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Research on leprosy in tribal areas of India: Challenges in accessing health facilities and diagnostics

- Mukul Sharma[1], Purna Dwivedi[1], Nalini Mishra[2], Purushottam Patel[1] and Pushpendra Singh[1*]*

Nutritional Knowledge, Food Habits and Health Status of Monpa Tribe Tawang in Arunachal Pradesh.

- Manish Sharma

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INFLUENCE OF SOCIO-DEMOGRAPHIC PROXIMATE FACTORS ON FERTILITY AND MORTALITY AMONG THE TENGAPANIA DEORI OF DIBRUGARH DISTRICT, ASSAM

Juri Borah[1] and Doli Dihingia[2]

Abstract: *For the survival and to maintain a balanced condition in human society, fertility and mortality are the two crucial determinants which depend on diverse factors. The present study aims to understand the factors affecting fertility and mortality of the Tengapania Deori mothers of Dibrugarh district, Assam. Different proximate factors considered in the present study are the age at marriage, age at first childbirth, birth order, birth spacing, maternal and paternal educational status, and paternal occupational status. The unit for demographic data was ever married Tengapania Deori women, having at least one surviving child residing in the Madhupur village of Dibrugarh district, Assam. Tengapania Deori, one of the territorial groups of Deori, a plain's scheduled tribe population of Assam. They mainly inhabit in the districts of Upper Assam. All of the considered factors are seemed to have played an important role in determining fertility and mortality of the present population. Early age at marriage, first delivery at an early age, low education of the couple, and family with the low economic condition are found to have more conceptions and live births. However, the incidence of miscarriage is more common in the first birth order, later age at first childbirth, the lesser gap between conceptions, parents with lesser educational attainment and lower economic condition of the family. Again, comparatively higher incidence of infant mortality is recorded in the first birth order, less educated couples and also among the mothers who marry and conceive at an early age and also belong to a family who has the low economic condition.*

Keywords: Proximate Factors. Fertility. Mortality. Tengapania Deori mother. Dibrugarh District. Assam.

INTRODUCTION

Fertility and mortality are the vital mediums of the survival process to balance the whole world. Hence, the estimation of fertility and mortality rates of any population occupies the core of population studies. Fertility is a positive force through which the populations expand, counteracting the force of attrition caused by mortality[1]. There is a good number of literature focusing on the determinants of fertility and mortality

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differentials directly or indirectly, notably, on the influence of age at marriage, age at first childbirth, birth order, birth spacing, nutritional status, educational and occupational attainment of the couple, religion, place of residence, family type, family size etc. A considerable variation in levels and trends in fertility and mortality have also been observed from the various studies.

Maternal education is considered as an important determinant of age at marriage. It is expected that women's education significantly raises the age of marriage[2,3]. Age at first union is a key determinant of female reproductive life length and fertility levels[4,5]. Both young and advanced maternal age is associated with adverse birth and child outcomes. Young maternal age at childbearing (≤ 19 years) is associated with an increased risk of preterm birth and intrauterine growth restriction, infant mortality, and child undernutrition which result from behavioural, social, and biological factors[6,7,8,9]. Advanced maternal age (≥ 35 years) is also associated with increased stillbirths, preterm births, intrauterine growth restriction, and chromosomal abnormalities[10,11,12,13]. The fact that women's education has a positive impact on fertility regulation has been established by many others[14,15,16,17,18,19]. The influence of parental education on child survival has been also mentioned by various studies[20,21]. Many studies indicate that infant mortality rate is inversely correlated with the distribution of lower salaries and with the post-neonatal mortality rate in particular[22,23,24,20].

Short and long preceding birth intervals, or time between birth and the subsequent birth, have been linked to adverse child outcomes[25,26,27]. Researchers have proposed maternal depletion as the causal mechanism with short birth interval since mothers may not have had enough time to recuperate physiologically from the previous birth[25,28]. Again, it is also mentioned that a woman's reproductive capacity may decline and return to the primiparous state if birth intervals are overly long[29].

OBJECTIVE

The present paper highlights the influence of various socio-demographic factors viz., age at marriage, age at first childbirth, birth order, birth spacing, maternal and paternal educational status, and paternal occupational status on fertility and mortality of the Tengapania Deori population of Dibrugarh district, Assam.

MATERIALS AND METHODS

The study was conducted in the Madhupur Deori village which is located in Barbaruah of Dibrugarh district, Assam. A total sample of 100 ever married Tengapania Deori women having at least one surviving child was selected. A self-structured interview schedule was used to collect information on fertility performance and mortality differentials of the respondents. Before collection of data, written consent (in local language) was collected from the subjects, their guardians as well as from the village head. Data are presented mainly in the figure of numbers, percentages and mean values with the help of Microsoft Office Excel 2007. However, a chi-square

test of significance is applied in a limited case with the computer software, Chi-square Test of Independence.

The Deori is a scheduled tribe inhabiting the plains of Assam. Tengapania is one of the major *khels* (sub-tribe or territorial group) of Deori community, others being Dibongiya, Borgonya, and Patorgonya. Ethnically they are affiliated to the Tibeto- Mongoloid group. They have almost abandoned their Deori dialect and use the Assamese language for communication. Their numerical strength is low. It is recorded as 43,750 in number for Deori as a whole[30].

RESULTS AND DISCUSSION

The present age of the respondents ranges from 23 years (2%) to 60 years (3%). Majority of the mothers (76%) are belonging to the reproductive age group (15-49 years). The age at marriage of the Tengapania Deori mothers falls between the age of 14 years (1%) and 35 years (1%). The highest numbers of mothers entered into the marital life at the age group of 20-24 years (37%), followed by the age groups of 25-29 years (35%) and 19 years or earlier (19%). Very few numbers of mothers got married at the age of 30 years or later (9%). The proportions of illiterate mothers are quite high (15%). 13 percent of the mothers have a primary level of education (class I-IV) and 32 percent of them have educational attainment up to class X. The number of mothers who have completed high school and beyond that level of education is 40 percent. Almost all the respondents (97%) are homemakers. Only a limited fraction of the mothers (3%) are serving as a teacher in primary schools.

Among their male counterparts, 10 percent are found as illiterate and 4 percent of the persons have education up to primary standard. However, the proportions of a person having education up to class X is 39 percent and 47 percent of the individuals have educational attainment of HSLC and above level. Among them, the proportions of cultivator (87%) are noticeably high. Only 7 percent of male individuals are engaged as service holders. However, 5 percent of them are running a petty business and also another 5 percent are found as wage earners.

The average number of conception and live birth are recorded as 2.43 and 2.34 respectively. The incidence of spontaneous abortion is calculated to be 4.12 percent. In regards to the postnatal mortality, the proportions of mortality at infancy and childhood are recorded as 1.28 percent and 0.43 percent respectively. Appreciably, no incidence of stillbirth and juvenile mortality is observed in the present study.

Table 1 shows the association between maternal education and age at marriage. The age at marriage is found to be higher with an increase in the educational attainment of the mothers. 37.78 percent of the respondents who have primary - class X level of education married at an earlier age (≤ 19 years), followed by the illiterate mothers among whom the proportion is recorded to be

Table-1: Association between maternal educational level and age at marriage

Maternal educational level	Age at marriage (in years)								No. of mothers
	≥19	%	20-24	%	25-29	%	≥30	%	
Illiterate	1	6.67	7	46.67	5	33.33	2	13.33	15
Primary – class X	17	37.78	12	26.67	16	35.56	0	0	45
HSLC & above	1	2.5	18	45.00	14	35.00	7	17.5	40

χ^2 = 21.19*, p = 0.002
Note: *indicates statistically significant at 5.0% level of probability

6.67 percent. Only 2.5 percent of the respondents with education beyond high school standard married at an earlier age (≤19 years). On the contrary, quite a good number of mothers (17.5%) who have education beyond high school standard entered into the conjugal life at relatively late (≥30 years). None of the respondents with primary - class X level of education are found to marry at the age of 30 years and above. The chi-square test of significance records statistically significant differences between the two variables considered. In Meghalaya also the increasing age at marriage among the Garo mothers with higher educational attainment was noticed[31].

Table 2 shows the association of age at marriage and the number of live-born children delivered among the ever-married mothers. The present studied Tengapania Deori mothers have been contributed maximum 5 live birth children and out of these considerably higher number of mothers (69.00%) have given birth 2-3 live-born children. Relative less number of childbirth was noticed among the mothers who married at the age of 30 years or later. On the other hand, a higher number of a child is experienced among those who married at a relatively earlier age. No statistically significant differences are observed among the number of mothers as per their educational status and number of live births (Table 3). A steady reduction in the number of a child with an increasing order of marriage was also reported among the Garo mothers of Meghalaya[31].

Fertility performance and mortality differential in relation to the age at marriage is shown in Table 3. Both mean conception and mean live birth is found to decrease gradually with their rising age at marriage. The present finding is corroborated by earlier studies

Table-2: Association of age at marriage and number of live-born children delivered

Number of live births	Age at marriage (in years)								No. of mothers (%)	Number of children
	≤19		20-24		25-29		≥30			
	No. of mothers (%)	Number of children	No. of mothers (%)	Number of children	No. of mothers (%)	Number of children	No. of mothers (%)	Number of children		
1	1(5.26)	1	6(17.22)	6	5(14.29)	5	4(44.44)	4	16(16.00)	16
2-3	14(73.68)	34	23(62.16)	51	28(80.00)	63	4(44.44)	8	69(69.00)	156
4-5	4(21.05)	16	8(21.62)	33	2(5.71)	8	1(11.11)	5	15(15.00)	62
Total	19	51	37	90	35	76	9	17	100	234

X^2 = 11.35, p = 0.08

Table-3: Fertility performance and mortality differential in relation to the age at marriage

Age at marriage (in years)	No. of mothers	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)	
					Infant	Child
≤19	19	53*(2.79)	51(2.64)	3(5.66)	2(3.92)	0
20-24	37	92(2.49)	90(2.43)	2(2.17)	0	0
25-29	35	81(2.31)	76(2.17)	5(6.17)	1(1.32)	0
≥30	9	17(1.89)	17(1.89)	0	0	1(5.88)

conducted among Mishing[32,33.34,35], Ahom[33], Moria Muslim[36], Assamese Sikh[37], Sonowal Kachari[33,38], Dibongiya Deori[39], Khamti[40], Tengapania, Borgonya and Dibongiya Deori[41] and working and nonworking Assamese mother[42] of Assam; Idu Mishimi[43] and Khamti[44] of Arunachal Pradesh and Meitei and Sekmai[45], Mao Naga[46], Loi mother[47], Anal[48], Khongsai Kuki[49] of Manipur and War Khasi of Meghalaya[50]. Considerably higher incidence of miscarriage is exhibited among the mothers who have entered into the conjugal life at the age group of 25-29 years (6.17%), followed by the age group of 19 years or earlier (5.66%). The mothers married at the age of 19 years or earlier have experienced relatively higher proportions of infant mortality. Similar findings are also reported among the Ahom[33] and Phake[44] of Assam; Khamti of Arunachal Pradesh[44]; Pnar[51] and Jaintia[52] of Meghalaya and Kabui Naga of Manipur[53]. The incidence of child mortality is recorded among that mother (5.88%) who married relatively late (³30 years).

Fertility performance and mortality differential of the ever-married mothers in relation to their age at first childbirth is shown in Table 4. The average number of both conception (1.89) and live birth (1.89) are found to be comparatively lower among those mothers who have delivered their first baby at relatively later ages. In Assam also lower mean conception and mean live birth are recorded among the Dibongiya Deori mothers who have delivered the first baby in their later years of age[54]. The

Table-4: Fertility performance and mortality differential in relation to the age at first childbirth

Age at first childbirth (in years)	Number of mothers	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)	
					Infant	Child
≤19	13	35(2.69)	34(2.62)	1(2.86)	2(5.88)	0
20-24	33	89*(2.70)	87(2.64)	3(3.37)	0	0
25-29	41	93(2.27)	90(2.20)	3(3.23)	1(1.11)	0
≥30	13	26(2.00)	23(1.77)	3(11.54)	0	1(4.35)

respondents experienced the first delivery at the age of 30 years or above (11.54%) have a noticeably higher incidence of miscarriage. The present finding is in conformity with the study conducted among the Dibongiya Deori mothers living in rural areas of Assam[54]. Among the Tengapania Deori mothers, the incidence of child mortality (4.35%) is experienced by that woman who married late. Contrary to this comparatively higher incidence of mortality at an infant stage is experienced by those who married at the age of 19 years or earlier (5.88%). Higher occurrences of infant mortality with early age at first childbirth were also reported among the Munda, Tanti, and Oraon[55], Bodo and Rabha[56] and Dibongiya Deori[54] of Assam.

Table 5 shows fertility performance and mortality differential of the ever-married mothers in relation to the birth order. The proportions of miscarriage (6%) and also the infant mortality (2.13%) are found to be comparatively higher in the 1st birth order. However, the incidence of child mortality is also observed in the first order of pregnancy only. The occurrence of miscarriage and infant mortality is not recorded in the 3rd birth order and onwards. Among the Ahom, Mishing, and Sonowal Kachari[33] and the Dibongiya, Tengapania and Borgonya Deori[41] in Assam also a higher occurrence of miscarriage in the first order of pregnancy are observed. Moreover, the higher proportions of infant mortality in the first birth order was also reported among the Rabha[57,56], Assamese and Bengali[58], Ahom, Mishing and Sonowal Kachari[33] and Bodo[56] of Assam and Hajong of Meghalaya[59].

Fertility performance and mortality differential in relation to the birth spacing is shown in Table 6. The preponderance of live birth (45%) is occurred at an

Table-5: Fertility performance and mortality differential in relation to the birth order

Birth order	No of mothers	Live birth	Miscarriage (%)	Mortality (%)	
				Infant	Child
1st	100	94	6(6.00)	2(2.13)	1(1.06)
2nd*	85	82	4(4.71)	1(1.18)	0
3rd	38	38	0	0	0
4th	17	17	0	0	0
5th	3	3	0	0	0

Table-6: Fertility performance and mortality differential in relation to the birth spacing

Birth spacing (in years)	Conception	Live birth	Miscarriage (%)	Infant mortality (%)
≤1	40	37	3 (7.5)	0
1-2	63	63	0	0
2-3	21*	22	0	0
≥3	19	18	1 (5.26)	1 (5.56)

interval of 1-2 years, followed by the gap of 1 year or less than that (26.43%). Moreover, 15.71 percent of live birth is delivered at an interval of 2-3 years and the remaining 12.86 percent of delivery of the live born baby is found at the interval of 3 years or more. A comparatively higher proportion of miscarriage is recorded among those mothers where the conception occurs at the gap of 1 year or earlier (7.5%). On the other hand, the incidence of infant mortality (5.56%) is recorded in the higher birth interval.

Women who have higher educational attainment (27.5%) are found to experience very less number of child i.e. 1. The occurrence of 4 to 5 number of children is quite high among the illiterate mothers (33.33%). The percentage of respondents having 4-5 numbers of children is found to decrease from 20 percent for primary - up to class X level educated respondents to 2.5 percent for respondents having education beyond high school standard. In this regard, the chi-square test of significance also records a statistically significant difference (Table 7). A relatively higher number of mothers with less number of children was also found among the Garo of Meghalaya[31].

Table 8 shows the fertility performance and mortality differential of the ever-married mothers based on the educational level of the couples. Comparatively higher mean conception (3.25) and mean live birth (3.25) are recorded among the couples with illiterate wives and HSLC and above level educated husbands. The couples with illiterate wives and primary – class X level educated husbands also have higher mean conception (3) and live birth (3), followed by the illiterate couples who have 3 mean conception and 2.80 mean live birth. Contrary to this, the lower average number of conception (1.81) and live birth (1.78) is shown by the couples having education beyond high school standard, followed by the couples with HSLC and above-educated wives and primary – class X level educated husbands (mean conception: 2.13; mean live birth: 2.00). The couples with primary – class X level educated wives and illiterate husbands (13.33%) have

Table-7: Level of maternal education and the number of live-born children delivered

Number of live births	Maternal educational level						No. of mothers (%)	Number of children
	Illiterate		Primary – class X		HSLC and above			
	No. of mothers (%)	Number of children	No. of mothers (%)	Number of children	No. of mothers (%)	Number of children		
1	1(6.67)	1	4(8.89)	4	11(27.5)	11	16(16.00)	16
2-3	9(60.00)	23	32(71.11)	75	28(70.00)	58	69(69.00)	156
4-5	5(33.33)	21	9(20.00)	37	1(2.5)	4	15(15.00)	62
Total	15	45	45	116	40	73	100	234

X^2 = 14.03*, p = 0.007
Note: *indicates statistically significant at 5.0% level of probability

Table 8: Fertility performance and mortality differential in relation to the couple's educational status

Wife's educational level	Husband's educational level																	
	illiterate						Primary – class X						HSLC and above					
	Couple	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)		Couple	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)		Couple	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)	
					Infant	Child					Infant	Child					Infant	Child
Illiterate	5	15(3.00)	14(2.8)	1(6.67)	0	0	6	18(3.00)	18(3.00)	0	0	0	4	13(3.25)	13(3.25)	0	0	0
Primary – class X	5	15(3.00)	13(2.6)	2(13.33)	0	0	29	75*(2.59)	73(2.52)	3(4.00)	0	0	11	32(2.91)	30(2.73)	2(6.25)	2(6.67)	0
HSLC and above	0	0	0	0	0	0	8	17(2.13)	16(2.00)	1(5.88)	1(6.25)	1(6.25)	32	58(1.81)	57(1.78)	1(1.72)	0	0

experienced a relatively higher incidence of miscarriage, followed by the couples with primary – class X level educated wives and HSLC and above level educated husbands (6.25%). In regards to the infant mortality, the highest incidence is recorded among the couples with primary – class X level educated wives and HSLC and above level educated husbands (6.67%). The incidence of child mortality is experienced only by the couple with HSLC and above level educated wives and primary – class X level educated husbands (6.25%). Thus, the present study witnesses the more influence of maternal educational level rather than paternal education on fertility performance and mortality differential of the Tengapania Deori population. The decrease in the average number of live birth as per increase in the educational status of the husbands and wife was also found among the Mishing of Assam and Minyong of Arunachal Pradesh[60].

Lower the level of fertility with the increasing level of maternal education was reported by earlier studies conducted among the Rabha[57], Garo[61], Harijan[62], Mishing[32,34,35,63], Ahom[64], Assamese and Bengali[58], Oraon[65], Tangsa[66], Ahom, Mishing and Sonowal Kachari[33], Assamese Sikh[37], Bodo Kachari[67], Assamese Muslim[68], Khamti[40], Tengapania, Borgonya and Dibongiya Deori[41], Sonowal Kachari[38], working and nonworking Assamese mother[42] and Phake and Ahom[44] and Dibongiya Deori[54] of Assam; Idu Mishimi[43], Khamti[44] and

Table-9: Fertility and mortality of the ever-married women in relation to the paternal occupational status

Paternal occupational status	No. of mothers	Mean conception	Mean live birth	Miscarriage (%)	Mortality (%)	
					Infant	Child
Wage earner	5	11(2.2)	9(1.8)	2(18.18)	0	0
Petty business	5	9(1.8)	9(1.8)	0	1(11.11)	0
Service	7	15(2.14)	15(2.14)	0	0	0
Cultivator	83	208*(2.51)	201(2.42)	8(3.85)	2(1.00)	1(0.50)

Monpa inhabiting in lower altitude[69] of Arunachal Pradesh; Anal[48] and Khongsai Kuki[49] of Manipur; Pnar and Sakachep in Meghalaya[70] and Ao Naga of Nagaland[71]. Moreover, the similar finding that the higher incidence of miscarriage among the lesser educated mothers was also corroborated by the study conducted among the Ahom[64], Mishing[33], Dibongiya Deori[41], Sonowal Kachari[38] and Ahom and Phake[44] of Assam and Loi mothers of Manipur[47].

The mean number of conception (2.51) and live birth (2.42) is comparatively higher among the cultivators. The women whose husbands are earning by running a petty business have a relatively lower contribution of mean conception (1.8) and mean live birth (1.8). A study conducted among the Khongsai Kuki of Saikul village in Manipur also found the highest mean live birth among the cultivators[49]. A relatively higher proportion of miscarriage is experienced by the women whose husbands are wage earners (18.18%), followed by the cultivators (3.85%). The incidence of infant mortality is higher among those women whose husbands run a petty business, followed by the cultivators (1%). The incidence of child mortality is found among the cultivators only (0.50%). Interestingly, no incidence of miscarriage and postnatal mortality is experienced by the women whose husbands are engaged as service holders.

CONCLUSION

Different socio-demographic factors are observed to involved clearly on fertility and mortality differentials of the present studied population. Early age at marriage, first delivery at an early age, low education of the couple, and family with the low economic condition exhibits more conceptions and live births. The incidence of miscarriage is more common in the first birth order, later age at first childbirth, the lesser gap between conceptions, parents with lesser educational attainment and lower economic condition of the family. Again, comparatively higher incidence of infant mortality is recorded in the first birth order, less educated couples and also among the mothers who marry and conceive at an early age and also belong to a family who has the low economic condition. Moreover, wife's education is found to play a more important role than husband's education in regulating the fertility performance and also reduce the incidence of mortality of their children. As

education has a profound effect on the level of occupation and age at marriage of the person concerned, societies should give importance and priority to education especially on maternal education for the well-being of society.

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Indigenous knowledge and practices related to the reproductive mother-child health issues of the Karbis in Karbi Anglong, Assam

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Abstract: *Every culture, irrespective of its simplicity and complexity, has its own beliefs and practices concerning diseases. Every culture evolves its own system of medicine in order to treat diseases in its own way. This treatment of disease varies from group to group. It may be pointed out that disease and treatment, particularly in the simple societies cannot be properly understood in isolation. Health and treatment are very much connected with the environment, particularly the forest ecology. The health care system and traditional treatment are based on their deep observation and understanding of nature and environment.*

The present study has been done on the Karbi tribal group of Karbi Anglong, Assam. The district is largely covered by a forest and several other natural resources. Such resources are used by the local people in every perspective of their livelihood. The Karbi people had a strong belief that different malevolent supernatural agencies can create tremendous harm and allied misfortune to the reproductive mother as well as to the new born.

The concerned people are very much psychologically depended upon the traditional healers and ethno-gynecologists for the treatment related to such cases. The concerned healers use a number of locally available plant resources for such treatment. Meanwhile, particularly in the cases of reproductive mother-child health, a number of floral and faunal resources are also used by them, as a part of their ethnic diet. The present study has the prime objective to reveal the relationship between traditional cultural practices, environmental resources and indigenous knowledge of health care system among the Karbi people, particularly related to reproductive mother-child health issues. The study has been primarily conducted through intensive field work. Several anthropological methods are used in this regard to collect primary data.

Keywords: Nature, Culture, Traditional healer, Indigenous knowledge, Reproductive Mother-Child Health, Ethno-gynecologists.

INTRODUCTION

Every culture, irrespective of its simplicity and complexity, has its own beliefs and practices concerning diseases. No culture works in a meaningless fashion in its treatment of diseases. Every culture evolves its own system of medicine in order to treat diseases in its own way. This treatment of disease varies from group to group. It has been noted that, in the rural

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areas, the belief in the interference of a supernatural agency is particularly strong in the context of health and disease. Most of their socio-cultural activities revolve around Gods and Spirits. They identify the supernatural powers with group of powerful forces and deities which control and influence the happenings in the community. It may be pointed out that disease and treatment, particularly in the simple societies cannot be properly understood in isolation. Health and treatment are very much connected with the environment, particularly the forest ecology. The health care system and traditional treatment are based on their deep observation and understanding of nature and environment (Chaudhuri, 2003: 17-24).

World Health Organization 1948, defined Health as "a state of complete physical, mental and social well being and not merely an absence of disease or infirmity." (Park, 2013:12).

Anthropology and Health: The Anthropological perspective of health is mostly considered under the domain of Medical Anthropology. It takes up the analysis of health in the context of culture, social behavior, economic system and human biology. The concept of health, disease and treatment vary according to the culture of different communities and ethnic groups. Moreover a particular culture is guided by the traditional customs and every member of the culture is ideally expected to confirm to it. Health and disease are universal experiences. The traditional medicine can be stated as the sum total of all knowledge and practices, whether explicable or not used in diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusive on practical experiences and observation. In Medical Anthropology, the examination of health issues extends to include knowledge, meaning, social behaviour and biology generally related to well being, suffering misfortune, life cycle and survival (Millard, 1992: 3). The roots of Medical Anthropology are as ancient as the Anthropology itself. Medical Anthropology Quarterly, has defined it as studies of ethno medicine, epidemiology, maternal and child health, population, nutrition, human development in relation to health and disease, health care providers and services, public health, health policy and the language and speech of health and health care" (Medical Anthropology Quarterly: September, 2001).

Reproductive Health: Reproductive health like health has been defined as a complete physical, mental and social well being and not merely the absence of reproductive disease or infirmity. It deals with the reproductive processes, functions and system at all stages of life. Reproductive health includes sexual health, the purpose of which is the enhancement of life and personal relations, and not merely counseling and care related to reproduction and sexually transmitted diseases" (Morgan, 1990:947). Traditionally, in Indian societies, women are, by and large, viewed only as reproductive agents and their fertility is generally prized, as pointed out by Mandelbum (1970), that "mark of her success as a person is her living and thriving children". The mother is

the central figure who provides child care, nutrition, hygiene and even primary health care.

Statement of the problem

It would be mis-conception of child rearing, if we consider over all care of a child only after birth. Since, proper growth and development of a child depend on its health status at birth and as it is very closely associated with its prenatal and natal period, hence, care during these periods is also assumes importance. Direct care cannot be given to the child during prenatal period and it depends completely on its mother, therefore, care of mother in all aspects is very necessary. Child rearing, therefore, encompasses care of mother during pregnancy and post partum period, including nutritional and health care, sleep and rest, care of the newborn and young children, such as breast feeding, weaning, complementary feeding, health care, toilet training, recreation, etc. Moreover, proper development of a child largely depends on its general health status especially in the early part: of childhood. Proper nutrition with the duration of breast feeding, timely weaning, immunization, treatment of ailments, etc., and social beliefs are the utmost important factors during this formative stage. But, these are often interacted by cultural norms and socio economic status of the family. India is considered as sub-continent for its rich and distinct cultural wealth. Cultural traits of the Tribal population of the country are very much different from the rest of the country's population. In Assam, although many studies have been undertaken on the tribal communities, yet studies emphasizing on child rearing are rather scanty. Nutritional status of Adivasis, tea tribes of Assam was not good as reported by many studies. Gogoi and Ahmed (2007) studied effect of nutritional status on the birth weight among tea tribe of Dibrugarh and revealed that 61 per cent babies were born with birth weight less than 2.5 kg. Another finding was also contrary to finding of nutritional status of pregnant women of Chaigaon block of Kamrup district which Mahanta *et. al*. (2012) reported. The study concluded that 48 per cent of pregnant women were having high level of undernutrition in low socioeconomic groups. Therefore, understanding these, this attempt has been made to undertake the study relevant to prevailing child rearing practices of among the Karbi Tribal population of Assam. Keeping these in mind the present study is concerned to understand the pattern of the pregnancy care, care of the newborn, infant feeding, weaning, treatment and preventive aspects of health, family welfare, nutritional status, toilet training, socialisation, play, etc among the Karbis.

MATERIAL AND METHODS

The present study has been done on the Karbi tribal group of Assam in Northeast India and in this concern exclusive Karbi villages were selected. To conduct the present study a pilot survey was conducted in November 2014 to select the villages. The study was conducted upto May 2017. The villages were selected from every block under every subdivision of Karbi Anglong district. From each block the first two villages which have the most number of Karbi population has been selected. Meanwhile

the sub divisions, their concerned blocks and studied villages are gradually more distant from the district headquarter of Diphu and having gradually lesser chance of access over western medicinal facilities as well as better scope to avail traditional health care practices. It is represented through the following charts-

Table-1: Selection of studied villages

Sub Divisions	Blocks	Villages Studied	Specific Criteria	
DIPHU	Lumbajong, Howraghat, Samelangso, Langsomepi	2 villages from each block	Near to district headquarter Diphu town.	
BOKAJAN	Bokajan, Nilip, Rongmongwe	2 villages from each block	Far from district headquarter Diphu town.	
HAMREN	Rongkhang, Sochen, Chinthong, Amri	2 villages from each block	Farthest from district headquarter Diphu town.	
Sub Divisions	**Blocks**	**Villages studied**	**Distance from district headquarter of Diphu town (in Km.)**	**Families studied**
DIPHU	Lumbajong, Howraghat, Samelangso, Langsomepi	8	0-50 Km	250
BOKAJAN	Bokajan, Nilip, Rongmongwe	6	100-150 km	240
HAMREN	Rongkhang, Sochen, Chinthong, Amri	8	200 km and above	195
TOTAL	**11**	**22**		**685**

Total sampling method was applied on the concerned settlements, where the primary data will be collected from all the studied families to know about the prenatal, child birth and postnatal health care practices. The study has been conducted among the Karbi tribal group on 685 families with a population of 4749. The studied families were selected on the basis that in such families at least one child member (aged between 0-14 years) is present. Along with that data were collected from the midwives, traditional medicine man, magico-religious healers to known about the studied issue in detail. The studied people could easily communicate through Assamese. The researcher's knowledge of Assamese enabled him to have a free interraction with the studied people. Out of the total studied population there were total 2396 males and 2353 females while the sex ratio is 982. From the present study on total 685 families, there were

total 1805 numbers of mothers and the total number of children was 1075 (in between the age group of 0-14 years).

The field work was conducted through four major divisions. Two to three times of field work was done under each division as per the requirement. Anthropological research methods like observation, case study, genealogy, interview, key informant interview has been applied to collect the required primary data.

Division-1: Foremostly, Preliminary Census Schedule (PCS) was applied to know about the demographic composition of the studied people and to collect the village level information.

Division-2: Among the total studied population, selected case studies were taken on women related to the issues of child mortality and other pregnancy related complications. Again selected case studies were taken on children related to their different diseases and ill health conditions. It was taken on the mothers, who were associated with prenatal, pregnancy and post natal health care practices, as well as on their family members. It was focused to know about their ethnic knowledge base associated with the reproductive mother-child health aspects. A special focus was given on the multifarious complications associated with the reproductive mother child health issues and their probable method of treatment. Further, it was focused to know about the role of the family members in such cases. Meanwhile a special attention has been given on the result of such treatment in the concerned cases.

Division-3: Interviews was taken from the key informant, traditional healers, aged male and female members of the studied families to know about their method of treatment and healing practices associated with reproductive mother child health issues.

Division-4: The collected data was analyzed in detail to reveal the co-relation between ethno-ecology with the cognitive aspects of reproductive mother-child health issues. It focused a special attention on the indigenous knowledge of the studied people for the sustainable utilization of such resources.

RESULTS AND DISCUSSION

Perception of health by the Karbis:

The Karbis believed in multiple deities and regards all objects on earth as having divinity or possession of supernatural power and therefore worship hills, mountains, rivers etc. They believed that diseases were caused by different malevolent spirits and by appeasing the benevolent spirits it could be redressed. Karbis regarded both binary spiritual concept as possessing divinity which could harm as well as bring peace and prosperity to the people such as good health, wealth, favourable weather, etc. Karbis worshipped household deities called *Hem Angtar* and these deities were propitiated annually. There were deities which were propitiated as and when required were called *Habit ase* (non-household gods). The disease condition or the notion of illness was being referred by the Karbis as *se kelong*. When a person falls ill, for example, after coming from forest, the household members attribute the cause due to

encounter of evil spirits and initiates propitiation of the spirits. In case the patient did not respond to normal traditional treatments, the household members seek the help of wise man to ascertain the cause of the illness. The wise man through divination, identified the Deity responsible for the illness and suggests certain rituals for recovery of the patient. This act of divination was called *Sang Kelang.* The cause of illness was also attributed to specific acts of commission or omission, spirits, or in some cases physical factors in the environment A state of health was regarded by the Karbis as being spiritually attuned and mentally sound, having a feeling of well being having personal fulfillment and being free from psychological disturbance. The term for health among the Karbis of the studied villages were *saisto* and *sehera,* which refer to the proper functioning of the body. It was a state of being well and a state of being free from illness.

Diseases Prevalent In The Study Population

Medical histories of different diseases were collected from the studied villages. All these diseases were believed to be caused by physical factors. The incidence of fever, anemia, dental problems and headache were very high followed by Malaria. Interestingly the frequency of dental flurosis, which was also high in Karbi Anglong district, was not recognized as an illness by the Karbis. It was considered as a dental problem and hence the same had been included as dental problems.

Table-2: Diseases, Their Local Name and Their English Equivalent among the Karbis

Sl. No	Local name of the disease	English Equivalent
1	*Apok Kisu*	Dysentry
2	*Ai bhagoboti alado*	Chicken pox
3	*Pok- Kepavi*	Diarrhea
4	*Khundamaar*	Stomach Ache
5	*Asey*	Fever
6	*Hapani*	Asthma
7	*Kukurikona*	Night blindness
8	*Ingthadob*	Scabies
9	*Senduria*	Red rashes
10	*Kholpia*	Skin boil
11	*Borola*	A painful skin boil bigger in size
12	*Chinjam*	Flu
13	*Asi-jang-je*	Constipation
14	*Samayaad*	Jaundice
15	*Akupali*	Severe head ache
16	*Susmo*	Pain in the joints

Source: Field study 2015-2017

In the studied areas, different water borne diseases like dysentery, jaundice, diarrhoea were well prevalent. Along with that, malaria was also well noticeable (Table 2)

As most of the people had a strong belief that, supernatural agencies were primarily responsible for different diseases, thus related to their treatment, they were primarily depended on their traditional healers like traditional medicine man, magico-religious healers etc. On the other hand the people who had the idea about the natural cause of diseases, were depended on western medical practitioners of Civil hospitals, PHC and at least on quacks (Table-3).

Table-3: Preference of first treatment among the studied population

Sex	Tradi-tional	Western	Total	If Traditional				If Western		
				Medicine man	Magico-religious healer	Local indigenous	Total	Doctor	Quack in medicine shop	Total
Male	1451 (60.56)	945 (39.44)	2396 (100.00)	752 (51.83)	598 (41.21)	101 (6.96)	1451 (100.00)	497 (52.59)	448 (47.41)	945 (100.00)
Female	1481 (62.94)	872 (37.06)	2353 (100.00)	792 (53.48)	602 (40.65)	87 (5.87)	1481 (100.00)	452 (51.83)	420 (48.17)	872 (100.00)
Total	2932 (61.74)	1817 (38.26)	4749 (100.00)	1544 (52.66)	1200 (40.93)	188 (6.41)	2932 (100.00)	949 (52.23)	868 (47.77)	1817 (100.00)

Source: Field study 2015-2017

However, in a number of cases, it has been noticed that, the educated couple of Diphu town, had a strong belief on their traditional healers. It was primarily because of their inter cultural affinity. During the study it was noticed that, particularly the Karbi womenfolk were very shy in nature and used to find a very few words to the outsiders. Most of the western medical practitioners were from other ethnic and cultural background. On the other hand the Karbi women were mostly fluent in their mother tongue only. Thus they could hardly explain about their ailment to any other people; on the other hand the traditional healer used to live in their own village or nearby. They were easily accessible by anyone and could be easily communicated in own mother tongue dialect. Thus they more prefer to consult their native healers in different ailments.

It was the main reason for which even the people who were dwelling in Diphu town or adjacent villages had the first preference to their traditional method of treatment (Table-4). Such native healers either used to gave them herbal medicines or conducted different rituals to appease the benevolent Deities and to redress the affects of malevolence on the affected people.

Table-4: Preference of first treatment in co-relation to the distance

Sub Divisions	Distance from district headquarter of Diphu town (in Km.)	Families studied	Method of Treatment				Total	
			Traditional		Western		Male	Female
			Male	Female	Male	Female		
DIPHU	0-50 Km	250	441 (50.63)	406 (47.10)	430 (49.37)	456 (52.90)	871 (100.00)	862 (100.00)
BOKAJAN	51-150 km	240	434 (51.24)	483 (59.12)	413 (48.76)	334 (40.88)	847 (100.00)	817 (100.00)
HAMREN	151-200 km and above	195	576 (84.96)	592 (87.83)	102 (15.04)	82 (12.17)	678 (100.00)	674 (100.00)
TOTAL		**685**	**1451 (60.56)**	**1481 (62.94)**	**945 (39.44)**	**872 (37.06)**	**2396 (100.00)**	**2353 (100.00)**

Source: Field study 2015-2017

It has been noticed that, in the studied area, the success rate of traditional method of treatment was very satisfactory and a very few were not cured from their ailments. On the other hand, in western medical practices non curability was well noticeable as well as the success rate was also not similar as in case of traditional methods. It may be because of the fact that, in most of the cases, the economic crisis of the people hindered them to complete the entire medical course. Even the communication problem emerged as a prime hindrance for the people to go western medical centres. As a result the cases of western medical drop out were very common among them. On the other hand, the traditional healers used to remain in their own village and they had not to purchase any medicine from the said healers. Thus it used to save their working schedule and undesired financial expenditure (Table-5).

Table-5: Result of Treatment

Sex	Traditional methods				Western methods			
	Cured	Recovered	Not cured	Total	Cured	Recovered	Not cured	Total
Male	1073 (73.95)	370 (25.50)	8 (0.55)	1451 (100.00)	453 (47.94)	106 (11.21)	386 (40.85)	945 (100.00)
Female	1154 (77.92)	323 (21.81)	4 (0.27)	1481 (100.00)	406 (46.56)	116 (13.30)	350 (40.14)	872 (100.00)
Total	2227 (75.95)	693 (23.64)	12 (0.41)	2932 (100.00)	859 (47.28)	222 (12.22)	736 (40.50)	1817 (100.00)

Source: Field study 2015-2017

Supernatural World and Belief of the Karbis:

In Karbi perception, diseases caused by supernatural forces can be categorized into the following six types.

1. Influence of evil spirit, 2. Black magic (sorcery), 3. Evil eye, 4. Delay in the performance of *charkidon,* 5. Breach of taboo and 6. Sins committed.

The definition of diseases among the Karbis was done on the basis of symptomatic and some culture specific criteria. Interestingly however, with the change of symptoms during the course of an illness episode, the type of disease diagnosed may also vary.

1. Influence of Evil Spirit:

Among the Karbis of Karbi Anglong district, *kidam,* an unusual kind of ailment, was symptomatically revealed by incessant shivers, high fever and mumbling. The common belief was that when an air borne spirit residing in the forests suddenly enters into a person, he or she becomes susceptible to *kidam.* The Karbis further believed that no biomedical system could provide remedy to this ailment. Another strange disease *hi nang cachober* was believed to be caused by the intrusion of an evil spirit *chekema.* It was symptomatically revealed by bleeding through the nose and mouth. *Chekema* who resided in trees enters suddenly upon persons working in the fields. Another belief was that, if a person used to sit under a tree inhabited by a *chekema*, he or she was invariably attacked by *hi nang cachober.* A *Thekeray* provided treatment to this type of an ailment by creating a mud puppet and later destroying it by pinning down with nails. Also, a rare disease among the Karbis, symptomatically characterized by unexpected swelling of the face that was believed to be caused by intrusion of an evil *syimt-dukhrai.* These spirits caused illness and misfortunes by their malign acts. The appeasement of such spiritism was done by sacrificing animals and birds.

Often the sex and the number of animals and birds to be sacrificed were fixed by the diviner who acts as a medium between the patient and the spirit. Spirit propitiation rituals were a common feature of the Karbis. These rituals were performed in specific locations.

2. Black Magic:

Sorcery and black magic practices were widely prevalent among the Karbis of the studied villages. Sorcery was a magical act by which a person can bring untold sufferings and misfortunes in the form of rare incurable illnesses. These illnesses could be inflicted by means of spells and charms.

Sorcery also involves magical objects, which was usually an amulet or a mud puppet in the house of a person with the sole objective of causing harm. They firmly believed that such sufferings could be relieved only by the services of an *Ojah* or a *Bez.*

3. Evil Eye:

Evil eye was the belief that certain people have the faulty casting of spell on others. Children who were more susceptible to such spells usually

suffered from ailments like fever and diarrhea. Infants show some unusual symptoms like weeping unusually. They also stopped to taking food and severe nausea occurred to them. The Karbis believed that certain people had the power to cast a spell on others by just looking at them. It was termed as, *ami keso* or *ame kahiyi.* In all the studied villages, children wore a black spot on their forehead. This practice was sometimes continued till the child attains puberty. Children were given amulets to wear at the advice of a *Bez* or a *Kurusar* (folk medicine man). Another procedure of curing evil eye was to burn a few mustard seeds and dried red chilies on a plate. The plate was then rotated in circles over the face of the affected child for seven times. After this ritual was over, the mustard seeds and dried chilies are thrown out of the house. To ward off evil eye a type of ritual known as *aso kecheru ase* was also performed that involves the sacrifice of a white hen.

4. Late In *Charkidon*:

The studied families firmly believed that the peace and prosperity of a household depends upon the peace of the departed ancestors. If the dead ancestors were not propitiated in time, they used to get infuriated and could bestow disease and even death. To appease the dead ancestors, they were worshipped annually in a ritual known as *charkidon.* Delay in the performance of *charkidon* was responsible for the outbreak of ailments that fall under the category of supernatural factors because of the involvement of the supernatural medium. Delay in its performance might result in accidents also.

5. Breach of Taboo:

Taboo is the prohibition of an action or the use of an object based on ritualistic distinctions of them either as being sacred and consecrated or as being dangerous and unclean Following were the taboos among the Karbis that are to be observed during the celebration of *Rongker.*

1. Husking was prohibited during the performance of the *Rongker* in the village.
2. Participation of the female folk in the worship area of *Rongker* was strictly prohibited.
3. No villager was allowed to leave the village during the performance of the *Rongker.*

Breach of the aforesaid taboos would bring untold sufferings to the villagers. The Karbis believed that breach of taboos such as violation of existing social norms, pre-marital and extra marital sex, on observance of rituals, killing a cow, etc , caused diseases affecting not only the individual family but the village at large. A pregnant Karbi woman was not allowed in the burial ground nor were they allowed in *Rongker*. Menstruating women as a social norm, should refrain from sexual activities as they were polluted and were in an unclean state.

6. Sins Committed:

The Karbis of the study villages believed that sins committed by a person causes mental illness (*hawalakd)* and barrenness. They believe that leprosy affects an individual who has committed a sin. They firmly believed that a woman

who had committed adultery, would not be able to give birth to a child.

Supernatural Forces and Illness

The Karbis dichotomized their supernatural world into two categories on the basis of the type of the supernatural being. The first category consists of super natural beings that were considered benevolent. They were guardians of everything and therefore they should be shown respect and should be venerated. This category consists of benevolent beings like Hemphu, Peng, Mukrang etc. The other category consisted of a number of malicious spirits. It was worth mentioning that treatment for illness under this category is invariably super naturalistic. However, illnesses recognized by the man caused by supernatural forces or by spirits could be broadly discussed as below-

1. Khetor: Khetor as an etiological category refers to fear. This fear might be caused by two agents- ghosts and the wrath of malicious spirits. These spirits through their malign acts caused illness and can bring misfortune to the family. The fear of ghosts was more pronounced between the Karbis dwelling in rural areas. Usually khetor inflicted an otherwise normal person who dreams of his death or his dead ancestors. Dreams therefore might be an indication of events to be followed shortly. The Karbis believed that in such a state, he became susceptible to the acts of evil spirits. The person dreams of ghosts chasing him in to the jungles and finally killing him after taking out his intestine. In such a state, the mental health of an individual used to come under tremendous threat that might even result in death. The affected person who felt helpless was paranoid and keeps murmuring in his dreams. The affected person tend to sit for a long time starring at one direction with his mouth wide open. To ward off such an illness, one required the services of a *Bez or Kurusa.* Spirit propitiation rituals were performed in fixed places generally outside the house. The number of animals and birds to be sacrificed was fixed by the specialist depending on the intensity of the ailment. As the symptoms manifests only at night and so the appropriate time for performing the ritual to appease the spirits was at night.

2. *Arnam kashir um*: When the benevolent spirit of *Hempbu* entered into the body of a person, it was known by the term *arnam kashir um.* A person affected by *arnam kashir um* abruptly woke up from his sleep and shiver (*arleng ehu amay kifangparainfhurn ey kaklatti) .* The individual then entered into a trance and was able to predict future course of events including the occurrence of illnesses and the spirits responsible for such occurrence. Once a person comes out of trance, he again resumed his normal duties.

3. ***Khontak:*** The term *khontak* means abnormality. When a person exhibits non-ordinary symptoms, he or she was believed to be suffering from *khontak.* The typical manifestations of *khontak* were physical deformity, incoherent speech and expression of extreme irritability. It occurred due to the spirit *Panichok .* They believed that the wrath of *Panichok* is responsible for the outbreak of *khontak.*

4. ***Hawalakz:*** This etiological category referred to persons who have lost their senses. In Karbi dialect, a mentally imbalanced person was known by the term *incham.* Apart from the physical manifestations an *incham* was recognized by shabby appearance, tattered and was always scantily dressed.

The Karbis of the studied villages had a number of specialists or healers who are not alike. The Karbi ethnomedical specialists or folk medicine men and women could be grouped in the following categories-

Table-6: Different Traditional Healers of the Karbis

Name	Sex	Specialization
Bez	Male	Healer, herbalist, priest and sorcerer
Uche	Male	Socio-religious specialists who treats chicken pox
Kobiraj	Male	Herbal specialists who treats all sorts of physical illness including dental problems.
Kurusar	Male	Magico-religious healer, priest and herbalist as well. Deals with reproductive mother-child health issues also.
Thekeraay	Male	Magico-religious sorcer, herbalist, deals with reproductive mother-child health issues as well.
Deori	Male	Priest
Ethnogynaecologist	Female	Herbal specialist and midwife who treats gynaeocological problems and reproductive mother-child health issues only.

Source: Field study 2015-2017

ISSUES RELATED TO REPRODUCTIVE MOTHER-CHILD HEALTH

1. Gynecological Problems

Among the studied Karbi women and girls, the following gynecological problems and symptoms was noticed-

Table-7: Gynaecological Problems of The Karbi Women and girls

Local term used by Karbi women of Karbi Anglong District	Symptoms	Affected female	Total considerable female
Khorai	Burning sensation while urinating	22 (1.21)	1819 (100.00)
Boga sap	A liquid discharge from the vagina	1317 (72.40)	
Avipatbek abut apok kacherot	Menstrual cramps	24 (1.32)	
Avijangpit lu	Excessive bleeding during menstruation	169 (9.30)	

Avi patbek atbekthe	Irregular menses	213 (11.71)	
Akaikimi wangtve detlu	Absence of menstruation	19 (1.04)	
Akrang	Dryness in the vagina	9 (0.50)	
Nari lora	Abdominal pain	33 (1.81)	
Nari bagora	Prolapse of the uterus	5 (0.27)	
Abang ki unbona orah	Untimely menopause	6 (0.33)	
Pang kleng or *Aso have*	Sterility or the inability to conceive	2 (0.11)	

Source: Field study 2015-2017

The above table shows that the frequency of *bogasap* is the highest in the studied villages of Karbi Anglong district followed closely by *Avi patbek atbekthe* and *Avijangpit lu*. The incidence of *khorai* and *akrang* was also noticable in the studied villages. For the treatment of gynaecological problems, the Karbi women of the all studied villages relied primarily on the ethno-gynecologists and the herbs prescribed by them. Rarely, they used to visit the Primary Health Centre.

From the field study, it was found that the age of menarche for the studied Karbi women started from 10 years of age and completed within 13 years. It was found that, among the total married women the age at marriage was primarily within 20 years, which used to start from 15 years of their age. Accordingly, the age of first conception starts from 16 years and within 24 years of their age. Around 97 percent of the ever became mother had more than one child, while among 90 percent of such cases the concerned couple had kept the birth interval upto 2 years. Significantly in 78 percent cases, child birth had taken place in home under the care of midwives and ethno-gynecologists. It can be noted that, the villages which were gradually more distant from the district headquarter, the cases of child birth were preferred more in home, under the care of midwives and ethno-gynecologists, both before and after the pregnancy period.

2. Folk Beliefs of Foods in The Context of Menstruation

It was found that hot foods such as meat, eggs and chicken were avoided as it was believed that these foods will cause stomach ache and more bleeding during the period of menstruation. *Hukati* (dry fish powder) is avoided for the belief that the menstrual blood will smell and so avoided during the entire period of menstruation. Foods such as curd, banana, pineapple are avoided for heavy bleeding. Sour foods as tamarind, pickles were also avoided for fear of heavy bleeding and stomach ache. The menstruating girls were also advised to exclude spices, chilli, pepper due to the belief that these foods will cause stomach cramps.

Table-8: Foodstuff avoided during menstruation

Food stuff	Period of restriction	Folk belief
Non-vegetarian (meat and egg)	First two days	Stomach ache, menstrual bleeding will increase
Spices, chilli, pepper	First two days	Stomach cramps
Banana, pineapple	Entire period of menstruation	Heavy bleeding
Sour foods (tamarind, pickle, curd, etc)	Entire period of menstruation	Heavy bleeding and stomach ache
Dry fish (*hukuti*)	Entire period of menstruation	Foul smell of menstrual blood

Source: Field Study 2015-2017

The present study also covered the foods included during the period of menstruation. During focus group discussion, the girls below the age of 18 years mentioned that coconut water, non-vegetarian and vegetarian soups, dals, hot tea, fermented rice and fresh fish were included especially during the period of menstruation apart from the foods they usually consumed (Table-9). Fluids as water, coconut water were advised by the elderly to be included as it is believed that the pain felt due to menstruation was subsided. Hot vegetarian and non-vegetarian soups, tea, dal and fresh fish were included more as it was believed that it reduced the abdominal pain. Nutritionally, if we observe that meat, egg, curd which were good sources of protein were avoided during menstruating period but it was heartening to note that instead of non- vegetarian items balance in protein was maintained by including non-vegetarian soups and dals. The below 18 years Karbi girls mentioned that fermented rice (*poita bhat*) was included for the belief that it keeps the stomach cool. Fermented rice which was a good source of nutrients was included during that period.

Table-9: Foodstuff included during menstruation

Foodstuff	Period of inclusion	Folk belief
Coconut water	First two days	Menstrual pain is subsided.
Soups (non- vegetarian, dal, vegetable, etc)	First two days	Reduces abdominal pain
Fermented rice (*poita bhat)*	Entire period of menstruation	Keeps stomach cool and reduces abdominal pain
Fresh fish	Entire period of menstruation	To get energy

Source: Field Study 2015-2017

3. Folk Beliefs of Foods in The Context of Pregnancy

Pregnancy period is another important phase in a women's life. Nutritional care in terms of food is required to attain a healthy baby. Focus group discussion was conducted among the pregnant women for the inclusion and exclusion of foods during the entire period of pregnancy. The Karbi women mentioned that duck and pork are avoided for fear that it will make delivery

difficult as the Karbis women belief that pork and duck contains high fat. Avoiding pork during pregnancy may be beneficial as if pork is not cooked properly it may affect the intestines and may cause stomach disorders. Usually, pork is contaminated with bacteria (*salmonella, S. aureus*, etc.) which are killed by cooking the food well in high temperature. Fish like *borali, mirika, kusia* were avoided up to three months of pregnancy because of vomiting tendency but all other fishes are included. Salt was restricted for the belief that it causes giddiness. However, during pregnancy all pregnant women avoided it for the belief that it increases the blood pressure and reduces the nutrients found in the food. All sour foods were restricted till delivery of the baby for fear of miscarriage and bleeding. Too much of sour foods may cause flatulence during pregnancy so it is advised by elderly to avoid them. Among vegetables, the Karbi pregnant women reported that they avoided plantain flower (*kaldil*), bottle gourd (*jatilao*), ash gourd (*kumura*) and bitter vegetable especially bitter gourd. Bottle gourd and white gourd was avoided up to delivery for fear of cough and cold as they consider it as cold food. Sugarcane was avoided for first two months of pregnancy for fear of miscarraige. On gynecological consultation, it was stated that during first few months of pregnancy, sugarcane juice may induce hyperglycemia which may hamper the foetus leading to miscarriage.

Table-10: Foodstuff avoided during pregnancy

Foodstuff	Period of inclusion	Folk belief
Duck and pork	Entire period of pregnancy	High fat, fear of difficulty during delivery.
Fish (borali, mirika, kusia)	Entire period of pregnancy	Hot food, high blood pressure and some old ailments may come up. Induce vomiting.
Papaya	Entire period of pregnancy	Fear of miscarriage
Pineapple	Entire period of pregnancy	Fear of miscarriage
Sour foods	First three months and last two months	Fear of miscarriage
Sugarcane	First two months of pregnancy	Fear of miscarriage
Egg	First three months of pregnancy	Fear of nausea and bleeding as considered as hot food
Plantain flower	Entire period of pregnancy	The foetus will be giant like a plantain flower
Bottle gourd and ash gourd	Entire period of pregnancy	Cold food, the mother may suffer from cold and cough.
Bitter vegetable	First two months and last two months	Nausea, headache and gas retension
Alkali (*khar*)	Entire period of pregnancy	Hypertension and the mother will not get proper nutrition from food.
Salt (limited)	Entire period of pregnancy	Giddiness

Source: Field Study 2015-2017

Non-vegetarian foods and indigenous green leafy vegetables were included by the Karbi women during pregnancy period and they belief these foods were beneficial for the health of the baby as well as the mother. A special food containing wild bird or local chicken was prepared by adding local herbs like asiatic pennywort (*Centella asiatica; Ass. manimuni*) and shunk vine (*Paederia foetida*; *Ass. vedailota)* with spices. The dish was mentioned as very nutritious and healthy and it was included from second trimester till delivery very frequently (twice or thrice/week). Other kind of animal foods as fish was included from conception and egg was included after first trimester till delivery. Eggs may be boiled and this destroyed salmonella bacteria and makes the eggs safe to eat. So, within the folk beliefs of food protein rich animal foods are included which helps in proper growth and development of the foetus. Karbis had a habit of including dry fish everyday which fulfils the requirement of protein among pregnant women. All types of green leafy vegetables which were very good sources of vitamins and minerals were included every day in Karbi pregnant women meals.

Table-11: Foodstuff included during pregnancy

Foodstuff	Period of inclusion	Folk belief
Local chicken/ bird with herbs	From second trimester to end of pregnancy	Help the foetus to grow and for health of the mother
Egg	After third month of pregnancy	For the health of the mother as well as the foetus
Fish	Entire period of pregnancy	For the health of the mother as well as the foetus
Dry fish	Entire period of pregnancy	To get nutrients
Indigenous green leafy vegetables	Entire period of pregnancy	Health of the mother and growing baby

Source: Filed study 2015-2017

4. Fish as Ethno medicine:

The Karbis used the body parts of different fishes to cure a number of ailments, such as cough, anemia, etc for the reproductive mothers. It can be represented through the following table-

Table- 12: Utilization of locally available fishes by the Karbi people

S. No.	Scientific name	Local name	Parts used	Disease condition	Application
1.	*Danio aequipinnatus*	*Nune*	Whole fish	Pregnancy complications	The boiled fish is consumed regularly.
2.	*Monopterus cuchia*	*Kumchirui*	Whole fish or raw blood	Anaemia during pregnancy	Raw blood taken orally.

			Whole fish/blood	Kalazar	Small sized raw fish is taken orally or fresh blood of the fish is consumed.
			Blood	Entry of leech	Fresh blood is consumed raw as tonic for removal of leech from rectum/anus.
3.	*Puntius* sp.	*Ok-puthi*	Head	Night-blindness to the baby in womb	Cooked head is taken regularly.
4.	*Clarius batrachus*	*Nagur*	Whole fish	Small pox and measles of the pregnant women.	Cooked fish is eaten.
5.	*Mystus* sp.	*Tengera*	Whole fish	Small pox and measles to the new born child.	Cooked fish is eaten.
6.	Any hillstream fish		Belly	Prevent swelling on injury wounds	The affected area is bandage with fish belly and kept for 2-3 days.
7.	*Channa gachua*	*Ok-langso*	Bile	Prevent inflammation due to prick of thorn or bamboo strips	The bile of the fish is applied when pricked by a thorn, it becomes easy to remove.
8.	*Puntius* sp. (fermented)	*Manthu*	Whole fish	Blood purifier for pregnant women as well as child.	*Manthu* is cooked with bamboo shoot and taken.
				Fever and common cold, specifically to pregnant women.	Manthu is cooked with chilli and taken to cure common cold.
9.	*Anguilla bengalensis*	*Nujung*	Fats	Rheumoid-arthritis	The fat is used as a ointment.
10.	*Heteropnuestes fossilis*	*Singki*	Brain	Sting by the fish itself	The brain of the fish is used as an antidote. The brain is consumed raw when stung by the fish itself.
11.	*Wallago atu*	*Seketa*	Head	To maintain health of the liver	Boiled head of the fish is taken regularly.
12.	*Labeo pangusia*	*Notun*	Flesh of the fish	Cure weakness after delivery	Boiled fish is taken regularly.
			Bile	Stomach ache	Bile of the fish is taken orally.
13.	*Channa punctatus*	*Ok-meklot/ ok-borok*	Eyes	Develop the eyesight of the baby, through pregnancy.	The eyes of the fish is mixed with common salt applied to the corn affected part of the body.

Source: Filed study 2015-2017

Some fishes were avoided during certain illnesses for example among the Karbis, the patient suffering from throat problem, goitre or leprosy is barred from eating scaled fishes.

5. Herbal Remedies:

Among the Karbis a number of locally available medicinal plants were used to cure a number of diseases and ill health conditions to the reproductive mothers, after the child birth and for the new born babies.

Table-13: Local Names of Herbs or Plants Listed and Used By The Karbis

Name of the plant	Part of the plant or herb used	Type of ailment	Medicinal use
Pipali (Piper longum)	Roots	Cough	The root is crushed and the pulp is extracted which is then given to the affected person.
Mirve (Averrhoea carambola)	Leaves	Skin disorder	The leaves of *Mirve* are mixed with kerosene and the paste is applied on the affected area.
Hanjura	Leaves	Bone fracture	The leaves of *Hanjura* are tied tightly on the affected area that helps in fixing a bone fracture.
Menuchek	Leaves	To reduce skin itching	The leaves are crushed and pounded into a paste and applied on the affected area.
Nusadol	Fruit	Dysentery to reproductive mothers	The pulp of the fruit is extracted and mixed with water. The affected person is then given this concoction to drink.
Thipli (Terminalia chebula)	Leaves	Dysentry to new born babies	The leaves are crushed and mixed with water. The mixture is given to the affected person to drink.
Chong-a-mok	Leaves	Dysentry to new born babies	The leaves are crushed with a few pieces of garlic and water and made into small balls.
Thermit Kecham	Roots	Dysentery to reproductive mothers	The roots are made into a paste with water. A small portion of the paste mixed with honey is given to the affected person to drink.
Vothung Mekbop	Leaves	To stop vomiting of the pregnant women and others	The leaves are crushed and made into a paste with water. A small quantity of salt is added to the mixture.
Amlokhi (Emblica officinalia)	Fruit	To stop vomiting of the pregnant women and others	The fruit is offered to the affected person to stop vomiting.
Tenesi	Bark	To stop blood dysentery during pregnancy and other time	The bark is cut into small pieces and soaked in lukewarm water. The mixture is given to the affected person.
Nok, tortey (Amaranthus bicolor)	Fruit, pulp	Prevent jaundice of the pregnant women and new born child	The pulp of *nok* is mixed with the juice of *tortey* which is given to the affected person to drink.
Pherklum	Leaves	Reduce high blood pressure during pregnancy	The leaves of *pherklum* are boiled with water to prepare a mixture.

Abela tengsa	Leaves	Kidney stone	The leaves are crushed with water and the mixture is given to the affected person to drink.
Henru-ki-ik	Leaves	To stop excessive bleeding during menstruation and pregnancy	The leaves are crushed and applied on the affected area to prevent bleeding
Thekek (Stevia rebaudina)	Leaves	Toothache	The leaves of thekek are crushed and pounded with some water and applied.
Baap Keso	Leaves	Pain in joints	The *baap keso* leaves are mixed with mustard oil and made into paste. The paste is applied on the affected area.
Mircharne	Bark	Prevent diabetes specifically in pregnancy	The bark is soaked in water and the mixture obtained is given to the affected person to drink.
Brahmi (Bacopa monnieri)	Leaves	Prevent Asthma	The leaves of the *brahmi* plant is soaked in water and then separated with a sieve. The drained out water is offered to the affected person.
Ghuikumari	Leaves	Prevent Fever, cold and caugh	The leaves are crushed and applied on the forehead of the affected person.
Ara (Rauvolfia Sepentina)	Leaves	Prevent Fever, cold and caugh	The leaves are mixed with straw, mustard oil and garlic. The mixture is then burnt on a cauldron wherein the ash is pounded with a few grains of rice and applied on the forehead
Sonari (Cafia Nedosa)	Leaves	Do	The leaves are crushed and mixed with mustard oil. The paste is then applied on the forehead.
Bohera (Terminalia bellirica)	Leaves	Cough	The leaves are mixed with *ocymum sanctum*, ginger and honey and pulp is given to the affected person to eat.
Bimu and amara (Emblica officinalis)	Leaves	Prevent indigestion, stomach ache during pregnancy	The elaves are mixed and pounded. It is then boiled for a few minutes after adding a small quantity of water.
Bethera	Bark	Prevent indigestion, stomach ache during pregnancy	The bark is first boiled with water. It is then pounded and mixed with pepper.
Durumphul (Vetiveria zizanioides)	Leaves	Prevent indigestion, stomach ache during pregnancy	The leaves are boiled and then separated with a sieve. It is then crushed to form paste.
Batmor	Leaves	Dysentery to reproductive mothers	The juice is extracted by crushing with both hands and given to the affected person with a teaspoonful of sugar as *batmor* is a bitter tasting herb.
Omora	Roots	Dysentery to reproductive mothers	The juice is mixed with a few guava leaves and then pounded
Chiratah (Sivertia Chirayita Bhedelilota)	Leaves	Dysentery to new born babies	The leaves are mixed with few drops of honey
Bhedililota	Leaves	Dysentery to new born babies	The leaves are first soaked in water. Thereafter it is pounded and prepared into a fish curry.
Khuramani and phepheringkam	Bulb	Cure infertility	The bulb is pounded into a paste and then mixed with a few drops of honey.

Nilokut	Seeds	Cure infertility	The seeds are cut into small pieces and soaked in water for about three hours. It is then pounded into a paste and mixed with water before administering it to the affected person.
Bankopath, kharmola, Ageasi	Bark and leaves	Skin boils	The leaves of *Bankopath,* and *kharmola* are mixed with the bark of the *Ageasi*, pounded and made into a paste. The paste is then applied on the skin eruptions at regular intervals.
Katphul	Leaves	Red rashes to the reproductive women and new born babies	The leaves of *katphul* are mixed with the leaves of watermelon and then burnt over a cauldron. The ash is again mixed with coconut oil and the paste is applied on the affected area.
Birbu	Leaves	Skin boil with pus inside	Leaves of a *birbu* are mixed with a beehive. This mixture is burnt and the ash is mixed with coconut oil. This mixture is applied on the affected area till the pus comes out. If the pus fails to come out on its own, the affected area is pricked with the thorn of a lemon plant.
Bhagordut, Dutgba	Flowers	A kind of diarrhea affecting infants	The flowers are boiled with water and the mixture is given at regular intervals.
Odor	Bark	Skin allergy to the reproductive mothers and new born child	The bark is mixed with lukewarm water and the affected person is given a bath with the mixture.
Enamarika, odor	Latex and bark	Fracture	The latex of the *enamarika* is used to cure fracture. The affected limb is manipulated with the hand by the herbal specialists to set the broken bones in order with the latex. Therefore it is tied tightly with the *odor*. The belief is that the whole exercise takes around fifteen days.
Neem (Azaridrachta indica)	Leaves	Prevent chicken pox to the pregnant women and new born babies	The leaves are pounded and the juice is mixed with water. This is then given to the affected person with a few drops of honey.
Onion *(allium cipa)*	Roots	Insect bite	The roots are crushed and made into a paste. The paste is then applied to a wound.
Manmoti, rupeswaad	Leaves and fruit	Prevent jaundice to the pregnant women and new born babies	The leaves of a *mammoth* is crushed with the leaves of a *rupeswaad* and then taken with a roasted crab.
Tortey	Fruit	Prevent jaundice to the pregnant women and new born babies	The juice of *tortey* is extracted and mixed withwater or sugarcane (*lolung*)

Source: Filed study 2015-2017

Table-14: Relationship between food inclusions and exclusions during pregnancy and pregnancy outcome

District	Number of pregnant women surveyed followed recommended food taboos	Pregnancy outcome-Infant weight at birth (Normal 2.5 kg)	Under weight (<2.5 kg)
Karbi Anglong	72	72 (100.00)	NIL

Source: Field study 2015-2017 and record of local PHC and Civil hospitals

During the period of study from 2015-2017, there were total 72 Karbi female were pregnant and had given successful birth to their children. It was found that, all the concerned women had given birth to their babies having normal birth weight. From the food habits and nutritional status it was observed that Karbi women were in a better state of health then other tribal women as stated in some previously conducted studies. Among the studied Karbi families, the traditional food habit had sustained the appropriate birth weight of their infants.

6. Pregnancy related taboos:

The Karbis used to follow certain crucial restrictions during pregnancy period. Funeral ground was the most commonly tabooed place during pregnancy among the Karbi pregnant women. In addition houses of deceased person, forest, deserted places, roaming outside alone after the dusk were also to be strictly avoided by an expectant mother. The reason associated with avoidance of those places were mainly fear of ghosts, evil spirits, etc. which might harm the unborn child and the pregnant women.

Besides debarring certain movements, a number of acts were also prohibited for a pregnant woman and her husband. Those primarily include the killing of any living thing. Particularly the killing of a snake was forbidden for the couple. Killing of a snake was feared to result in a silt in the child's tongue and eventually his tendency to lick and show the tongue all the time. Touching and carrying a corpse was also another taboo for a pregnant mother and her husband in the studied population. There were also beliefs about the effects of the conduct and the behaviour of a pregnant women on her unborn child such as she cannot not tell lies. If she used to do it, her children would feared to be liars. An expectant mother could not steal anything, else the child would also be thief. She should not show any disrespect to elders. Such behaviour of an expectant mother used to cause difficulty in child birth.

7. Rituals related to Pregnancy and Child Birth

The Karbis believed that their supreme Deity *Hemphu* was responsible for impregnating and that was God's wish whether a couple should have children or not. However if a woman did not have any

children then they generally performed a ritual to propitiate the Deity *Somme,* to cure the barrenness even within a year. The offering to *Somme* was generally made in the jhum fields or in the jungles. A goat, a pig or fowls are offered to the deity. If after one year, there was no symptom of conception, then the ritual was supposed to be repeated again.

The Karbis hold rituals to relieve expectant mothers of pre-natal pain and to ensure easy delivery. Eggs were extensively used in these rituals.

The Karbis generally used to perform three ceremonies at the time of pregnancy. The first one was usually performed before 6 months of pregnancy, known as *Hee-i- phuri*. This was mainly performed to protect the expected mother from any evil spirit. The second rite was known as *Hemphu-anoor,* performed at the time of delivery. Another rite called as *Oti Rongpang* was also performed at the time of delivery. Along with that they used to perform a special rituals like *Nari Kata Suwa* during the pregnancy period for the safety and protection of the expectant mother.

This was a kind of purification ritual whereby the ritual impurity of the child birth extends to the mother, the newborn and also the delivery room. It was preceded by the *Daini puja* performed for the welfare of the newborn by warding off the evil eye from harming the newborn. The ritual used to start with the installation of the image of *Daini* in the delivery room. Spells were chanted and she was requested to thwart off evil on befalling upon the newborn baby. At the same time a black bird which was believed to possess mystic powers against evil was sacrificed as offering to the *Daini*. This was followed by the *Nari Kata Suwa* ceremony observed in the same delivery room. The paraphernalia included the laying of a banana leaf in one corner of the room whereupon powdered rice and a lighted earthen lamp was duly placed, the traditional priest *Kurusar*, used to break an egg over this offering while chanting spells to remove the chuwa (period of pollution) from room, i.e, the mother and the baby.

8. Role of Ethno-gynecologists

In relation to pregnancy and delivery and the treatment of gynecological problems, Karbi women had a deep faith on the ethno-gynecologists. They believed that they could effectively discuss their gynecological problems with the ethno gynecologists without any apprehension and shyness because of the fact that she was one among them who can never be wrong. In contrary, the doctors of the Primary Health Centre majority of them were males, used to treat many patients a day. The Karbi women of the studied villages believed that the doctors of the Primary Health Centre hardly have time. Another firm belief held by Karbi women of the studied villages was that the doctors and the staff of the Primary Health Centre caused anxiety among the women because they advised them on so many aspects of pregnancy that it almost appeared to them as a disease. Karbi

women of the all studied families believed that pregnancy was a 'normal process' in the life of a woman.

In the studied families, midwifery was not associated with any particular clan. Women who had mastered the skill of midwifery could take up this profession. Ethno-gynecologists used to occupy a position of honour and esteem in the traditional Karbi society. They were knowledgeable about the gynecological problems and its solution. In her capacity as a herbalist, she used to collect various roots, leaves and other edible parts o f a herb. She used to play certain significant roles in different stages related to pregnancy and child birth, as mentioned below-

1. Prenatal Care

In the studied families, an ethno-gynecologist was usually selected between the sixth to the ninth month of pregnancy. During this period, the ethno-gynecologist used to visit the pregnant woman weekly. The most common prenatal practice was that of abdominal massage. This massage is thought to make the birth easier. The ethno-gynecologist used to take a small quantity of warm mustard or coconut oil in a bowl and taking a small portion of the oil in her palm, she used to massages the abdomen of the pregnant woman in slow circular movements. She claimed to be well-informed about the kind of strokes to be applied. To keep the body of the pregnant woman in homeostasis or balance, a pregnant woman was advised to drink coconut water in the ninth month of pregnancy.

2. Delivery

The delivery was conducted by the ethno-gynecologist in a separate part of the house. This place was usually the inner room of the house, but not at any place which was near to the objects of religious usage. The ethno-gynecologist ensures that the place selected for the delivery is cleaned properly as the mother and the new born are highly susceptible to various illnesses. The place must not be over crowded. Apart from a few elderly relatives, she advises neighbours and friends to wait in the other room. The most popular position for delivery in the all studied families was sitting with knees bent, leaning back on someone or something for support. Other traditional positions include kneeling, squatting, and standing up. The attendants who assisted the pregnant women were usually the mother, mother in law, elder sister or sister in law of the woman. The attendants were asked to hold the feet and hands of the pregnant woman. The ethno-gynecologist then exerts pressure with each labour pain and lubricates the vaginal canal with coconut oil. The major duties of an ethno-gynecologist during the process of delivery were to provide physical, mental support to the woman and to massage her abdomen (especially during contractions) and sometimes her back, legs and thighs. It was believed that massaging eases the birth process. Before and after conducting the delivery, the ethnogynaecologist washes her hands with soap or detergent whatever is available. Delivery among the Karbis of studied villages is known as *oso mahang thek.*

3. Removal of The Placenta and The Umbilical Cord

The placenta is known as *phul* among the Karbis in all all studied villages. The placenta was taken out without much manual assistance in all the all studied villages. Standing, stretching, and uterine massages are often used to facilitate expulsion of the placenta. In case of delay, the woman was massaged gently and attempts are made to make the woman gag. It was generally taken out before the umbilical cord was cut. The umbilical cord was tied with a thread or a string. To cut the umbilical cord, a split of sharp bamboo known as *siju* was used. The placenta was buried outside the house. The umbilical cord was cut only after the placenta was expelled when the baby breathes normally The umbilical cord was known as the *chete ari* among the Karbis. It was not disposed off at birth. It was neatly wrapped with a cotton or linen cloth and kept inside the house. When the baby cried, the *anari* along with the cloth was dipped in a bowl of water and then fed to the infant. Then it was buried.

4. Post- Delivery

After delivery, the new born was held upside down and then sprinkled with water to make it cry. Then the baby was sponged thoroughly with luke warm water. Immediately after the birth, the ethno-gynecologist put a black spot on the forehead of the new born to ward off the evil eye. Thereafter, the baby was shown to relatives and friends. After the third day, a few drops of mustard oil was smeared on the body of the baby and massaged gently by the ethno-gynecologist. For the next few days, the ethno-gynecologists clapped the hands or beats small objects near the ears of the new born to observe its responses. They advised the mother not to take the baby outdoors, as new borns were extremely susceptible to infections. The ethno-gynecologists used to educate the newly became mother how to hold the baby's head after birth. She regularly used to visit the house of the woman to massage her and to advice her on the diet to be followed. Newly delivered mothers used to follow the advice of the ethno-gynecologists and accordingly avoid chillies and other spices as it used to affect the breast milk.

In this regard the following case studies can be mentioned-

Case study-1: O Phunu Timungpi, a 75 year old female has been working as an ethno-gynecologist since 25 years and she was the oldest in this work among the studied villages. Till date she dealt with around 175-200 pregnancy and delivery cases. She was an midwife who claimed to have a fair knowledge of herbs she administers to women suffering from gynecological problems. Her function as an ethno-gynecologist was manifold. She provided emotional support in rendering assistance to women undergoing the process of delivery. Phunu believed that midwifery was typically a female job. However the profit motive of such a profession was never to be thought of, because a child is the messenger of their

Deity only. Whatever, the couple used to give her happily, she was satisfied with it only. According to Phunu, the skills of midwifery could be learned from other midwives only. After her first successful delivery, news spread in the village that she had mastered the skill of midwifery and that was how she became an ethno-gynecologist even in neighbourhood villages. However, she learnt about the medicinal values of the local herbs from her mother.

Case study-2: Ambika Katharpi a 57 year old female was an ethnogynaecologist since last 20 years and attended more than 150 successful cases. She was inducted into the profession of midwifery not by choice, but by sheer accident Ambika was working in the agricultural fields when she received the news that a woman of the village was experiencing labour pain. Her mother who was a midwife was not available at that point of time. The relatives of the women requested Ambika to assist the delivery, which she agreed. It was also easier for her to assist in the delivery as she herself was the mother of a four year old girl. It was a successful delivery and Ambika decided to follow the footsteps of her mother and became an ethno-gynecologist. Being in the profession of midwifery for the past 20 years, she experienced complications in four cases and all the cases were successfully completed by herself only. Ambika believed that complications arose sometimes because the women had the habit of working till the advanced stages of their pregnancy in the agricultural fields as well as doing their household chores. She informed that contraceptives were not popular among the Karbis, because majority of the husbands dislike them and persuade their wives not to teach them the benefits of its use.

Also narrating the incidence of gynecological problems, Ambika believed that lack of personal hygiene, overwork and stress was responsible for the occurrence of these problems. She was also a herbalist and her works were related to prenatal, delivery, antenatal and childcare collectively.

She reiterated the fact that it was not for money that she became an ethno-gynecologist. She was in the profession because it provided her with a sense of completeness, as she was able to assist women in the most significant moment of their lives.

It has been reported that, the concerned Karbi females were very much dependent on the ethno-gynecologists to overcome the gynecological and reproductive complications, as well as for the safe and secured child birth. In this regard the following case studies can be noted-

Case study-3: Jotsna Tokbipi was a 40 year old female inhabiting in one of the studied village of Bokajan. When she was of 35 years, suddenly menopause occurred to her. She became very frightened with it, to get socially ashamed. At first she went to Diphu civil hospital, but the male doctor, who was from a different ethnic group, hardly able to communicate with Jotsna due to different mother

tongue. Her treatment remained incomplete and the problem persisted as it is. Then, she went to the ethno-gynaecologist for the treatment. The said healer, told her to remember, whether she had broken the taboo of food during menstruation or pregnancy at any point of time. She admitted the fact that, unknowingly and unintentionally it was once done by her. The said healer advised her to consult with the magico-religious healer at first to appease the benevolence. Accordingly Jyotsna did it and after the said rituals she went to the ethnogynaecologist for the appropriate treatment. She gave Jyotsna indigenous medicine for a month and gradually her problem was redressed.

Case study-4: Jayanti Ingtipi, a 26 year old female of Bokajan, narrated her experiences in delivering her first child Sarkathim who was two years old during the period of study. Kadami Rongpipi an ethno-gynecologist of the village assisted her in the process of delivery. As it was her first delivery, Jayanti was advised by Kadami Rongpipi to abstain from eating jackffuits, red meat and black gram as these things generate heat inside the womb. Kadami Rongpipi believed that overeating might lead to suffocation and the baby might die inside the womb. She was also advised not to lift heavy utensils and buckets. On the day of her delivery, her elder sister along with Kadami Rongpipi assisted Jayanti Ingtipi who was in unbearable pain at the time of the delivery. But Kadami reassured her that everything would be all right and told her to tolerate the pain for the sake of her baby. Jayanti delivered a healthy normal baby, who was physically well in condition.

Case study-5: Klirdap Kropi, a 30 year old woman of Nilip, narrated that the ethno-gynecologists were not merely midwives. The unstinted support they provided at the time of delivery is incredible. This emotional association was something that continues for life and so the services of an ethno-gynecologist was sought even after the process of delivery. Neera who was blessed with two children- a boy and a girl narrated that at the time of her first delivery she was extremely weak and felt nauseated almost all the time. Ethno-gynecologist Phunu Timungpi who assisted her in her pregnancy used to visit her regularly and advise her on her diet and nutrition. Phunu Timung knew that Neera was anemic. She used to gave her appropriate indigenous medicines. Both of her delivery was safe and the health of the babies was also proper.

As a result, during the period of study from January 2015- December 2017, it was recorded that, total 72 women became pregnant and had given birth to their children safely. No cases of Maternal mortality has been recorded during the period of study. Further, among the total studied family, none of the cases of maternal mortality has also been recorded. Further, during the period of study from January 2015- December 2017, total 105 numbers of child birth has been recorded. Among them no cases of child mortality has been recorded. Any case of fetal loss, still birth, U5 mortality

has not been recorded.

Again the record was taken from the period of January 2013 to December 2017 and total 235 cases of birth was recorded from the studied families. Among them total 1 case of U5 mortality was recorded, due to malaria.

Thus, among the studied Karbi people, covering collective sample population from every block of the entire district, it has been found that, the cases of Maternal mortality rate, Infant mortality ratio, Under 5 mortality ratio is remarkably lesser than the National level, state level and even within the district level data. It has been reported by the doctors of Diphu civil hospital and PHCs that in the district of Karbi Anglong, the cases of infant mortality, neo natal mortality, U5 mortality was quite high among the caste Hindus of both Bengali and non Bengali communities, muslims. But in case of the Tribal communities, particularly among the Karbis, the issues of reproductive mother child health was intimately associated with their cultural practices. Even the literate couples who were located close to the urban vicinity and even converted to Christianity were also depended a lot on their traditional healers and ethno-gynecologist.

Concluding remarks:

The reproductive mother-child health issues of the Karbis cannot be understood in isolation. It is intimately related with their surrounding ecological background, natural resources, indigenous knowledge, folk belief, rituals and psychological dependence primarily. Their folk belief and indigenous knowledge used to play a very crucial role in the preparation of different ethnic diets for the menstruating and pregnant women. On the other hand, they used to cure gynecological and reproductive complications through their traditional medicines as prepared through the locally available floral and faunal resources. Karbi women were very much psychologically depended on their traditional healers as well as ethno-gynecologists due to their similar cultural background. It has been found that, among the studied Karbi population traditional method of treatment and ethnic diet related to reproductive mother-child health issues, had been successful to prevent the cases of maternal mortality, infant mortality, fetal loss, U5 mortality. If their method is being followed by the other non tribal ethnic groups of the studied villages and adjacent villages, then it is expected to be effective in reducing the reproductive mother-child health related mortalities to a certain extent.

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Short Communication

Identifying reproductive tract infection in high altitude tribal area of Himachal Pradesh

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Keywords: RTI, STI, reported symptoms, sensitization, tribes, Lahaul & Spiti

Tribal population in India need special attention since they are mainly governed by traditional beliefs, practices and ecological conditions. Lahaul and Spiti a pre-dominant tribal district located in high altitude areas of Himachal Pradesh poses a very specific ecological conditions under which the people struggle to adjust themselves from time to time to cope up with the situation. According to Census 2011 the district is completely rural with 521 villages and a total population of 31564.[1] Swangla and Lahula in Lahul and Bodh/Bodhs in Spiti division are the major tribes in the district.[1] This snowclad mountainous district is located in the lap of Himalayas at an altitude of 4,270 meters from sea level.[2] The present administrative centre is Keylong in Lahaul. The district was formed in 1960, and is the fourth least populous district in India (out of 640 districts).[2] This district is connected to Manali through the Rohtang Pass. To the south, Spiti ends 24 km from Tabo, at the Sumdo where the road enters Kinnaur and joins with National Highway No. 5.[2] The two valleys are quite different in character. Spiti is more barren and difficult to cross. It is enclosed between lofty ranges, with the Spiti river rushing out of a gorge in the southeast to meet the Sutlej River. It is a typical mountain desert area with an average annual rainfall of only 170 mm.[2]

The area is characterized by heavy snow fall which starts from October and it continues till mid-May. During this period the temperature drops below freezing point and excessive snowfall blocks the roads thus disrupting the common vehicular transportation and thus isolating the area from rest of the world.[1] During the season when the temperature drops sharply a sizeable number of the residents temporarily

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migrates to low land areas in the state, until the condition improves in Lahaul and Spiti. While those who stay back during these extreme situations struggle to cope up with basic minimum requirements. Along with many others, the food and water scarcity are a common problem particularly during this extreme cold climatic condition.



Fig 1. Topography of the area

The harsh conditions of the district permit only scattered tufts of hardy grasses and shrubs to grow. Due to certain changes in climate, nowadays people are being able to grow some vegetables and the main cash crops are potatoes, cabbage, and green peas.[2] Apples are also grown as part of their agro-economy. Other than tourism, there is limited scope and diversity of the livelihood pattern in the area.

The settlement pattern is scattered in large areas located in extremely difficult terrains. Inter village transportation and with the district headquarter is a difficult one. These climatic and ecological conditions make the life difficult for the local people. There are one District

hospital and three Community Health Centers along with 15 Primary Health Centers which caters to the health needs of the district.[3] Further these infrastructures are poorly accessible to the people living in far flung villages.

Cold temperature and scarcity of water for domestic purposes upsurges poor personal hygiene and in turn promotes various morbidities particularly of reproductive tract infections (RTI). Until now RTI was a lesser known morbidity in the area with scanty literature on the same. Looking into the sensitivity of the issue, people find it disgrace to discuss it with others. In developing countries, women are at higher risk for several reproductive health problems especially reproductive tract infection/sexual transmitted infection (RTI/STI).[4] The problem of RTI/STI morbidity in women is largely due to ignorance, low level of awareness regarding sexual and reproductive health coupled with other social factors like low female literacy, cultural factors. Social taboos and stigma also persist within the society related to health problem which is also a barrier in seeking medical help particularly for women. Women are the most affected from such infection since the disease may often go unnoticed in them leading to negligence. In India, one among four women in the reproductive age group has any one type of RTIs and the annual incidence of RTI estimated is about 5%. Consequently, the prevalence rate of RTIs in various states of India ranged from 19 - 71%.[4]

ICMR - National Institute of Research in Tribal Health (ICMR-NIRTH), Jabalpur has established a field station at Keylong in the year 2014 to identify the local health problems in the area and conduct research to find the remedy to strengthen the state health authority. Looking into the above-mentioned situation the ICMR-NIRTH Field Station has conducted a pilot study to understand the existence of the RTI problem with the objective to study the people's knowledge, self-reported symptoms and treatment seeking behavior.



Fig 2: ICMR-NIRTH Field Station at Regional Hospital, Keylong

Study population includes 494 women in the reproductive age 15-49 years who were the resident of the valley and had consented to participate from 19 villages that were selected randomly.



Fig 3: Interviewing the respondent in the open field

The socio-demographic profile of the participants in the study revealed that most of the women were in the age group of 30-39 years (with a mean age of 32.6±9.2 years) of which 70% were ever married women with a mean age at marriage of 22.3±4.5 years. Most of them were from Schedule tribes (86%). Overall 52.6% women did not practice any kind of contraception whereas 20.9% women reported that their partners used condoms regularly.

Twenty six percent of the women interviewed had reported at least one of the symptoms of RTI during three months preceding the survey. The main symptoms reported were excessive abnormal vaginal discharge (73%) followed by itching around the vagina and lower abdominal pain not related to menstruation. This study is in accordance with Sangeetha et al. 2012 [5] and Nandan et al. 2001[6]. It is also found in the study that only 34.1% seek any treatment mostly from Regional Hospital, Keylong.

Hence the study highlights the need for community-based studies including laboratory investigations to know the exact prevalence of the disease, as the self-reported symptoms has its limitation and alone cannot measure the burden of any disease in the community. The study also points to the fact that RTI is not considered very seriously in the community until the condition deteriorates severely. Proper need-based sensitization programme is essential to aware the masses about the ill effects and prompt treatment for RTI such as to generate a demand for services available. Further it is felt necessity to educate the masses the importance of personal hygiene and practice of safe sex. This study will serve as a reference for researchers interested in the field of RTI epidemiology in such areas where the climate is extremely cold, and may take up similar studies to compare and highlight the performance of reproductive and child health programme in combating this infection.

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Nutritional status among pre-school and school going tribal children of Jagdalpur, Chhattisgarh

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Abstract: *India is the second most populous country in the world with 8.6% of its population consisting of ethnic communities. A preliminary study was carried to identify the nutritional status among pre-school and school going children (<19 years of age) of district Jagdalpur, Chhattisgarh. (Lambda-mu-sigma (LMS) method used for calculation of for z-score value for growth assessments and WHO z-score classification for growth was employed. The age-sex wise variation was calculated in terms of growth and nutritional status. The study revealed higher percentage of underweighted, stunted and undernourished children than the national average. The study indicates an urgent need for nutritional intervention with contemporary health and wealth benefit schemes to address their health ailments.*

Keywords: Underweight, Stunting, BMI and NCHS

INTRODUCTION

In India, 8.6% of total population of the country (10, 4281,034 individuals) belong to ethnic communities and are classified as Scheduled tribes. Among them 5,24,09,823 are males and 5, 18,71,211 females. Nearly, 75% of these tribal populations live in Central India. The Central India mainly comprises of the states of Madhya Pradesh and Chhattisgarh. Total tribal population in Chhattisgarh is 78, 22,902 which includes 38, 73,191 males and 39, 49,711 females[1]. The tribes of Chhattisgarh mainly depend on the forest for dwelling, food and livelyhood, but the civilization and developmental processes, have gradually invaded the forest area, depriving these tribal communities of their means of subsistence. The tribal communities are socio-economically disadvantaged and face extreme poverty, food insecurity, unemployment and poor health. They are nutritionally susceptible to many vectors born diseases and several genetic disorders due to consanguineous marriage . The malnutrition, communicable and non communicable diseases play a significant role in morbidity and mortality among them. Despite existence of food security, nutritional rehabilitation, and intervention programme for malnutrition etc, hundreds of tribals and children die due to malnutrition.

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Nutrition is a core pillar of human development and concrete, large-scale program that reduce the burden of under-nutrition and deprivation in countries will help in development of nations. The good nutrition is essential for healthy growth, strong immune system, neurological and cognitive development in the early childhood. Malnutrition syndrome is the result of interaction between improper diet and disease. Malnutrition is an important health indicator and one of the leading causes of high morbidity and mortality especially among preschool children and pregnant women. Globally preschool children are most susceptible to the double burden of nutrition as compared to adults. Globally, an estimated 26% (165 million of children) were stunted; 16% (101 million children) were underweight and 8% (52 million children) were wasted under-five years of age[4]. Further, more than one-third of under-five deaths are attributable to under nutrition. In India, children 0-5 years of age were found to be stunted (38.4%), wasted (21%) and undernourished (35.7%) respectively. Similarly, 24% of adolescents (10-19 years) were found to be undernourished and 5% adolescents over weighted. Overall, 60% of tribal children between the ages of 0-5 years of age are underweight, 59% were stunted and 21% children were wasted[8]. About 50% of under five children were moderately or severely malnourished. These rates are higher in communities that are socially and economically underprivileged. The prevalence of undernourished children of 5-18 years was highest in Bihar (33%) and lowest in Uttarakhand 19.9%. Chhattisgarh stands at 3rd position in respect to undernourished (<2 SD) children of 5-18 years of age group[12]. The nutritional assessment indicator body mass index (BMI) of any individual influenced by anthropometric measurements like arm circumference, waist circumference, hip circumference, skin fold thickness, body fat percentage, body fat, basal metabolic rate, total energy expenditure adiposity index etc,. Previous studies of developing countries indicate that the individuals generally fail to achieve their genetically determined potential growth because of poor diet and infection. The present study was carried out to assess the nutritional status among pre-school and school going tribal children of district Jagdalpur, Chhattisgarh.

METHODOLOGY

The present studies were conducted in two phases (phase-I on September, 2015 and phase-II during October 2016 - January 2017). The study was conducted among pre-school going children (<5 years of age) and school going (12-18 years) tribal children from Anganwadi centres and schools of district Jagdalpur, Chhattisgarh respectively. A total of 543 children (138 preschool children from Anganwadi centres and 405 school going children from government schools) of Bastar were selected using multistage stratified random sampling method (Figure-1). The required consent was obtained from the head of Anganwadi centers and Head of school prior to data collection. All information and physical growth measurements were recorded using pretested and certified anthropometric instruments. The data was recorded in a semi-structured interview schedule in the presence of Aganwadi workers or school teachers.

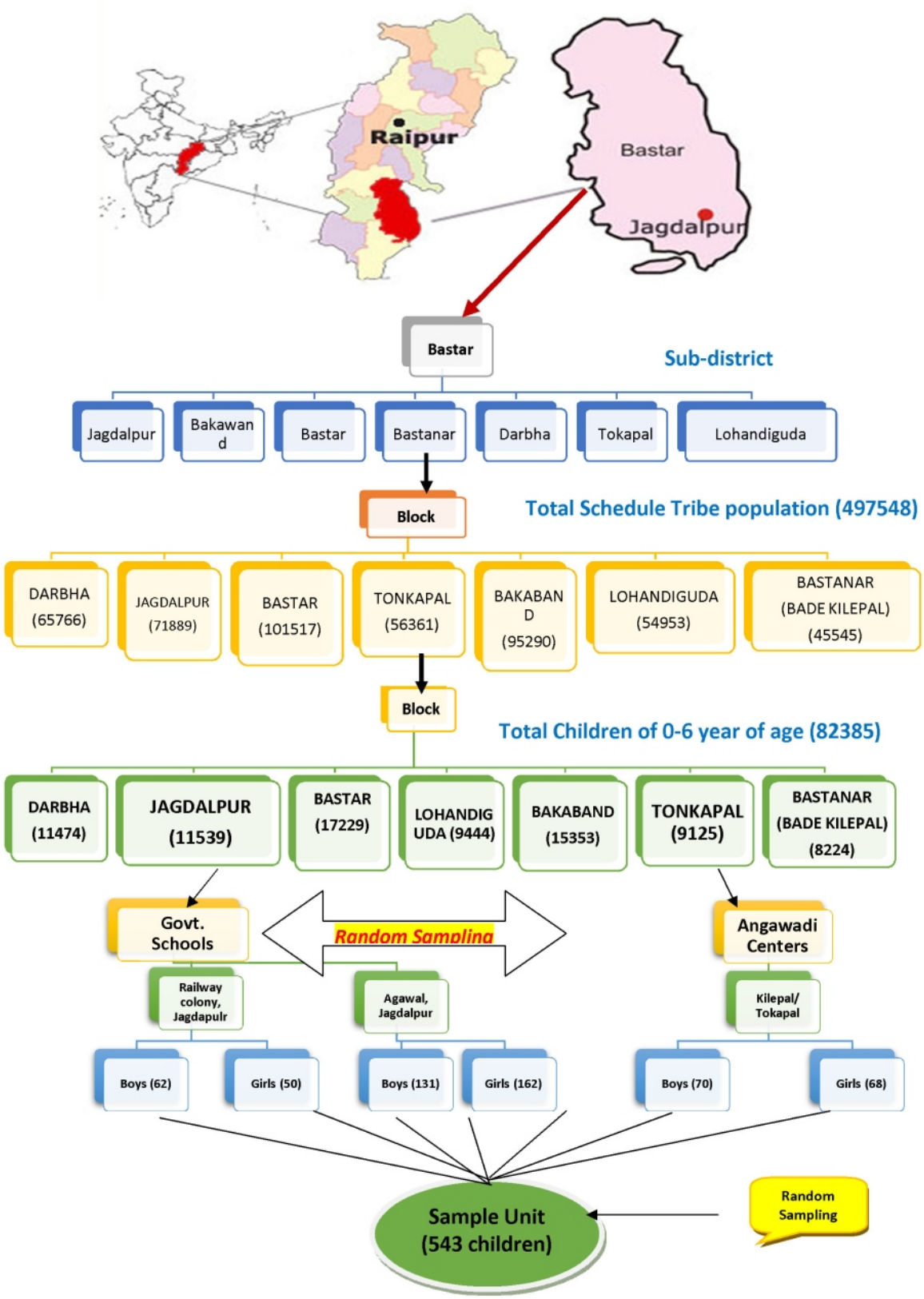

Figure-1: Flow chart for sample selection using Multistage Sampling

For nutritional assessments all the participants were weighed using digital weighing machine, height and other body length measurements were taken with the help of Anthropometric rod. Age and sex wise assessments of nutritional status was done in terms of undernourished, stunting and underweight using recommended LMS methods for z-score or standard deviation (SD). The severity of under-nourishment, stunting and underweight was assessed by utilizing the z-score/SD cut-off i.e. -3SD. Z-score SD classification for nutritional assessment presented in table-1.

Table-1: Classification for nutritional assessments: WHO, 2007

Classification	Z-score
Obese/Over weight	≥2 Z-score
Adequate	-2< Z-score>+2
Moderately Malnourished	-3 <Z-score>-2
Severely Malnourished	Z-score<-3

The data was analysed using SPSS V.21; MS. Excel and WHO Anthro plus.

Phase-II of the study mainly involved, the school going tribal children (12-18 years of age). These children were randomly selected from government schools of Jagdalpur and tested for nutrition assessment using LMS method of z-score[16]. The level of nutritional and anthropometric measurements were compared with NCHS, 2005 reference values, and national level survey NHFS-3, 2005-06, NHFS-4, 2015-16.

Study area

Jagdalpur is the district headquarters of Bastar, Chhattisgarh and geographically located at $19^{0}07'$ North and $82^{0}03'$ East coordinates. The district Jagadalpur has a tropical savanna climate. The district has 54% area under forest cover and the total population is 14, 13,199 with predominant tribal population (65%)[1]. Majority of population comprises of tribal communities. Dominant tribal groups are Gond, Halba, Dhurvaa, Muria and Bison Hon Maria. Major proportions of tribal as well as non-tribal population of study area are engaged in their traditional jobs, agriculture practices, and daily wage labour. Forty per cent of livelihood is forest based, 30 % are agriculture based and 15 % of livelihoods are dependent on animal husbandry. Another 15 % of people are employed as daily wage labourers. Unfortunately, this district is exposed to serious threat of Naxal activities/Maoist attack.

RESULT

The finding of phase-I[st] nutritional survey among pre-school children of Kilepal and Tokapal Anganwadi centers is shown in table 2 and Figure 1. Age and sex wise population pyramid of children (≤ 5 yrs age) is depicted in Figure-1. Figure 1 clearly shows that the number of girls aged between 0-11 months was highest and in contrast boys were highest in the

ages between 36-47 months.

Among preschool children, the nutritional status was assessed using LMS method: for weight-for-age z-score[16]. The findings are presented in the **Table 2.** The table 2 shows that the overall, prevalence of underweight was 29.7% (95% CI: 17.3 - 46.0) followed by the prevalence of moderate underweight children (21.7%; 95% CI: 7.1 - 50.1) and severe underweight children (8.4 %; 95% CI: 2.1 - 25.7). Similarly, the prevalence of underweight among boys 41.4 % (95% CI: 30.2 - 53.6) was higher than girls 17.6 % (95% CI: 3.9 - 53.0).

The percentage of underweight children here was higher than the national level[8].

Age wise weight–for-age (underweight) among under five children is presented in **Figure 2.** As can be seen from Figure 2; the prevalence of underweight (weight-for-age) increases with age upto 5 years. Similarly, age wise the percentage of underweight (weight for age) children increased with age excluding children of 24 to 35 months. At age cohort (48-60 months), the percentage of underweight children was significantly higher than nutritionally normal children ($p<0.05$) (**Table.3**).

Age and sex wise population pyramid for school going children (12-18 years) is presented in **figure-3**. It was observed that more than 50% of school going children (52.6% of girls and 47.4%

Table-2: Prevalence of underweight based on weight-for-age z-scores

Prevalence of underweight	**All n = 138**	**Boys n = 70**	**Girls n = 68**
Underweight (<-2 z-score)	29.7 % (95% CI: 17.3 - 46.0)	41.4 % (95% CI: 30.2 - 53.6)	17.6 % (95% CI: 3.9 - 53.0)
Moderate underweight (<-2 - >=-3 z-score)	21.7 % (95% CI: 7.1 - 50.1)	30.0 % (95% CI: 10.6 - 60.8)	13.2 % (95% CI: 2.1 - 52.5)
Severe underweight (<-3 z-score)	8.0 % (95% CI: 2.1 - 25.7)	11.4 % (95% CI: 2.7 - 37.1)	4.4 % (95% CI: 1.4 - 13.5)

Table-3: Prevalence of underweight by age group

Age (Month)	**Nutritional status**		**Total**
	Underweight	**Normal**	
0-11	5 (19.2%)	21 (80.8%)	26 (18.8%)
12-23	4 (26.7%)	11 (73.3%)	15 (10.9%)
24-35	12 (23.1%)	40 (76.9%)	52 (37.7%)
36-47	12 (38.7%)	19 (61.3%)	31 (22.5%)
48-60	8 (57.1%)	6 (42.9%)	14 (10.1%)
Total	**41 (29.7%)**	**97 (70.3%)**	**138**

boys) were of 16 years of age group with mean age i.e. 15.26±2.5 years. The number of girl participants was higher than boys in this cohort. Comparison of age and sex wise average with NCHS 2005 is presented in **Figure 4, 5 and 6**. It is apparent from figure 4, that the boys were significantly heavier (43.73± 8.2 kg) than girls (40.56± 6.74kg); p<0.001 in all the age groups. However, their weight was lower than national average, NCHS 2005 references (p<0.001). Similarly, the body stature increased with increasing age among both children (boys and girls) excluding 14 year of age category. The boys were taller (160.3± 8.2 cm) than girls (151.08± 6.6 cm); p<0.001 in all the ages. The mean value of body stature for both sex was found to be lower than reference values (**Figure-5**).

The age-sex wise comparison of mean body mass with NCHS, 2005 is displayed in **Figure-6**. The age wise average value of mean body mass index nutritional status of boys and girls was significantly (p<0.05) lower than reference values of NCHS, 2005. Among them the mean body mass index varied for girls (16.5 kg/m-2 to 18.5 kg/m-^{2}) and

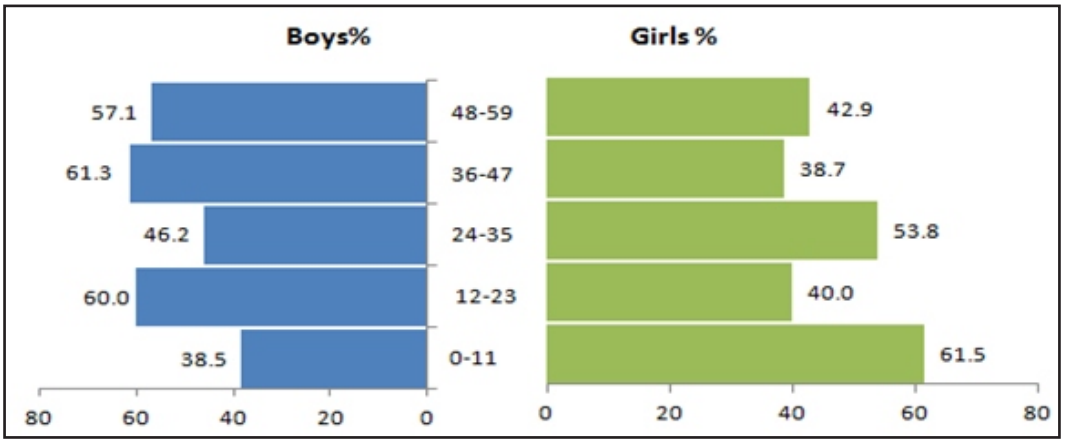

Figure-2: Age-sex wise population pyramid of studied children (<5 years)

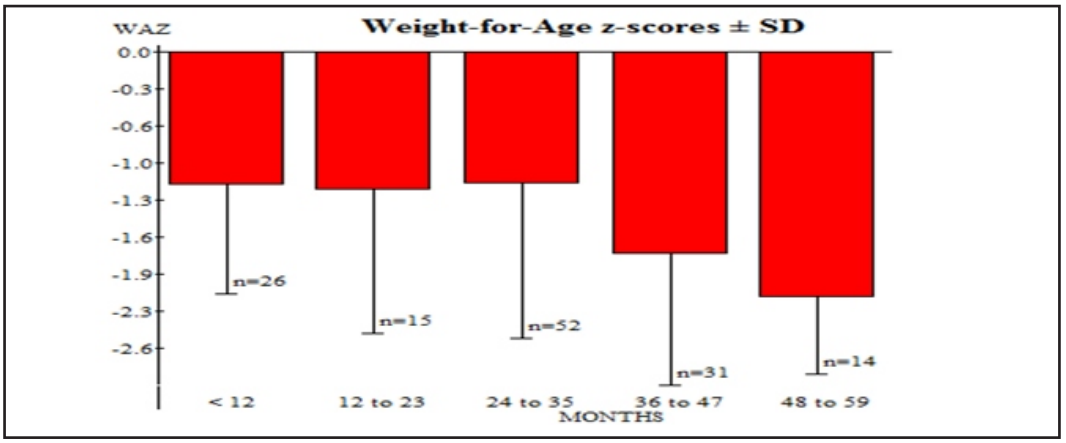

Figure 3: Mean weight for age z-score by age of the subject

for boys (15.6 kg/m-2 to 17.5 kg/m-^{2}). Based on z-score of body mass index-for-age nearly 33% of school going children fall under undernourished category while 1.7% children were overweight/obese. Overall the percentage of under-nourished children was highest among boys i.e. 44.1% as compared to girls 22.9% ($p<0.05$). Similarly, overweigh and obesity was higher among girls i.e. 2.4% than boys 1% ($p<0.05$) (**Figure-7**).

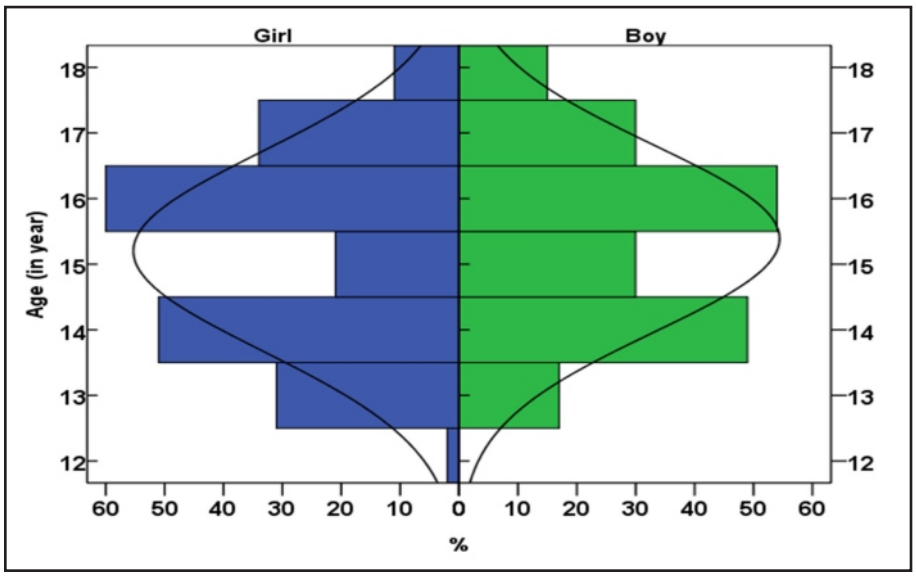

Figure-4: Age and sex wise population pyramid of school going Children (12-18 years) of Jagdalpur

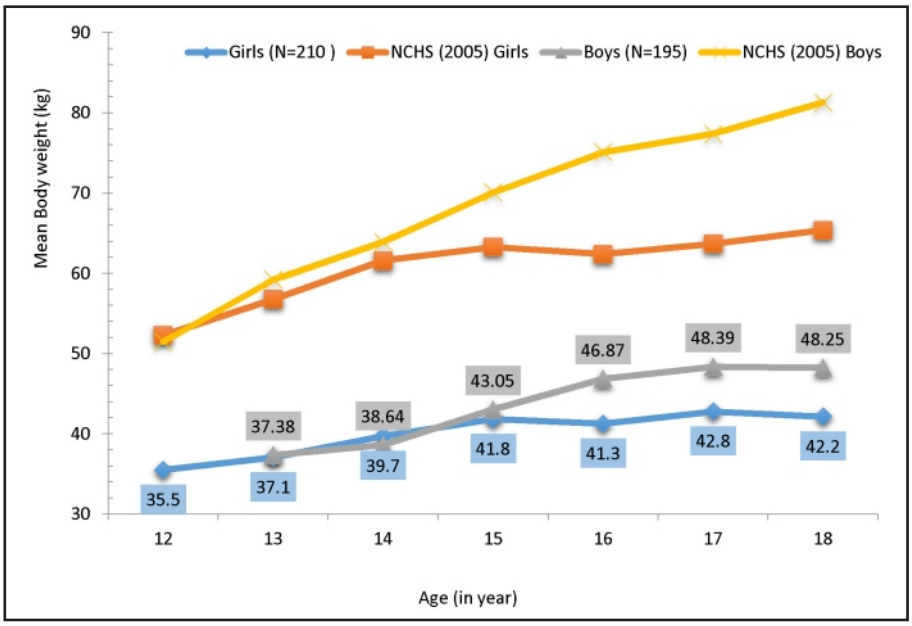

Figure-5: Age-sex wise comparison on body weight in between children and NCHS, 2005

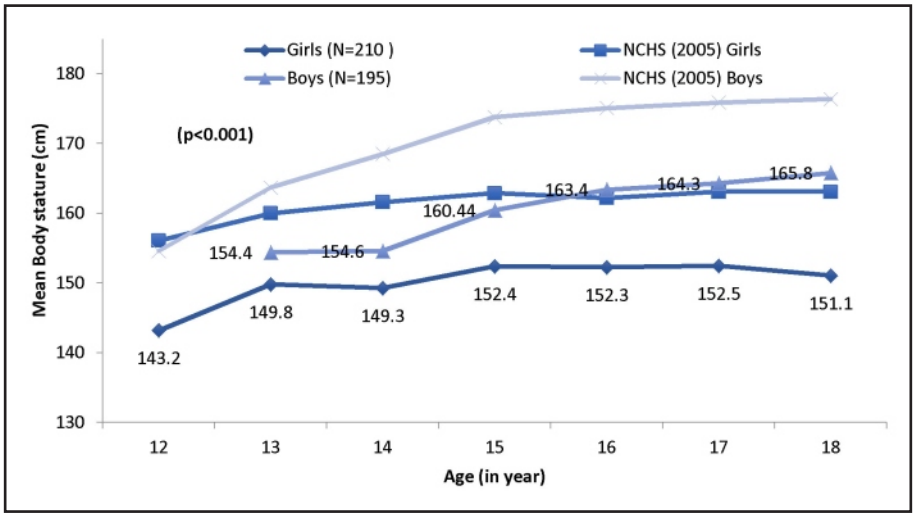

Figure-6: Age-sex wise comparison on body stature in between children and NCHS, 2005

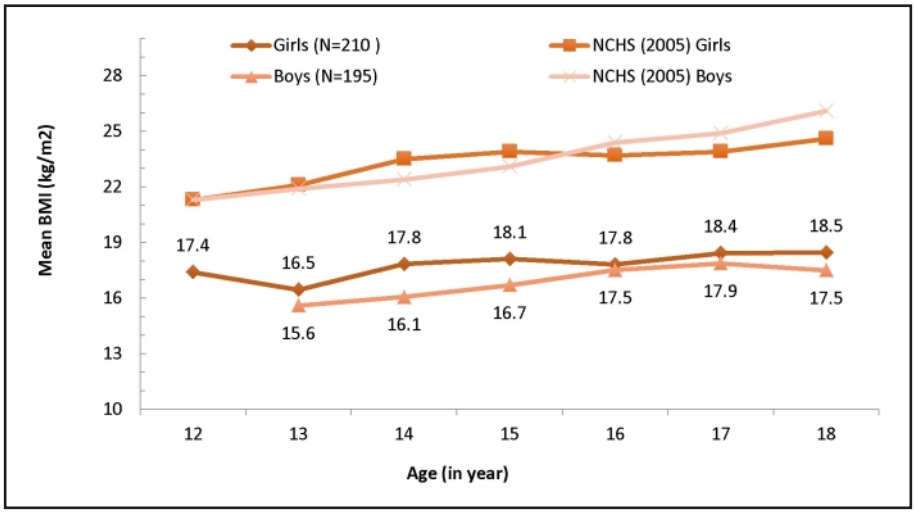

Figure-7: Age-sex wise comparison on body mass index in between children and NCHS, 2005

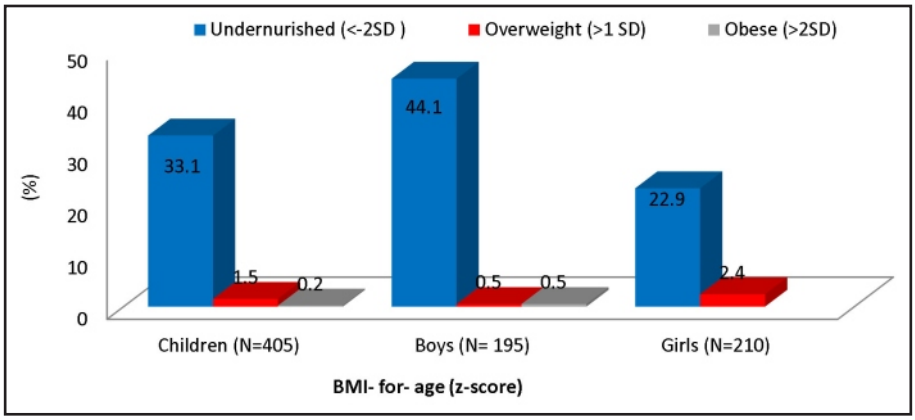

Figure-8: Distribution of nutritional status among school going children

DISCUSSION

Assessment of the nutritional status among children bears great significance in the developing county such as India, where the majority of the populations are undernourished and living in deprived conditions[13]. Due to lack of health facilities, socio-economic status and ignorance, a large proportion of children are affected and undernourished[19],[20]. In Sagar, MP, 10% of studied school going children were found undernourished and their level of nutritional status was poor as compared to national level. Among Baigas of Patalkot in MP, the mean values of growth measurements were lagging behind NCHS references. However, their physical growths measurements like body weight, height etc. were increased with age. Comparison with previous studies revealed that, the percent undernourished children was higher than in Madhya Pradesh (31.1%); Odisha (32.2%); Rajasthan (32.5); Jharkhand (30.3%); Bihar (33.0%); Assam (27.6%) and Uttarakhand (19.9%)[12].Present findings and their comparison with national standards for preschool and school going children will aid policymakers to formulate appropriate nutritional intervention and references to combat malnutrition at regional level.

CONCLUSION

Despite, government programs, tribal children continue to suffer from double burden of malnutrition (undernourished & overweight/obese). The prevalence of undernourished was more severe in 0-5 years in Jagdalpur, Chhattisgarh . There is an urgent need for nutritional intervention programs to address the public health problems and care needs to be taken that these interventions do not infringe traditional cultural customs and be socially acceptable.

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Research on leprosy in tribal areas of India: Challenges in accessing health facilities and diagnostics

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INTRODUCTION

Leprosy is caused by uncultivated pathogens namely, *Mycobacterium leprae and Mycobacterium lepromatosis,* which primarily affect skin, mucosal surface of upper respiratory tract and the peripheral nerves(1, 2).Leprosy occurs in many regions of the world but the majority of cases (over 3 quarters of the cases) are reported from Brazil and India. With over 1.25 lakh new leprosy cases detected in 2019, India accounts for >60% of the total cases reported globally indicating an active transmission, especially in certain pockets of hyper-endemicity(3). Ironically, community-based leprosy eradication seems to have been tantamount to achieving the elimination goal demarcated by WHO as a public health issue (Prevalence rate <1 per 10,000 population) attained by India in 2005(4). Post 2005, major structural improvements were made by the National Leprosy Eradication Programme (NLEP) and the Global Leprosy Plan which may have contributed to new case detection (NCD), disability, number of paediatric leprosy cases. However, a substantial reduction in leprosy burden has not been documented since then. For example, Annual New Case Detection Rate (ANCDR) in 2006-07 was 1.2 which has come down only marginally to 1.02 in the 2016-17 (Figure 1) with a proportion of 49.57% belonging to MB cases, 39.17% of all cases in females, 8.7% of all cases among children and 3.87% show visible deformity.

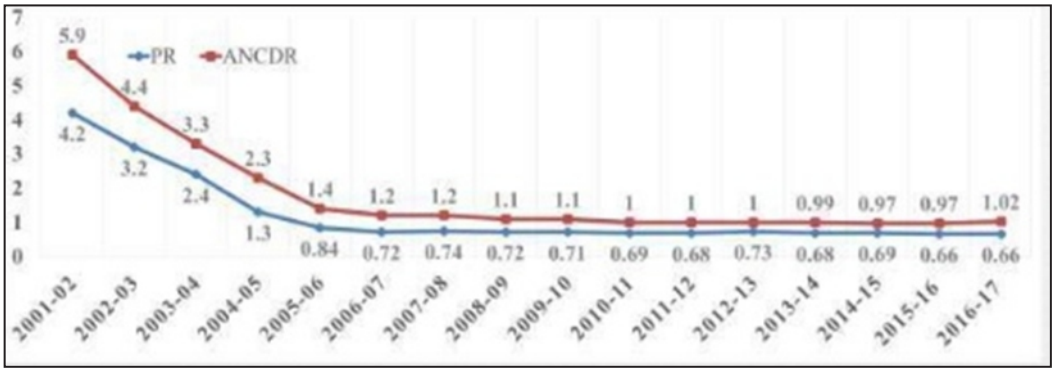

Figure 1: Trends of Prevalence Rate (PR) and Annual New Case Detection Rate (ANCDR) per thousand populations (Source: NLEP Report 2017)

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Tribal communities were named differently before independence and were included in the 'depressed classes' category. After independence, the definition of 'Scheduled Tribes' (ST) was coined and given legal status, as it was contained in the Constitution vide Article 342(i) empowering the President of India to determine by public notice the tribes or tribal groups. Consequently, tribal group identification was developed as part of an administrative mechanism whereby the tribes thus named were eligible for certain development schemes and other benefits funded by the state. Adivasi is the collective word for Indian subcontinent tribes that are considered indigenous to places in India where they live. Accounting for 8.6% or 104 million people of India's population (Census 2011) and spread across 705 tribes, they are still considered to be highly marginalized and discriminated(5). Recognising the need for a roadmap for tribal health which is based on the understanding of the health situation of tribal people, India's first comprehensive tribal health report was presented before public in 2018. The report is the result of years of research by an expert committee that explored how tribal communities in India are suffering from healthcare inequity, and how to bridge that gap(6).

As per this report, "Though the proportion of tribal population of in India is 8.6%, during 2012, the proportion of new leprosy cases among the tribal population was found to be 18.5% revealing a disproportionate burdenof leprosy among the tribal population. Since leprosy treatment is integrated with the general health services, identifying the leprosy cases is not going to be easy in these settings and they remain as endemic reservoirs, unless greater efforts are made to reach them". There are always substantial number of cases identified whenever targeted under a drive or Leprosy Case Detection Campaigns (LCDCs) which demonstrates that there aresignificant proportion of undetected cases of leprosy especially in those areas which arenot covered by the general health services for numerous reasons(7, 8). The incidence of undetected cases of leprosy is estimated to be greater in vulnerable demographic communities without physical and social access to health care(9). In the Indian sense, Scheduled Tribes (ST) are seen as economically deprived communities with a greater chance of living in unfavourable circumstances(10, 11). The WHO Specialist Leprosy Committee has recognized unequal leprosy distribution across nations and has suggested that governments should concentrate on regions of greater endemicity which involved the tribal communities(12). Despite the disproportionate burden of leprosy cases in India, very little is known about the leprosy research in the tribal population, especially after 2005 when India achieved the so called "elimination" goal. Moreover, the current data available has not yet been compiled in a metadata analysis of relevant published literature. Thus, this review summarizes available literature on the research focusing on leprosy in the tribal regions of India.

METHODS

Search and selection of papers

Research articles from MEDLINE were identified via PubMed and PMC. PubMed and PubMed Central (PMC) is a free public library that records open-access, full-text scientific publications written in journals in the field of biological sciences. The search was limited in including the manuscripts published after 2005 in the indexed journals. The searching has been done by using the following keywords: Leprosy Tribal, Leprosy India Tribal, Adivasi leprosy, Indian tribal leprosy. Papers were selected if they include any aspects of leprosy in the tribal regions of India. Most common studies were epidemiological studies, review, prevalence of leprosy, literature knowledge and perspectives.

Data Extraction

leprosy related data of all the available tribal regions from Last 15 years (2006-June 2020) were obtained. This data was categorized into Year of study, Tribes included, Tribal area and Type of study. Lastly, analysis of significant studies conducted in tribal areas within the districts were discussed.

RESULTS

Out of 15 studies conducted in tribal areas, nine were related to epidemiological studies(13-21)followed by four studies which is about the search of traditional medicinal plants used to treat mycobacterial and other diseases in order to find out the compounds that can be used to curb the disease(22-25). It was postulated that tribal people have the authentic information on medicinal values of different parts of the plants such as fruits, seed, flower, leaves, roots and stembark(26-30). The focus on these studies were to record the ethno-botanical data, identify the possible medicinal plants to evaluate their toxicological potential and biological activity in order to find out the major compounds responsible for its medicinal activity. On the other hand, the goal of the epidemiological studies was to collect data on the prevalence of a particular form of leprosy in a rural population cluster with a largely tribal community in the various Indian states.

These literature sources include a Case study(31), a Review(32), and a description of adverse effects of Multi-drug therapy in leprosy(16). To our surprise no studies has explored the patterns of drug resistance inleprosy. Table 1 describes the studies conducted in different parts of India among different tribes related to leprosy. Most published studies did not mention the tribes but surely mentions the area/region which was helpful to know about the tribes residing in those regions. Most studies were conducted in central India which includes Maharashtra, Chhattisgarh, Gujarat, and a few studies were from Assam, Tamil Nadu, Madhya Pradesh and Odisha.

Table 1: Leprosy Studies Conducted in Tribal Populations of India

Year	Tribes Involved	Area	Focus of study
2006	Jaintia	North Cachar Hills, Assam	Medicinal Plants
2009	Chenchus, Yerukula, Sugalis, Irulas	Chittoor, Andhra Pradesh	Medicinal Plants
2009	LangiaSaora (LS), Paudi Bhuiyan (PB), KutiaKondh (KK) and DongriaKondh (DK	Orissa	Epidemiology
2010	Not Mentioned	Panchmahal, Gujarat	Epidemiology
2011	Not Mentioned	Chattisgarh	Epidemiology
2011	Not Mentioned	Bastar, Jagdalpur, Chattisgarh	Epidemiology
2013	Not Mentioned	Jagdalpur, Chhattisgarh	Case Study
2015	Not Mentioned	Thane, Maharashtra	Epidemiology
2015	Yanadhi	Nellore, Andhra Pradesh	Epidemiology
2015	Gonds, Baigas, Kols, Kanwar, Oraons, Dhanuhar, Bhumias and Manjhis	Central India	Epidemiology
2017	Not Mentioned	Maharashtra	Epidemiology
2018	Not Mentioned	Tribal districts of M.P	Medicinal Plants
2018	Not Mentioned	Kaparada,Gujarat	Epidemiology
2019	None specified	None specified	Review
2019	Uralis, Soliga, Malayalee and Naicker	Sathyamangalam wildlifesanctuary, Tamil Nadu	Medicinal Plants

DISCUSSION

In order to provide a comprehensive guide for future studies, this work seeks to summarize the current state of leprosy since 2005 and discussed the challenges.The prevalence rate of leprosy across different population subgroups provides an understanding of disease transmission patterns and is also a measure of the influence and efficacy of current public health initiatives. Post 2005, very few studies have determined the prevalence in tribal regions and at present we don't have any comprehensive data available that shows the prevalence of leprosy exclusively in the tribal region of India. Majority of epidemiological studies demonstrate that NLEP has a positive effect on the leprosy issue by sustaining the pace of leprosy removal in their respective tribal district for more than a decade and advised that to improve the surveillance, cases released from treatment and relapse cases to further reduce leprosy burden. However, only one study carried out in 2017 has identified the regions of actual hot spots of leprosy within Maharashtra state by further dividing them to child, female and multibacillary (MB) and Grade 2 disability cases within "Hotspot area."By comparing the prevalence to non-tribal hotspot data, the study concluded that even a single new case with grade 2 disability/new child/femalecases should be treated as evidence of hidden endemicity in tribal belt(20).

MDT has proven to be an effective tool for treating leprosy, particularly when patients arrive early and begin care promptly. However, the side effects recorded from the use of MDT in lakhs of patients around the world indicate that most of them are minor, and seldom cases. One such unusual case of clofazimineenteropathy was published in 2013 which presented as "clofazimine-induced crystal storing histiocytosis" where a 19-year-old tribal male patient has developed this state after taking high doses of clofazimine during the treatment. The treatment was discontinued immediately with suitable substitute regimens but the patient had occasional stomach pain for 2 months during the follow-up period(31). The reason mentioning the case study here is after various studies reported the same case studies subsequently, unfortunately, we don't have any monitoring system for signs and symptoms of enteropathy in tribal areas.

Recently drug resistance has become evident in the leprosy cases(33, 34). A survey by the World Health Organisation into drug-resistant leprosy showed that 8 percent of the samples examined in India exhibit DNA mutations in M. lerpae which cause resistance to the anti-leprosy drugrifampicin (35).The global study was performed on new and relapse cases recorded from 2008-15 and found that, aside from Brazil, the largest percentage of samples were resistant to the medication used in the first line of therapy were from India under the National Leprosy Eradication Program(35, 36). Scientists have systematically used molecular epidemiological methods to help explain the nature of primary and secondary drug resistance in different populations across the world. However, despite the knowledge of high burden of

leprosy in the tribal areas, such studies have not been performed in these neglected groups of people. This compromises their treatment adherence and can also contribute in the transmission of mycobacterial pathogens to other communities in different locations. Hence, the control of infectious diseases in tribal population has broader health benefits for non-tribal communities as well. Government of India (GOI) figures from Tapi district in Gujarat (with a tribal population of more than 80 percent) suggest that the incidence of leprosy has risen from 9.37 per 10,000 populations in 2010 to 17.16 per 10,000 in 2014. Likewise, the incidence has gone up in several tribal belts between 2010 and 2014.Moreover, 64.8% of leprosy sufferers in the state come from the Scheduled Tribes, whereas the proportion of ST population in Gujarat is a mere 14.8%. The figure has risen from 63.91% in 2015-16 and is well above the national average of 18.8% in 2016-17 and 18.79% in 2015-16 (LCDC survey, 2019). The reason of the high prevalence of thedisease in such areas could be their remote location where access to healthcare facilities and awareness is limited, leading to long diagnostic delays from the time of onset of symptoms. This leads to continued transmission. Indeed, a recent study from Raipur district in Chhattisgarh state (with a significant proportion of tribal population), has shown that nearly 40% individuals didn't take any action after noticing the symptoms and nearly all the individuals (98% of the leprosy patients diagnosed between April 2017-March 2019), attributed 'ignorance about the symptoms of leprosy' as the cause of their delay in seeking proper treatment (37). This also highlights the disparities in the tribal population's poor access of the healthcare system, which could be the main reason thatthe expected level of leprosy control has remained elusive despite much acclaimed success in other sections of society. The capacity building in utilizing modern technologies including nucleic acid amplification tests (NAAT) such as TrueNat or Cartridge-based NAAT (CB-NAAT) should be adapted for providing a Point of Care diagnosis of leprosy, in a similar manner it has been successfully depoyed for TB and COVID-19 diagnostics at peripheral level. For that purpose, the government schemes such as Model Rural Health Research Units (MRHRUs) should be strengthened in adopting such latest technologies.

CONCLUSION

There is a dearth of data available on tribal health indicators of Indian tribal population. The scarcity of healthcare specialists willing to work with native people is also a significantobstacle towards tribal health. To overcome this, the major work done should emphasises the need for a fundamental mentality shift that also highlights the possibilities for indigenous tribal people to join the health workforce by inspiring and training them. Inclusion of the previously cured cases of leprosy as "the agents of change" or as "Leprosy Champions" can bridge some of the gaps as well as can address the concerns around social stigma against leprosy. Engaging local tribal youngsters with the communities and inducting them into healthcare will be a more viable, sustainable, and long-term answer that

fills the void of healthcare professional. Increased awareness among the tribal population about the signs and symptoms of the disease is most important for achieving the target of 'leprosy-free India'.

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Nutritional Knowledge, Food Habits and Health Status of Monpa Tribe Tawang in Arunachal Pradesh

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Abstract: *Tawang constitutes the western most trans-Himalayan part of Arunachal Pradesh of India. It is one of the youngest state and least studied region inhabitating Monpa Tribe. Monpas are one of the most prominent ethnic groups of Arunachal Pradesh having distinct social cultural ethos. They are generally adherents of the Gelung sect or red sect (Tibetan) of Buddhism and so the proximity to the Tibetan culture exists.*

In this study I have tried to understand the food habit of the Monpa tribe and their understanding of curative , preventive and nutritional value of the their food intake and at the same time tried to note their BMI to understand the indication of their dietary habits to body mass index in a very simple manner. I found the dietary habit of the Monpas are rich in protein and fat and BMI of 60 percent adult male and 50 percent of adult female were of normal grade and 25 percent of adult female were obtuse grade while 12 percent adult male were of obtuse grade .

Keywords: Monpa Tribe, Traditional Foods, Nutritional Status, Ethnic Food, Food Habit and BMI

INTRODUCTION

Arunachal Pradesh, erstwhile NEFA is situated in the Northeastern tip of India It comprises of mountainous and sub-mountainous portions of the Himalayan system in its extremity, covering an area of 83,743 sq km. This state is surrounded by Bhutan in West, Tibet (China) in North and Northeast, Burma in East and Assam in South. It is the largest area wise state in Northeast region of India. (Sharma, M.; 2008). And within Arunachal Pradesh, Tawang district is in western most part of Arunachal Pradesh. The area of this district is approximately 2,172 Sq.km, bounded by Tibet (China) to the north, Bhutan to the south-west and Sela ranges separated from West Kameng district in the east. (NIC , Tawang), at the average altitude of 10,000 ft and mainly inhabited by the Monpa tribe.

Most of the region is spare with vegetation. Because of high mountains all round and heavy snowfall during winter, the area remains almost inaccessible to the outside world during snowfall.

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The main livelihood of the Monpa tribe is agriculture and allied activities; they practice shifting and permanent types of cultivation. They practice terrace cultivation to prevent soil erosion and sows crops like paddy, maize, wheat, barley, millet, buckwheat, peppers, potato, tomato, cabbage, pumpkin and various types of beans. However "diversity of this district is congenial for commercial cultivation of tropical and temperate fruits, orchid species, potato, ginger, species, medicinal and aromatic plants etc." (Bareh, 2001). Beside this most of the households keep Cattle, yaks, pigs, sheeps, cows, and fowl as domestic animals to earn livelihood.

However, due to unfavourable and hostile environment prevailing over the region, cultivation is limited to a very less in terms of time and space. And, the elevation of the cultivable land affects both the length of the growing season and the choice of crops produced. It seems that the reason behind human habitation in the region is the ingenuity of local people, who has devised new and sustainable way of living. One major product of this ingenuity is the traditional foods and beverages, which over the time has been evolved (through outside influence and local resources available) and established their own food system and dietary habit.

MATERIAL AND METHODS

This paper has limited objectives. The main objective is to understand the food habit of the Monpa tribe and its nutritional value by measuring the simplest indicator of health i.e. the BMI. The area under investigation for the present study covered four administrative circles of Tawang districts of Arunachal Pradesh. It was observed during discussions that the level of awareness about the nutritional value of the food intake was extremely poor; however most of the households know the preventive and curative value of their food intake for certain diseases. The information for the study was collected through informal group discussions (IGDs) with groups of head of the household and community leaders in each village under study. The field investigators appointed were conversant with the local language and were equipped and acquainted with standard equipments and procedures. Total population covered in the study was 765 from 149 households. Demographic characteristics and household characteristics are given as table 3 and table 4 for reference. For Body Mass Index (BMI) as an indicator to nutritional status, we calculated the weight and height of respective adult male and female of the households. Specifically for this piece of studies only household information was considered.

Traditional Foods and Beverages of Monpa Tribe

Monpa tribe consumes a wide range of solid, semi-fermented, fermented, boiled foods, beverages and processed foods which are nutritionally rich and medicinally important.The use of various indigenous crop plants, forest products and meat of wild (especially bear) as well as domesticated animals make their diet nutritious. Most of the foods and beverages described in this section are almost common in entire Monpa Tribe of Tawang district.

The staple diet of region is huskless barley *(bong)* (*Hordeum vulgare* Linn.), or grim, which is roasted used as flour. Barley *(bong*) is a traditional grain for the Monpas. They use *tsampa* (Tibetan) or *namphey* for making the local beer brew, *chhang*. Their traditional foods are mainly based on, soyabean (*Glycine max* Merrill.), maize (*Zea mays* Linn.), rice (*Oryza sativa* Linn.). buckwheat (*Fagopyrum esculentum*), Amaranthus, maize, barley, chilli ,yak milk and various indigenous of fruits and vegetables. The foods consumed by Monpa are nutritionally rich and are compatible with their social, cultural and natural environment

These foods are easy to prepare using least fuel and above all ingredients used are available locally. Most of the following cuisines are prepared with nutritious ingredient and are sustaining food for the people of this remote region.

Major Drinks

Monpa tribe prepares a range of alcoholic beverages from finger millet (*Eleusine coracana* Gaertn.), maize (*Zea mays* Linn.), barley (*Hordeum vulgare* Linn.) and rice (*Oryza sativa* Linn.). Major drink items are *Arak, Bang Chang*, *Themsing, Roxy, Mingri, and Laupani* and of course Butter Tea, which is also popular among the visitors to the region.

Aarak / Baang-chang (Liquor of Barley)

It is a type of homemade strong liquor prepared by distilling either of maize, *kongpu* (millets), rice or *bong* (barley). It is served as a hot drink.

Laupani

It is a beverage which is made from fermented rice. Its alcohol percentage is a little bit more than beer. They use various herbs for facilitating the fermentation process. These herbs are dried in sun, minced and made into round dough with pounded rice. Laupani is used on special occasions like New Year celebration, housewarming celebration, birth celebration, marriage ceremony etc.

Roxy

Roxy is an alcoholic beverage prepared from barley, rice, finger millet or/and maize fermented for 2-3 days with *Pham* (yeast tablets) in lukewarm seeds of barley, rice, finger millet or/and maize .

Butter tea

It is a non alcoholic drink using fresh yak *ghee*. The boiled water is put into the specially made wooden cylinder vessel and after mixing the salt and yak *ghee*, it is churned properly before drink It is believed that it keeps body warm and provides energy during the cold.

Sing-chang

It is an occasional drink, Monpa used to drink this sweet beer like drink especially during their New Year festival *Lossar.* It is a type of blended drink using the mixture of millets, buckwheat and barley, and may be served both hot and cold.

Themsing

It is prepared from *kongpu* (finger millet) or *bong* (barley) or mixture of both. *Kongpu* gives low yield but high quality of *themsing,* whereas when *bong* is used

alone or in combination with *kongpu* gives high yield of *themsing. Themsing* looks like black tea and has a good aroma. It is used in curing certain disease like waist and muscles pain, and added as an ingredient in formulation of certain local medicines.

Roxy, *Laupani and Themsing* are also used as medicine to the patients of stomach pain, dysentery and also at the time of delivery of a child to a woman.

Major Food Item

***Chhurpi* Chutney**

The ingredients of *Chhurpi chutney* are soybean *chhurpi,* ripe tomato, *solu krepu, shjappe* (*Allium* spp.) and *mann* (*Allium* spp.), all are taken together to make a paste. This is eaten with *momo* or other maize and barley based ethnic foods and also used an ingredient to make other local food.

Gyapa-khazi

This is a type of Pulao and is prepared by mixing rice, fermented cheese, small dried fish, chilli, butter ginger etc.

Khapse

Bundangmo (*Amaranthus*) seeds are used in making a variety of ethnic foods like *khapse* and *sathu*. The grains of *bundangmo* are dried, roasted and made into flour. The flour is kneaded with lukewarm water. They prepare thick round bread made of this flour. Then they turn the edges, twisted and pressed to give a woven appearance, sugar may be added as per the taste, after shaping into multiple -shaped rolls it is fried in oil till it becomes crispy. It is also used during birth of a child because of its nutritious value.

Momos

It is one of the popular ethnic foods of *Monpa* tribe. The flour of indigenous barley is made into fine powder. Local chilli (*solu*), *lai saag, cabbage, onion, mann* (*Allium* spp.) and *shjjape* (*Allium* spp.) are taken, washed and made into small pieces. After putting the yak *ghee* into frying pan, garlic, chilli and onion are fried till these becomes light golden red. Then all the green vegetables are fried in this for a while to prepare stuffing for the memos. In case of non vegetable momos, mixture of meat (pork or yak meats are preferred) are used instead of green vegetables. The flour of *bong* (barley) (now a days use of maida has been increased) is kneaded and fried greens or meat is put inside this. After making into oval shaped balls they are steamed in a multiple tiered perforated utensil placed one above another utensil containing water at the bottom layer of utensil, that water is further used for soup. It is eaten with the chutney made of local chilli, garlic and *mann*.

Puta

Puta is nothing but noodles and are made out of buckwheat flour. Preparation of Puta is a time consuming and cumbersome. It is made using a special noodle maker called the *Putatzirsheng*. The dough is put through noodle maker and is then pressed. The Puta is usually eaten with a stew made of vegetables, fermented cheese and chilli

Teeta phaphad

Monpa use ground buckwheat (a grain like seed but not a cereal), to make a naturally leavened pancake called Khura and is taken with tea. Green and dried (shaded dried) leaves of *teeta phaphad* are used as an ingredient for other staple foods, died fish and also used in different chutneys. The vegetable made of green leaves of *teeta phaaphd* is given frequently to the diabetic person and patient suffering from stomach and gastric trouble. The green leaves of the buckwheat plant are dried for use in the colder days when fresh green vegetables are not available.

Thukpa

It is a noodle soup mixed and pounded with meat, spices and chillies, etc. Thukpa is one of the most popular and common gravy based dish of Monpa. There are different variety of it such as *Dheb- Thupka* in which noodles are replaced by rice, *Asum- Thukpa* in which noodles are replaced by maize and beans, *Sha-Thupka* in which noodles are replaced by meat or fishes *Putang-Thukpa*. *If Putang* is added to curry when it is near to ready it is called *Putang Thukpa*

Chhura

It is a type of paneer made from soybean.

Animal Products and Meats

Churpi

Monpa use Yak milk to produce, ghee, butter, and cheese product which is called churpi. Hard Churpy (preserved Cheese) is made up of curdling skimmed milk with whey and straining the curd off in a container then that curd is cooked till it becomes stringy and then it is kept between two hard surfaces and pressed to remove excess water and then it hanged for some days for hardening and then it is ready to use either as an ingredient or to chew directly. There are different types of *Chhurpi such as Chhur singba* ; fresh *chhurpi* is known as *chhur singba*

Yak fat

Yak fat is known as ghee, and used in chhurpi and other different dishes.

Yak meat

Consumption of yak meat is common among the Monpas. They dry surplus amount of meat under sun shade for use during the winter season.

As far as raw ingredients are concerned common grains and vegetables are as follows which signify the nutritional element into Monpa's food intake.

Kongpu (finger millet) or *bong* (barley), rajma bean (Phaseolus vulgaris), millet (Panicum psilopodium vars. psilopodium and coloratum), coriander (ush), bottle gourd (lau), cucumber (manthong), soybean (lee), pumpkin (Broomsa peela, B. saphed, Cucurbita moschata), gourd (kaibandu), indigenous spinach (taktak), field pea, mustard species (lai saag , leme and penche, Brassica sp.), garlic (lamm), onions (mann bada, mann chhota, chong - Allium spp.), and chili peppers (solu).

Body Mass Index (BMI)

During survey we gathered data regarding height and weight of 230 adult

male out of 252 adult male surveyed and 169 adult female out of 208 adult female surveyed. Here adult refers to the person above 14 years of age. Few people denied to be measured either of shyness or hesitation or ill health. Therefore we were able to get measurement of height and weight of 399 persons. The criterion for BMI's presumptive diagnosis is shown as below. It was calculated as weight in Kg divided by height in meter ^{2}.

Table 1: Criteria for BMI's Adult Person's presumptive diagnosis

BMI for Adult Person	< 18.5	18.5-20.0	20.0-25.0	25.0-30.0	>30.0
Category	Under weight	Low normal weight	Normal	Obese Class I	Obese Class II

Source : Guide lines of WHO

And I found the dietary habit of the Monpas are rich in protein and fat and BMI of 60 percent adult male and 50 percent of adult female were of normal grade and 25 percent of adult female were obtuse class I while 18 percent adult male were of obtuse Class I . While 09 percent male and 10 percent of female were of Obese Class II. BMI of low normal weight categories are concerned it was 08 percent for male and 06 percent for female. And for underweight category and 05 percent for male and 09 percent for female was observed.

Table 2: BMI's Adult Person's in surveyed Population

Category	BMI	No of Adult Participant Observed			No of Adult Participant Observed in percentage	
		Male	Female	Total	Male	Female
Under weight	< 18.5	14	13	27	08	06
Low normal weight	18.5-20.0	09	19	28	05	09
Normal	20.0-25.0	101	104	205	60	50
Obese Class I	25.0-30.0	30	52	82	18	25
Obese Class II	>30.0	15	20	35	09	10
Total		169	208	377	100	100

Source: Field Work

The new generation of *Monpa* community has undergone significant changes in their diets over the past 30 years due to intervention of modern crop varieties, materialistic life and current trend towards the increased use of commercial processed foods.

Monpa tribe of Arunachal Pradesh inhabiting western part of the state is highly influenced by the Tibetan culture, their way of life and henceforth the food habit. Hence it is interesting to make note of their health seeking behavior in the back ground of food habit. By modernization and acculturation with other societies, they are secluding from traditional method of food intake. Subsequent increase in market economy plays a crucial role and therefore it is useful to understand the food behavior of the tribal studied. (Sharma, M. 2018)

CONCLUSION

Nutritional and cultural value of the ethnic foods, and their close relationship to environmental health should be well recognized. Interaction with non Arunachalee people and outmigration of Monpas for study and other purpose; involvement and engagement of Monpa in tertiary and secondary sector has influenced the food habit of Monpa at large in current time in terms of food preparation as well as in food items. Due to which for many Monpas it is no longer worthwhile to continue farming. For instance rice, which had previously been a luxury in the Monpa diet, but now it is so cheap and became a staple and so the intake of carbohydrates has been increased, earlier they were using different verities of beans in their food habit but now it is gradually replaced by the different lentils consequently reducing their protein intake. On the other hand instead of local drink or beer (Home made) consumption of modern liquor is increasing resulting increasing number of patient of liver cirrosis and behavioural disorders as per the records of District Hospital, Tawang. Moreover, it is alarming as consumption of it increasing among the expectant mothers also. On the other hand as the desire to appear modern grows, people are rejecting their own culture particularly in urban Tawang and villagers are imitating them. I feel even the traditional foods are no longer a source of pride among few Monpa, but these changes carry with them the danger inherent and should be checked, looking in to the nutritious value of their traditional intake. A intensive and extensive survey must be conducted to know the measurable nutritious value of their ethnic food item

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