909	13.3	19.1	45.7	56.8
South West#	**2.4**	**28.4**	**897**	**16.3**	**18.0**	**43.4**	**44.4**
Banka	1.6	24.5	908	3.5	17.1	28.7	63.4
Bhagalpur	2.4	27.2	876	18.7	12.8	38.1	70.2
Jamui	1.4	32.9	918	7.4	22.2	26.3	63.4
Khagaria	1.3	29.3	885	6.0	14.5	29.3	48.8
Lakhisarai	0.8	23.9	921	14.7	16.5	34.0	62.3
Munger	1.1	20.3	872	27.9	14.9	47.4	53.0
Sheikhpura	0.5	25.0	918	15.5	19.7	33.9	59.5
South East#	**9.2**	**26.2**	**900**	**13.1**	**16.8**	**34.0**	**60.1**
Aurangabad	2.0	30.2	934	8.4	23.6	41.9	61.7
Begusarai	2.3	29.1	912	4.6	14.6	35.6	65.4
Gaya	3.5	30.0	938	13.7	29.7	36.7	69.8
Jehanabad	1.5	28.6	929	7.4	9.5	36.7	24.9
Nalanda	2.4	18.6	914	14.9	20.0	38.6	53.8
Nawada	1.8	33.1	946	7.7	24.2	32.2	62.0
South Central#	**1.9**	**28.3**	**929**	**9.1**	**18.7**	**37.4**	**51.8**
Bihar	829.9	28.6	919	10.5	16.6	33.1	46.2

Source: Primary Census Abstract, series-11, Census of India, 2001. [1] In million, [2]Decadal growth rate, [3] Female per 1,000 males, [4] Female literacy (7+), * Source: State programme implementation plan, Bihar, 2005, # average of the districts under the geographical region

below 900 female per 1000 male. The rural-urban breakup of the population shows that 89 percent of the population was enumerated in rural areas and only 11 percent in urban areas. Kamiur with 3.2 has lowest urbanized district and Patna the capital of Bihar has highest urbanized area (41.6%), both the district is fall under South West Region. A total of 16.6 percent schedule caste/tribe population was enumerated in the Bihar, in which less than one percent is scheduled tribe population of 2001. Highest population of scheduled caste/tribe population has been recorded in South West region (16.3%) and lowest in North Central region (6.2%), among the districts, Gaya district with 29.7 percent has recorded highest proportion of scheduled caste/tribe followed by Kaimur (25%) and lowest in the Jehanabad district (9.5%). The literacy rate in the state has improved slightly from 1991-2001. While female literacy rate is just 33.1 percent is far behind from national average (53.7%). The average of female literacy rate is only 22.1 percent in North East region and about double of it is in South West region (43.4%). The lowest female literacy rate is recorded in Kishganj district of North East region (18.6%) and highest female literacy rate is recorded in Patna district of South West region (50.8%). About half of the family (46.2%) is identified as below poverty line family SPIP, (2005).[17] The proportion of BPL is more than 60 percent is identified in North East region (62.6%) and in South East region (60.1%).

Table 2 : Post delivery complication by specific symptoms

Percentage of currently married women age 15-44 who had given their last live/still birth during three years preceding the survey reported postnatal problems by symptoms according to region, Bihar

Symptoms		Region						Total
		North West	North Central	North East	South West	South East	South Central	
High fever	%	17.6	19.5	26.4	11.8	17.0	15.4	17.8
	n	(553)	(915)	(611)	(346)	(346)	(471)	(3241)
Lower abdominal pain	%	31.5	35.0	40.3	25.5	31.0	32.2	32.6
	n	(989)	(1647)	(934)	(746)	(630)	(988)	(5934)
Foul smelling vaginal discharge	%	6.1	11.9	4.8	7.4	5.7	6.2	7.6
	n	(167)	(526)	(117)	(170)	(186)	(189)	(1373)
Excessive bleeding	%	8.4	10.3	6.8	6.2	6.4	5.1	7.6
	n	(265)	(486)	(158)	(181)	(131)	(155)	(1375)
Convulsion	%	3.4	7.3	5.8	5.7	3.7	3.1	5.1
	n	(106)	(345)	(134)	(166)	(76)	(94)	(921)
Severe headache	%	14.1	18.5	24.1	13.0	17.6	9.9	16.0
	n	(444)	(870)	(558)	(380)	(357)	(304)	(2913)
Any post delivery complication	%	42.5	48.8	51.3	38.4	44.1	42.4	44.8
	n	(1337)	(2295)	(1188)	(1121)	(897)	(1300)	8139)
Number of women		3,144	4,700	2,316	2,921	2,032	3,064	18,177

Among the districts, Araria with 80.3 percent has the highest BPL family where as Kamiur with 15.4 percent has the lowest proportion of BPL family.

About two-fifth of the women reported any post delivery complication in Bihar, which is more among North East region (53 percent) and this proportion is found low among South West region (38 percent) (Table 2). The mean value of any post delivery complication is 1.7 per women who reported any post delivery complication. The symptoms 'lower abdominal pain' (33 percent), 'fever' (18 percent) and 'severe headache' (16 percent) are most common symptoms reported by women in the all the region. Another problems reported by women are 'foul smelling vaginal discharge' and 'excessive bleeding' (8 percent each) and 'convulsion' (5 percent). A similar result was found in a study in rural Maharahstra reports that 24 percent of the mothers who delivered reported some problems after delivery such as excessive bleeding, vaginal discharge and fever, Barua (2001)[18]. The passage of blood is considered beneficial in that it is believed to cleanness the birth passage and relive the cramps, especially if clots are passed, fever was frequently mentioned as a symptoms, but invariably so in conjunction with other symptoms and excess smelly vaginal discharge was identified as common non problem after childbirth, Elizabaeth et al., (1995)[19]. However, the prevalence of fever (26 percent), severe headache (24 percent) and abdominal pain (40 percent) is more among North East region, and foul smelling vaginal discharge (12 percent), excessive bleeding (10 percent) and convulsion (7 percent) is more among in North Central region.

Table 3 : Prevalence of any postnatal problems and treatmsent

Percentage of women who reported any problem after delivery and sought treatment by place of residence according to region, Bihar

Region	Prevalence			Treatment		
	Total	Rural	Urban	Total	Rural	Urban
North West	42.5	44.0	36.3	40.9	40.3	44.3
North Central	48.8	49.2	46.7	38.5	36.8	47.8
North East	51.3	53.1	43.5	38.5	38.7	37.4
South West	38.4	39.9	36.4	47.7	49.6	44.9
South East	44.1	44.5	43.2	50.3	47.8	56.6
South central	42.4	42.4	42.6	42.0	39.5	49.7
State	44.8	46.0	40.8	42.0	40.6	47.1
Number of women	18177	13861	4315	8139	6377	1761

Table 4 : Number of postnatal problems occurred after delivery

Percentage of women[1] who reported number of postnatal problems occurred after delivery by region, Bihar

Region	Postnatal problems				
	No problem	Only one	Only two	Three or more	Total
North West	57.5	19.4	12.2	10.9	100.0
North Central	51.2	18.6	15.2	15.1	100.0
North East	48.7	20.0	14.4	16.9	100.0
South West	61.6	18.9	11.8	7.7	100.0
South East	55.9	21.8	11.7	10.6	100.0
South central	57.6	22.4	13.0	7.0	100.0
Total	55.2	20.0	13.3	11.5	100.0

[1]Currently married women age 15-44 years who had given live/still births last three year preceding the survey

It was also found that, the prevalence of any post natal problem among women was reported relatively more (46 per cent) in case of rural areas than in urban areas (41 per cent) with characteristic variations across different regions in the state. Rural-urban difference in terms of post natal problems was reported to be highest in the North East region. On the whole, it was found that prevalence of any post natal complications was highly concentrated in the North East (51 percent), North Central (49 per cent) and South East region (44 percent). It was also observed from the analysis that the treatment seeking behaviour for any post natal problem was higher in urban areas than rural areas. It may also highlight here that the likelihood of sought treatment is more among rural women from North East region than urban women. Moreover, women from South East, South West and South Central region have reported more percentages for seeking treatment with regard to any post natal problem (Table 3).

The prevalence of number of postnatal problems among women by region indicates that more than half of the women had reported no problem, and one out of 9 women reported three or more problems. Around 20 percent women had only one problem and nearly a quarter of the women had only two or more problems (Table 4 and Figure 1).

In North East and North Central region, more than three postnatal problems were found relatively higher than other areas. Irrespective of all the reasons, the treatment seeking behaviour is higher for those who have three or more problems. It means in the case of post natal problems also women use to go for treatment after the accumulation of their problems. It was found from the analysis that around 36 per cent of women had sought treatment after reporting only one problem, nearly 43 per cent had sought treatment after reporting two problems and it increase up to 51 percent after reporting three or more problems. At the regional level, nearly 57 per cent and 52 per cent from South east and North East sought treatment who suffered from three or more problems respectively (Table 5 and Figure 2).

Figure 1
Percent distribution of postnatal problems

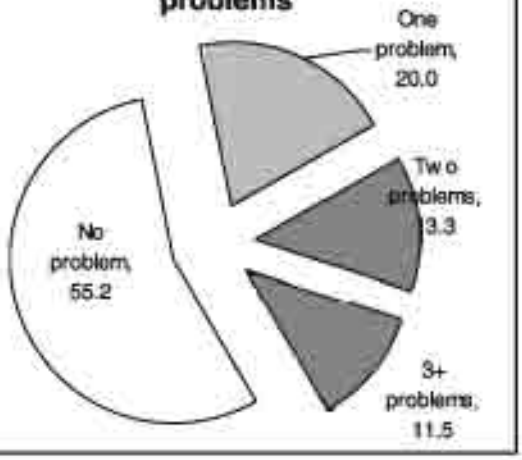


Figure 2
Treatment with number of problems

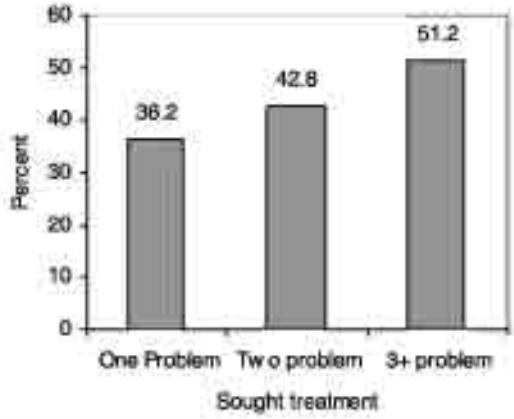


Table 5 : Sought treatment for postnatal problems

Percentage of women who sought treatment for postnatal problems by region according to number of problems, Bihar

Region	Sought treatment with;		
	Only one problem	Two problems	Three or more problems
North West	34.6	38.1	55.2
North Central	31.3	37.9	47.9
North East	29.7	39.2	48.4
South West	42.7	51.3	54.7
South East	46.5	50.9	57.3
South central	36.5	46.8	50.7
Total	36.2	42.8	51.2
Chi-square	48.7***	31.04***	11.1*

Significant level: *** P ? 0.001, * P ? 0.05

Additionally, the post natal problems and their seeking behaviour reflect the perceived severity about the certain poet natal symptoms. It also highlights the clear rural-urban divide in the prevalence and treatment seeking of the problem against the rural women i.e. they were relatively more likely to suffer from the post natal complication and less likely to seek the treatment in comparison to their urban counterpart. It was found that most prevalent postnatal ailments among women were lower abdominal pain (33 per cent), followed by high fever (18 per cent) and severe headache (16 percent). On the other hand, other ailments like foul smelling vaginal discharge (8 percent), excessive bleeding (8 percent) and convulsion (5 percent) were relatively less prevalent among women. Though lower percentage of women face the problem of convulsion, but the treatment seeking is highest for it; in spite of the highest prevalence of lower abdominal pain, percentage of women seeking treatment is less. It shows that women do not perceive lower abdominal pain as much serious problem as the convulsion and prefer to go for the treatment (Table 6).

Table 6 : Prevalence of specific symptoms and treatment

Prevalence of postnatal problems by specific symptoms and sought treatment according to place of residence, Bihar

Problems	Prevalence				Treatment			
	Total	Rural	Urban	N	Total	Rural	Urban	N
High fever	17.8	18.9	14.5	3241	49.6	49.0	51.8	1606
Lower abdominal pain	32.6	33.7	29.2	5934	44.1	42.9	48.3	2616
Foul smelling vaginal discharge	7.6	8.0	6.2	1373	37.0	36.9	37.8	508
Excessive bleeding	7.6	7.8	6.9	1375	43.5	42.5	46.8	598
Convulsion	5.1	4.9	5.4	921	53.8	52.0	59.1	496
Severe headache	16.0	16.6	14.2	2913	45.6	45.6	45.7	1328

The proportion of women who reported any post delivery complications is higher for those having 1-2 visits and three or more ANC visits than who did not receive any antenatal care during antenatal period, and chi-square shows significant association. One probable reason may be the higher reporting of the women because those having problem they are going for the antenatal check up and reporting their cases. Percentage in reporting any complication during postpartum is found more among who had experience of problem during antenatal period and natal period, and who deliver the baby at home ($p=0.001$) and having instrumental delivery ($p<0.05$) and among those having symptoms of RTI/STI ($p=0.001$). Result clearly shows that there is linkage between the morbidity that occur in the antenatal and natal period with morbidity occurring in postnatal period (Table 7).

Women who reported any post delivery complication were asked whether they seek treatment or consulted any one for their problems. Treatment seeking behaviour for any post delivery complication is presented in Table 8. It is clearly evident from the tables that women who reported any post delivery problems only two fifth of the women among them were sought treatment. Even treatment seeking behaviour for any post delivery problems is quite low, a significant difference may observed by maternal age, age at consummation, previous birth interval, number of pregnancies, place of residence, educational status, standard of living index, religion and by region and found statistically significant for any post delivery complication. A large difference may notice here that, about 60 percent of women who are received three or more visits for antenatal check-ups sought treatment with any problems compared with one-third of the women who did not receive antenatal check-ups, and such proportion increase up to 66 percent with who were gone under treatment in antenatal episode than 37 percent who had not sought treatment for antenatal problems.

Table 7 : Prevalence of post delivery complication by selected characteristics

Percentage of women[1] who reported post delivery complication by selected characteristics, Bihar		
Selected characteristic	Any post delivery complication	Number of women
Number of ANC visit	(0.000)	
No visit	43.8	11294
1-2 visits	48.3	3324
3+ visits	44.6	3559
Any antenatal problem	(0.000)	
No	37.9	12135
Yes	58.6	6042
Any natal problem	(0.000)	
No	33.9	4160
Yes	48.0	14017
Place of delivery	(0.000)	
Institute	42.0	4172
Home	45.6	14005
Delivery characteristics	(0.018)	
Normal	44.9	16865
Caesarean	41.5	734
Assisted	46.7	578
Vaginal discharge problem	(0.000)	
No	44.0	16991
Yes	56.4	1186
Total	44.8	18177

Note: [1] Currently married women age 15-44 years who had live/still births during three years preceding the survey.

Table 8 : Sought treatment for post delivery complications by selected characteristics

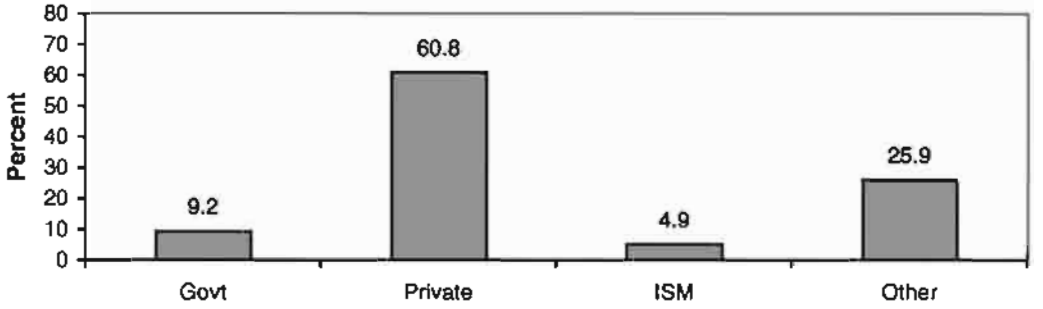
Percentage of women[1] who reported any post delivery complication and sought treatment by selected characteristics, Bihar		
Selected characteristic	Any post delivery complication	Number of women
Number of ANC visit	(0.000)	
No visit	34.8	4946
1-2 visits	47.4	1604
3+ visits	59.0	1588
Treatment for pregnancy complication	(0.000)	
No	36.7	6621
Yes	65.1	1518
Place of delivery	(0.000)	
Institutional	58.3	1751
Home	37.6	6387
		1518
Total	42.0	8139

Note: [1] Currently married women age 15-44 years who had live/still births during three years preceding the survey

Utilization of Health Services for Treatment of Post Delivery Complication

Less than 10 percent of the women received the treatment from government health facility for their problems that occurred in postpartum period, private health facility is the major source to provide the services, as 60 percent and more women sough treatment from private health institutions. A quarter of women prefer to visit other means of source for their problems and another five percent visited to ISM hospital/clinic as per the availability (Table 9 and Figure 3).

Figure 3 - Source of treatment for post delivery complication



To avail services from other means of sources is more among respondent from North East and South East region, where about one-third of the women sought treatment for the post natal problem from other sources. The utilization of government health facility is quite low in the South East region and proportionally higher proportion of women among South Central region prefer to go private health institutions. As most of the women seen to a doctor for either antenatal care services or treatment of antenatal problems; more than two third of women consulted to doctor for treatment of post natal problems. Only seven percent contacted to ANM/nurse and about one-fifth sought treatment from other health professionals or other sources (Table 10). One possible cause of low utilization of government health facility could be unequipped health facility in terms of supply, manpower and infrastructure, Facility survey, (2006),[20] and existing facilities is lacking the basic minimum infrastructure SPIP, (2005).[17] Also lack of availability of ANM/nurse could be one of the possible reasons behind this.

Table 9 : Place of treatment for post delivery complication

Women who reported post delivery complication and sought treatment by place of treatment according to region, Bihar

Region	Government	Private	ISM †	Other	Number of women
North West	10.7	58.0	8.3	25.8	547
North Central	8.7	62.6	1.7	27.2	883
North East	9.2	53.8	3.4	33.9	458
South West	12.0	63.9	4.8	21.3	535
South East	4.3	57.1	6.1	32.9	451
South central	10.1	66.8	7.1	16.1	546
Total	9.2	60.8	4.9	25.9	3420

Note: Total may add more than 100.0 due to multiple responses. † Either Government or Private ISM

Table 10 : Source of treatment for post delivery complication

Women who reported post delivery complication and sought treatment by source according to region, Bihar						
Region	Doctor	ANM/ Nurse	Other health professionals	Other	Missing	Total percent
North West	65.7	6.4	3.3	24.5	0.1	100.0
North Central	66.9	6.0	2.7	24.4	0.1	100.0
North East	66.4	4.8	4.4	24.4	0.0	100.0
South West	68.2	10.4	7.5	14.0	0.0	100.0
South East	58.9	5.2	5.8	30.1	0.0	100.0
South central	75.5	9.8	1.5	12.3	0.8	100.0
Total	67.2	7.1	4.0	21.6	0.2	100.0

CONCLUSION

It is well known fact that complication during pregnancy can adversely affect women's health or the outcomes of the pregnancy. Early identification of the complication during pregnancy and its timely treatment are the important components of the safe motherhood programme.

Almost two-firth of the women reported postnatal problem and who reported postnatal problem only 42 percent of them sought treatment. Treatment seeking is increased when problems are accumulating. May be due to 'culture of silence' they carry the burden unless and until it is not bearable then only they sought treatment for the problems.

In general terms it might be expected that rural women, less educated women, and women from lower socio-economic strata might experience more problems. It is also excepted age will show J-shaped relationship. However, Srinivasa and Narayana, (1998)[21] and Bhatia, (1993)[1] did not found such relationship, in this study also no consistent pattern were found. Bhatia found that relatively privileged sectors reported more problems, such result is also exists here. One possible explanation for these variations is that some types of women are more likely to undergo routine antenatal check-up than other.

As expected, urban women, educated women, women with higher SLI are more likely to sought treatment for post delivery complication. It has also been observed that women who received antenatal care are more likely to sought treatment post delivery complication, and women who had institutional delivery are more likely to sought treatment for post delivery complication. It has also been noticed that women who sought treatment for pregnancy complication, a higher proportion of them also sought treatment for post delivery problems, if occurred.

Utilization of Government health facility is also performing poorly in terms of antenatal services, delivery care, and of treatment for morbidity. A lot of programme launched by Government of India to promote antenatal converge and institutional delivery, still Bihar is far lagging behind of this. There is urgent need to generate aware at community level as well as programme like IEC, IPC and BCC should also promote.

REFERENCES

1. Bhatia J.C. (1993): Abortionists and abortion Seekers. Indian Journal of Social Work 34, 3.
2. Ganatra B.R., Coyali K.J., Rao V. (1996): Community cum hospital based case control study on maternal mortality, final report, KEM Hospital Research Centre (mimeo) Pune
3. Fauveau V, Micjeal Koenig, Chakraborty J., Choudhary AI, (1988): Causes of Maternal Mortality in Rural Bangladesh, 1967-85. Bulletin of the World Health Organization 66, 5:643-651
4. Datta K.K., Sharma R.S., Razack P.M.A., Ghosh T.K., Arora R.R., (1980); Morbidity patterns amongst rural pregnant women in Alwar, Rajasthan – A cohort study, Health and Population – Perspectives and Issues. 3(4): 282-292
5. Koblinsky M.A., Oona MR, Campbell O., Sioban H, (1993): Mother and More: A boarder prospective on women's health. In The Health of women: A Global Prospective: eds, Margery, A Koblinsky, J Timyan and J Gay. Boulder, CO: Oxford, England West view Press
6. Melrose E.B. (1984): Maternal Deaths at King Edward VIII Hospital, Durban: A Review of 258 consecutive Cases. South African Medical Journal, 65.
7. Bose, E.G.M. (1987a),Maternal Mortality in Southern Africa, 1980-1982, Part I, Pregnancy Can Be Lethal, South African Medical Journal, 71.
8. Gormaker S.L. (1979): The Effects of Prenatal Care Upon The Health of The New Born, American Journal of Public Health 69: 653-660.
9. Greenbergs R.S. (1983): The Impact of Prenatal Care in Different Social Groups, American Journal of Obstetrics and Gynaecology, 145 : 797-801.
10. Gould J.B., S. Le. Roy.(1988): Socio-Economic Status and Low Birth Weight: A Racial Comparison, Paediatrics 82 : 896-904.
11. Kwast, B.E., et. al (1989): Confidential Enquiries into Maternal Deaths in Addis, Abada, Ethiopia 1981-83. Journal of Obstetrics and Gynaecology of Eastern and Central Africa, 8
12. Prual A, Bouvier-Colle MH, de Bernis L, Breart G.(2000) Severe maternal morbidity from direct obstetric causes in West Africa: incidence and case fatality rates. Bulletin of the World Health Organization; 78: 593-602.
13. Registrar General of India, Census 1991
14. International Institute for Population Sciences (IIPS). 2002-04. District Level Household Survey, (DLHS-2) Mumbai:
15. International Institute for Population Sciences (IIPS). 1998-99. National Family Health Survey, (NFHS-2) Mumbai:
16. Registrar General of India, Census 1991
17. State Programme Implementation Plan for RCH-II, Bihar State, 2005, Department of Health and Family Welfare, Government of Bihar
18. Barua, A., K. Kurz. (2001): Reproductive health-seeking by married adolescent girls in Maharashtra, India. Reproductive Health Matters, 9(17): 53-62.
19. Elizabeth A.G., Rukhsana G., Chowdhury M (1995): Beliefs and Practices Regarding Delivery and Postpartum Maternal Morbidity in Rural Bangladesh. Report, Studies in Family Planning, 26 (1):22-32
20. International Institute for Population Sciences (IIPS). (2006): India, Facility Survey (Under Reproductive and Child Health Project)-, Mumbai: IIPS.

21. Srinivasa D.K., Narayan K.A., Oumachigui A., Roy. G. (1998): Prevalence of Maternal Morbidity and Health Seeking Behaviour in a South Indian Community. Paper Presented in International Conference of Reproductive Health 15-19 March 1998, Mumbai, India.

Abbreviation:

ANC – Antenatal care

ANM – Auxiliary Nurse Midwives

BCC – Behaviour Change and Communication

BPL - Below Poverty Line

DLHS - District Level Household Survey

IEC – Information, Education and Counselling

IIPS – International Institute for Population Sciences

IPC – Inter Personnel Communication

ISM – Indian System of Medicine

NFHS – National Family Health Survey

PIP – Program Implementation Plan

PPS - Probability Proportionate to the Size

PRC – Population Research Centre

RCH – Reproductive and Child Health

RTI – Reproductive Tract Infection

STI – Sexually Transmitted Infection

SLI - Standard of Living Index

SPOUSAL PERSPECTIVES ON FERTILITY PREFERENCES: DIFFERENTIALS IN IDEAL FAMILY SIZE

Nizamuddin Khan*, Usha Ram**

Abstract : *Spousal perspectives on fertility preferences were investigated in a probability sample of 418 young married couples in Ratlam district of Madhya Pradesh, India. Findings reveal that the reported ideal family size is higher among husbands than their wives. In terms of reporting the ideal family size, the non-numeric ('up to God/can't say') responses are mentioned more by wives, especially those who are illiterate and belong to the lowest wealth quintile. Findings from multivariate analysis reveal that the number of surviving children is significantly associated with ideal family size. Couples' education, exposure to mass media, and standard of surviving has significant positive impact on couples' ideal family size of two or fewer children. One son and one daughter in desired ideal family size, is preferred more by wives than their husbands. However, son preference in ideal family size has been observed and found more among couples residing in rural areas. Overall finding of the study reveals that education and standard of surviving play an important role in shaping the small family norm and ideal family size of one son and one daughter.*

INTRODUCTION

The International Conference on Population and Development (ICPD) strongly advocated the need for greater emphasis on sexually active couples and not just the women.[1] Since then, involving men in reproductive behaviour research and programs, and study on couples has acquired focus worldwide.[2,3] Many studies have explored couples' fertility attitudes and preferences, where the idea was to look for agreement in the responses of both the spouses.[4-6] Another important aspect which needs to be explored in couples' studies is to find out who among the spouses dominates the reproductive decision-making, in case of a disagreement between husband and wife on reproductive intentions. A few studies have explored spousal agreement on reproductive attitudes and preferences.[7-10] Becker argues that if men and women were involved as equal partners in the fertility and family planning programs, it would probably have a high success rate.[9,11] Biddlecom and Fapohunda in their study found that the reproductive decisions made by men do not necessarily echo their wives' reproductive preferences and may actually contradict those reported by their wives.[12] Reproductive goals of the spouses may be different and in order to establish these differences, it is necessary to obtain the

* Research Scholar, International Institute for Population Sciences (IIPS), Mumbai
** Associate Professor, International Institute for Population Sciences (IIPS), Mumbai,
Email: iipsnizam@yahoo.com

relevant data from both partners and not just from one partner alone.[13] Demographic and Health Surveys (DHS) report that comparatively men have more desire than women for an additional child. One of the most important predictors of the fertility behaviour of the couple's is the fertility desire of both marriage partners.[5,8,14,15]

Bankole in his study concludes that the husband's desires emerge as the dominant predictor for those couples who have fewer surviving children.[5] Among Muslim couples, husbands' reported higher family planning use and desire for additional children compared to their wives.[16]

However, a number of recent studies have interviewed men directly. In the male dominated developing countries men continue to play dominant roles in all family matters, including reproductive behaviour[3]. In this scenario, the husband may actually influence a woman's response as she is likely to report in a way that he would approve it.[9,17] Hence, the data obtained directly from men shows that to get correct data they need to be covered in the study rather than capturing proxy information from their wives.[18] In the Indian context, the motivation to become parents soon after marriage is strong. Once a woman is married, she must establish her womanhood and identity quickly by getting pregnant and becoming a mother, preferably of a son.[19] One particularly important factor in the Indian context is the desire to have children of a particular sex composition.[20] In traditional Indian society, the number of children especially the number of sons, not only establishes a woman's position in society, but also ensures family lineage. In male-dominated societies, the ideal and desired number of children is influenced by the number of desired sons.[20,21] This effect generally changes the attitude of reproductive behaviour among the couples. The two most commonly used fertility preference indicators are the ideal family size and desire for an additional child. However, we do not have much information about the consistency over time of responses to each measure, the consistency between the two indicators or the predictive value of these indicators in India.[22] Various studies reflect couples' demand for children i.e., awareness about the number of children they want to have.[17] Increased desire for children among couples will result in high fertility.[23] Lower socioeconomic status and strong son preference are the major obstacles for the achievement of the two-child family.[24]

In this study, fertility preference data was collected from the questions asked to both spouses, separately. The questions asked were: In your opinion, how many children should a couple ideally have ? And how many sons and daughters would you like to have in ideal family size ? These two questions focusing on preference data point to the association of preferences with achieved fertility and the fact that almost all population policies affecting fertility influence by fertility desires (Pritchett, 1994). Research on fertility has always highlighted the close relationship between fertility desires and actual fertility.[5,9,21,25,26,27]

In some traditional societies, many couples attribute the number of desired children up to God or to fate and not their personal decision.[28] According to National Family Health Survey (NFHS) conducted in three rounds, shows that in India particularly in Madhya Pradesh, non-numeric responses

for ideal family size and desire for additional children has rapidly reduced in the past ten years.[29-31]

The objective of this paper is to understand the socioeconomic and behavioral factors of spouses that encourage towards fertility decline, to identify policy options for reducing fertility through spousal agreement, as well as, examine spousal agreement on reproductive preferences. The findings of this paper are divided into three parts:

- Differentials in desired family size
- Identification of the determinants of the ideal family size; and
- Identification of the determinants of the desire for additional child

DATA AND METHODOLOGY

A total of 418 couples (wives aged between 15 - 30 years and their husbands) were interviewed successfully from 25 rural and 12 urban Primary Sample Units (PSUs) in Ratlam District, Madhya Pradesh, India. The sampling units in the present study are adopted from the District Level Household Survey under Reproductive and Child Health (DLHS-RCH).[32], Phase-II, Round-II sampling frame, conducted in Ratlam district in 2004. In DLHS survey, 1088 eligible couples (women aged 15-44 years) were identified in 1051 selected households, however, only 564 could be interviewed. As the present study is focused on the couples of younger age, i.e, the women of age group 15-30 years , it was found that only 670 young couples were available within the DLHS sampling frame for the present study. Hence the following three types of sample groups were available for interviewing the couples for the present study:

Group-A : 286 interviewed both eligible women and their husbands.

Group-B : 245 only eligible women interviewed.

Group-C : 139 not interviewed couples.

In order to cover maximum couples in the present study, an attempt was made to visit all 40 PSU's in the district. A total of 418 couples (226 couples from Group-A, 133 couples from Group-B and 59 couples from Group-C) were successfully interviewed from 25 rural and 12 urban primary sampling units (PSUs) in the district after several visits. However three PSUs could not be visited due to the inaccessibility in rainy season. Not at home and non availability of partners are the two major reasons for not covering the households in the present study. The study explored similar information using individual questionnaire from both husband and wife. Therefore, to minimize the chances of biasness in reporting, the emphasis has given for interviewing both the spouses simultaneously. Of the 418 couples, 57 percent were interviewed simultaneously (same day and same time), 29 percent were interviewed same day but different time and 13 percent of the couples where husbands interviewed after completing the interviews of their wives.

Data was analyzed using Statistical Package for Social Sciences (SPSS) and STATA. Findings are represented in the form of bivarivate, multivariate tables. The

cross tabulation findings were tested for significance using ANOVA, Kappa statistics to measure the level of significance as well as measure of association between the variables. Binary logistic regression analysis was carried out to understand the effect of crucial independent variables on the dependent variables such as ideal family size, desire for additional child and use of family planning methods. Additionally, various indices such as wealth index, women's autonomy index, opinion on inter-spousal communication towards reproductive behavior were calculated and alphas value were measure to determine the composition of variables included in the formation of particular indices.

RESULTS

Profile of respondents

About three-fourth (73 percent) interviewed couples are residing in rural areas and almost all (96 percent) couples are followers of Hinduism. About 26 percent couples belong to scheduled tribes (STs) in the study area. The median age of wives is 24 years and for husbands it is about 27 years. Nearly two-thirds of the wives were married before the legal age at marriage. Among 23 percent couples, the age gap between the spouses is up to five years. The age gap between the spouses is more in urban areas compared to rural areas. In terms of marital duration, 35 percent of couples have been married for less than five years while 25 percent of couples have been married for more than 10 years. Nearly one-fifth of couples are illiterate in study area. Twenty-two percent of couples have no surviving children while 56 percent of couples have one or two surviving children followed by 23 percent of couples with three or more surviving children (Table 1). One-third of couples surviving in rural areas have had three or more children as compared to 19 percent urban couples. Furthermore, 39 percent of couples have both sons and daughters while 17 percent of them have only daughters and 23 percent have only sons (figures not shown in the table).

In terms of spousal educational status, 58 percent of wives and 21 percent of husbands are illiterate in study population. The median year of schooling is 0 among wives and 7 years among husbands. However, the median year of schooling among literate wives is 6 years, which is higher for urban wives (8 years) than that for rural wives (5 years). In terms of work status of couples, nearly 50 percent of couples are current working (dominated by agricultural sector). More husbands (26 percent) than wives (only 3 percent) are employed in the professional sector in the district (figures not shown here). Less than half (46 percent) couples are exposed to any mass media and in another 26 percent couples, only husband was exposed to any mass media. Wealth index is calculated on the basis of household amenities and assets and divided into each 20 percent quintiles called standard of surviving quintiles (Table 1). However, none of the household belongs to lowest quintile in urban areas, whereas 28 percent of households fall in lowest quintile in rural areas.

Table 1 : Percent distribution of couples according to background characteristics

Demographic indicators	Percent	Number
Type of residence		
Rural	72.7	304
Urban	27.3	114
Religion		
Hindu	95.5	399
Other	4.5	19
Ethnicity		
Scheduled caste (SC)	6.5	27
Schedules tribe (ST)	26.1	109
Other backward classes	40.7	170
General (higher caste)	26.8	112
Median age in years		
Wife	24	418
Husband	27	418
Age gap between husband and wife		
Same age or age gap up to 2 years	47.1	197
3-4 years	30.1	126
5 or more years	22.7	95
Marital duration		
Less than 5 years	34.9	146
5-10 years	40.4	169
11 years or more	24.6	103
Number of surviving children		
None	21.5	90
1-2	56.0	234
3 or more	22.5	94
Mean children ever born	1.8	418
Mean number of surviving children	1.6	418
Education		
Both illiterate	19.1	80
Only wife literate	2.2	9
Only husbands literate	39.0	163
Both literate	39.7	166
Median year of education among wives	0	418
Median year of education among husbands	7	418
Work status		
Both not working	8.4	35
Only wife working	1.0	4
Only husband working	42.1	176
Both working	48.6	203
Exposure to media		
Both not exposed	23.2	97
Only wife exposed	4.8	20
Only husband exposed	26.1	109
Both exposed	45.9	192
Wealth Quintiles		
Lowest	21.1	88
Second	22.7	95
Middle	21.5	90
Fourth	17.9	75
Highest	16.7	70
Total percent	**100.0**	**418**

Ideal family size differential by number of surviving children

Most of the information gathered through fertility surveys suggests that women desire considerably smaller ideal family size than their husbands.[33] However, other research suggests there is a greater demand for children among women than men in settings wherein women are relatively powerless.[34] Table 2 shows the percent distribution of couples' desired ideal family size by number of surviving children. Sixty-three percent of wives reported that the ideal family size should be two children as compared to 57 percent of their husbands. More husbands than their wives reported the ideal family size three or more children in study area. A significant proportion of wives (13 percent) gave non-numeric responses for ideal family size. The ideal family size is positively associated with actual number of surviving children of a couple. Among couples with two surviving children, more wives (72 percent) than their husbands (65 percent) reported that the ideal family size should be two children while more husbands (26 percent) reported three or more children ideal family size as compared to their wives (15 percent). But in case of couples with three or more surviving children, more wives (40 percent) than their husbands (33 percent) report that the ideal family size should be two children while more husbands (62 percent) as compared to their wives (53 percent) reported ideal family size as three or more children.

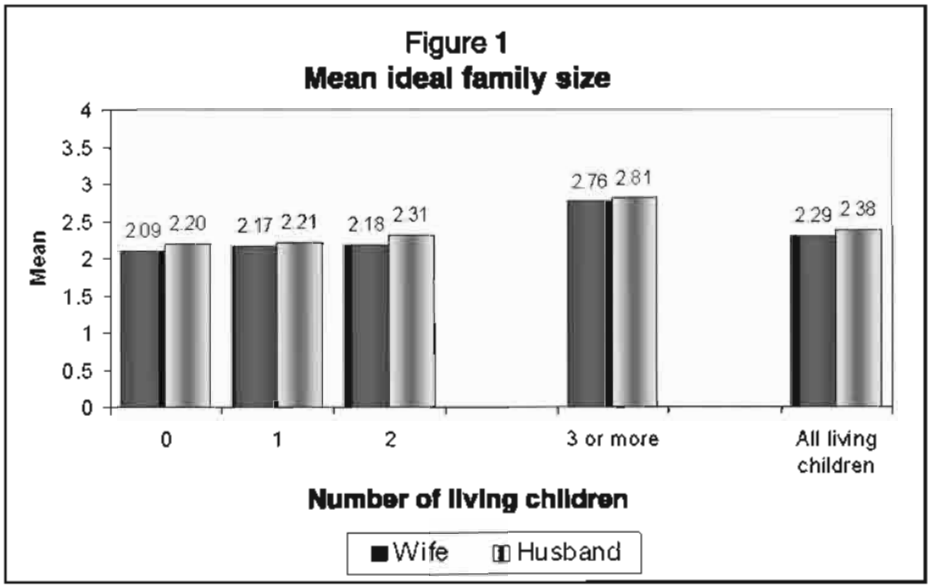
Table 2: Percent distribution of couples by desired ideal family size by sex composition of surviving children

Sex composition of surviving children	Wife				Husband				Number of couples
	1	2	3 or more	Non-numeric	1	2	3 or more	Non-numeric	
None	3.3	64.4	10.0	22.2	2.2	65.6	20.0	12.2	90
One	**2.2**	**70.7**	**16.3**	**10.9**	**5.4**	**62.0**	**25.0**	**7.6**	**92**
Only son	0.0	72.9	14.6	12.5	6.3	66.7	22.9	4.2	48
Only daughter	4.5	68.2	18.2	9.1	4.5	56.8	27.3	11.4	44
Two	**0.7**	**71.8**	**14.8**	**12.7**	**0.0**	**64.8**	**26.1**	**9.2**	**142**
Both sons	0.0	74.3	11.4	14.3	0.0	65.7	25.7	8.6	35
Both daughters	0.0	73.9	21.7	4.3	0.0	52.2	39.1	8.7	23
One son and one daughter	1.2	70.2	14.3	14.3	0.0	67.9	22.6	9.5	84
Three or more	**0.0**	**40.4**	**53.2**	**6.4**	**1.1**	**33.0**	**61.7**	**4.3**	**94**
All sons	0.0	54.5	45.5	0.0	0.0	18.2	81.8	0.0	11
All daughters	0.0	75.0	25.0	0.0	0.0	25.0	75.0	0.0	4
More sons than daughters	0.0	46.7	44.4	8.9	0.0	42.2	53.3	4.4	45
More daughters than sons	0.0	28.6	64.3	7.1	3.6	28.6	60.7	7.1	28
Equal sons and daughters	0.0	0.0	100.0	0.0	0.0	16.7	83.3	0.0	6
Total	**1.4**	**62.9**	**22.7**	**12.9**	**1.9**	**57.2**	**32.5**	**8.4**	**418**

A one way ANOVA revealed that there are significant differences in mean ideal family size.
For wife: $F(1, 362) = 115.934$, $p<0.000$; **for husband**: $F(1, 381) = 131.043$, $p<0.000$.

The mean ideal family size (shown in figure 1) reported by wives is 2.3 children which significantly vary from 2.1 to 3.3 with the number of surviving children. The mean ideal family size among husbands is also similar (2.4) as in case of wives. To examine the reported ideal family size by husbands, it is significantly vary with the number of surviving children in positive direction. Overall results reveal that there is a strong association between ideal family size and number of surviving children.

given more by wives than their husbands. Moreover, reported ideal family size does not show any significant difference among illiterate couples. Couples where one of the spouses is educated, the ideal family size concentrates around two children as reported by 58 percent of husbands and 67 percent of wives. About three-fourth (73 percent) of such husbands reported three or more children as compared to only 26 percent of wives. But similar to illiterate couples, reporting of ideal family size



Ideal family size by educational differentials

Table 3 presents the comparison of ideal family size between husbands and wives by educational status and standard of surviving. For couples where both the spouses are illiterate, the mean ideal family size is close to three children. Among illiterate couples, 40 percent of wives and 46 present husbands reported ideal family size as three or more children. However among illiterate couples, non-numeric responses such as up to God, can't say is among the couples where one of the spouses is not educated does not show any significant differences. In case of couples where both the spouses are educated, the mean ideal family size is reported two children. Seventy-four percent husbands and 81 percent wives of such couples mentioned desired ideal family size as two children. Interestingly, while comparing the mean ideal family size between uneducated and educated couples, more than a quarter has reduced from illiterate couples to literate couples especially more among wives.

Table 3: Comparison of ideal family size in terms of numeric responses between husband and wife by educational and standard of surviving status.

educational and standard of surviving status.

Education of couple	*Desired ideal family size*	*Wife*	*Husband*	*Difference*
Both the spouses are illiterate	1	1.3	1.3	
	2	16.3	21.3	
	3 or more	40.0	46.3	P<0.317@
	Non numeric responses	42.5	31.3	
	*Mean**	*2.89*	*2.82*	
One of the spouse is literate	1	0.6	1.7	
	2	66.9	57.6	
	3 or more	25.6	36.6	P<0.300
	Non numeric responses	7.0	4.1	
	*Mean**	*2.31*	*2.40*	
Both the spouses are literate	1	2.4	2.4	
	2	81.3	74.1	
	3 or more	11.4	21.7	P<0.009**
	Non numeric responses	4.8	1.8	
	*Mean**	*2.11*	*2.22*	
Wealth quintile				
Lowest	1	1.1	1.1	
	2	34.1	37.5	
	3 or more	37.5	39.8	P<0.341
	Non numeric responses	27.3	21.6	
	*Mean**	*2.61*	*2.64*	
Second	1	2.1	1.1	
	2	52.6	51.6	
	3 or more	29.5	36.8	P<0.552
	Non numeric responses	15.8	10.5	
	*Mean**	*2.39*	*2.44*	
Middle	1	1.1	3.3	
	2	67.8	58.9	
	3 or more	17.8	34.4	P<0.239
	Non numeric responses	13.3	3.3	
	*Mean**	*2.24*	*2.36*	
Fourth	1	1.3		
	2	81.3	66.7	
	3 or more	14.7	30.7	P<0.013*
	Non numeric responses	2.7	2.7	
	*Mean**	*2.15*	*2.33*	
Highest	1	1.4	4.3	
	2	87.1	77.1	
	3 or more	10.0	17.1	P<0.658
	Non numeric responses	1.4	1.4	
	*Mean**	*2.13*	*2.16*	

Note: Used pared sample t-test to see the significance difference in reporting ideal family size by husband and wife.
*Mean ideal family size calculated after excluding the non-responses
@ Used Wilcoxon Signed Ranks Test due to less number in cell

The ideal family size also analyzed by standard of living (wealth quintiles) of the couples. The mean ideal family is inversely associated with wealth quintiles as it is found in decreasing order from lowest to highest quintile among both the spouses. The majority of wives, varying from 34 percent in lowest quintile to 87 percent in highest quintile, reported desired ideal family size as two children. While in case of husbands it increases from 40 percent to 77 percent respectively. However, there is no significant difference between the spouses' reporting of ideal family size in all wealth quintiles except in the fourth quintile.

Table 4: Percent distribution of couples by preferred sex composition in desired ideal family size according to sex of surviving children

Table 4: Percent distribution of couples by preferred sex composition in desired ideal family size according to sex of surviving children

Sex composition of surviving children	Only Son	Only Daughter	Equal no of sons and daughters	More sons than daughters	More daughters than sons	Number
	Wife					
None	2.9	12.9	71.4	12.9	0.0	70
Only sons	1.2	6.1	76.8	13.4	2.4	82
Only daughters	6.2	7.7	67.7	16.9	1.5	65
Both sons and daughters						
Equal no of sons and daughters	1.4	9.1	56.6	32.2	0.7	143
More sons than daughters	1.3	11.8	68.4	17.1	1.3	76
More daughters than sons	2.4	7.3	48.8	41.5	0.0	41
	0.0	3.8	34.6	61.5	0.0	26
All	**2.5**	**8.9**	**66.1**	**21.4**	**1.1**	**360**
	Husband					
None	0.0	9.0	67.9	19.2	3.8	78
Only sons	0.0	4.6	63.2	29.9	2.3	87
Only daughters	0.0	3.2	60.3	27.0	9.5	63
Both sons and daughters						
Equal no of sons and daughters	0.0	2.7	61.0	33.6	2.7	146
More sons than daughters	0.0	2.6	74.0	19.5	3.9	77
More daughters than sons	0.0	0.0	46.5	53.5	0.0	43
	0.0	7.7	46.2	42.3	3.8	26
All	**0.0**	**4.5**	**62.8**	**28.6**	**4.0**	**374**

Sex Preferences in Desired Ideal Family Size

For all couples who gave a numeric response to ideal family size a question was also asked regarding the ideal sex composition. Table 4 presents the distribution of couples by preferred sex composition in desired ideal family size according to number and sex of surviving children.

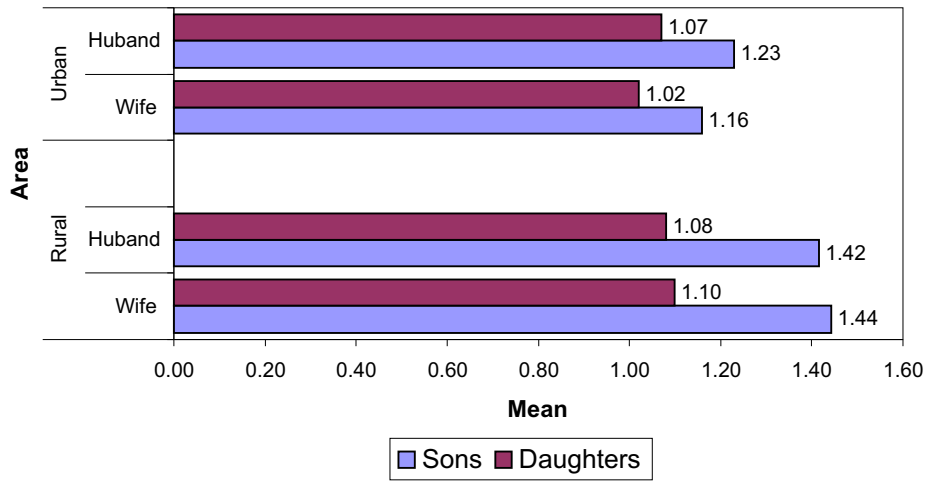
Spousal desire for sex of children in ideal family size strongly recommended for son preference among both the spouses. In terms of ideal sex preferences, the ideal family size differs with sex of surviving children as found in both the spouses' reporting. Couples with only sons, 77 percent of wives report equal number of sons and daughters in ideal family size as compared to 63 percent of their husbands. More husbands (30 percent) than their wives (13 percent) desired more sons than daughters in ideal family size. Among couples having both sons and daughters, almost one-third of both spouses desired more sons than daughters in ideal family size. Among couples with more surviving sons than daughters, or more surviving daughters than sons, majority of spouses reported more sons than daughters in their desired ideal family size.

Figure 2 shows that the couples residing in rural areas desired to have more sons as compared to urban couples. In case of wives, the reported ideal number of sons and daughters are 1.44 and 1.1 in rural areas and 1.16 and 1.07 in urban areas respectively. Both wives and husbands from rural areas desired to have more sons than number of daughters. The difference between urban and rural respondents is higher in case of reported ideal number of sons as compared to reported ideal number of daughters.

Ideal family size by socio-economic and demographic differentials

In developing countries, a significant proportion of respondents, whether husbands or wives respond non-numerically, for example, by saying that it is "up to God", to the question of desired ideal number of children. In the present study, more wives

Figure 2:
Mean ideal number of children according to sex preference



(13 percent) than husbands (8 percent) provided such answers. The most of these couples reside in rural areas and are less educated.

Table 5 shows the couple's reported ideal family size up to two children and ideal family composition as one son and one daughter by selected background characteristics. Non-numeric responses are included in other category while calculating the ideal family size two or fewer children. The ideal family size up to two children is reported more (70 percent) by couples residing in urban areas as compared to rural couples. Younger wives believe more in small ideal family size than older wives (25 years or above). Couples belonging to scheduled caste/tribes are comparatively less likely to report ideal family size of two or fewer children. Couples where spouses' age gap is five or more years are also more likely to desired a family with two or fewer children.

More couples who have been married for less than 10 years, report ideal family size two or fewer children as compared to couples married for more than 10 years. Many studies have shown that education, particularly female education plays an important role in promotion of small family norms. Couples having literate wives are more likely to have ideal family size two or fewer children. Similarly, among couples where both spouses are literate, 71 percent of them reported ideal family size up to two children followed by eight percent among illiterate couples. As mentioned earlier, ideal family size is strongly associated with number of surviving children. Couples who have experienced the child loss are less likely to desire small ideal family size. Where one of the spouses works in professional sector, relatively more couples desire (69 percent) ideal family size up to two children. Study reveals that exposure to mass media also plays significant role towards small family size, as couples where both the spouses are exposed to any mass media, are more (64 percent) likely to have a small family (i.e. up to two children) as compared to couples with no exposure of mass media. Wealth quintile is a proxy of standard of living and inversely related to ideal family size. More couples from highest wealth quintile reported (77 percent) ideal family size up to two children. It is important and interestingly to learn that when both the spouses could not be interviewed simultaneously, relatively more couples reported ideal family size up to two children.

Among couples who gave numeric responses for deal family size, a similar trend is seen with respect to sex preferences in ideal family size of one son and one daughter. Couples residing in urban areas, having higher age gap between the spouses, couples with no child, educated couples, atleast one of the spouse working in professional sector, exposure to any mass media, and couples belong to higher quintile are more likely to desire ideal family size as one son and one daughter. It was also found that when spouses gave different numeric response, the probability of a husband preferring more ideal number of children than his wife becomes greater than the probability that a wife would desire more ideal children than her husband. Similarly, in cases where one spouse provides a numeric response while the other responds non-numerically, husbands are more inclined to give non-numeric responses than their wives.

Table 5: Percent distribution of couples according to ideal family size by selected background characteristics

Background characteristics	Up to two children*	Number of couple	One son and one daughter*	Number of couple
Type of residence				
Rural	39.1	304	38.3	235
Urban	70.2	114	60.0	110
Wife's Age				
15- 24 years	51.5	233	48.4	190
25-30 years	42.7	185	41.3	155
Religion				
Hindu	46.9	399	45.0	327
Other	63.2	19	50.0	18
Ethnicity				
Scheduled caste/tribes (SC/ST)	32.4	136	35.7	98
Other backward classes	50.0	170	48.3	143
General (higher caste)	62.5	112	50.0	104
Age gap between the spouses				
Up to 2 years	42.1	197	43.4	152
3-4 years	51.6	126	44.6	112
5 or more years	53.7	95	49.4	81
Marital duration in years				
Less than 5 years	54.1	146	52.2	113
5-10 years	52.7	169	48.6	146
11 years or more	30.1	103	30.2	86
Education of couples				
Both illiterate	7.5	80	2.8	36
One of the spouse literate	44.2	172	39.2	153
Both literate	70.5	166	60.9	156
No. of surviving Children				
No child	52.2	90	55.6	63
Below 3	56.0	234	53.3	197
3 or more	22.3	94	18.8	85
Work status of couples				
Both working in agricultural sector	30.9	149	31.8	110
One of the spouse is a professional# worker	68.6	118	55.8	113
Other combinations	47.7	151	47.5	122
Couple Exposure to any media				
Both not exposed	19.6	97	25.5	55
One of the spouse exposed	45.0	129	43.9	107
Both exposed	63.5	192	51.9	183
Wealth Quintiles				
Lowest	20.5	88	25.9	54
Second	38.9	95	34.2	73
Middle	50.0	90	44.2	77
Fourth	60.0	75	55.6	72
Highest	77.1	70	62.3	69
Couple interviewed				
Parallel	39.9	238	37.4	187
Husband first	50.0	32	39.3	28
Wife first	59.5	148	57.7	130
Total	47.6	418	45.2	345

Note: The association of ideal number of children with all the selected background characteristics are highly significant ($p<0.01$) except age gap between spouses.
*Excluded non-numeric responses.
#Includes white/blue color service, business at large scale, petty/small scale business and skilled workers.

Ideal family size differential by timing of interview

The desired ideal family size is also analyzed by timing of interview of spouses to examine the differential in reporting by individual. About 64 percent of wives and 59 percent of husbands mentioned ideal family size two or fewer children. In case of couples where spouses were interviewed simultaneously, 58 percent wives and 53 percent husbands reported ideal family size two or fewer children. However, among couples, where husbands were interviewed first, 72 percent wives mentioned ideal family size two or fewer children and 19 percent of them reported three or more children as ideal family size. Shifting in reported ideal family size from larger number of children to smaller one among wives, the reason could be of passing the information by their husbands as they were interviewed first. Similarly, among couples where wives were interviewed first, more husbands reported ideal family size of two or fewer children than the other group of couples.

Determinants of ideal family size and desire for additional child

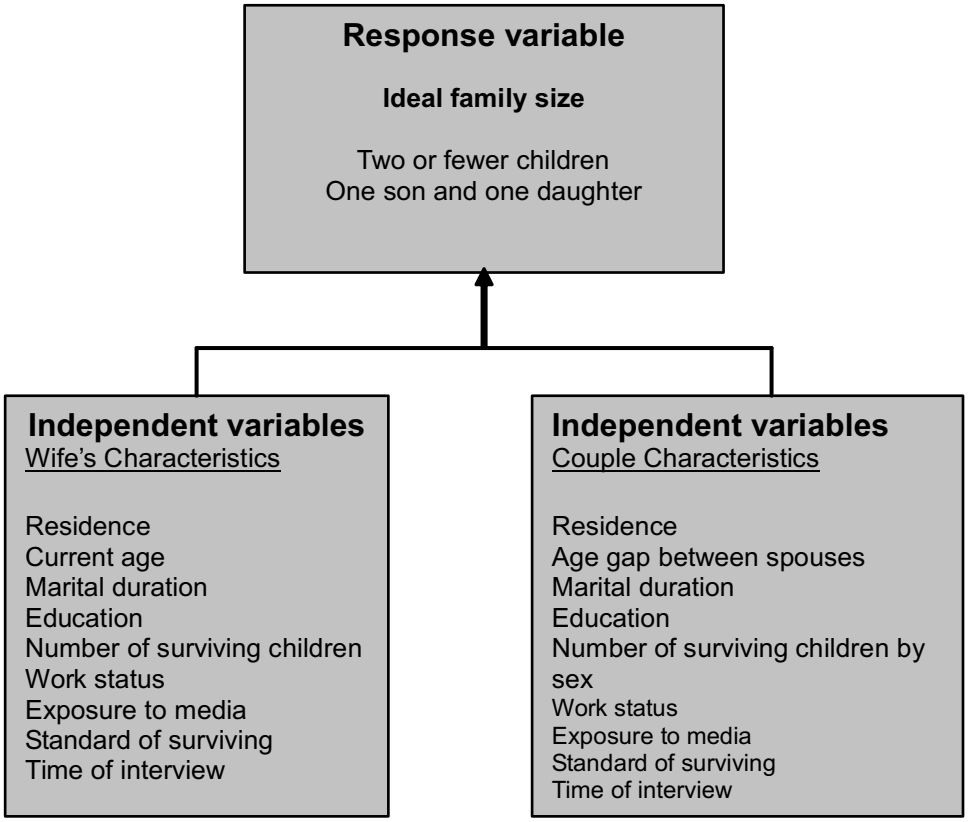
A theoretical framework is presented in Figure-3. This framework allows each spouse to have his/her own fertility desire. The desire of couple is hypothesized to be influenced by each spouse's socio-economic and demographic characteristics.

The determinants of ideal family size was analyzed, starting with the factors that shape whether wives have, or do not have, a specific view towards couple's fertility desires. In logistic regression, the dependent variable in both the models is categorized as dummy variables with value 1 if reported two or fewer children ideal family size or one son and one daughter ideal family size by the couples and 0 otherwise. The independent variables were grouped into appropriate categories to get sufficient number of observations in every category. Two models were generated for each of the respective dependent variable to get an in-depth perspective. The basic difference in Model-1 and Model-2 is that Model-1 includes wives' characteristics,

Table 6 : Percent distribution of couples by ideal family size according to timing of interview

Timing of interview	*Wife**			*Husband**		
	Up to 2	3 or more	Non-numeric	Up to 2	3 or more	Non-numeric
Parallel	57.6	27.3	15.1	52.9	36.1	10.9
Husband first	*71.9*	*18.8*	*9.4*	65.6	28.1	6.3
Wife first	73.6	16.2	10.1	*67.6*	*27.7*	*4.7*
Total	64.4	22.7	12.9	59.1	32.5	8.4
Number	*418*	*418*	*418*	*418*	*418*	*418*
Chi-squire test: *p<0.05, **p<0.01, ***p<0.00						

Figure-3



Model-1 **Model-2**

while Model-2 includes spouses' characteristics to examine the impact of individual as well as couples on ideal family size. Table 7 provides details on ideal family size preferences.

Ideal family size: Two or fewer children

To study the ideal family size and the effect of various parameters on it, two key dependent variables were analyzed namely - ideal family size of two or fewer children and ideal sex composition of one son and one daughter. According to Model-1, wives, who are educated, are significantly three times more likely to desire an ideal family size of two or fewer children (OR 2.8; $p<0.01$) than non-educated wives after controlling the effect of socio-economic and demographic variables. Couples where both the spouses are literate are significantly more likely to report ideal family size two or fewer children than illiterate couples (OR 13.7; $p<0.01$) as shown in Model-2. This effect remains significant, even when only one of the spouses is educated (OR 7.4; $p<0.01$). Number of surviving children is a significant variable where wives without child are defined as a reference category. According to Model-1, wives having 3 or more surviving children are significantly less likely to report ideal family size two or fewer children (OR 0.30; $p<0.05$) as compared to reference category which reflect the strong positive

association between the sizes of ideal with actual number of surviving children. Generally, exposure to media plays the significant role in reproductive matters. According to Model-2, couples in which both or one of the spouses is exposed to any media are almost two times more likely to report ideal family size two or fewer children as compared to couples with no exposure to media. Standard of surviving is an important indicator which assesses the social and economic status in the family. Couple's ideal family size of two or fewer children is significantly associated with wealth quintile as couples from the highest quintile are four times more likely to prefer ideal family size of two or fewer children as compared to couples belong to the lowest wealth quintile.

Ideal sex preferences: One son and one daughter

In case of reporting ideal family composition (one son and one daughter), the last two column of table 7 are odds ratios for dependent variable of agreement on reporting ideal family size of one son and one daughter. The ideal family size of one son and one daughter is significantly associated with wife's education, number of surviving children, wealth quintile and timing of couple's interview in Model-1 while only couple's education shows the significant effect in Model-2. Covariates such as type of residence, wife's current age, age gap and marital duration of couples, sex of surviving children, work status and exposure to media have no significant effect in both the Models.

According to Model-1, wives, who are educated, significantly two times more likely to report ideal family size of one son and one daughter (OR 2.4; $p<0.01$) as compared to uneducated wives after controlling of the effect of socio-economic and demographic variables. Couples in which both the spouses are literate, significantly more likely to report ideal family size of one son and one daughter than the illiterate couples (OR 35.6; $p<0.01$) as shown in Model-2. Even though, this effect remains significant when only one of the spouses is educated (OR 18.0; $p<0.01$). According to Model-1, wives having 3 or more surviving children are significantly less likely to report ideal family size of one son and one daughter (OR 0.20; $p<0.01$) as compared to wives having no child. Couple's ideal family size of one son and one daughter is significantly associated with wealth quintile. According to Model-1, couples from the highest wealth quintile are two times more likely to prefer ideal family size of one son and one daughter (OR 1.6; $p<0.1$) as compared to couples belong to the lowest wealth quintile. Couples where wives were interviewed first are significantly more likely to report the ideal family size of one son and one daughter (OR 1.6; $p<0.10$) than couples where both the spouses were interviewed simultaneously.

CONCLUSIONS

The study reveals the existence of substantial difference in desired ideal family between spouses. The mean ideal family size is found higher among husbands (2.4) than their wives (2.3). Ideal family size of two or fewer children is reported more by wives than their husbands. Among illiterate couples like to have more children

Table 7: Odds ratios of logistic regression of the probability of two children versus other responses expression of desired ideal family size by couples

of desired ideal family size by

Background variables	*Desired Ideal family size two or fewer children*		*Agreement on reporting one son and one daughter*	
	Model-1	*Model-2*	*Model-1*	*Model-2*
Type of residence				
Rural [R]				
Urban	1.37	1.33	1.17	1.27
Wife's current Age				
Below 25 years [R]				
25 years or more	0.99	-	1.13	-
Age gap between husband and wife				
Up to 2 years [R]				
3-4 years		1.07		0.86
5 or more years	-	1.74*	-	1.28
Marital duration in years				
Less than 5 years [R]				
5-10 years	1.17	0.89	1.20	0.93
11 years or more	0.66	0.41*	0.93	0.56
Wife's education				
Illiterate [R]				
Literate	2.76***	-	2.39**	-
Education of couples				
Both illiterate [R]				
One of the spouse literate		7.4***		18.0***
Both literate	-	13.7***	-	35.6***
No. of surviving Children				
No child [R]				
Below 3	1.14		0.89	
3 or more	0.30**	-	0.20***	-
Sex of surviving children				
No Child [R]				
Only daughter		0.85		0.64
Only sons		1.36		1.09
Both daughters and sons	-	0.85	-	0.71
Wife work Status				
Not working [R]				
Working	1.23	-	1.24	-
Work status of couples				
Both working in agricultural sector [R]				
One of the spouse is a professional worker		0.91		0.67
Other combinations	-	1.14	-	1.15
Wife exposure to media				
No [R]				
Yes	1.53	-	0.83	-
Couple Exposure to any mass media				
Both not exposed [R]				
One of the spouse exposed		2.02*		1.78
Both exposed	-	1.89*	-	1.23
Wealth Quintiles				
Lowest [R]				
Second	2.67**	1.87	1.41	1.13
Middle	2.63*	1.80	1.66	1.22
Fourth	2.38*	2.09	1.98	2.01
Highest	4.25*	4.40*	1.93*	2.45
Couple interviewed				
Same day and same time [R]				
Husband first	0.71	0.72	0.67	0.68
Wife first	1.26	1.11	1.62*	1.34
Number of couples	*418*		*345*	

R- reference category Level of significance: ***p < 0.01; **p < 0.05; *p < 0.10

in their family as compared to literate couples. Couples having illiterate wives and those who belong to lowest wealth quintile, are more to mentioned non-numeric responses such as up to God, can't say, etc. Ideal family size is significantly differs with number of surviving children in positive direction. Couples having higher number of surviving children are also more to mentioned higher ideal family size, this may be because they like to justify their fertility outcomes. Looking at the ideal sex composition in ideal family size, more wives than their husbands reported equal number of son and daughter in ideal family size. Son preference in reported ideal family size has been seen more among couples residing in rural areas (where wives report more sons than husbands) as compared to urban couples. Findings from multivariate analysis also reveal that couples' education, exposure to mass media, and standard of livening has significant positive impact, whereas the number of surviving children has a significant negative impact on desiring small family size. It is important to note from the Model-1 that wife's education, wealth quintile and timing of couple's interview have significant positive impact whereas numbers of surviving children have significant negative impact. But in Model 2, couple education is only parameter that shows a significant and positive effect.

The interesting findings emerge from the couples when both the spouses could not interview simultaneously. In such condition, wives were highly motivated /influenced by their spouse's perception when their interview was conducted after the husband's interview. Overall, one can conclude from the findings that the perceptions of husbands and wives are different in terms of fertility preferences. Therefore, one spouse's desire may not be used to approximate the desires of the other. Husband's preferences should be collected personally rather than being satisfied with getting husband's preferences from their wife or concentrating only on female's perceptions.

REFERENCES

1. ICPD (1994): Report of "International Conference on Population and Development", Cairo.
2. Verma R.K. (1997). Reproductive health issues: Focus on Men. IASSI Quality, 16 (3 & 4): 172-182.
3. Khan M.E. Patel BC. (1997): Male Involvement in Family Planning: A KABP study of Agra District. The Population Council, India, June 1997.
4. Ezeh A.C. (1993): The Influence of Spouses Over Each Other's Contraceptive Attitudes in Ghana. Studies in Family Planning, 24 (3): 163-174.
5. Bankole Akinrinola (1995): Desired fertility and fertility behavior among the Yoruba of Nigeria; a study of couple preference and subsequent fertility. Population Studies, 49 (2): 317 - 328.
6. Salway S. (1994): How Attitudes toward Family Planning and Discussion between Wives and Husbands Affect Contraceptive Use in Ghana. International Family Planning Perspective, 20 (2): 44-47.
7. Koenig M. A., Simmons G. B., Mishra B.D. (1984): Husband-wife inconsistencies in contraceptive use responses. Population studies, 38(2): 281-298.

8. Mason, Karen., Anju Malhotra Taj (1987): Differences between Women's & Men's Reproductive Goals in Developing Countries. Population and Development Review, 13(4): 611-638.

9. Becker S. (1996): Couples and Reproductive Health. Studies in Family Planning, 27 (6): 291-306.

10. Jejeebhoy S. J. (2002): Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India. Studies in Family Planning, 33(4): 299-308.

11. Becker S. (1999): Measuring unmet need: wives, husbands or couples? International Family Planning Perspectives, 25 (4): 172-180.

12. Biddlecom Ann E., Fapohunda Bolaji M. (1998): Covert Contraceptive Use: Prevalence, Motivations and Consequences. Studies in Family Planning, 29 (4): 360–372.

13. Bankole Akinrinola, Susheela Singh (1998): Couples' Fertility and Contraceptive Decision-Making in Developing Countries. International Family Planning Perspectives, 24 (1): 15-24.

14. Mott F. L., S.H. Mott (1985): Households Fertility Decisions in West Africa: A Comparison of Male and Female Survey Results. Studies in Family Planning 16(2): 88-99.

15. Thomson E., E. McDonald, L.L. Bampass (1990). Fertility desires and fertility: Hers, his and theirs. Demography, 27(4): 579-588.

16. Srivastava H. C. (1983): Some Aspects of Family, Fertility and Family Size Limitation among Muslims in an Urban Setting. Ph. D. Thesis, IIPS, Mumbai, India.

17. Williams, Rechard., Elizabeth Thomson (1985). Can Spouses be Trusted: A Look at Husband/Wife Proxy Reports. D.J., 22(1): 115-123.

18. Adamechak D. J., Adebayo A. (1987). Male fertility Attitudes: A Neglected Dimension in Nigerian Fertility Research. Social Biology, 34: 57-67.

19. Arnold F., Kuo E. C. Y. (1984). The Value of Daughters and Sons: A Comparative Study of the Gender Preference of Parents. Journal of Comparative Studies, 15 (2).

20. Arnold F. (1992): Sex Preferences and its Demographic and Health Implications, International Family Planning Perspective, 1 (3).

21. Lane T. (2004). In India, son preference declines with ideal family size, but remains strong. International Family Planning Perspectives, June 1.

22. Saha U.R., Bairagi R. (2007): Inconsistencies in the relationship between contraceptive use and fertility in Bangladesh. International Family Planning Perspectives, March 1.

23. Pritchett L. H. (1994):. Desired Fertility and the Impact of Population Policies. Population and Development Review, 20(1): 1-56.

24. El-Zeini L.O. (2008): The Path to Replacement Fertility in Egypt: Acceptance, Preference, and Achievement. Studies in Family Planning, 39[3]: 161-176.

25. Becker G. S. (1960): An Economic Analysis of Fertility in Demographic and

Economic Change in Developed Countries. Universities-National Bureau Conference Series 11. Princeton, N.J.: Princeton Press.

26. Bulatao R. A., R. D. Lee (1983): A framework for the fertility determinants. In determinants of fertility in Developing Countries. Ed. R.A. Bulatao and R.D. Lee,. 1(1-26). New York: Academic Press.

27. De Tray D. N. (1973). Child Quality and the Demand for Children. Journal of Political Economy, 81(2): S70-S98.

28. Coombs, Lolagene C., Dorothy Fernandez (1978): Husbands-wife agreement about reproductive goals. Demography 15 (February): 57-74.

29. International Institute for Population Sciences (IIPS).,ORC Macro. (1995). National Family Health Survey (NFHS-1), 1992-93: India. Mumbai: IIPS.

30. International Institute for Population Sciences (IIPS).,ORC Macro. 2000. National Family Health Survey (NFHS-2), 1998-99: India. Mumbai: IIPS.

31. International Institute for Population Sciences (IIPS) and ORC Macro. 2007. National Family Health Survey (NFHS-3), 2005-06: India. Mumbai: IIPS.

32. International Institute for Population Sciences (IIPS). District Level Household Survey (DLHS-2), 2002-04: India.

33. Eberstadt N. (1981). Recent Declines in Fertility in Less Developed Countries, and What Population May Learn from Them. New York, Praeger Publishers.

34. Cain M., Syeda Rokeya Khanam Samsun Nahar (1979). Class, Patriarchy and Women's Work. Bangladesh. Population and Development Review 5(3): 405-438.