Monograph on Nutritional Assessment of Tribals in Western Ghat Region

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Preface

As per the Ministry of tribal welfare, the article 366 (25) of the Constitution of India refers to Scheduled tribes as those communities, who are scheduled in accordance with article 342 of the Constitution. This article says that only those communities who have been declared as such by the president through an initial public notification or through a subsequent amending act of parliament will be considered to be scheduled tribes. We got independence of India since 68 years, till date the peoples have been accrued to living with poverty, indebtedness, poor health care, loss of production assets and governance failure.

However, the preceding of actual facts and figures of Chronic Poverty Research Centre (CPRC) envisaged that, an about eight percent of India's population, they account for a fourth of population living in poorest wealth decile.The starkest marker of tribal deprivation is child mortality, lack of food, shelter and pitfall of basic amenities for daily routine life; undoubtedly the quality life of tribals were seen worsen. The tribal deprivation is alarming stage due to the lower human health index, higher mortality, starvation etc. Under –five mortality rates among tribal children in forested areas remain startlingly high. Unlike other excluded groups in India, such as Scheduled castes. Tribal groups do not face any ritually endorsed exclusion say, in the form of untochability. Poverty is becoming hereditary in India, at least for a sizeable population. That is the conclusion derived from a three-decade tracking of poor households in tribal population. Although tribal population living in forested areas is at a higher risk of under nutrition because of their dependence on primitive collection of NTFP's , agricultural labour works, elevated poverty and irregularity of food supply. Similarly, health is prerequisite for human development and is an essential component for well being of the mankind. The health problems of any communities influence by interplay of various factors including social, economic, biological and political ones. Nutritional status of population is an important tool to know the status of health index of any population .Although it will be depends on the consumption of food in relation to the need and requirements.

It is well accepted that a good nutrition level grounding is more essential for the development of Quality life of people living (QOL) in forested areas without basic amenities. This monograph is serving as tool for implementation of new innovative developmental programme at national level in tribal areas.

Throughout the monograph there is generous criticism on nutritional level, demographic quality of life-domains and tribal traditional knowledge of medicinal plants with respect to curing of chronic illness and disorder. The overall salient findings are discussed with suitable statistical analysis. Finally, I sincerely hope that policy makers, researchers and academician read the research work which set the ethos and philosophy.

Acknowledgement

Special acknowledge is due to Professor *Dr.Suryanarayana Joshyam* ,Professor and Unit chief ,Department of ENT, Bangalore Medical College and Research Institute, Fort Road Bangalore for his constant supports and overwhelming guidance on the assessment of nutritional aspects of tribals in western Ghat region. I also acknowledge with thanks of our beloved team members of the study group that personally met and discuss the too many research gaps on tribals *viz.*, deprivation , socioeconomic barrier , health hygiene and socioeconomic and health development index *etc*. I convey my sincere thanks to *Mrs.Prof .Dr. M.Bharathi,* Retd., Professor and Head ,Department of Rural Sociology and extension , Dairy Science College, KVAFSU(B),Hebbal,Bangalore, *Dr.B.N.Nagraju* ,Professor ,Department of Veterinary Surgery, Veterinary College, KVAFSU(B),Hebbal,Bangalore.*Dr.H.D.Narayanaswamy*,Professor, Department of Veterinary Pathology, Veterinary College, KVAFSU(B), Hebbal,Bangalore. Finally, I would like to thank the KFD (Karnataka Forest Department) for their permission to collect the relevant data sets and information pertaining to the tribals. I heartfelt thanks to all respondents for their kind participation and cooperation. I owe to convey my sincere thanks to all key officer's of the Karnataka Veterinary animal and Fisheries Sciences University for their heartfelt co operation and constant encouragements.

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1. BACK GROUND

The tribal groups are constitute about 8.20 percent of the total population in India (2011 census).It may be notice that, the tribes can be found in approximately 461 communities with almost 92.0 percent of them resided in rural areas, mostly in remote unreserved forest regions with little or no basic civic amenities like transportation, roads, markets, primary health care centers, safe drinking water or sanitation *etc*. The tribal communities therefore lag behind as compared to general population with respect to attainment of income, education, health and other prerequisites like good nutritional level (NIHFW 2014). The scheduled tribes are geographically distributed throughout the country except Pondicherry, Haryana, Punjab, Chandigarh and Delhi (NIHFW 2014). However the tribal's are facing many basic amenities such as lack of personal hygiene, poor sanitation, poor health service, problems in sanitary food supplies, water contamination and poor food intake reflect on the health status of tribals.The tropical diseases like malaria is still widespread in the tribal areas. Regrettably life expectancy is very low due to accidental cause of death (stamped of elephant, attack of wild animals and biting of very poisonous snakes *etc*). It is worth while bearing in mind we obtained independence for the past 69 years, till date we are unable to provide the basic amenities to the scheduled caste and scheduled tribes lives at remote settlement. Hence, better nutrition level and good environmental; health care are the important aspects of rural health services. It is evident from the national tribal report (2014) nutritional deprivation is overwhelmingly the largest factor in overall poverty , unsurprisingly given that half of all children in India are under-nourished. In fact, the contribution of nutrition to the overall MPI is even greater in urban than rural India. As can be seen in Mishra (2005) study report , eventually he pointed out that the multidimensional poverty is highest 81.40 percent accounting for poor among Scheduled tribes within India's population, followed by Scheduled Caste 65.80 percent, other backward class 58.30 percent and finally the general population 33.30 percent. As per the tribal population concerned we selected Western Ghat region of Coorg district of Karnataka State the selected area is the home to tribal people (4248987), of whom 50870 belong to the primitive group. However these people represent only 6.95 percent of the population of the State, there are as many as fifty different tribes notified by government of India, living in Karnataka South peninsula, of which 14 tribes including two primitive ones are primarily naive of this state. Considering that extreme poverty, detrimental ignorance over the generations, lack of proper implementation of upliftmental or developmental programmes and improper monitoring and evaluation of existing government projects and many state and central programmes or schemes have left them in poor state of health and nutritional level. Unfortunately, despite efforts from the Government and nongovernmental organization alike, literature that is available to assess the status of health of these tribes of the regions remains scanty. Many studies have been reported that lack of medical facilities is another problem for them .The poor tribal's do not get food regularly so they fall sick. Although the coffee planters exploiting their livelihood routed by the bonded labour .The bonded labour till existing and practiced immorally and illicit in many tribal settlement across the state . Furthermore, Hygiene problem is very common in tribal population due to lack of health educational awareness, drinking water, cloths, female sanitation pad etc. It is evident from the various studies as due to unhygienic conditions; their children suffer with many diseases like measles, mumps, polio, tetanus and whooping cough *etc*. Although the paucity of literature the government of Karnataka is deniable to implement the nutritional and health routed prevention programmes in the selected regions and also it is surprising that a very limited research has carried out in this area before. In this proximity of the research gap the present study attempt to know the nutrional level and to correlate with different economic and demographic factors of the tribals.

2. MONOGRAPH PREPARATION

The Western Ghat region is the one of the hotspot of biodiversity –"*flora and fauna*" supports an enormous rich species diversity routed (indigenous and exotic). However, over the time the biodiversity is undergoing great stress and impact on anthropogenic disturbances. This region which forms the "*Malbar Botanical Province* "and also considered as land of medicinal plants. According to the Forest survey of India map the western ghat region is a narrow stretch and running from the hills of south on Tapathi river in the north to Sri Kanyakumari of Tamilnadu along with west coast of Goa, Maharshtra, Karnataka, Tamilnadu and Kerala. The *flora* and *fauna* stretches of Western Ghat region ranges approximately 1500 km and encompasses with conducive environmental gradient of varied optimal climatic conditions, which would be

resulted in the ameliorate of diverse forest types ranging from the dry scrub to the semi-evergreen and evergreen forests. The development of the tropical rain forests in the southern Western Ghats and the '*Sholas*' in the Nilgiris region are the most outstanding features of Western Ghats. The area is one of the world's ten " *Hottest biodiversity hot spot* " and has over 5000 species and 179 amphibian species is undiscovered species lives in the Western Ghat region. Total 325 globally threatened species occur in the Weternghats (Madhav Rao Gadgil Report) .Although this region could be directly and indirectly support the livelihood over 200 million peoples and tribals through ecosystem services.

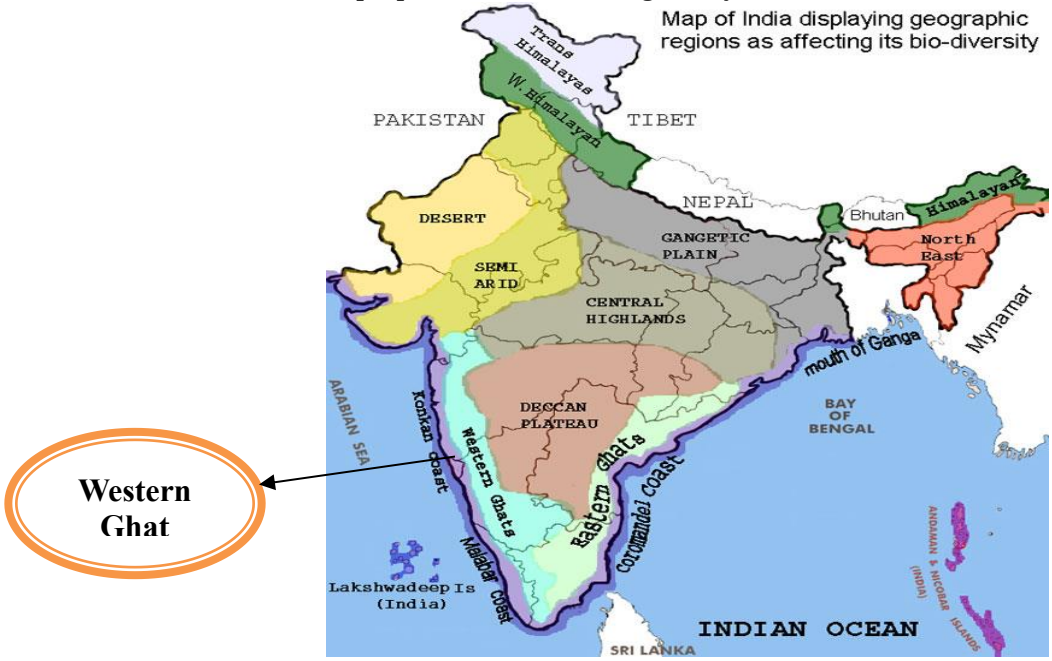

Figure (1): Map showing Western Ghat Biodiversity

The total number of tribal people recognized by the Government of Karnataka is about 4248978 which is 6.95 percent of the tribal population of the state. There has been a 6 percent increase in the tribal population during the last decade .It was 6.60 percent of the State Population in 2001 with absolute number of 3463986 .The sex ratio for scheduled tribes in Karnataka is 990 females per 1000 males which is higher than all-India average of 964 for STs as well as State overall average of 973 females per 1000 male population. The Sex ratios of STs Population in Rural and Urban areas of Karnataka is 990 and 993 females per 1000 males. There has been acceptable improvement in the sex ratio of STs since 1991 when it was only 961 females per 1000 males. The study was conducted in selected villages of Coorg District of Karnataka State for the accrual period of 2013-2014. The district has situated in the Southern part of the Karnataka State, lying between North Latitude 11 56' to 12 56' with an area of 4102 sq kms. About 33.0% (134597) of the total geographical area of the district is covered by the forest ecosystem and bestowed with rich floristic diversity. The district demographically has lowest 554519 (Male: 2134754, Female: 2114233) population with sex ratio 978:1000.It is covered with green forest fascinated with awesome climate .Many literature revealed that the land of the Coorg called as "*Kashmir of South India*". The River Cauvery originates from Kodagu at Talakavery.

3. DATA SETS AND RECRUITMENT OF TRIBAL RESPONDENTS

The entire district is inhabited by various tribal like Ervaru, Kudiyaru, Kurubas, Jenu Kurubas, Betada Kuruba and small pocket of Akipiki (migrants).As per the study concerned ten villages were randomly selected based on the probability proportional sampling system with varied nutritional level indicators, for each selected village considered as a sampling unit or strata (cluster) .The unit of samples drawn from the cluster with greater accuracy, reduced cost and lesser time .The sample size was determined by the standard formula (Design effect 20% ,alpha is 0.05 and power beta 0.87) . A total 250 respondents were considered for the study with written consent obtained (Local language). The pretested interview schedule was used to

obtain the primary data from the tribal's. Anthropometric parameters like height, weight, BMI, waist circumference and hip circumference were recorded in separate master chart (suitable scale) . The daily consumption of food pyramid was also collected from the tribal respondents. The collected data was analyzed by the SPSS -16.50 version. Univariate logistic regression-predictive model was employed to draw the significant inference.

4. 4.1 RATIONALE OF THE MONOGRAPH

The purpose of the monograph is to provide scientific information on the tribals quality of life (QOL), Socioeconomic status, health development index, traditional knowledge of widely used medicinal plants by the tribal for curing multifarious infectious and non infectious diseases. It can be facilitate the scientific tool for the policy makers for the implementation of innovative programmes for the nutritional plausible upliftment of tribals at national and global level. Although the information pertaining with tribals will be exchanged between nongovernmental organization, state government officers, researchers and policy makers at the larger extent datasets have been collected for the qualitative phrase of research through in-depth and focus group interviews.

5. 5.1 USE OF MONOGRAPHS

This structured monograph will be encourages to provides the full-fledged information on socioeconomic and nutritional status of tribals living in Western Ghat region and also there can be furnish the effective traditional medicinal -remedies for chronic illness and also it can be supported to documents their diversified usage of different medicinal plants for curing the infectious and non infectious diseases in deterministic approach. This publication is not intended to replace official compendia such as formularies or legislative documents. The monograph is intended primarily to promote awesome traditional knowledge and use of herbal and ayurvedic medicine with respect to safety and low cost. The monograph would be supplemented and updated periodically as new information appears in the literature, and additional monograph will be prepared accordingly.

6. 6.1 SCIENTIFIC FINDINGS

Table (6.11): Descriptive statistics of demographic profile of the triabls in Western Ghat region

SL	Categorical variables	No (%)	Odd ratio	CI-95%	P-Value
I	Demographic profile				
01	Gender Male Female	 176(70.40%) 74(29.60%)	 0.56-0.72 0.33-0.48	 171.22-178.98 73.66-76.13	 $P<0.05^{*}$ $P<0.05^{ns}$
02	Age group Younger Medium Older	 150(60.00%) 65(26.00%) 35(14.00%)	 0.80-0.91 0.63-0.76 0.54-0.58	 148.13-153.60 62.16-67.88 33.62-38.17	 $P<0.05^{*}$ $P<0.05^{*}$ $P>0.05^{ns}$
03	Sub Caste-ST Jenukuruba Kadu Kuruba Betada Kuruba Yarava	 120(48.00%) 52(20.80%) 55(22.00%) 23(9.20%)	 0.91-0.96 0.83-0.89 0.56-0.63 0.45-0.52	 118.33-123-14 50.69-54.55 53.62-57.02 21.19-24.58	 $P<0.05^{*}$ $P<0.05^{*}$ $P<0.05^{*}$ $P>0.05^{ns}$
0	Land holdings				

4	1-1.5 acres 2.0-2.5 acres >3.0 acres Landless	30(12.00%) 19(7.60%) 5(2.00%) 196(78.40%)	0.33-0.46 0.21-0.30 0.11-0.19 0.82-0.88	28.02-32.68 17.04-21.54 4.02-6.35 194.02-198.16	P<0.05* P>0.05* P>0.05ns P<0.05
05	Income Low Income ($\leq \bar{X} \pm {}^{1}/_{2}$ SD) Mid income ($= \bar{X} \pm {}^{1}/_{2}$ SD) High Income ($\geq \bar{X} \pm {}^{1}/_{2}$ SD)	236(94.40%) 10(4.00%) 04(1.60%)	0.93-0.96 0.36-0.38 0.13-0.16	233.14-238.63 8.63-11.24 2.01-5.86	P<0.05* P>0.05ns P>0.05ns
06.	Education Literate Illiterate	52(20.80%) 198(79.20%)	0.45-0.56 0.89-0.93	50.88-54.18 196.78-202.10	P>0.05ns P<0.05*

*, Significant @0.05 level (p<0.05), ns-Non significant

The district has a high percentage of tribal population, which is 20.5 per cent of the total population. Approximately 10-15 types of tribes residing in the district. Out of 3 talucks of Virajpet, Madikeri and Somvarpet.Asper the result indicate that 120 (48.00%) Jenukuruba schedule tribe geographically distributed in selected sites followed by Kadukuruba 52 (20.80%), Betada Kuruba 55 (22.0%) and yarava 23 (9.20%) respectively. Primitive tribal group were correlated on sex, age and geographical settlement, it was clearly showed that positive relation between tribal settlement area and different tribal groups (p<0.05) Tab (6.11) .196 (78.40%) of tribal were land less, low income group and below poverty line 236 (94.40%) . The literacy rate among the tribal people of the district tunes to 20.80 per cent out of which Scheduled tribes male literacy is 13.00 per cent and female literacy rate is 7.0 per cent. Scheduled Tribe children lag far behind when it comes to educational attainment above the primary level. The tribal communities still lag behind in comparison to other communities of the district in spite of the fact that government have been taking various development measures for improving the present condition as can be seen in Table (6.11)

Table (6.12): Infrastructure status of tribal people.

II	Infrastructure	No (%)	Odd ratio	CI-95%	P-Value
a.	Road facility Yes No	09(3.60%) 241(96.40%)	0.21-0.28 0.90-0.93	6.14-12.18 238.06-243.11	P>0.05ns P<0.05*
b.	Drinking water Yes Ponds Bore wells Streams Others	191(76.40%) 15(6.00%) 36(14.40%) 08(3.20%)	0.92-0.98 0.12-0.24 0.21-0.28 0.16-0.18	189.16-193.48 13.14-16.81 33.26-38.74 6.54-9.19	P<0.05* P<0.05* P<0.05* P>0.05ns
c.	Electricity No	236(94.40%)	0.86-0.91	233.62-237.14	P<0.05*
d	Schools				

.	**Yes** **No**	**62(24.80%)** **188(75.20%)**	**0.55-0.60** **0.84-0.86**	**59.16-63.11** **186.18-190.63**	**P>0.05** **P<0.05***
e.	**Health services** **Yes** **No**	**40(16.00%)** **210(84.00%)**	**0.36-0.41** **0.91-0.94**	**39.18-41.23** **198.63-212.3**	**P>0.05*** **P<0.05***
f.	**Veterinary service** **Yes** **No**	**54(21.60%)** **196(78.40%)**	**0.45-0.59** **0.89-0.93**	**52.26-56.32** **195.42-197.86**	**P>0.05ns** **P<0.05***

Figure (6.21): Tribal were interviewed by one of the author

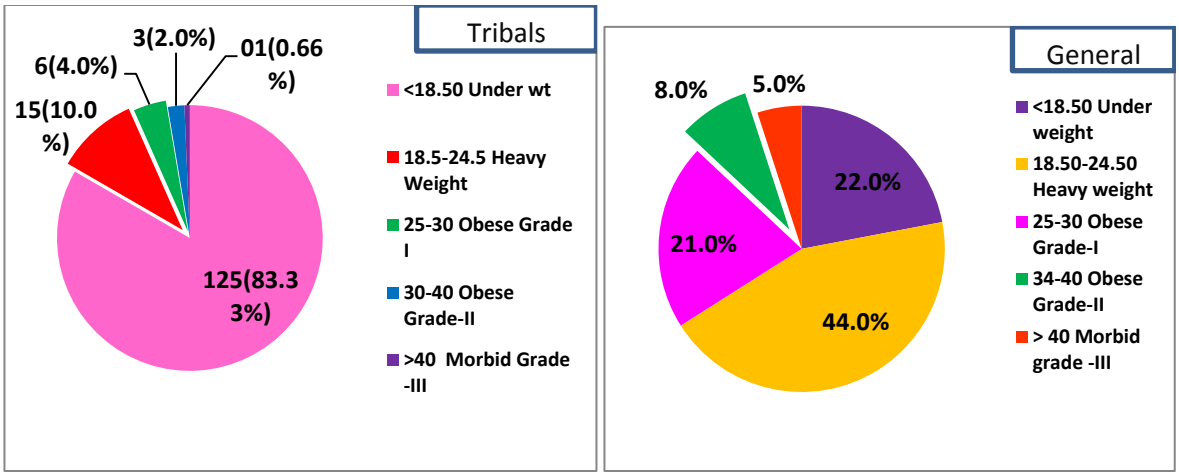

Figure (6.22): Distribution of Body Mass Index among tribal's in Western Ghat selected regions

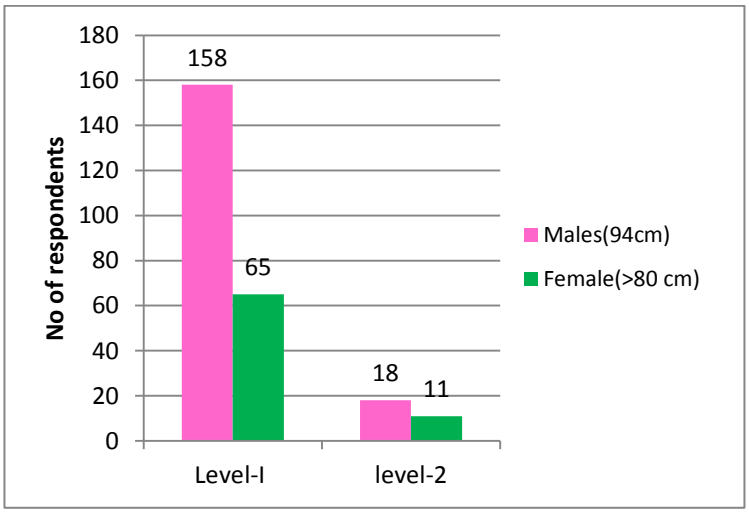

Figure (6.23) Waist circumference distribution in tribals

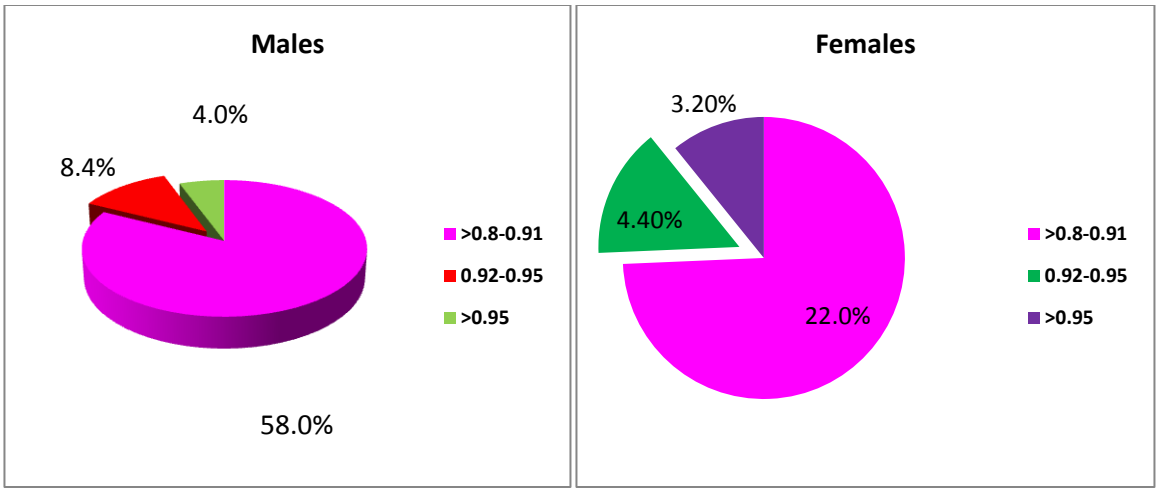

Figure (6.24) Hip circumference distribution in tribals

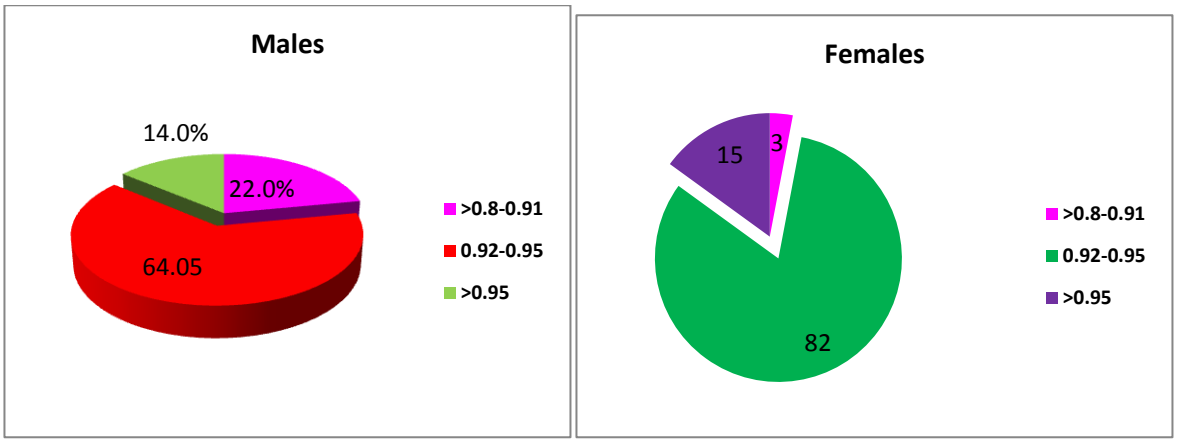

Figure (6.25) Hip circumference distribution in General population (Control Group)

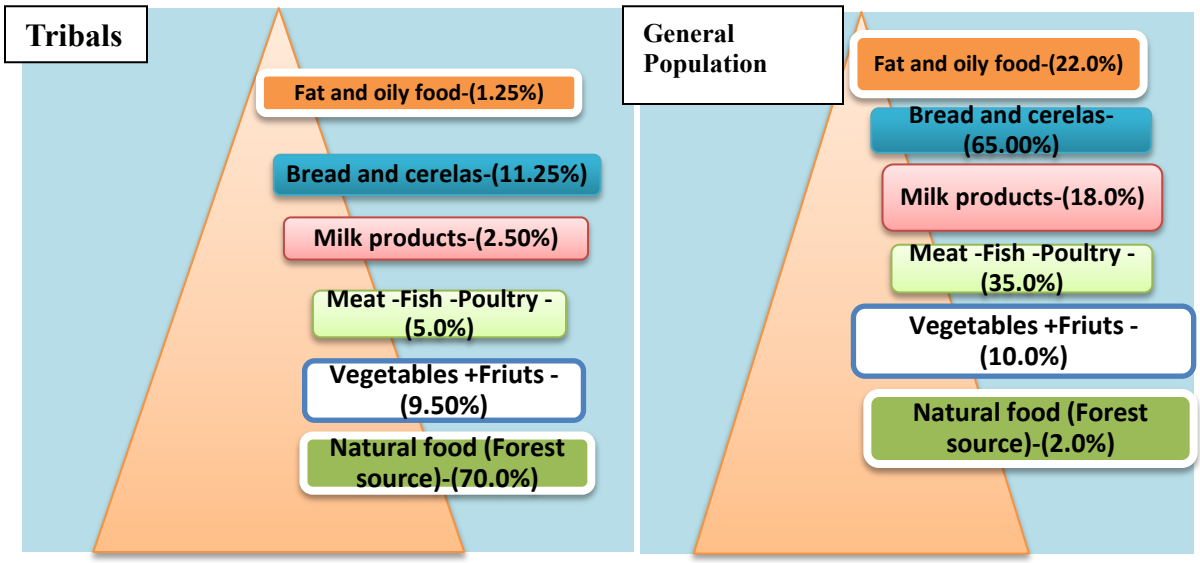

Figure (6.26): Food pyramid accurded by the tribal and general population (Cumalative percentage)

The tribal nutritional status were assessed by anthropometric parameters and frequency of various foods consumed. As per the study concerned weight for height indices have long been used to assess the body composition of adults. The Composition is directly affected by nutritional risks. Different analytical approach of the height for weight index score have been considered for the analysis. The main proximity of this anthropometric assessment to find an health index of the traibals with respect to different geographical location. However, the results were showed that, the BMI is negatively correlated with weight and height of the tribal.($p > 0.01$). Although, the BMI of tribal's found to be negatively related with food intake and fortunately the results explains the BMI of tribal is statistically significant ($p<0.01$) when compared to the general population. Apparently, the individual variations should be due to differences in body weight as a lower proxy of body energy stores and muscle mass among tribals living in Western Ghat region. Nevertheless, the mean body mass index was 18.52±0.63 kgs with CI 95% was (17.28-19.75). In addition to that other formulations tended to have a relatively lower correlation with BMI in tribals, albeit the lack of nutritious food consumed by the tribals due to Indian forest act 1957, thus the Government forest officers are not been allowed to be collecting the forest based nutritious food from forest as can be seen in Figure (6.10) to (6.70) It has therefore been argued that a low BMI value (<18.50) represents a state of chronic energy deficiency (CED). BMI has also consistently been shown to be much less related to fat proportions thus making it a valid indicator for severe malnourished. As far a tribal health concerned there is some empirical evidence to show that a low BMI is positively correlated with life quality domain viz., physiological, biological and socioeconomic consequences. The suggestions is that aerobic work capacity at BMI level is reached .This is to be expected if low BMI values reflect reduced fat free mass. As can be seen in Figure weight and heights were measured in a given population , a BMI distribution were found to be generated for that population overwhelmingly suffered from risks of chronically –deficient (<18.50) and the proportion at risk of being obese (>25.0). Forest based fruits and nuts consumed by the tribals earlier is presented below

Figure(6.28) Ancardium accidentalis

Figure(6.29) Syzygium sasidharanii

Figure(6.30): Garcinia indica

Figure(6.31): Artocarpus intigrifolia

Note: Permission obtained from the forest officials for photography

Figure(6.32): Sorinum cherry

Figure(6.33): Syzygium cumini (Black plum)

Figure (6.34): Mangifera indica (wild)

It is worthwhile bearing in mind the mean consumption of all the foods and the median intakes of all nutrients were below the recommended dietary intake (RDI) among tribals irrespective of gender and age group of the population. It is regretted that the prevalence of chronic energy deficiency (CED) was found to be significantly higher (p<0.01) among the primitive tribals in Western Ghat regions of Coorg district. The children and pregnant tribal women are subsisting on inadequate diets, which are reflected in the poor intake of all nutrients and higher prevalence of under nutrition. Significantly higher proportion of tribal children, pregnant women and elderly population are undernourished compared with their general population (p<0.01). As per the results led with anthropometric parameters the mean BMI of tribals were below the NIHFW's standard with irrespective of age and gender distribution (p<0.01) . The median waist and hip circumference though comparable with their general population was below the standard reference values. The overall prevalence of underweight (weight for age < median -2SD) was significantly higher 76.0% when compared to general population 15.0% and it was found to be statistically significant (p<0.01).To this end the spearheaded association (p<0.01) was observed between stunting and socioeconomic indicators such landless, family divergent during collection of NTFPs in forest, ignorance of spouse and children, lack of nutrient food, lack of awareness and education *etc.* The stunting was significantly higher (p<0.01) among the children of joint families(51.36%) compared to nuclear (%).The prevalence of stunting tended to increase with younger age group children (<4-5 years, Median age 4.20 years).The proportion of children with stunting could be relatively more (65.0%) among house hold engaged in daily wages of coffee plantation and Agricultural labour works. Similar findings observed in underweight population.

Table (6.13): Clinical sign of nutritional deficiency among tribals and general population

Sl	Clinical signs	Tribal's (N=250)		General population (N=100)		P-Value
		Cum No.	Odd ratio	No	Odd ratio	
I	Hair					
a.	Spare and thin (Protein ,Zn deficiency)	145(58.0%)	0.81-0.93	05(5.0%)	0.41-0.52	0.00**
b.	Easy to pull out (Protein deficiency)	68(27.20%)	0.76-0.82	06(6.0%)	0.22-0.36	0.00**
II	Mouth					
a.	Glossits	78(31.20%)	0.68-0.81	02(2.0%)	0.14-0.32	0.00**
b.	Bleeding ,spongy gums	18(7.20%)	0.56-0.63	05(5.0%)	0.41-0.63	0.00**

c.	Angular stomatitis	05(2.0%)	0.32-0.41	02(2.0%)	0.14-0.26	0.16 ns
d	Leukoplakia	02(0.80%)	0.10-0.21	01(1.0%)	0.89-1.24	0.18 ns
e.	Sore mouth and tongue	03(1.20%)	0.11-0.52	03(3.0%)	0.89-0.41	0.16 ns
III	Eyes					
a.	Night blindness	22(8.80%)	0.63-0.72	06(6.0%)	2.6-7.52	0.00**
b.	Photophobia	10(4.0%)	0.55-0.63	01(1.0%)	0.14-0.89	0.00**
c.	Blurring	39(15.60%)	0.79-0.86	02(2.0%)	0.19-3.14	0.00**
d.	Conjuctival-Inflamation	08(3.20%)	0.45-0.43	03(3.0%)	1.14-4.42	0.16 ns
IV	Nail					
a.	Spooning	45(18.0%)	0.71-0.88	01(1.0%)	0.63-1.52	0.00**
b.	Nail pigmentation	86(34.40%)	0.92-0.98	03(3.0%)	0.88-4.10	0.00**
c.	Transverse lines	18(7.20%)	0.56-0.62	01(1.0%)	0.24-1.66	0.00**
V	Skin					
a.	Pallor	13(5.20%)	0.42-0.56	02(2.0%)	1.63-3.58	0.00**
b.	Follicular hyper Keratosis	10(4.0%)	0.36-0.42	03(3.0%)	2.58-4.86	0.00**
c.	Flaking dermatitis	16(6.40%)	0.24-0.38	04(4.0%)	2.89-5.88	0.00**
d.	Pigmentation, desquamation	18(7.20%)	0.47-0.52	02(2.0%)	1.12-2.86	0.00**
e.	Bruising, purpura	25(10.0%)	0.66-0.78	01(1.0%)	0.23-0.58	0.00**
f.	Thyroid gland	05(2.0%)	0.34-0.62	08(8.0%)	6.28-7.86	0.11ns

Significant at 1% level ($p \leq 0.01$), ns-Non significant

In the scourge of human health development index (HDI) , the tribal health is significantly very low as compared to the general population ($p<0.01$). The health and nutritional deficiency of the massive tribal population of India has varied as the tribal groups themselves who present a debilating diversity and relative changes in Socio-economic, cultural and ecological settings. The malnutrition is significantly higher ($p<0.01$) in the tribal population. However, the nutritional deficiency leads to diseases like endemic goiter, Protein and Zn deficiency respectively. As per the results the Zn deficiency was 58.0%, ODR 0.81-0.93; Protein deficiency was 27.20% ODR 0.76-0.82 respectively . The Mouth diseases is very commonest in tribals with this mind Glossits was 31.20% ODR 0.68-0.81; Bleeding spongy gums was 7.20 ODR 0.56-0.63; Angular stomatitis was 2.0% ODR 0.31-0.41; Leukoplakia 0.80% was ODR 0.10-0.21 and sore mouth tongue was 1.20% ODR 0.11-0.52. It was evident from the results Vitamin –A deficiency is underlined remarks in tribal population it could be adversely affected to the vision. It is interesting point we have been explored that 8.80% tribals were ODR 0.63- 0.72 suffering from night blindness followed by photophobia 4.0% ODR 0.55-0.63, blurring 15.60% ODR 0.79-0.86 and Conjunctival inflammation 3.20% ODR 0.41-0.45 respectively. Skin is more sensitive

organ and is continuously exposed to various environmental stresses. Thousands of tribal people affected annually with various dermatological problems that could be causes marked discomfort, significant morbidity and even rarely death .During the study period we encountered the dermatological problems in tribal settlements. Nail pigmentation is very common dermatological episode among tribals and it was accounted 34.40% ODR 0.92-0.98; Spooning was 18.0% ODR 0.71-0.88; Transverse lines was 7.20% ODR 0.56-0.62; Bruising, purpura was 10.% ODR 0.66-0.78 followed by Pigmentation, desquamation was 7.20% 0.47-0.52; Flaking dermatitis was 6.40% 0.24-.38; Pallor was 5.20% ODR 0.42-0.56; Follicular hyper Keratosis was 4.0% ODR 0.24-0.38 and Thyroid gland was 2.0% ODR 0.34-0.62 respectively.

Many tribals knew the traditional knowledge of medicines prevailed in surrounding area in the forest .They can cure the diseases naturally without any allopathic medicine. However, the concerned government or competent authority (Department of Forest,- KFD) have not been allowed to picking or collecting the medicinal plants for their traditional usage. In the contrast on the knowledge of traditional medicinal value of the tribals, the present research explores the electrifying knowledge of traditional medicines using from the tribals for curing of chronic illness and various dermatological problems as can be seen in Table (6.13).Widely used plant species for curing skin problems are *Acalypha indica* Linn (Khajoti) –The fresh Juice leaves mixed with salt is applied on eczema of hand and sole of legs; *Croton banplandianum* (Putri) latex is applied to treat scabies and sores , leaf paste is applied in cuts and wounds to stop bleeding ,stem juice is applied on ring warms; *Emblica afficinalis* and *Azardiracta* indica powdered dries in shade, mixed in honey is applied in the treatment of leprosy and *Phyllanthuus amarus sehum* (Bhuiaonla) fresh leaf paste is applied over wounds and is bandaged and also latex of stem is applied for curing wounds till is cured.

The malnutrition is significantly higher among the tribal population as compared with general population ($p<0.01$) .Nutritional deficiency leads ($p<0.01$) to diseases like endemic goiter, thyroid gland, anemia, pellagra and beriberi. The deficiency diseases occurring when the human body has insufficient amounts of thiamine, riboflavin, cauline and Vitamin C *etc*. The deficiency may result from improper dietary intake and less energy riched food consumption. This is particularly serious in view of the fact on psychological and physical quality life domain (QOL) ($p<0.01$). Aneamia lower resistance to fatigue affects working capacity under conditions of starvations, stress and increased susceptibility for other diseases. Maternal malnutrition is quite common among the tribal women especially those who have many pregnancies too closely spaced and lead with more deficit in calcium, vitamin A, vitamin C, riboflavin and animal proteins *etc*.

USAGE OF MEDICINAL PLANTS BY THE TRIBALS

Table (6.14): Knowledge of Medicinal plants used by the tribals in Wetern Ghat region for health remedies

SL	Species Name	Uses
01	*Andrographis piniculata(Kalmegh)*	Febrigue,Tonic, diabetes, liver tonic,STD , Cough ,Stomach cancer and viral infection
02	*Emblica afficinalis* (amla)	Antibacterial, anti-inflammatory, antiulcer, hepatoprotective, and anticancer actions
03	*Terminalia belerica* (Bahera)	Fever ,cough
04	*Tinospora cardifolia* (Gilo)	Diarrhea, vomiting etc.
05	*Garcinia Indica(Fruits)*	Antioxidants and skin diseases
06	*Osmium sanctum* (Tulasi)	Mouth ulcer, fever, cough and antibacterial infection
07	*Mimosa pudica*	Major ailments like asthma, jaundice, bronchial ailments, and blood disorders
08	*Leucas asperan (*Thumbai)	Plant is used for inhalation in conditions like nasal congestion, cough, cold, fever,
09	*Hibiscus angulosus (*Karkadi*)*	Used in ayurvedic medicine for epilepsy treatment and ornamental purpose artificial Jewellery like bangles ankles etc.

10	***Calotropis gigantean*(Akra)**	**Digestive disorder including diarrhea, constipation ,stomach ulcer,toothache,cramps,joint pain ,elephantiasis and worms**
11	***Phyllanthus neruri***	**Removal of Kidney and gall bladder stones,HBV and HCV**
12	***Tridax procumbens***	**Used for the treatment of bronchial catarrh, dysentery, diarrhea and for the restoration of hairs.**
13	***Buchanania lanzan***	**Wound healing and therapeutic option of ointment**
14	***Anona squamosa***	**A decoction of the leaves is used as a cold remedy and to clarify urine.**
15	***Dioscorea bulbifera (Masaalu)***	**Improvement or treatment for the conjunctivitis, diarrhea and dysentery as a folklore medicine**
16	**S*emecarpus anacardium (Bibba)***	**Improving sexual power and increasing sperm count, curing diseases related to digestive system.**
17	***Aphanamixis polystachya***	**Diseases of liver and spleen**
18	***Saraca asoca***	**Urinary tract infection, bleeding and Uterine fibroid**
19	***Rauvolfia serpentina***	**Snake bites, Insect stings and mental illness**
20	***Gloriosa superba***	**Skin and labor pain**
21	***Strycnos nux-vomica***	**Tonic and stimulants**
22	***Gymnema sylvestr*e**	**Diabetes and lowering of cholesterol**

Figure (6.35): Ophiorrhiza mungos

Figure (6.36): Acacia concina (Sigekai)

Figure(6.37): Semecarpus anacardium

Fig(6.38)Aphanamixis polystachya

Figure(6.39) Saraca asoca

Figure (6.40): Rauvolfia serpentina

Table 6.15: Self reported health behavior indicators of tribal and control groups

Sl	Health behavior	Tribal (N=250)		Control (General population) (N=100)		P-Value
		Cum. No (%)	Odd ratio	Cum. No (%)	Odd ratio	
I	General health behavior indicator					
a.	Smoking	192(76.80%)	0.81-0.96	63(63.0%)	0.81-0.89	0.00**
b.	Consumption of alcohol	136(54.44%)	0.88-0.93	78(78.0%)	0.78-0.86	0.00**
c.	Physical activity					
	Agriculture	05(2.0%)	0.32-0.44	48(48.0%)	0.21-0.36	0.00**
d.	Animal husbandry	08(3.20%)	0.52-0.47		0.14-0.52	0.00**
	Piggery	29(11.60%)	0.48-0.56	56(56.0%)	0.65-0.72	0.00**
e.	Collection of NTFPs	136(54.44%)	0.89-0.93		0.82-0.88	0.00**
	Other activities		0.81-0.88	52(52.0%	0.89-0.93	0.00**

f. g. h.		72(28.80%)		) 02(2.0%) 10(10.0%)		
i.	Sense of community belong	198(79.20%)	0.93-0.96	32(32.0%)	0.56-0.63	0.00**
j.	Life satisfaction Yes	02(0.80%)	0.14-0.26	67(67.0%)	0.45-0.63	0.00**
II	Age Standardized mortality per 1000	0.68	0.88-0.91	0.12	0.23-0.36	0.00**
a.	Potentially avoidable mortality	0.52	0.83-0.98	0.23	0.11-0.39	0.00**
b.	Avoidable mortality from preventable causes	0.46	0.86-0.93	0.78	0.87-0.93	0.00**
c.	Avoidable mortality from treatable causes	0.12	0.79-0.96	0.65	0.91-0.98	0.00**
d.	Disparity rate ratio	85.25	0.82-0.93	32.11	0.81-0.92	0.00**
e.	Experience of chronic health diseases Yes	35(14.0%)	0.92-0.98	12(12.0%)	0.86-0.94	0.00**

Significant at 1% level (p≤0.01)

The primitive tribal groups of Western Ghat region have special health problems and associated with QOL self behavioral indicator Table (6.15) .The study have been found to be approximately 55-63% of the tribal population were suffered from anaemia . The prevalence of hepatitis (26.0%) is high incidence among the tribals and it was found to be statistically significant (p<0.01) as compared to general population. Sexually transmitted diseases (STD's) is more prevalent in tribal settlement (11.25%).

7. 6.3 IMPACT OF HEALTH AND NUTRITION ON EDUCATION OF TRIBES OF WESTERN GHAT REGION

In an Indian context the health and nutritional problems is a scourge in tribal areas, the school drop –out is more than 70-80% eventually school drop out is due to lack of food, elevated poverty , death of family members, *etc*. However, on humanitarian ground this burning issues will be address in appropriate forum or competent authority bestowed with HDI, particularly primitive tribal house hold. The literacy rate for the total population in India has increased from 52.21% to 64.84% during the period from 1991-2001, whereas the literacy rate among the ST have increased from 29.60% to only 47.10%.Among ST males literacy increased from 40.65% to 59.17% and among ST female literacy increased from 18.19% to 34.76% during the same period .The ST female literacy is lower by approximately 21.0 % as compared to the overall literacy of the general population. Over the last two years, the overall school dropout rate for preschool children has increased sharply, from 40 percent 2011 -2012 to 42.36% in 2013-2014.Retension in school is more difficult at the upper preschool .Eventually special attention has to paid to ensure continuation of schooling ,particularly among children from Yarava and Jenukuruba native tribals. The special commitment of the National Policy on education, 1986 (revised in 1992) to improve the educational status of ST's continue to be the major strength in launching special intervention and Incentives to improve the accessibility for the tribals who live in the far-flung remote areas and remains isolated,till date the tribals upliftment programme has not been taking place from the government , NGO's and concerned ministry at tribal remote settlements. However, the efforts for universalizing primary education continued, especially through the national program of " Sarva

Shiksha Abhiyan". In the field of technical and higher education , the special provisions make to provide for the downtrodden population such as reservation of seats , relaxation in minimum qualifying cut-off parentages , encouragement of students to perceive higher education , effective utilization of SCPT and TSP grants from the concerned academic and research institutions for the development of SC and ST's academicians and researchers .The special provisions and remedial measures should make for ST's students viz., coaching and scholarships were being extended by the state and central government through DSHE , University, academic institution and various colleges.

8. DISCUSSION

Many authors Mishr *et al* (2005), Nagada *et al*. (2004), Mittal *et al* (2006). Reddy *et al*., (1995) opined that almost all the states of India. Tribal household had a higher incidence of childhood stunting as compared non tribals (p<0.001). Similar study reported by Nagada *et al*., (2004) reported an anemia prevalence is more than 80% among tribal population and school going children.Several studies have also been reported that, the deficient intake of calories and protein were seen in tribal population relative to the Indian RDA, which may be an explanation for the high rates of stunting among this deprived population. The results revealed that Iron and vitamin-A deficiency is recognized as the major cause of anemia in tribal communities and several studies have been reported that , the deficiency of micronutrients such as Iron , Zn often occur together. Hence the high rates of anemia among tribal populations provide additional evidence of the possibility of marginal Zn deficiency in tribal settlements. This is further supported by the high prevalence of stunting and the highly deficient dietary intake in the tribal population since intake of both Zn and iron are known to be positively correlated energy intake. Tribal population still largely depend on Agriculture and NTFP's collection for their sustainability or livelihood and follow a relatively homogeneous life style with their available natural food habits, dietary practice and general pattern of living . Many tribes of Western Ghat region still rely on their indigenous foods, which can usually consists of wild unconventional forest products although some cultivate grains and other farm products for subsistence. However , from recent study findings (NSSO) showed that 82.40% of tribal hamlets not having sanitary and drainage facilities, a situation that predisposes population exposed to infectious communicable diseases. The present study reported that the prevalence of diarrhea and acute respiratory infection is higher among the tribal children rather than non-tribal population.

9. CONCLUSION

The findings conclude that the tribal populations is pessimistically affected **by many non communicable diseases and could be shortfall by various quality of life (QOL) domains, that potentially expose them to ameliorate the high rate of severe malnutrition and chronic health problems. The government could be address and implement the upliftment programme to the tribal population in accordance with special status of the Indian Constitution.**

10. RECOMMENDATION

- **Literacy level of tribal is very low with high dropout ratio. It is a matter of great concern and need to be addressed properly. It is the root cause of low profile of economic and quality domains.**
- **The livelihood securities need to improves the eradicate poverty. Alternative sustainable source of livelihood could be generated. The concerned state government and policy makers should be revived with active participation of tribal. Training should be provided for knowledge about raring of animal husbandry, like piggery, Cattle, goats sheep's, apiculture, rearing of bees, technical collection of minor forest produces and NTFP'S.**
- **Formulation of development polices for tribal men and women are not so important, as that of implementation. The main stress should be given to create awareness and to inbuilt self reliance among tribal.**
- **More research activities on supplementation of nutrition, and decision making behavior should be**

encouraged. Priority must be given to timely monitoring the improvement in their livelihood status condition

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