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HEALTH STATUS OF PRIMITIVE TRIBES OF ORISSA

Despite remarkable world-wide progress in the field of diagnostics and curative and preventive health, still there are people living in isolation in natural and unpolluted surroundings far away from civilization with their traditional values, customs, beliefs and myth intact. They are commonly known as "tribals" and are considered to be the autochthonous people of the land. About half of the world's autochthonous people, comprising 635 tribal communities including 75 primitive tribal communities live in India. They are found in all states except Punjab, Haryana and Jammu & Kashmir[1]. Orissa, the most picturesque state in eastern India, occupies a unique place in the tribal map of the country having largest number of tribal communities (62 tribes including 13 primitive tribes) with a population of 8.15 million constituting 22.3% of state's population[2]. The primitive tribal communities have been identified by the Govt. of India[3] in 15 states/union territories on the basis of (a) pre agricultural level of technology (b) extremely low level of literacy; and (c) small, stagnant or diminishing population.

Health is a prerequisite for human development and is an essential component for the well being of the mankind. The health problems of any community are influenced by interplay of various factors including social, economic and political ones. The common beliefs, customs, practices related to health and disease in turn influence the health seeking behaviour of the community[4]. There is a consensus agreement that the health status of the tribal population is very poor and worst among the primitive tribes because of their isolation, remoteness and being largely unaffected by the developmental processes going on in the country.

Situation Analysis

Studies undertaken in the country indicate that the primitive tribes have distinct health problems, mainly governed by multidimentional factors like their habitat, difficult terrain, ecologically variable niches, illiteracy, poverty, isolation, superstition and deforestation. Hence an integrated multidisciplinary approach has been adopted by different researchers to study the tribal health problems[5-14].

Orissa Health Strategy 2003 has advocated for improving the health status of tribal population by reducing mortality and morbidity. It indicates that the tribal people suffer disproportionately from malaria, sexually transmitted diseases, tuberculosis, genetic disorders like G6PD deficiency, sickle cell anaemia as also nutritional deficiency diseases. These are some of the special health problems attributed to these communities. The situation

analysis of health indices of the tribal population in Orissa are worse than the national average: Infant mortality rate 84.2; under five mortality rate 126.6; children under weight 55.9; anaemia in children 79.8; children with acute respiratory infection 22.4; children with recent diarrhoea 21.1; women with anaemia 64.9 per 1000. A high incidence of malnutrition has also been documented in the tribal dominated districts of Orissa[15]

Orissa is one of the ten states in the country covered under the National Nutrition Monitoring Bureau (NNMB). According to the latest report of NNMB (2000 – 2001), Orissa continues to have second highest level of under nutrition among the ten states. When compared with the aggregate figures for chronic energy deficiency (BMI < 18.5) in adult men and women in these states the level is higher in Orissa. The prevalence of chronic energy deficiency (CED) in adult men in the state is 38.6% compared to aggregate of 37.4%, whereas the CED prevalence in the adult women is 46% against 39.3% aggregate figure[16]. As malnutrition is known to potentiate susceptibility to death due to infectious diseases, the high mortality rate amongst the primitive tribes may be attributed to this. In a prospective study conducted in *Bondo*, *Didayi*, *Juanga* and *Kutia Kondha* primitive tribes of Orissa severe malnutrition (based on Gomez classification) was observed in 16, 19, 25.1 and 26.6% population respectively (GP Chhotray: Unpublished observation). In a separate study conducted by Regional Medical Research Centre (RMRC), Bhubaneswar, 66% of primitive tribal population (6 – 15 years age group) of Mayurbhanj and Sundergarh districts was found to be malnourished[17]. Similarly the chronic energy deficiency was found to be very high among *Langia Saura* (89.4%) and *Kutia Kondha* (88.9%) primitive tribes of Rayagada district of Orissa[18]. Nutritional status of primitive tribes of Orissa was lower compared to other major tribes[19]. Anthropometric analysis of other primitive tribes of the country revealed that 50% of the children in *Pahariyas* of the Rajmahal hills of Bihar were below 3rd percentile and below 90% of Harvard standard[20]. It was found that 85% of *Great Andamanese* children (<6 years) were undernourished and more than 77% children and adolescents (<19 years) were stunted, wasted or both[21], while 38.8, 23.6 and 7.3% preschool children among *Baiga* tribes of Madhya Pradesh had mild, moderate and severe grades of malnutrition respectively[22].

The majority of *Bondo*, *Didayi*, *Kondha* and *Juanga* primitive tribes of Orissa had different grades of anaemia (as per WHO classification) as an important clinical manifestation. The severe anaemia (Hb<7 g/dl) ranged from 0.6 to 2.3%, moderate (Hb 7–9 g/dl) from 7.4 to 13.6% and mild (Hb 9–11 g/dl) 30.7 to 48.2% of population. Anaemia was more common in females than males. Another study reported 85% of *Paudi Bhuyan* primitive tribes of Sundergarh district to be suffering from different grades of anaemia[23]. A cross sectional study conducted in Madhya Pradesh revealed severe anaemia in 40% of *Abhujmaria*, 29% of *Birhor* and 42.2% of *Baiga* primitive tribes[24]. Majority (51.2%) of the anaemic primitive tribal population of Orissa showed microcytic hypochromic blood picture suggestive of iron deficiency anaemia. Statistical analysis revealed a positive correlation between hookworm infestation and anaemia possibly due to indiscriminate defecation, bare foot and lack of health awareness. An appropriate intervention resulted in the reduction of worm infestation and improvement of anaemia status in 51.2 and 34.8% of individuals respectively (GP Chhotray: Unpublished observation).

The demographic status of the primitive tribes has shown a declining or static trend. The demographic data of *Juanga* primitive tribe of Orissa revealed a marital fertility rate of about 6 and life expectancy at birth 35.9 years[25]. A study carried out recently by RMRC, Bhubaneswar amongst four primitive tribes of Orissa, revealed an infant mortality rate (per 1000 live birth) of 139.5 in *Bondo*, 131.6 in *Didayi*, 132.4 in *Juanga* and 128.7 in *Kondha (Kutia)*; a maternal mortality rate (per 1000 female population) of 12 in *Bondo*, 10.9 in *Didayi*, 11.4 in *Juanga* and 11.2 in *Kondha* tribe; the life expectancy of 48.7 years in *Bondo*, 57.1 years in *Didayi*, 49.6 years in *Juanga* and 50.7 years in *Kondha*; the crude birth rate (per 1000 population) of 18.31 in *Bondo*, 24.3 in *Didayi*, 22.3 in *Juanga* and 21.6 in *Kondha* tribe and the crude death rate (per 1000 population) of 19.2 in *Bondo*, 23.7 in *Didayi*, 21.2 in *Juanga* and 20.9 in *Kondha* population. The average number of pregnancies was found to be 5.09 in *Kutia Kondha* tribe. The unhygienic and primitive parturition practices were mainly responsible for high maternal mortality. It was observed that among *Kutia Kondha* the delivery was conducted by the mother herself in a half squatting position holding a rope tied down from the roof of the house. 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 also found in *Kharia* primitive tribes (S.K.Basu: Unpublished observation). The selection potential based on differential fertility and mortality was found to be 0.668 in *Lodhas* of West Bengal and 0.524 in *Sahariyas* of

Rajasthan[26]. The demographic characteristics of the *Baiga* tribes of Madhya Pradesh has shown steady rise since 1901. Forty-two percent of the populations were under 14 years of age and 89% were under the age of 40 years. The mean menarcheal age is 15.2 years and mean age at first marriage was 16.6 years. Age at menarche, marriage, breast-feeding and time interval between marriage and first conception are natural in this society[27].

Upper Respiratory Tract Infection

After anaemia, the respiratory disease including upper respiratory tract infection was more commonly prevalent (14.9% in *Bondo*, 16.6% in *Didayi*, 13.6% in *Kondha* and 8.3% in *Juanga*) and accounts for a high infant mortality due to inadequate vaccination, lack of early diagnosis and prevention (GP Chhotray: Unpublished observation). Similar observations were made in *Birhor* (11.2%) and *Sahariya* (57.5% in children aged 0-4 years and 56.9% in children aged 5 –14 years) tribes of Madhya Pradesh[28-29].

Malaria

Malaria is the foremost public health problem of Orissa contributing 23% of malaria cases, 40% of *Plasmodium falciparum* cases and 50% of malaria deaths in the country[15]. More than 60% of tribal population of Orissa live in high-risk areas for malaria. Though the tribal communities constitute nearly 8% of the total population of the country, they contribute 25% of the total malaria cases and 15% of total *P.falciparum* cases. Various epidemiological studies and malariometric surveys carried out in tribal population including primitive tribes reveal a high transmission of *P.falciparum* in the forest regions of India, because malaria control in such settlements has always been unattainable due to technical and operational problems. In a specific study conducted in undivided Koraput district, it was observed that the district is endemic for malaria and is hyperendemic in top hills where *Bondo* primitive tribes are residing[30]. A prospective study conducted by RMRC, Bhubaneswar during 2000 – 2003 in Malkangiri, Kandhamala and Keonjhar districts, showed slide positivity rate (SPR) of 14.2% in *Bondo*, 14.4% in *Didayi*, 10.5% in *Kondha* and 9.5% in *Juanga* primitive tribes. The Pf% was 93.5% in *Bondo*, 91.6% in *Didayi*, 92.7% in *Kondha* and 91.2% in *Juanga* population and the spleen rate in children of 2 to 9 years was 25.8, 35.1, 26.3 and 24.4% in *Bondo*, *Didayi*, *Kondha* and *Juanga* tribes respectively(GP Chhotray: Unpublished observation).

Diarrhoeal Disorders

Water-borne communicable diseases like gastrointestinal disorders including acute diarrhoea are responsible for a higher morbidity and mortality due to poor sanitation, unhygienic conditions and lack of safe drinking water in the tribal areas of the country. In a cross sectional study conducted by RMRC, Bhubaneswar in 4 primitive tribes of Orissa, the diarrhoeal diseases including cholera was found to occur throughout the year attaining its peak during the rainy season (From July to October). During 2002 to 2003, 12.7% of *Bondo*, 13.2% of *Didayi*, 10.4% of *Kondha* and 12.6% of *Juanga* children (0- 6 years) and 10.9% *Bondo*, 11.6% *Didayi*, 10.2% *Kondha* and 6.9% *Juanga* adult population presented with acute diarrhoea. Bacteriological study of the rectal swabs revealed *Vibrio cholerae* in 2.5%, *Escherichia coli* in 39.2%, *Salmonella* in 0.23% and *Shigella spp* in 1.8% of all culture positive cases while 56.3% of rectal swabs were culture negative. Among the *V.cholerae* isolates *V.cholerae O1 Ogawa* was the predominant serotype. The acute diarrhoeal problem was basically due to the poor environmental hygiene, lack of safe drinking water, improper disposal of human excreta which was further aggravated by low literacy, low socio-economic status coupled with blind cultural belief, lack of access to medical facilities leading to serious public health problem encouraging faeco-oral transmission of enteric pathogens (GP Chhotray: Unpublished observation). In a similar study conducted by RMRC, Jabalpur in *Hill Korwas*, it was observed that 0.1% population suffered from acute diarrhoea[29].

Intestinal Parasitism

Intestinal protozoan and helminthic infestations are the major public health problems and were observed in 44.6% *Bondo*, 44.9% *Didayi*, 31.9% *Juanga* and 41.1% *Kondha* primitive tribes of Orissa. Amongst helminthic infestation hookworm was most common (21% in *Bondo*, 18.7% in *Didayi*, 14% in *Juanga* and 18.2% in *Kondha*). Children (aged 0–14 years) were more affected than the adults. A repeat stool examination after 4 months of antihelminthic and antiprotozoal treatment revealed significant reduction in the worm burden (from 38.9 to 18.9%). Most of these infections are due to indiscriminate defecation in the open field, bare foot walking and lack of health awareness and hygiene. These are preventable with repeated administration of antihelminthic and protozoal treatment at 4 months interval which can be used effectively in national parasitic infection control programme[31]. Studies

conducted by RMRC, Jabalpur also revealed that intestinal parasitic infection is widely prevalent in 75% of *Abhujmaria*, 57.8% of *Baiga* and 6.7% *Kamar* primitive tribes of Madhya Pradesh[29].

Micronutrient Deficiency

Micronutrient deficiency is closely linked with nutritional disorders and diarrhoea. Deficiency of essential dietary components leads to malnutrition, protein calorie deficiency and micronutrient deficiencies (like vit A, iron and iodine deficiency). Vitamin A deficiency in the form of Bitot's spot, conjunctival xerosis and night blindness was observed in 8.9, 25.9 and 11.4% *Bondo*; 13.7, 24.2 and 27.6% *Didayi*; 14.9, 17.9 and 7.4% *Juanga*; and 3.4, 12.6 and 6.9% *Kondha* tribes, respectively (GP Chhotray: Unpublished observation). However, other micronutrient deficiencies like iodine deficiency (goiter), vitamin B complex deficiency (in the form of angular stomatitis) were not encountered. Similarly a high percentage of vitamin A deficiency was observed in 24.4% of *Birhor* tribes and 53.3% of *Sahariya* tribes of Madhya Pradesh. Goitre was also observed in 3.4% of these tribes[28].

Skin Infection

Skin problems like scabies is a major health problem amongst the primitive tribes because of overcrowding and unhygienic living conditions as also close contacts and lack of health awareness. In a study conducted by the RMRC, Bhubaneswar, 20.6% of *Bondo*, 6.9% of *Didayi*, 10.7% of *Juanga* and 15% of *Kutia Kondha* tribes were affected with scabies (both infective and noninfective), which is comparable with the findings in *Birhor* primitive tribe (7%) of Madhya Pradesh[28].

Other communicable diseases such as tuberculosis, leprosy, yaws and venereal diseases, though have been described as significant health problems in several major tribal populations of the country, very few published reports are available concerning these diseases in the primitive tribes. In a prospective study undertaken in Orissa, the incidence of tuberculosis and leprosy was found to be 1.4% in *Bondo*, 3.9% in *Didayi*, 0.7% in *Kondha* and 1.6% in *Juanga* tribes. Yaws was reported only in 0.2% *Bondo* population of Malkangiri district compared to high incidence of 7% in *Abhujmarias* of Madhya Pradesh[28].

Hereditary Haematological Disorders

Hereditary haematological disorders especially sickle cell disease, G6PD deficiency, haemoglobinopathies and allied haemolytic disorders are important public health problems and occur in high frequencies among different tribal groups and scheduled caste population. These result in a high degree of morbidity and mortality due to haemolysis in vulnerable population.

Sickle cell gene is widely prevalent among the tribal population in India. These have been investigated in over 100 tribal population spread over different parts of the country. The prevalence rate varies widely (0.5 to 45%) among different tribes. Interestingly this gene is restricted amongst the tribes of central, western, southern and eastern India and is conspicuously totally absent in north–east India. There are many primitive tribes who have been identified to be in high-risk group. Majority of the tribals of Orissa have a common gene pool that is relatively unmixed with other nontribal population[32]. High degree of inbreeding among some of the primitive tribes results in relatively high prevalence of genetically inherited diseases like sickle cell anaemia, G6PD deficiency and thalassaemia. The incidence of sickle cell haemoglobin was found to be 22.3% in *Baiga* and 14% in *Bharias* of Madhya Pradesh and 3% in *Kondha*, 7.4% in *Kharia*, 3% in *Munda*, 14.2% in *Gonda* and1% each in *Santal*, *Bhatudi*, *Bhuyan* and *Kolha* tribes of Orissa. Contrary to the expectations the frequency of sickle cell gene was observed to be low (0.6% in *Bondo*, 3.2% in *Didayi*, 1.3% in *Juanga* and 1.5% in *Kondha*) among primitive tribes of Orissa similar to that of *Hill Korwas* of Madhya Pradesh[28]. The intriguing feature of sickle cell disease in Orissa is the presence of high fetal Hb, and less sequestrational crisis.

The frequency of G6PD deficiency gene in various primitive tribal population of Orissa was very high (*Munda* 15.9%, *Kharia* 14.2%, *Bhuyan* 12.9%, *Kolha* 9.8%, *Bhaturi* 9.5%, *Santal* 9.0% and *Saura* 7.7%). In a study conducted by the RMRC, Bhubaneswar, the prevalence of G6PD deficiency was found to be 0.36% in *Bondo*, 1.6% in *Didayi*, 7.3% in *Juanga* and 4.8% in *Kutia Kondha* primitive tribes. An indepth molecular analysis amongst the G6PD deficient tribal subjects including *Juanga* primitive tribes of Keonjhar district of Orissa revealed the presence of a new variant of G6PD known as G6PD Orissa[33]. This particular enzyme is responsible for protecting red cell membrane from oxidative stress, preventing haemolysis from offending agents and providing selective advantage against falciparum malaria.

Thalassaemia also contributes significantly for the anaemia cases in tribal population of Orissa. Studies have

shown that the frequency of thalassaemia gene varies from 1.9% in *Kharias* to 8% in *Santala,* 1.7% in *Bhumija*, 2% in *Kolha*, 5.2% in *Munda*, 6.2% in *Saura* and 7% in *Lodha* primitive tribes[34]. The prevalence of thalassaemia was 0.5% in *Bondo*, 3% in *Didayi*, 2.6% in *Juanga* and 2.3% in *Kutia Kondha* primitive tribes.

Conclusions

The primitive tribes of Orissa and their health scenario presents a kaleidoscopic mosaic of various communicable and non-communicable disease profile keeping in pace with their socio-economic development. Among these there are communities who still depend primarily on hunting and food gathering as primary source of livelihood. The wide spread poverty, illiteracy, malnutrition, absence of safe drinking water and sanitary conditions, poor maternal and child health services, ineffective coverage of national health and nutritional services, *etc.* have been found, as possible contributing factors of dismal health condition prevailing amongst the primitive tribal communities of the country. Many of the infectious and parasitic diseases can be prevented with timely intervention, health awareness and IEC activities. Some of the intervention programmes can be included in the national programme also. The non-communicable diseases like diabetes and hypertension are conspicuously absent indicating that the primitive tribal communities are still far away from the modern civilization and developments. In spite of the tremendous advancement in the field of preventive and curative medicine, the health care delivery services in these primitive tribal people are still poor and need to be strengthened in order to achieve the goal of Health for all in the country.

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This write-up has been contributed by Dr. G.P. Chhotray, Dy. Director, Regional Medical Research Centre, Bhubaneswar.

SILVER JUBILEE OF *IN VITRO* FERTILIZATION IN INDIA

In vitro fertilization (IVF) and embryo transfer (ET) was successfully introduced to treat human infertility in 1978 and the world's first test-tube baby, Louise Brown, was born in the UK on 28th July 1978. Exactly 67 days later Subhash Mukerjee from Calcuttta announced the birth of the World's second test tube baby, Kanupriya alias Durga, on October 3, 1978. Both these announcements were received with great skepticism and the scientists responsible for these births severely criticised. Nevertheless, the British team carried on with their work and produced several more test tube babies. In marked contrast, Dr. Subhash Mukerjee was transferred to an eye hospital and could not pursue his work and validate and standardize the various procedures he had used. His untimely death left big lacunae in our understanding and the rationale behind the techniques he used. However, his report submitted to the Government of West Bengal clearly indicates that Mukerjee's techniques were different form those used by the British team.

Salient differences between UK and Indian approaches to IVF in 1978*

Natural cycle	Gonadotropin stimulated cycle
Monitoring ovarian response by measuring urinary LH	Cervical Mucous changes during the cycle
Embryo cultured in synthetic medium	Embryo cultured in uterine mucous
Embryo transferred in same cycle	Frozen-thawed embryos transferred in next cycle

*(*Based on published data by Edwards and Steptoe and on the report submitted to the West Bengal Government by Mukerjee and his team in 1978).*

Consequently, India languished in the area of IVF while the rest of the world progressively introduced the technique into their repertoire for treating infertility. Today over a million test tube babies are reportedly born all over the world. India would have been in this situation until the ICMR boldly undertook to support the programme of IVF ET which led to the birth of Harsha in 1986 in Mumbai (ICMR Bulletin, Vol.16, 41, 1986).

Several other clinics soon followed suit and now there are reportedly over 200 clinics claiming to offer IVF all over India.

IVF has turned out to be a major scientific achievement of mankind during the last century. It has not only opened up novel ways of treating infertility involving third and sometimes fourth party parenting a child in a tandem manner, but also advanced our understanding of the basic biology and pathology of human reproduction. With new developments occurring in the potential use of embryonic stem cells in the development of biotherapeutics, IVF is the only way to obtain pluripotental embryonic stem cells.

In view of these vast developments in the field of IVF it is only appropriate that the pioneers in the field are remembered and honored. Britain celebrated the birth of Louise Brown with much fanfare on July 28 this year. The Indian Council of Medical Research in collaboration with the Inter Academy Biomedical Science Forum and Hope Infertility Clinic commemorated the silver jubilee of IVF in India, at a simple function held in the premises of the Indian Academy of Science, Bangalore on October 3, 2003. The Council felicitated Kanupriya, Professor Sunit Mukerjee, the only surviving member of Mukerjee's team, and Dr. C.P. Puri, Director, National Institute for Research in Reproductive Health, Mumbai for his personal contribution to the endocrine evaluation and monitoring of controlled ovarian hyper stimulation of women recruited for IVF and which was the corner stone for the successful pregnancy to occur after IVF and embryo transfer. This was followed by Scientific seminar on the subject. The topics for the seminar were: Unknown facts of male infertility, environmental factors affecting male fertility, genomics of male infertility, potential biotherapeutic approaches involving the use of embryonic stem cells and co-operative research between infertility clinics and research funding agencies of the Government of India.

In vitro fertilization techniques are mainly offered by the private sector, very heavily dependent on imported

drugs, equipments and devices including disposable plastic ware used in *in vitro* culture. Consequently the cost of IVF is extremely high and unaffordable to many in India. Research into aspects of human reproduction is almost non-existent in the private sector and there is hardly any scientific publication that emerges from Indian laboratories or clinics practicing IVF. A need for collaboration between the private and public sector funding agencies therefore was stressed in the seminar. Some such public-private programmes available under the Department of Scientific and Industrial Research (DSIR) such as Programme aimed at Technological Self-Reliance (PATSER) and Co-operative Research Associations enable the establishment of research centres as a collaborative effort between the private sector and Government funding agencies. This was deeply appreciated by the participants who endorsed the view that similar collaborations must be established between private IVF clinics and Government agencies like the ICMR to address issues that are of common interest and aimed at improving patient care and more importantly, providing indigenous substitutes for imported equipment, supplies and drugs.

Dr. T.C. Anand Kumar

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