

BIOLOGY OF NATURAL AND FORCED MIGRATIONS

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ABSTRACT

During past twenty thousand years, man has moved from caves to occupy all possible ecological niche: forests, mountains, river banks and sea shores. Man's elastic adaptability is probably on account of architectural anthropology and blood genetics. Human Haemoglobin chains offer regulatory adaptability for reproductive biology by switching on and off regulatory genes during lifetime of each and every individual. Our haemoglobin chain configuration offers variable and flexible physiological adaptability (more so on account of HbF proportions in the adult blood). Practically, the evolution of blood physiology has inherently ensured physiological adaptability among all vertebrates, even among amphibians the proportion of gamma chains goes on responding to adaptive stresses. This paper on the basis of on going work reemphasizes on extensive studies to be carried out to understand influences of abrupt and natural migrations on changing patterns of foetal haemoglobin and adaptive significance among adults. Shifting of populations under compulsion may be increasing socio biological problems.

Key words : *AAbrupt migrations; Foetal haemoglobin variations; Adaptaion and HbF.*

Introduction

Instinct to migrate must have evolved with the bipedal uplift of *Homo* in the usual course of evolution. Precisely, evolution and speciation within the genus *Homo* was necessitated by large size migrations offering favourable chances for random mating among so called sub species over a few million years (Cavalli-Sforza,1960; Haldane,1965; Vogel,1993). Man as a species must reproduce to survive and must survive to reproduce (Goswami, 1990). Migrations have tested and enhanced adaptive elasticity of the human genome and the enormous variables at many a loci might be the inherent results of natural hybridizations, diversified selection pressures and series of mutations. So practically, migrations of small and larger groups are the natural vehicles of genetic drift and gene flow among populations of the world. This

became more clear in the present context when we had noticed "migration" as a natural part of human adaptive means of survival. Based on preliminary studies in the interior sectors of forests in Bastar (now in Chhatisgarh) migrations were classified in to four groups (Goswami, 1981):

(1) Passive Migrations- Small returnable movements : tribals/ isolated small population groups go to the market – village area – towns and come back soon after sometime, intention is to stay back.

(2)Active Migrations: regular migrations of educated families/ individuals in search of jobs and settling at distant places ; in search of better and better. They have a desire / decision to migrate elsewhere.

(3)Transmigrating Populations : A large number of human groups visiting distant places with an open option of settling in their

groups but at a different and distant places: in several hundred years.

- (i) African Siddhis migrated to coastal Gujrat (Western India) as ship labour and settled
- (ii) Massive movements in past hundreds of years of Indian population groups for business or otherwise to different coastal parts of the world (Southern hemisphere through seas is well documented-)
- (iii) Invasions- warriors from Alexander the great army : Not all of them returned; many stayed and have had families in Sindh area – thal genes and other gene frequency estimates can indicate such genetic drifts.

(4) Abrupt Migrations: Sudden calls to leave the place under compulsion

- (A) natural calamities: earthquakes- floods etc
- (B) diseases / epidemics
- (C) wars: physical atrocities
- (D) Forced/ Political- evacuations

In this short presentation, the major focus has been placed on the forced migrations which most governments have imposed on inhabiting populations on the name of progress thus leaving no room for any considerations. Unfortunately however, as our simple studies extended over three decades from well displaced populations but now, at settled phases, have indicated that unnatural and forced migrations of populations have caused more deep seated biological complications.

Methodologies

We have been studying migrations among various groups of tribes in various parts of Central India for quite a long time but with primitive methods as were however prevalent at that time within our resources. Fig 1 is imaginary migrant picture of primitive



Fig.1— Early Human Migrations were for Food and Shelter with covers



Fig.2— Tribes settled in valleys and forests have been brought tojoin the main social stream during last 40 years



Fig.3— Modern human migrations are for better living more food and Health and education.

But there are many a men who still, stick to old settlements in the deeper areas of forest

tribe but Fig 2 and 3 are based on Bharia (Tamia, M P) and Maria (Geedam, Chhatisgarh) tribes. In those days medical and forest personnel were able to offer excellent support and tribes themselves had had cooperated wholeheartedly.

Our studies carried out during 1967-2001 have been summarized along with methodologies in 2003 (Goswami *et al*, 2003). Brief and pertinent references have been mentioned regarding estimations of inbreeding levels (due to consanguinity) recurrent abortions, stillbirths, twins and twinning (Goswami,1987a; Goswami and Goswami, 1991, 1993 and imposed (somatic mutations) as well as natural globin gene frequency variations (particularly with HbF variables in adult population samples) among tribal, urban, rural and migratory populations. The base line data for migratory populations were generated from settlers from Pakistan to certain parts of Punjab (Patiala, for example) and many caste-communities migrated and settled from Rajasthan in to many parts of central MP (Vishnois for example). More than 10,000 (Ten thousand) blood samples were screened by students during three decade period following simple blood groupings, smears and staining schedules as well as cellogel electrophoretic methods as and when available (Goswami, 1981, 1985, 1987a,b; 1996; Chandorkar and Goswami, 1993, Goswami, *et al* 2003). Truthfully, a well planned study will be needed with better and sophisticated approaches (genomic studies so as to decipher some DNA sequences and detection of mutations of certain loci ?) on all these and newly displaced populations as many of the new settlements would be having a decade old acquired acquaintance.

Observations and Comments

In India, marrying within the caste groups is still prevalent with maximum confinement to linguistic affiliation and as such, intercaste- outside linguistic marriages are just too few to have any appreciable proportion. Migrations of a few families or small populations to a new area though theoretically offer equal chances of out or

inbreeding but in practice result in consanguineous marriages even among those communities which otherwise disregard them. Forced migrations thus result in closed circuit affiliation with sociobiological bondages (Table 1) On the basis of covering more than 10000 individuals and several hundred families over 30 years and, recalling those experiences in the modern context of political-administrative complex, these classic rituals of caste based biological parameters can never be subdued. On the contrary, caste biased benefits have surpassed all limits.

We know that genetic variability present in any gene pool in the form of recessive mutations imposes a "hereditary burden" (better known as Genetic Load; Muller,1959; Crow 1960) and according to Wallace and Dobzhansky (1959), all deleterious genes in a gene pool are the genetic load. Based on our studies (Goswami,1970,1983, 1987; Goswami and Goswami, 1991; Parisi and Caperna, 1971) encompassing all very relevant references cited here and many others we had offered a new alternative approach for estimations of a genetic load which included in principle, the segregational as well as mutational loads operative on each and every pregnancy. Obviously the proposed formula considered abortions+ still births, lethal congenital malformations and inbreeding levels (Inbreeding coefficients as estimated by family segregation-pedigree method; Goswami, 1970; these references have been cited from Goswami and Goswami, 1991 and Goswami, *et al*, 2003). Inbreeding coefficients also influence twinning rates (Goswami,1987) as well as frequency of abortions (Goswami and Goswami, 1993). Table 1 has a comparative display of major influences and apparent differences only sufficient to indicate (not prove) that forced migrations are not in the interests of biological anthropology of persons inhabiting a particular area for a very long period. At the same time, this is also true, that rise in

uncontrollable proportion of human population will have to be met with some or the other risks. But we have to minimize installing biological defects in our own populations for a trivial reason because persons with predisposed genetically even with HPFH (hereditary persistent of foetal haemoglobin) genes and some other genes for globin gene complex show higher affiliation with mensural

disorders (Goswami, 1996) and mental and behavioural developments (See, Goswami, *et al* 2003). This is difficult to prove though, much beyond the simple fact that, forced migrations offer deleterious or uncongenial biological setup sufficient enough to express defective genetic as well as environmental interactions as tentatively summarized (Table 1) here.

TABLE 1— MAJOR SIGNIFICANT DIFFERENCES AMONG MIGRATED INDIVIDUALS ASSESSED DURING 1996-2002 (Based on Published studies)

Features associated with Normal/ usual migrations (Based on earlier workers)	Observed differences among abrupt/ forced migrants (Based on Goswami <i>et al</i> ,2003)	Remarks
1. Offer altered/new ways and means to adapt	Compelled to adapt (willing or unwilling)	
2. Tend to reduce consanguineous marriages at a later stage(widening gene pool by mixing with new populations	Encourages consanguineous marriages	Personalized relationships
3. Rate of abortions (not studied earlier)	Rate of abortions to the same mothers increased (possible rise in perinatal load) (ca.1.2 to 1.5 fold)	General Health decline + Insecurity-Anxiety Syndrome
4. Foetal Haemoglobin levels (Normal among adults)	Rise in adult HbF among women (in 50% among HPFH individuals) 2 to 5.8 % in adult Hb	—do—
5. Twinning Rates do not indicate significant differences	Well known to rise among forced migrations since World War II; studies in European Populations. We have reported rise in DZ twinning with minor rise in Inbreeding load	Over anxiety worry do lead superovulation

Summary

Ever since evolved, humans are living testimony to migrations. Migrations continue as biological destiny for settlements and future shaping of the human genome. During past twenty thousand years, man has moved from caves to occupy all possible

ecological niche: forests, mountains, river banks and sea shores. Man's elastic adaptability is on account of architectural anthropology and blood genetics. Haemoglobin chains offer regulatory adaptability for reproductive biology by switching on and off regulatory genes during lifetime of each and every individual. Our

haemoglobin chain separation studies on more than 10,000 persons from all kinds of settlements and migrant population samples by cellogel strips in the fields have shown that HbF proportions in the adult blood indicate physiological adaptability and have direct positive correlation with mothers showing:

1 *Recurrent abortions*, 2. *Higher twinning rates* and 3 giving birth to *mentally underdeveloped* children. These frequencies increase, in comparison to prevalent population frequency estimates, by 12%, 04 per thousand and 17% respectively among those mothers who have been abruptly dislodged on account of imposed sudden migrations *en mass*. So called modern developments like construction of huge dams, big reservoirs and also terrorism have caused displacements. These are causing unaccounted biological loss damaging

basic human physiological adaptability and behavioural psychology. These sociobiological stress indirectly increase smoking /tobacco use and even, drug abuse thereby causing increment in rates of abortions etc in that population when compared to main population of adjacent areas. The most urgent step is to provide extra care for health and education.

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