Assessment Report

Health Status of Particularly Vulnerable Tribal Groups (PVTGs) of Odisha, India

Scheduled Castes & Scheduled Tribes Research and Training Institute (SCSTRTI), Bhubaneswar

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Executive Summary

Background: About 22% of the total population of Odisha comprises of indigenous people – 62 Scheduled Tribe (ST) groups. Among these tribal communities thirteen ethno-cultural vulnerable tribal groups were identified as per their relative physical isolation, stagnant or diminishing population, low literacy rate and association with low-level technology. They are collectively referred as Particularly Vulnerable Tribal Groups (PVTGs) and they often found to be more underprivileged and vulnerable. These 13 PVTGs are Kutia Kondh, Chuktia Bhunjia, Paudi Bhuyan, Lodha, Hill Kharia & Mankirdia, Birhor, Juang, Bonda, Didayi, Dongria Kondh, Lanjia Saora and Saora live in 17 Micro-project areas of Odisha, distributed across 12 districts – Malkangiri, Kandhamal, Kalahandi, Rayagada, Keonjhar, Nuapada, Deogarh, Anugul, Sundargarh, Mayrubhanj, Gajapati and Ganjam of Odisha. The aim of this project was to measure their "health status" in terms of anthropometric assessment, well-being, nutrition, and health-seeking behavior, so that policy can be informed for improvement of the plights of these vulnerable group of indigenous people.

Methods: This study was carried out in 17 Micro-project areas of PVTGs in Odisha. Both quantitative and qualitative research approaches were used for this assessment. All the households of the 17 micro-project areas of Odisha state constitute the universe and "household" was the study element for quantitative purposes. A two-stage stratified clustered random sampling strategy was adopted to select the households. 'Health status' of all the individuals of sampled household was assessed. The household demographic, education, socioeconomic status, location, sanitation, housing condition, health seeking behavior, and information on mortality during last twelve months were collected. Anthropometric assessment – height, weight, mid upper arm circumference and waist circumference as well as nutritional practices including food security of all the individuals were assessed. In order to estimate the prevalence of diseases affecting the individuals – information of physician-diagnosed diseases that commonly affects such communities like malaria, skin infection, diarrhea, tuberculosis, leprosy, chronic lung diseases, cancer, diabetes, heart disease, and paralysis were collected. Individuals who did not have a physician-diagnosed condition, questions regarding relevant symptoms were asked. Information on bitot's spots was observed during the interview. The information of tobacco and alcohol consumption habit, social structure and health seeking behavior, social well-being using WHO well-being assessment tool (1998) were assessed and blood pressure was measured for all above the age of 14 years. The study undertook hemoglobin estimation for women in reproductive age (15-49 years) group using haemocue method. The additional information on menstruation management, sexual transmitted diseases (STD) and reproductive tract infection (RTI), and history of marital life and childbirth were collected for reproductive age women. The WHO-UNICEF Integrated Management of Childhood Illness (IMCI) format was used to assess the health status of under-five children. For older people the data on timed walk,

grip strength, verbal recall and activities of daily living (ADL) were collected. The results were presented in the form of contingency tables that depicted the numbers along with the percentages of the population and data pie charts. The data were analyzed using R software (3.0.1). Total thirteen Focus Group Discussions (FGDs) among the PVTGs (one at each PVTG) community members and twenty-six In-depth Interviews (IDIs) among traditional and modern healthcare practitioners, service providers and program managers (two from each PVTG) were conducted for more in-depth information on their health-seeking behaviours and nutritional practices.

Findings: In this study 32% were under the category of severe stunting, 35% severe underweight, and 18% severe wasting among under-five children. Among the reproductive age women (15 to 49 years) 38% were under-weight (BMI <18.50), and 3% suffered severe (Hb < 7.0), 22% moderate (Hb 7 – 10) and 29% mild (10 – 10.9) anemia. The study showed that the risk of well-being declined significantly with age with a steady gradient. It was reported that the burden of infectious diseases such as malaria (43%), skin infection (30%), diarrhea (20%) and tuberculosis (5%) was significantly more in comparison to non-communicable diseases and also as compared to prevalence of those diseases in the general population of the state. About 60% of the study populations had access to improved drinking water sources such as tube-well or public water supply but only 13% had access to latrine. Only 7% of the study population perceived acceptability (social norms) as a barrier to access modern and predominantly public health care indicating that the PVTGs are keen to accept modern medicine, which is perhaps an important change in their health seeking behaviour. However, above 40% perceived that road connectivity and above 30% perceived that service-availability in the health facilities as major obstacle for accessing public health services. This study also showed that around 52% study population perceived that "affordability" as the key barrier for accessing health services. The results also showed that 63% mothers delivered at home and 36% children did not receive any formal post-natal care from public health system.

Conclusions: This study recommended integrated approach – the combined effort of Department of health and family welfare, Integrated Child Development Services (ICDS), Integrated Tribal Development Agencies (ITDA) and civil society platform is indispensable to address the issue of malnutrition. This study emphasizes the need of social mobilization for awareness generation on public health entitlements among the community members. Probably, the involvement of traditional healers in mainstream of health system will pave the situation. This study suggests the requirement of micro-project area specific disease algorithm for the control of communicable diseases among the PVTGs.

Acknowledgement

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Table of Contents

Chapter 1

1 General Background and Methodology

1.1 Background: Statement of the problems

Health as defined by World Health Organization (WHO) is *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"*. The health status of any community is influenced by socio-cultural, demographic, economic, educational and political factors, often referred to as the social determinants of health. The health consciousness, common beliefs, tradition, customs, myths and practices related to health and disease in turn influence the health seeking behaviour of the community. In spite of the socio-environmental variation, as per the United Nations' (UN) Universal Declaration of Human Rights, *"everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services"*. Furthermore, International Convention on the Elimination of All Forms of Racial Discrimination states *"to prohibit and to eliminate racial discrimination in all its forms and to guarantee the right of everyone, without distinction as to race, colour, or national or ethnic origin, to equality before the law"*. The right to health emphasize that everyone should have:

"The right to public health, medical care, social security and social services". (UN)

The tribal communities, which are often indigenous populations, worldwide and especially in developing nations, are generally considered as vulnerable sections of the population as they are often not integrated into the national mainstream of socio-economic activities. This invariably leads to their lower educational and economic attainment, leading forcefully to their dependence on traditional occupation of hunting-gathering-subsistence farming; a life often marred by lack of material circumstances and lack of access to public utilities and services. Their geographically isolated habitats often compound their problems. Moreover, deleterious social beliefs and cultural practices that often remain entrenched in their practices affect them unfavorably. All these issues have telling effects on their health and health-seeking behaviour.

Odisha, a state in eastern India, occupies a unique place in the tribal map of the country having largest number of tribal communities (62 tribal groups including 13 primitive tribes) with a population of 8.15 million constituting 22.3% of state's population. The tribes in Odisha can be classified into three groups based on their socio-cultural practices and status: Particularly Vulnerable Tribal Groups (PVTGs, previously referred to as Primitive Tribal Groups – PVTGs), tribes in transition and assimilated tribes. Broadly there are two mountain ranges in the Odisha State that may be referred to as northern and southern zone that are home to almost all the PVTGs; majority of them inhabiting these geographically difficult terrain. In southern-zone Bonda, Didayi, Dongaria Kondh, Kutia Kandha, Lanjia Soara, and Soara

and in northern-zone Khadia, Mankirdia, Lodha, Juang and Paudi Bhuinya live. Since time immemorial they remain in these remote forest-covered hilly areas, practicing mostly their traditional occupations and often remain untouched by the so-called" modern" advancements of the mainstream society with regards to health, education and occupational skills.

A study recently done by Regional Medical Research Centre of Odisha revealed that both infant and maternal mortality was high among the tribal group; the report indicating towards 'unhygienic' parturition practices for high child and maternal mortality. The study also stated that more than 60% of tribal population of Odisha lives in high-risk area for malaria and the burden of diarrheal was more due to poor environmental hygiene, lack of safe drinking water and improper disposal of human excreta. Furthermore, low literacy rate, blind cultural beliefs, poor socio-economic status and lack of access to health services lead to serious public health problems among these communities in Odisha.

1.1.1 Rationale of the study

Health is a prerequisite for human development and is an essential component for the wellbeing of mankind. There is a general belief that health status of the tribal population is very much sub-optimum due to all the reasons stated above, especially among the primitive tribes. Studies in the field of tribal health in general and PVTGs in particular are rare in Odisha and for that matter anywhere in the country, and whatever little has been done they are often not comprehensive enough to adequately inform the policy. Hence, a comprehensive study exploring their health status and the underlying drivers of their health can narrate the actual situation and identify targets for prompt intervention, which can ultimately benefit innumerable number of members of these vulnerable groups.

1.1.2 Overall aim

To study the health status of the Particularly Vulnerable Tribal Groups (PVTGs) in 17 micro-project areas of Odisha, which would include identification of the common diseases and health related problems affecting them, examination of the underlying determinants of their health, characterization of their health-related hygiene and nutritional practices and lastly, exploration of their health seeking behaviour.

1.2 Methodology

1.2.1 Study settings

This study was carried out in seventeen Micro-project areas of Odisha which covers the entire thirteen PVTGs distributed across twelve districts that include Malkangiri, Kandhamal, Kalahandi, Rayagada, Keonjhar, Nuapada, Deogarh, Anugul, Sundargarh, Mayrubhanj, Gajapati and Ganjam of Odisha.

1.2.2   Study design

The study utilized an explorative mixed methods design, which included both quantitative and qualitative research approaches. The summary of the study design, data collection methods and study groups is given in (Table 1.1).

Table 1.1. Summary of the study design, data collection methods, study groups and data analysis

Methods	Data collection methods and participants
Quantitative (Cross-sectional survey)	**Section A: Household Information** **Demographic information of the household** **Household information:** Household decision maker, household socioeconomic status, accessibility to the household, health seeking behaviour towards health program, health insurance, health seeking behaviour towards treatment, sanitation and housing condition. Mortality indicators during last 12 months **Section B: Individual Assessment (adult male and female including older age group)** **General information:** Social Well-being (WHO indicators), blood pressure, anthropometric assessment – height, weight, mid upper arm circumference and waist circumference, injury, chronic lung diseases – emphysema, bronchitis, COPD, tuberculosis, general diseases: asthma, bitot's spot, diarrhea, skin infection, malaria, leprosy, diabetes, paralysis, heart disease and cancer, nutrition uptake (food intake in last 72 hours – last 3 days), accessing free food and food intake behaviour (during last 12 months) and tobacco and alcohol consumption habit. **Reproductive age women (15-49 years):** Hemoglobin, menstruation management, Sexual Transmitted Diseases (STD) and Reproductive Tract Infection (RTI), social structure and health Seeking behaviour, mariatal life and children and antenatal and postnatal care. **Older Age Group:** Timed walk, grip strength, verbal recall and activities of daily living. **Section C: Under Five Children:** General danger signs, fever, measles, diarrhea, malnutrition, annamea, post-natal care services delivery, feeding Practices, immunization **Section D: Six to fourteen years children:** Anthropometric assessment – height, weight, mid upper arm circumference and waist circumference, injury, chronic lung diseases – emphysema, bronchitis, COPD, tuberculosis, general diseases: asthma, bitot's spot, diarrhea, skin infection, malaria, leprosy, diabetes, paralysis, heart disease and cancer, nutrition uptake (food intake in last 72 hours – last 3 days)
Qualitative	Total 13 Focus Group Discussions (FGDs) among the PVTGs (one at each PVTG) • Eight to ten participants participated in one FGDs Total 26 IDIs among traditional and modern healthcare practitioners, service providers and program managers (two from each PVTG) Observation of their environment and case studies

1.2.3   Sampling strategy

A household was the study element for quantitative purposes and all the households of the 17 micro-project areas of Odisha which cover the entire 13 PVTGs distributed across 12 district of the state constitute the universe.

A two-stage stratified clustered random sampling strategy was adopted to select the households in our sample. The primary sampling units (PSU) were the villages/hamlets stratified by 17 project areas, the proportion of villages and the hamlets across project areas in the sample approximating their proportional distribution in the universe. From each selected primary sampling unit, i.e. village/hamlet, the households were selected through simple random sampling method. The derived household sample size for survey was 384, which provided precise 95% confidence intervals for prevalence estimates and 80% statistical power to obtain effect sizes of 1.5 between outcomes and exposures, which are not very uncommon.

The sample size was determined by the following formula: $s = X^2 NP (1 - P) \div d^2(N - 1) + X^2 P (1 - P)$ where s = required sample size; X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841); N = the population size; P = the population proportion (assumed to be .50 since this would provide the maximum sample size); d = the degree of accuracy expressed as a proportion (0.05).

By following this method mentioned above, out of 514 villages/hamlets, 32 villages/hamlets were selected for the survey and therefore, to meet the required sample size 12 households were, randomly, selected from each village/hamlet. Hence, the sample size 32 villages X 12 households from each village = 384 households.

The respective head of the households or the prime member of the household was interviewed to gather the household and demographic information. The demographic details of all the household members of the sampled households were collected regardless of their availability or unavailability during the survey. Data was collected about demography- age and sex of all the Particularly Vulnerable Tribal Groups (PVTGs). In table 1.2 detail sampling strategy is given.

1.2.4 Qualitative data collection approach

We explored the barriers in availing the modern health facilities extended by government and other developmental agencies and the role of medicine man and magico-religious practitioners. Total ten Focus Group Discussions (FGDs) were conducted among the PVTGs community. Eight to ten participants were participated in one FGDs. Total fifteen IDIs among traditional and modern healthcare practitioners, service providers and program managers were carried out.

We also observed their environment – water and sanitation, housing condition, availability of seasonal food and local market. We also conducted case studies among the tuberculosis and cancer patients.

Qualitative data were digitally recorded, transcribed, and translated in English. Content analysis method was used for data analysis.

Table 1.2. Sampling strategy

Districts	Blocks		Universe of the Study		Primary Sampling Unit		Study Element
		Universe	Micro-project areas (N=17)		Villages/Hamlets (N=541)		Households (N=19096)
		Sample	n=17		N=541	n=32	n=384
Malkangiri	Khairput	1	Bonda Dev. Agency, Mudulipada		29	2	2 X 12= 24
	Kudumuluguma	2	Didayi Dev. Agency, Kudumuluguma		37	2	2 X 12= 24
Kandhamal	Tumudibandh	3	KutiaKandha Dev. Agency, Belghar		68	2	2 X 12= 24
Kalahandi	Lanjigarh	4	KutiaKandha Dev. Agency, Lanjigarh		16	1	1 X 12= 12
Rayagada	Bcuttack, Muniguda	5	DongariaKandh Dev. Agency, Kurli		62	2	2 X 12= 24
	K.Singhpur	6	DongariaKandh Dev. Agency, Parsali		40	1	1 X 12= 12
	Gunupur	7	LanjiaSoura Dev. Agency, Puttasinghi		20	1	1 X 12= 12
Keonjhar	Banspal	8	Juang Dev. Agency, Gonasika		35	2	2 X 12= 24
Nuapada	Komna	9	ChuktiaBhunjia Dev. Agency, Sunabeda		14	2	2 X 12= 24
Deogarh	Barkote	10	PaudiBhuyan Development Agency, Rugudakudar		32	2	2 X 12= 24
Anugul	Pallahara	11	PaudiBhuyan Development Agency, Jamardihi		25	2	2 X 12= 24
Sundargarh	Lahunipara	12	PaudiBhuyan Dev. Agency, Khuntagaon		22	1	1 X 12= 12
Mayrubhanj	Jashipur	13	Kharia&Mankirdia Dev. Agency, Jashipur		18	3	3 X 12= 36
	Morada, Suliapada	14	Lodha Dev. Agency, Moroda		12	1	1 X 12= 12
Gajapati	Gumma	15	LanjiaSoura Dev. Agency, Seranga		21	2	2 X 12= 24
	Mohana	16	Soura Dev. Agency, Chandragiri		32	2	2 X 12= 24
Ganjam	Patrapur	17	Tumba Dev. Agency, Tumba		58	4	4 X 12= 48
		Total			**541**	**32**	**32 X 12= 384**

In this study total 358 household participated. Among the individual participants (n=1077), 223 were under-five and 162 were six to fourteen years old children. Total 275 were adults male and 417 were adult female. The detail study sample is described in (Table 1.3).

Table 1.3. Study sample

District	Block	viProject Areas	PVTGs Group	Village	PVTGs Population Total Household	Total Population	Study sample No of households	Male	Female	6 to 14 years children	Under five children
Kalahandi	Lanjigarh	1	KutiaKondh	Banigaon	34	245	13	13	14	3	7
Nuapada	Komna	2	ChuktiaBhunjia	Godbhatta	62	240	10	8	11	6	5
Nuapada	Komna	2	ChuktiaBhunjia	Sonabahali	24	118	10	9	14	2	7
Sundergarh	Lahunipara	3	PaudiBhuyan	Uskela	117	420	12	7	13	8	13
Deogarh	Barkote	4	PaudiBhuyan	Bijadihi	37	163	11	10	12	7	12
Deogarh	Barkote	4	PaudiBhuyan	Mahullata	48	180	11	8	11	2	2
Angul	Pallahara	5	PaudiBhuyan	Rugudihi	34	148	12	6	18	8	5
Angul	Pallahara	5	PaudiBhuyan	Nagira	103	509	8	7	11	0	3
Mayurbhanj	Moroda	6	Lodha	Chikitamatia	74	224	12	12	14	6	4
Mayurbhanj	Jashipur	7	HillKharia	Gudgudia	55	175	12	12	15	0	7
Mayurbhanj	Jashipur	7	Mankirdia	Durdura	27	93	12	6	12	4	3
Mayurbhanj	Jashipur	7	Birhor	Badjhili	29	70	12	13	15	4	7
Keonjhar	Banspal	8	Juang	Gupataganga	65	306	14	9	15	7	8
Keonjhar	Banspal	8	Juang	U. Baitarani	42	197	12	7	13	4	11
Malkanagiri	Khairput	9	Bonda	Krishnipada	107	400	10	8	7	2	14
Malkanagiri	Khairput	9	Bonda	Padeiguda	73	304	9	7	9	7	7
Malkanagiri	Kudumulguma	10	Didayi	P.gumma	46	213	12	9	14	2	4
Malkanagiri	Kudumulguma	10	Didayi	Oringi	153	815	12	9	17	3	7
Rayagada	Bisam Cuttack	11	DongriaKondh	Kuruli	38	120	6	1	9	2	4
Rayagada	Bisam Cuttack	11	DongriaKondh	Munduballi	41	159	10	6	12	3	6
Rayagada	K. Singhpur	12	DongriaKondh	S. Dengeneli	26	97	5	4	5	4	1
Rayagada	Gunupur	13	LanjiaSaora	Sagada	121	763	10	6	11	6	6
Gajapati	Gumma	14	LanjiaSaora	Abasing	42	195	12	9	14	5	6
Gajapati	Gumma	14	LanjiaSaora	Angada	50	217	12	8	17	8	4
Gajapati	Mohanna	15	Saora	Manikapur	22	106	14	14	18	12	12
Gajapati	Mohanna	15	Saora	Gubriguda	13	49	12	11	12	12	9
Ganjam	Patrapur	16	Saora	Gujulingi	44	134	12	8	10	6	13
Ganjam	Patrapur	16	Saora	Puriasahi	50	184	11	8	14	4	8
Ganjam	Patrapur	16	Saora	Bhogibandha	21	98	12	10	15	6	3
Ganjam	Patrapur	16	Saora	Burasahi	16	66	13	13	18	4	6
Kandhamal	Tumudibandha	17	KutiaKondh	Kadapana	22	99	12	9	14	2	8
Kandhamal	Tumudibandha	17	KutiaKondh	Rangaparu	68	324	12	8	13	13	11
							358	**275**	**417**	**162**	**223**

1.2.5 Data quality assurance

To improve the internal validity of the studies, the data collection instruments were developed in consultation with relevant professionals and carefully field-tested before use. All the checklists, interview and FGD guide were prepared in regional language, in this case Odia. All the field assistants had a brief training about PVTGs and their health status. They had also taken thorough training on data collection tools and operational procedures. All the field assistants had basic qualification of master degree. We also took the help of local field level health workers during data collection. We developed a chart-booklet with picture, which was used during interview to facilitate visual recognition of objects by the respondents such as food items.

All the hard copies of questionnaires were checked thoroughly before data entry. Quantitative data were entered in Epi.info software. All of the entered data were checked against the checklists. Quantitative data were analysed using R software.

Qualitative team of AIPH conducted the qualitative studies. The audio/video-recorded information were transcribed verbatim in Odia and then translated into English. To improve the credibility of the findings, triangulation, peer debriefing and member checks were followed.

1.2.6 Ethical consideration

The ethical committee of Asian Institute of Public Health, Odisha, India approved the study. Before the study, permission was granted from the relevant local authorities. Information about the purpose of the study was given to the all participants. The reproductive age women were also agreed for blood sample of haemoglobin estimation. They were also informed about digital recordings and photos. The written consent was obtained from them.

1.2.7 Variables and analytical strategies

All the variables either directly measured or derived at the analysis stage and their statistical analysis strategies are described in details in individual chapters.

1.3 Outline of the chapters

The detailed methods, results and interpretations of our study are narrated in the following chapters

- Social determinants of health: dealing with underlying causes of health-related states/events
- Health status of adult males and females (15 years and above)
- Health status of individuals aged between 6 to 14 years
- Health status of under-five children
- Health status of women in the reproductive age group (15-49 years)
- Health status of older adults (>50 years)

1.4 Characteristics of sampled villages

In Table 1.4, additional information on sampled villages especially the median (Inter-quartile range or IQR) distance from the nearest key facilities that include administrative head quarter, market, educational institutions, health centres, transport hubs, banks are presented. Above 50% of the villages had daily market situated at a distance of more than six kilometers. Most of the villages had Angawadi centers (AWC) and primary schools. Above 50% villages were located more than four kilometer from a primary health centre and 50% villages were located more than 22 kilometer from community health centre.

Table 1.4. Sampled villages

Distance of sampled villages from	Median (IQR)
GP head quarter	3 (3)
Block head quarter	26 (20.8)
District Head quarter	80.5 (17.5)
Nearest weekly market	5 (9.5)
Nearest Daily market	6 (11)
Micro project office	5 (7.5)
AWC	0 (0)
ICDS office	27 (18.3)
Health sub-center	2 (3.3)
PHC	4 (4)
CHC	22.5 (19.8)
Primary School	0 (0)
M.E. School	2 (3.75)
High School	3 (4)
College	25 (17.25)
Post Office	3 (3)
Bank	8 (9)
Bus Stop	5 (15.8)

Chapter 2

2 Social Determinants of Health

2.1 Background

The social condition is a significant determinant of both physical and mental well-being of the individuals. It has emerged from research and literature across the world that socioeconomic factors and cultural beliefs and practices are the critical drivers of diseases in various courses and stages of life. Therefore, we assessed individual and household social determinants such as educational attainment, mariatal age, housing condition, occupation, socioeconomic status, water and sanitation, road connectivity to the households, lifestyle choices including tobacco and alcohol consumption and health seeking behaviours along with the general health status survey of ours of members of Particularly Vulnerable Tribal Groups (PVTGs). This study also explored the total number of mortality and possible cause for death during last twelve months in the sampled households.

2.2 Methods

The sampling strategy and general description of the villages from where the households where selected are given in Chapter 1.

2.2.1 Variables

Data was collected under the following themes of variables

2.2.1.1 Socio-demographic

Age was collected and recorded as a continuous value but at the analysis stage it was grouped into six categories: 0 – 5 years, 5 – 15 years, 15 – 30 years, 30 – 45 years, 45 - 60 years and 60 – 85 years. Whether the household qualifies to be a Below Poverty Line (BPL) was enquired and verified. To capture the socio-economic condition of the households of the PVTGs, data was collected regarding the type of practiced religion i.e. whether Hindu or Muslim or Christian or any other; their educational status and occupational engagement. With regards to education they were asked whether they have attained education up to only primary level or secondary level or higher secondary level or whether they have attained any diploma or equivalent degree or are graduate/post-graduate education; and regarding occupation they were asked from the following options: agriculture, horticulture, wage earning, shifting cultivation, forest collection, food gathering, small business, fishing, housewife and other occupation.

2.2.1.2 Housing

The type of road connecting the household and the type of vehicle (mode of transport) most suitable for accessing the respective areas were enquired and observed. To gain a better idea about their housing condition data were collected regarding preferred mode of cooking i.e. traditional chullah, open fire, kerosene stove or gas, and type of fuel used for cooking. Apart from this the number of rooms

comprising the household and the main material of the floor, wall and roof the household were also noted. Data were also collected regarding the cooking facilities, whether situated within the living or sleeping arena. Data regarding accessibility of electricity (be it electrical or solar) and availability of network for mobile telephony were also observed.

2.2.1.3   Economic

Asset was used as the proxy for household wealth in this survey. Data was collected regarding possession of various assets such as land, livestock and thirteen other commodities. A list was presented before the interviewee and as per the reply a score was assigned to each household in a scale of 0 to 15, which represents the number of assets possessed by the household. It was arranged in an ascending order i.e. score of zero represents no assets and fifteen signifies the presence of all fifteen commodities from the presented list. Assets variable was then converted to quintiles, i.e. the population was divided into five equal groups in terms of the number of assets possessed; the cut-points were determined by the data analysis software.

2.2.1.4   Water, Sanitation and Hygiene (WASH)

Water, sanitation and hygiene (WASH) practices of the household members were recorded. It comprised of- primary source of drinking water, defecation practice i.e. whether they have a latrine (private or shared) or they defecate in the open and also whether they wash their hands after defecation, if so then whether they use any material such as soap/detergent or ash/mud during washing their hands.

2.2.1.5   Health seeking behaviour

Data was also collected about their health seeking behaviour. They were asked whether the respondents sleep under mosquito net or not, whether they have attended any health programmes in the last 12 months, and where do they present themselves when in need of assistance with regards to health- formal medical professionals or para-medicals, frontline health workers, traditional healers, quacks/informal healers, or nowhere i.e. stay at home.

2.2.2   Data quality assurance

Data were entered into the computer from field formats through open-access Epi-info software of Centre for Disease Control and Prevention. The quality of data underwent assurance checks at the field level while being collected through close supervision by the researchers. Ten percent data entered in the computers underwent random validity checking.

2.2.3   Statistical analysis

Most of the results were presented in the form of contingency tables that depicted the numbers along with the percentages of the population and for some data pie charts were drawn for better understanding and interpretation of the topic of interest. Summarizing statistic for quantitative data included measures of central tendency and dispersion. To present the demography of the surveyed

respondents in the best possible comprehensible way, age pyramid was derived. The data analysis was using R software (3.0.1).

2.3   Results and Interpretation

2.3.1   Demographic details

Of the 13 PVTGs present in Odisha, spread across its vast and diverse geographic terrain, all the 13 PVTGs were surveyed in this study; both on household and individual level.

Data was collected for 354 households and its respective members, comprising a total of 1837 individuals/household members.

The data on the population by demography, especially age and sex, is essential for planning and developing appropriate health programmes for the targeted section of the respective economy.   As per the data, although the proportion of females (52%) was comparatively more than the proportion of males (48%) but the difference was marginal. With regards to distribution of population across various age groups it was found that the share of population comprising each age group was comparable to that of Odisha, as per the Census 2011 data.

In our survey we found that the overall proportion of population under the age-group of 0 -15 years old was 39%, the proportion of working population i.e. 15 – 60 years age-group was overall 55.76% and the overall proportion of 60+ aged population in this survey was 5.25%. In Figure 2.1 age pyramid of study population is presented.
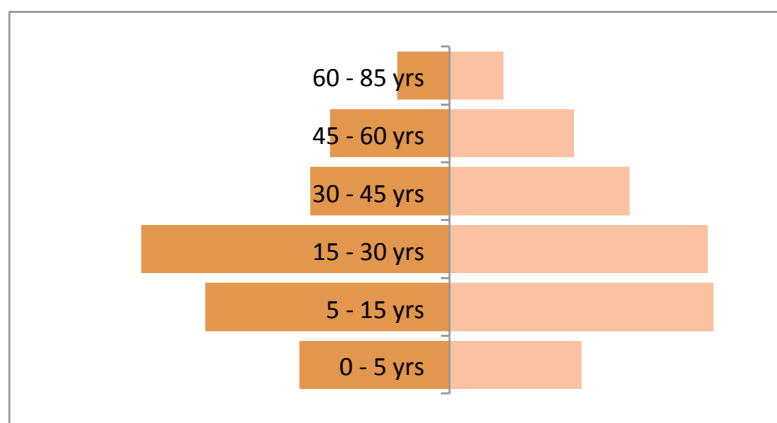
Figure 2.1. Age pyramid of sampled individuals

The above age-pyramid depicts the distribution of the sample by age among the two sexes- males and females. As apparent from the figure the pyramid is narrow at the base gradually gaining volume as we move from bottom to top and then again tapering at the top, thus depicting that there is a smaller proportion in the population at the base which is the 0 – 5 age-group; this scenario being somewhat unlike the country-wide population distribution in India.

In other words, the proportion of the population in age group 0-5 is considerably low than that of the national population. Either it may be due to low fertility of the PVTGs attributable to a high standard of

contraception practices, birth spacing and sterilization, which seems unlikely (to be explored in subsequent chapter); or may be due to some genetic defects resulting from consanguineous inbreeding due to smaller geographically isolated sub-population of these ethnic groups. Another possibility may be due to relatively higher mortality among children aged 0-5 years that their proportion in the population has declined to some extent. It should be kept in mind while interpreting our study results that the age pyramid that we constructed was not based on census data but was from a sample of the population, but it is also very unlikely that the estimates would be grossly inaccurate from such sample-based inferences, because the sample on which the survey was conducted was representative of the PTG population.

2.3.2   Educational attainment

Attainment of formal education although comparatively less; but, was not uncommon among the PVTG population in contemporary times. About 9.5% of the population reported to have completed their high school, 2.5% reported completion higher secondary/diploma and 1.7% have attained higher education i.e. graduation/post-graduation. The illiteracy rate was 11.6% among children, 60% among adults and 80% among above 50 years old. This study indicates that the rate of educational attainment among PVTGs is increasing from older to newer generations. However, the higher education rate was very less – only 2% had intermediate or more education. The educational attainment is present in Table 2.1.

Table 2.1. Educational attainment

Educational attainment	Male n (%)	Female n (%)	Total n (%)
Illiteracy rates (N=449)			
Among 6-14 years children	8 (10.8)	10 (12.3)	18 (11.6)
Among 15-50 adults	97 (43.9)	249 (70.3)	346 (60.2)
Among above 50 years old	35 (66.0)	50 (94.3)	85 (80.2)
Current school/college attendance (N=136)			
Six to fourteen years children	54 (87.1)	63 (85.1)	117 (86.1)
Educational attainment for $\geq$ 15 years (N=676)			
Illiterate	132 (48.4)	299 (74.2)	431(63.8)
Primary	82 (30.0)	72 (17.9)	154 (22.8)
Middle school	14 (5.1)	7 (1.7)	21 (3.1)
High school	34 (12.5)	20 (5.0)	54 (8.0)
Intermediate/ diploma	9(3.3)	4 (1.0)	13 (1.9)
Graduate/Postgraduate	2 (0.7)	1 (0.2)	3 (0.4)

2.3.3   Marital status and household head

It was found that about 4% (n=17) male were married with age below 21 years and 9% (n=11) girls married before attaining 18 years. The detail of mariatal status is given in Table 2.2.

Table 2.2. Marital status

Marital age	Males (N=441), n (%)	Females (N=523), n (%)	Total (N=964), n (%)
Single, never married*	53 (12.0)	70 (13.4)	123 (12.8)
Married	379 (85.9)	403 (77.1)	782 (81.1)
Separated	1 (0.02)	1 (0.02)	2 (0.02)
Divorced	1 (0.02)	2 (0.04)	3 (0.03)
Widowed	7 (1.6)	47 (9.0)	54 (5.6)

*Excluded women < 18 and men <21 years

About 87.5% of the households were headed by males and in the remaining cases it was the elderly widow who was heading the household. This indicates that the PVTGs have a predominantly patriarchal society.

2.3.4   Religion

From the survey it was found that the common religion practiced by the households of the Particularly Vulnerable Tribal Groups (PVTGs) was Hinduism (Table 2.3)

Table 2.3. Distribution of religion

Religion	N	Percentage
Hindu	311	88.1%
Muslim	0	0
Christian	41	11.6%
Other	1	0.3%

2.3.5   Occupation
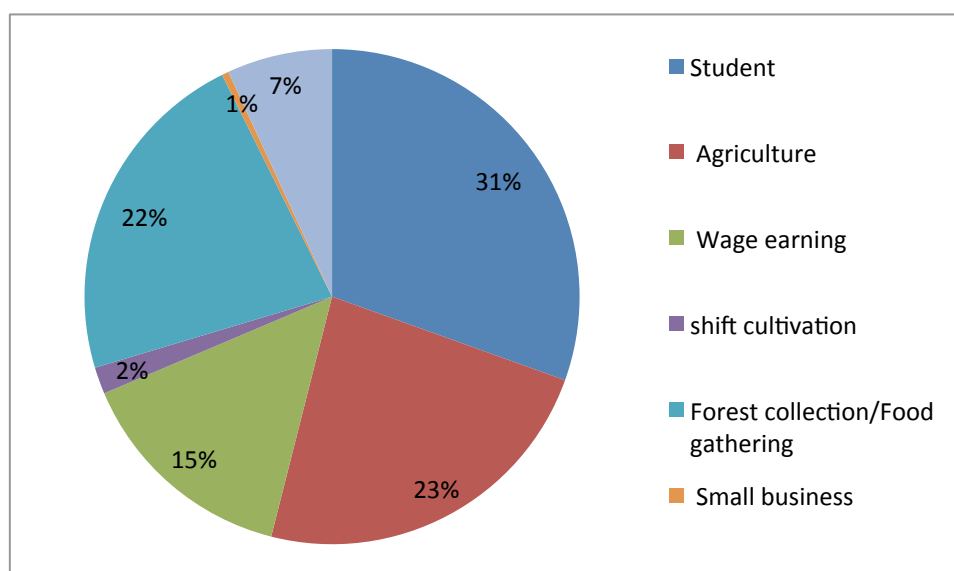
Figure 2.2. Distribution of occupation

This study showed that agriculture as well as collection and gathering of forest products were the prime occupation of the PVTGs. Twenty three percent of the population was engaged in agriculture mostly men were belong to this group. Twenty two percent of the population depended onforest collection and

food gathering and they were mainly women. Nearly 15% of the PVTGs were daily wage earners engaged in minimal jobs. Thirty one percent of the population (PTG) was engaged in student life (Figure 2.2).

2.3.6   Economic status

Irrespective of caste, creed and ethnicity, wealth is the most independent factor that influences the health and also the health seeking behaviour of people across the globe. Hence, looking into this aspect of the societies comprising the Particularly Vulnerable Tribal Groups was inevitable.

The economic status of the household was recorded not through any monetary measure of income and wealth as often it is very difficult to monetise such characteristics of people living a traditional rural life in the Indian context. Hence, through presence of various material possessions and commodities such as land, livestock, television, mobile phone, automobiles etc., a proxy measure for household wealth, the economic conditions of the households were measured.

The 26 household assets given in NHFS tool for socioeconomic assessment are electricity, mattress, pressure cooker, chair, cot/bed, table, electric fan, radio/transistor, black and white television, colour television, sewing machine, mobile telephone, land line telephone, internet, computer, refrigerator, air conditioner/cooler, washing machine, watch/clock, bicycle, motorcycle/scooter, animal-drawn cart, car, water pump, thresher and tractor. In our study as the participants were PVTGs, we used following 15 household assets, which were electricity, television, mobile/cellular phone, land line telephone, watch or clock, radio, bi-cycle, motor bike, bullock or animal cart, chair, cot or bed, table, computer, vehicle and electric fan.
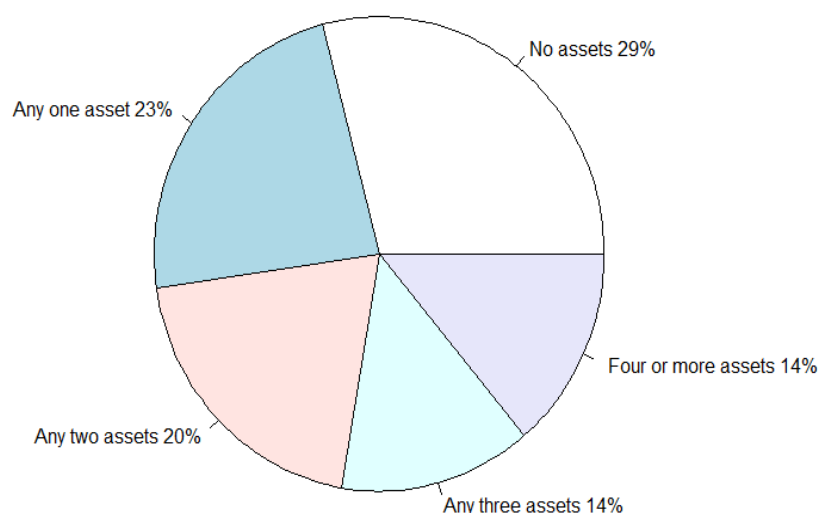
Figure 2.3. Distribution of assets possessed

During analysis a score was assigned to each household that represented the number of commodities possessed by the household, from a pre-existing list of items presented to them, and the analysis

revealed that on a scale of 0 – 15 the highest obtained score by any household was 9 while the lowest was 0 i.e. no assets. The most commonly possessed commodities were television and mobile phone; one fifth of the population owned mobile phone. (Figure 2.3)

According to the results, for 314 (89%) households the members claimed that they belonged to BPL category, but, of those households, only 282 (90.7%) could be physically verified through presentation of a BPL card.

From the analysis it was found that nearly 70% of the PVTGs owned land and more than 50% of the households possessed livestock (either cattle or goat or sheep or pig or poultry), cattle being the most popularly found form.

2.3.7   Housing condition and basic amenities

The physical condition of the place of residence such as-number of rooms in a house, whether the household has a separate kitchen or not, the fuel used for cooking food, main material comprising the house's floor, roof and walls; are very important aspects with regards to the health of individuals of the respective dwellings since, these factors act as catalyst for health events such as illness and mortality due to indoor air pollution. Therefore, these factors were studied in the survey.

From the survey it was found that the houses commonly comprised of one or two living room(s) and a kitchen and bathroom (if any). In most of the places it was found that the main material used in building the floor of the house was mud/clay/earth/sand/dung (44%) and in few the floor was cemented (19%). Whereas with regards to the roof the commonly used material was asbestos sheet(s) (48.4%), in some cases the roof was concrete (24.9%) and in some cases it was mainly made up of thatch/palm leaf/reed/grass or straw (19.8%). The exterior walls were made of bamboo/ wood and mud in 44% of the houses, nearly 22% of the houses' walls were made of bricks/stones and in some houses the walls were made of cane/palm/trunks/bamboo (19%) and around 12% of the houses had concrete walls.

One fourth of the PTG households had a separate room for cooking whereas nearly 60% of the PVTGs cooked food in the same room that they use for living and sleeping purposes. 14.1% of the households had set up their mode of cooking outdoor.

The residences of the vulnerable tribal population are often situated in hard-to-reach terrains, to some extent, jeopardizing their easy accessibility to basic requirements such as electricity and accessibility to mobile telephony, that have become an essential part of modern human life, with a bearing on lifestyle and hence health. Therefore, the survey also enquired for availability of these facilities.

It was found that 254 (73.4%) of the households had access to electricity and only 26.6% of the households were devoid of it. Access to mobile telephony signals has already been discussed.

2.3.8 Water, Sanitation and Hygiene (WASH)

WASH and related practices have a great bearing on the health of individuals especially among under-five and infants. Since the survey aims to evaluate the health status of the PVTGs therefore exploring the practices with regards to WASH was of prime importance, given the proportion of morbidity and mortality attributable to it even in population where such facilities are well provided.

Table 2.4. Primary source of drinking water

Source	n (%)
Tube-well	207 (58.6%)
Well	64 (18.1%)
Supply water	35 (9.9%)
Stream	19 (5.4%)
River	16 (4.5%)
Spring	10(2.8%)
Pond	2 (0.6%)

As evident from the above (Table 2.4), the most common source of drinking water among the PVTGs was tube-well followed by well; i.e. overall, among the PVTGs, nearly 60% of the population used water from the tube-well and 20% used water from well for drinking purpose, although the quality and potability of the water coming from this sources could not be verified by the survey. Almost 14% of the surveyed households still depended on "unsafe" sources such as ponds and streams.

Table 2.5. Defecation practice

Type	n(%)
Private latrine	49 (13.9%)
Shared latrine	2 (0.6%)
Open-defecation	302 (85.6%)

About 13.8% (12.2% - 15.3%) of the PTG households possessed private latrine but Open-defecation practice was very high at 85% (83.81% - 86.98%) in this section of the society as compared to approximately 60% for the whole state. (Table 2.5)

With regards to hand washing practice after defecation, it was found that the use of soap/detergent was restricted to only (37.3%), among the PVTGs, whereas use of ash/mud (29.9%) or washing with only water (32.5%) was very common.

Hence, WASH practices reflected the health vulnerability of these tribal groups.

2.3.9 Road and other connectivity to the household

Road connectivity has a significant contribution in shaping the health of the sub-populations since the access and coverage of any heath programme depends on it, so does the health-seeking behaviours of the inhabitants.

In this survey the type of roads (if any) connecting the households and also the ease of accessibility through various modes of transport were taken into account to determine the physical connectivity of the areas. Apart from this the connectivity through mobile telephony was also captured by observing if the place of interest received any mobile phone signals that could facilitate such connectivity, since mobile network is equally gaining significance with regards to health programmes at present and is also expected to gain further momentum over the time.

From the analysis of the collected data it was found that nearly 49% of the households were connected through hard-top roads, followed by kuchha (unpaved) roads that connected nearly 43% of the households, but only five percent of the households were connected through the all-weather asphalt-surfaced roads. In Table 2.6 road connectivity to the household is given.

Table 2.6. Road connectivity to household

Type	n (%)
All-weather	21 (6%)
Hard-top	171 (48.6%)
Kuchcha (unpaved)	153 (43.5%)
Footpath	4 (2%)

Sixty percent and more households were accessible through motor vehicle. The proportion of houses that could be accessed through motorbike and bicycle were 14.5% and 14% respectively. Eleven percent of the houses could not be accessed through any kind of vehicle but by foot.

Only 37% of the households received fair mobile telephony signals facilitating communication through cellular phones. In Table 2.7 accessibility to the household is given.

Table 2.7. Accessibility to the household

Type	n (%)
Motor vehicle	207 (59.3%)
Motorbike	49 (14%)
Bicycle	49 (14%)
By foot	44 (12.6%)

2.3.10 Health seeking behaviour

Growing literature and research in this genre have emphasized that understanding this aspect of the population is very essential determinant of healthy life of the population. It is an important factor driving the increasing proportion of morbidity and mortality among the community members.

Various factors- attendance in various health programmes, sleeping under mosquito net and choice of medical assistance; were taken into consideration to understand the health seeking behaviour of the PVTGs.

From the study it was found that more than two-third of the PTG population practised sleeping under the mosquito net, a reflection of free distribution of Long Lasting Insecticide-treated Net (LLIN) among these groups by the anti-malaria programme of the state, as most of these groups inhabit in high malaria-endemic zones.

The proportion of males who reported of attending preventative public health programmes was 33% and that for females was slightly higher at 36%.It was also found that when in need of assistance with regards to health, irrespective of age and gender, the primary preference was given to formal medical assistance for curative care as shown in the table below, with little variations between age and sex-groups.

Table 2.8. Health seeking behaviour

	Children n (%)	Women n (%)	Men n (%)	Adults n (%)
Formal medical	278 (78.5%)	277 (78.2%)	280 (79.1%)	269 (76%)
Frontline health workers	28 (6.5%)	25(7.1%)	22 (6.2%)	25 (7.1%)
Traditional healers	31 (8.8%)	34 (9.6%)	30 (8.5%)	28 (7.9%)
Quacks/Informal	18 (5.1%)	15 (4.2%)	16 (4.5%)	15 (4.2%)
Nowhere/Home	2 (0.6%)	1 (0.3%)	2 (0.6%)	3 (0.8%)

Figure 2.4 Interview of a traditional healer from Paudi bhuyan community

The community members viewed that during the emergence the traditional healer are the only hope for them. We interviewed seven traditional healers. The traditional healers were treat general disease like cold fever, cough, diarrhea and especially snakebite cases. They took fewer fees for their treatment. Some of the healer takes alcohol for giving the treatment.

The traditional healers viewed that, when they feel difficult to treat, they refer the patient to the hospital.

The people believe more on the traditional healer, as they are the local community. They collect the roots, leaf and seeds from the forest to prepare the medicines.

We interview a traditional healer from Paudi Bhuyan community, who was expert in treating urine infection in that locality. Those who have urine infection he collected the urine and put it in a mud pot, and put some oil or kerosene on the urine. After five to ten minutes there was formation of various types of bubbles on the urine. By observing that bubbles he diagnosed

Figure 2.5 Interview of anther traditional healer

the types and severity of infection and provide treatment. According to him he cured so many patients in his life without taking any fees.

Table 2.9. Social structure influencing health seeking behaviour

Social structure and health seeking behavior	Male, n(%)	Female, n(%)	Total, n(%)
Acceptability (N=683)			
Big Problem	7 (2.6)	38 (9.2)	45 (6.6)
Small problem	83 (30.6)	62 (15.0)	145 (21.2)
No problem	181 (66.8)	312 (75.7)	493 (72.2)
Affordability (N=680)			
Big Problem	139 (51.3)	217 (53.1)	356 (52.4)
Small problem	97 (35.8)	154 (37.7)	251 (36.9)
No problem	35 (12.9)	38 (9.3)	73 (10.7)
Accessibility (N=683)			
Big Problem	106 (39.1)	132 (32.0)	238 (34.8)
Small problem	112 (41.3)	161 (39.1)	273 (40.0)
No problem	53 (19.6)	119 (28.9)	172 (25.2)
Accompaniment (N=683)			
Big Problem	25 (9.2)	40 (9.7)	65 (9.5)
Small problem	83 (30.6)	87 (21.1)	170 (24.9)
No problem	163 (60.1)	285 (69.2)	448 (65.6)
Availability (N=683)			
Big Problem	87 (32.1)	118 (28.6)	205 (30.0)
Small problem	101 (37.3)	140 (34.0)	241 (35.3)
No problem	83 (30.6)	154 (37.4)	237 (34.7)
Concern that there may not be a same gender provider	11 (4.1)	35 (8.5)	46 (6.7)
Concern that there may be no drugs available	76 (28.0)	66 (16.1)	142 (20.9)
Concern that there may not be any health provider	115 (42.4)	163 (39.7)	278 (40.8)

2.3.11 Tobacco and alcohol consumption

The tobacco consumption was quite at a high rate with both smoked and smokeless tobacco equally distributed in the adult males; women mostly indulging in smokeless tobacco (Table 2.10)

Table 2.10. Tobacco consumption

Tobacco consumption	Male (N=240) n(%)	Female (N=388) n(%)	Total (N=628) n(%)
Never	98 (40.8)	237(61.1)	335(53.3)
Current			
Daily	101(42.1)	131(33.8)	232(36.9)
Not on daily basis	35(14.6)	20(5.2)	55(8.8)
Previous users	6(2.5)	0(0.0)	287(45.7)

Alcohol consumption was also considerable in these populations (Table 2.11). Of those who consumed, 93% consumed locally made alcohol, which was of non-standardized quality and varied considerably with regards to alcohol content. The gender difference in alcohol consumption was much wider than

that in tobacco consumption, with significantly greater proportion of women abstaining from the intoxicating drink.

Table 2.11. Alcohol consumption

Alcohol consumption	Male (N=240) n(%)	Female (N=388) n(%)	Total (N=628) n(%)
Never	81 (30.1)	296(72.4)	377(55.6)
Current			
Daily	47(17.5)	25(6.1)	72(10.6)
Not on daily basis	138(51.3)	82(20.0)	220(32.4)
Previous users	3(1.1)	6(1.5)	9(1.3)

As for the tribal culture they consumed alcohol as their traditional practices and for their refreshment. The alcohols they consume were *Salap,* which was prepared by using one of the tree's liquid,*Handia,* prepared by water of the rice, which. *Mahuli* prepared by using the flower called mahuli. The male and female both of the groups use alcohol in their day today life. And some of the tribal group also earns money by selling the alcohol in the market. So this also helps them to develop their family's economic status.

2.3.11.1 Access to welfare programme and food security

About 82% (n=559) of the study population had accessed to free food by the government (ICDS, PDS, BPL) during last twelve months and 8% (n=55) got emergency food meals from any religious institution/food pantry/food bank. About 23% (n=154) attained community program centre/any social centre to eat "prepared meals". About 80% (n=485) were worried about food stock – run out before they got money to buy more and about 37% (n=251) had to cut the size of meals or skip meals because there wasn't enough money for food in household. Above 25% (n=170) said that their children had not eaten for the whole day because there wasn't enough money for food during some of the days in last years. The detail description of food security during past twelve months is given in Table 2.12.

Table 2.12. Food intake behaviour during last twelve months

Food intake behavior	Male, n(%)	Female, n(%)	Total, n(%)
Worried about food stock (run out before got money to buy more) (N=681)			
Often true	52 (19.2)	61 (14.9)	113 (16.6)
Sometimes true	143 (52.8)	229 (55.9)	372 (54.6)
Never true	72 (26.6)	119 (29.0)	191 (28.0)
Refused	4 (1.5)	1 (0.2)	5 (0.7)
Cut the size of meals or skip meals because there wasn't enough money for food (N=680)			
Yes	112 (41.3)	139 (34.0)	251 (36.9)
No	153 (56.5)	266 (65.0)	419 (61.6)
Refused	6 (2.2)	4 (1.0)	10 (1.5)
Children ever not eat for the whole day because there wasn't enough money for food (n=677)			
Yes	82 (30.3)	88 (21.7)	170 (25.1)
No	179 (66.1)	312 (76.8)	491 (72.5)
Refused	10 (3.7)	6 (1.5)	16 (2.4)

2.3.12 Mortality indicators

In table 2.13 mortality in various age groups during the year 2014 is given. In table 2.14 perceived cause of death is provided. Most of the cases (44%) fever was perceived as main cause of death.

Table 2.13. Mortality in various age groups during the year 2014

Age	Male (N=22), n (%)	Female (N=17), n (%)	Total (N=39), n (%)
Under five children	4 (18.2)	2 (5.9)	5 (12.8)
6-14 years children	1 (4.5)	0 (0.0)	1 (2.6)
Adults	6 (27.3)	3 (17.6)	9 (23.1)
Older age	11 (50.0)	13 (76.5)	24 (61.5)

Table 2.14. Perceived cause of death

Cause of death	Male (N=22), n (%)	Female (N=17), n (%)	Total (N=39), n (%)
Diarrhea	2 (9.1)	0 (0.0)	2 (5.1)
Fever	11 (50.0)	6 (35.3)	17 (43.6)
Infection diseases	1 (4.5)	0 (0.0)	1 (2.6)
Malaria	1 (4.5)	1 (5.9)	2 (5.1)
Paralysis	0 (0.0)	2 (11.8)	2 (5.1)
TB	2 (9.1)	1 (5.9)	3 (7.7)
Accident	1 (4.5)	2 (11.8)	3 (7.7)
Old age	1 (4.5)	3 (17.6)	4 (10.3)
Don't know	3 (13.6)	2 (11.8)	5 (12.8)

Chapter 3

3   Health Status of Adults

3.1   Background

There is limited information on health status of PVTGs in Odisha; and the social determinants of health, dealt in previous chapter(s), indicate towards an entrenched milieu of lack of privilege among the majority of the members of these communities, which is likely to have a profound effect on the epidemiology of health-related states and events in these groups. Therefore, this study assessed the general health status, burden of communicable and non-communicable diseases, mental well-being, prevalence of injury and nutritional uptake practices among PVTGs to characterize their contemporary health status, so that policy can be informed for planning future mitigating measures.

3.2   Methods

Questionnaires were administered to each adult individual present during the survey in the household (N=680). Physical measurements on some domains were also undertaken which are given in detail below (3.2.1). The sampling details have already been described in Chapter 1.

3.2.1   Variables

The following set of variables were measured or later on derived at the analysis stage with the measures recorded from the respondents.

3.2.1.1   General health indicators

The anthropometric data – height (in cm), weight (in kg), mid upper arm and waist circumference (in cm) were measured during interview. The BMI was calculated by dividing the weight (in Kg) with height (in m^2) and then divided into conventional categories <18.5=underweight, 18.5-24.9=normal, 25-29.9=overweight, $\geq$30=obese. Waist circumference more than 81 cm for females and 88 cm for males were considered as an indicator for central obesity.

The blood pressure was measured for each individual – three times, both systolic pressure (SP) and diastolic pressure (DP) were recorded and average of these three readings were considered for analysis. The National Institute of Health (NIH) hypertension classification criteria were used to categorize the respondents into various groups: SP <120 and DP <80 = Normal, SP: 120-139 or DP: 80-90 = Pre-hypertension and SP $\geq$140 or DP $\geq$90 = Hypertension. The

Figure 3.1 Blood pressure being measured by research nurse

peak flow of air during expiration of each participant was recorded using a peak flow meter.

3.2.1.2   Diseases

In order to estimate the prevalence of diseases affecting the individuals– information of physician (or trained health personnel from the health system)-diagnosed communicable diseases that commonly affects such communities were collected which included malaria, skin infection, diarrhea, tuberculosis (TB) and leprosy. The same process was also followed for collecting information with regards to common non-communicable diseases such as chronic lung diseases, cancer, diabetes, heart disease, and paralysis. For those individuals who did not have a physician-diagnosed condition, questions regarding relevant symptoms were asked, which indicated towards the likelihood of such disease affecting the individuals. Information was also collected on Bitot's spots as observed during the interview of the respondents.

3.2.1.3   Well-being

The well-being questionnaire as per the WHO well-being assessment tool of 1998 contained five items, whereby the respondent was asked how she felt about those items during the last two weeks. The scores for possible answers ranged from 0-5, 0 representing worst possible and 5 representing the best possible quality of life. The raw composite well-being score was

Figure 3.2 Interview being conducted

calculated by adding up the scores of the five answers, which range from 0 to 25. A cut-point of 13 was used to define those at higher risk of mental ill-health such as depression and would need further exploring into their well-being.

3.2.1.4   Injuries

The prevalence of injury during last twelve months was collected. The intention behind the injury (unintentional/intentional/self-inflicted) and cause of injury (fall, struck, stabbed, gun shot, electricity shock, drowning, poisoning, burn as well as snake and animal bite) were also reported. In case of disability related to injury type of disability such as unable to use hand or arm, walk with limp, loss of hearing or vision, weakness of breath, loss of memory and inability to chew was also reported.

3.2.1.5   Nutritional practices

The nutritional intakes during last three days (72 hours) were also assessed using a detailed questionnaire. Pre-designed photo book was used to facilitate the interview.

3.2.2   Analysis

The adult data was analysed primarily using univariable tables; and then bi-variable cross-tables, to mainly elicit the gender and age differentials in health status. Regression analysis were also conducted to estimate the effect of age and gender on well-being.

3.3 Results and Interpretation

Total 680 adults were interviewed. Among them 40% (n=269) were male and 60% (n=411) were female. Out of 680, about 20% were young adults (15 – 25 years), 49% adults (26 – 45 years), 26% older adults (46 – 65 years) and 5% above 65 years old (Table 3.1).

Table 3.1. Sample description: Age distribution among males (n=269) and females (n=411)

Age	Male	Female	Total
Young adults (15-25)	48 (17.8)	86 (20.9)	134 (19.7)
Adults (26-45)	126 (46.8)	206 (50.1)	332 (48.8)
Older adults (46-65)	79 (29.4)	98 (23.8)	177 (26.0)
Later life (65 above)	16 (5.9)	21 (5.1)	37 (5.4)

*The figures in parenthesis reflect the proportion (%) of males, females and total number of adult individuals in different age-groups.

3.3.1 General health indicators

The men were considerably taller and heavier set than the women in the PVTGs, the details of which are in (Table 3.2); though the two indices for obesity that include average BMI and average waist circumference did not vary significantly across gender.

Table 3.2. Anthropometric measurements

Anthropometric Assessment	Male (N=272)	Female (N=412)
	Mean (SD)	Mean (SD)
Height in cm	155.9(7.5)	145.5(7.1)
Weight in Kg	49.0(8.2)	41.4(7.5)
Body Mass Index in Kg/m^2	20.2 (3.4)	19.6 (3.5)
Waist circumference in cm	72.8(8.03)	72.4(9.3)

Approximately 35% (n=242) of the adult PTG population was found to be *underweight*; which is more than the 28% reported by National Family Health Survey – 3 (NFHS-3) in 2005-2006. But the proportion of adults with underweight in this vulnerable tribal group was very much similar to that observed among the Indian sample for Study on Global Ageing and Adult Health (SAGE), measured in 2010, albeit the age of the SAGE sample was more than 50 unlike that of our PTG adult sample. The prevalence of *abdominal obesity* was 3% among male and 18% among female; indicating much higher probability of central accumulation of adipose tissue than what is desirable among the women.

Table 3.3. Body weight and obesity-related measures

BMI	Male (N= 272) n(%)	Female (N=411) n(%)	Total (N=683) n(%)
BMI			
Under Weight (<18.50)	84 (31.10)	158 (38.3)	242 (35.5)
Normal range (18.50-24.99)	158 (58.5)	233 (56.6)	391 (57.3)
Overweight (25-29.99)	28 (10.4)	17 (4.1)	45 (6.6)
Obese (≥30)	0(0.0)	4(1.0)	(0.6)
Abdominal obesity	7 (2.6)	75 (18.2)	82 (12.1)

*The figures in parenthesis reflect the proportion (%) of males, females and total number of adult individuals in different BMI categories and also for possessing abdominal obesity

The blood pressure records of the respondents demonstrate that 19% suffered from *hypertension* and 45.5% had *pre-hypertension* and both these conditions were more common in men (Table 3.4)).

Table 3.4. Prevalence of hypertension

Blood pressure	Male (N= 272) n(%)	Female (N=411) n(%)	Total (N=683) n(%)
Normal (SP<120 and DP<80)	79 (29.0)	169 (41.1)	248 (36.3)
Pre-hypertension (SP: 120-139 or DP: 80-90)	134 (49.3)	170 (41.4)	304 (45.5)
Hypertension (SP≥140 or DP≥90)	59 (21.7)	72 (17.5)	131 (19.2)

*The figures in parenthesis reflect the proportion (%) of males, females and total number of adult individuals in different Blood Pressure categories

3.3.2 Well-being

The prevalence of relative lack of well-being, which was a raw composite score below 13 was found among 56% of people with almost no gender difference. On exploration with difference in risk across age-groups it was found that the risk of lack of well-being increased significantly with age with a steady dose-response relationship as shown in Table 3.5. The odds ratios increasing consistently with increasing age.

Table 3.5. Risk of lack of well-being (raw score <13) with increasing age

Age group	Odds Ratio (95% CI)
15-25 years	1
26-45 years	1.95 (1.3 – 2.95)
46-65 years	3.52 (2.2 – 5.68)
>65 years	4.28 (1.96 – 9.98)

Often, patronizingly, communities living in stark poverty are characterized as happy and in good mental health despite lack of material circumstances, which may be a form of an escape strategy for the socio-political policy-makers who often fail to support these communities adequately as would be expected in a socialistic welfare state. Our study deflates this "myth" and illustrates that these communities mostly living with severe economic hardships does not always possess good mental well-being as would be expected intuitively. Out results also underscore that with increasing age the life seems to be even more unfulfilled as many aspirations remain unattained among these community members.

3.3.3 Communicable diseases burden

Forty three per cent adult respondents among the PTG (male 49% and female 40%) suffered from malaria episode(s) during the last twelve months, as diagnosed by a physician or a trained and designated health personnel from the public health system. Among those who diagnosed or confirmed the diagnosis of malaria were medical doctor (89%), ASHA (6%) and ANM (4%). Out of 295 malaria-diagnosed patients 274 (96.5%) had completed the full course of anti-malaria treatment as self-reported by the sufferers. Among those who did not suffer from diagnosed malaria, 33% (n=204) suffered from prolonged fever resembling malaria symptoms during last twelve months and among those sufferers of undiagnosed fever80% had undergone blood examination. The complete figure of malaria is given in Table 3.6.

The findings indicate that in spite of various governmental and non-governmental programmatic efforts on malaria eradication through National Vector-borne Disease Control Programme (NVBDCP), these habitats of PVTGs are hyperendemic for malaria, for which perhaps the modestly hilly terrain of those areas with thick forest cover receiving higher rainfall that help to breed malaria mosquito vectors may be a major underlying cause. These areas qualify as the one of the highest malaria-burdened area of the country and these clans as those most highly affected by this dreaded disease, which even deepens their existing socio-economic woes. Despite higher detection rate of malaria case among this population, with increased surveillance from NVBDCP, often stock-out of Rapid Diagnostic Kits (RDK) and Artemisinin-based Combination Therapy (ACT) with the front-line health workers may be a driver of this hyper-endemicity, as was apparent from the in-depth interviews of these community member and frontline health workers; which allows a critical build-up of malarial parasite reservoir in the communities perpetuating the disease transmission cycle. The vector control measures may be also somewhat deficient as anecdotes from NVBDCP supervisory mechanism underscores perhaps declining efficacy of the Insecticide-treated Mosquito Nets (ITNs) distributed to the vulnerable families, with passage of time and further lack of investment in renewing those vital weapons against malaria.

A caveat, the data presented here is self-report of diagnosed malaria disease or disease-like symptoms and could not be confirmed by the researchers from relevant medical documents. Hence, ascertainment error, more towards over-reporting cannot be entirely ruled out.

Table 3.6. Malaria cases in the past twelve months

Malaria (N=295)	Male n(%)	Female n(%)	Total n(%)
Suffered from diagnosed malaria during past 12 months*	132 (48.7)	163 (39.8)	295 (43.3)
Diagnosed (or diagnosis confirmed) by (n=295)$			
ASHA	8 (6.2)	8 (5.1)	16 (5.6)
ANM	6 (4.7)	6 (3.8)	12 (4.2)
Medical doctor	111 (86.7)	142 (90.4)	253 (88.8)
Other	3 (2.3)	1 (0.6)	4 (1.4)
Completed full course of anti-malaria treatment (n=295)$	122 (95.3)	152 (97.4)	274 (96.5)

*The figures in parenthesis reflect the proportion (%) of males, females and total number of adult individuals experiencing episode(s) of malaria

$The figures in parenthesis reflect the proportion of males, females and total number of adult malaria sufferers (n=295) who were diagnosed of malaria by various types of providers and who then went to complete full course of anti-malaria treatment

Above 5% (n=35) individuals were either diagnosed with *tuberculosis (TB)* or where consuming anti-TB treatment during the past twelve months before the survey, which shows again very high burden of TB in this community as compared to the rest of the state or the country, even when these numbers are very difficult to translate into epidemiologically accurate disease prevalence or incidence figures in absence of very rigorous scientific techniques, as would be expected only from disease-specific burden survey, which this current survey definitely lacked. But, undeniably the burden of TB and its risk is humungous in these populations, which can be easily inferred from our study results. More males (9%) than female (2%) were affected with TB as is universally found in similar settings. Of those who did not have a diagnosis of TB in the past twelve months or were not consuming anti-TB drugs, 15% (n=98) had chronic cough and weight/appetite loss for more than two weeks during last two months, which are stand-out screening symptoms for TB. Out of these 98 presumptive TB sufferers only 9% (n=9) have undergone sputum or TB related examination. This clearly reveals that timeliness in diagnosis remains a challenge. Diagnostic delay, which is a critical component of fueling the vicious circle of disease-infection-disease, keeps TB alive and thriving in those communities, notwithstanding the substantial progress made by the DOTS strategy of Revised National Tuberculosis Control Programme (RNTCP) in detecting TB cases at late stages presumably, and preventing many deaths, but, the delay explaining the

tenaciously high disease burden rates in these regions for a long time despite implementation of the programme for more than a decade.

The TB burden was high among Saora community of (Tumba development agency) Patrapur, Ganjam. The community members also reported mortality associated with TB (three to four individuals during last two years). Qualitative interview was conducted with a TB patient – 45 years old woman.

Figure 3.3 Young girl suffering from diagnosed TB and not complying to treatment

According to her she was suffering from TB for the last two years and she did not access any free treatment from the government hospital. She reported that she consumed only seven tablets during last two years. We also interviewed a sixteen years old girl, whose father was suffered from TB last year. She was suffering from TB for last 6 months. She was not taking any treatment and also reluctant to go to DOTS, as she did not like to consume any tablets, she liked to consume syrup. The picture (Figure 3.3) was taken with permission of her father during the interview.

Figure 3.4 Skin infection in 42 years old male from Dongoria Kondha

It was found that total 30% (n=204) of the studied adult personnel suffered for *skin infection (severe itching, boils or ulcers)* during last twelve months. Total 118 (19%) had symptom of skin infection during survey (male 23% and female 17%). Figure 3.4 shows the symptoms of skin infection in the body of a 42 years old Dongoria Kondha male**.** He is suffering from this infection (presumably a fungal infection known as candidiasis) since last two years. He is taking traditional treatment. The researcher took the photograph during assessment with the consent of the patient.

The prevalence of *diarrhea* was 28% (n=190) during last twelve months. The diarrhea episodes were more among male (35%) than female (23%). Among those affected with diarrhea, 43% had multiple episodes.

There were very few people suffering from active leprosy disease during the survey period.

3.3.4   Non-communicable diseases burden

In this study, prevalence of non-communicable disease such as chronic lung diseases, cancer, diabetes, heart disease and paralysis were assessed.

It was found that 5% (n=37) of the adult respondents suffered from physician-diagnosed chronic lung disease. The prevalence of asthma was 20% (n=135), which was also higher among male (31%) in comparison to female (13%) as for physician-diagnosed chronic lung diseases. Symptomatically 19% (n=129) had shortness of breath at rest and 12% (n=75) had reported coughing up sputum or phlegm for

most days during last twelve months (Table 3.7). This shows that symptomatic pulmonary diseases were not uncommon in these adult respondents belonging to PVTGs, much of which can be perhaps attributable to considerable use of smoked tobacco in these communities.

Table 3.7. Lung diseases during past 12 months

Lung diseases	Male (N=271)	Female (N=412)	Total (N=683)
	n(%)	n(%)	n(%)
Physician-diagnosed chronic lung disease (emphysema, bronchitis and COPD)	25 (9.2)	12 (2.9)	37 (5.4)
Asthma (N=135)	82 (30.6)	53(13.1)	135 (20.1)
Shortness of breath at rest	61 (24.9)	62 (15.7)	129 (19.2)
Coughing up sputum or phlegm for most days	41 (17.7)	34 (8.8)	75 (12.2)

*The figures in parenthesis reflect the proportion (%) of males, females and total number of adult individuals experiencing chronic lung diseases, either physician-diagnosed or symptomatically suspected

About 37% (n=251) had symptoms of *bitot's spots* demonstrating a considerable occurrence of Vitamin A deficiency in these communities.

The other non-communicable diseases in this study population of which questions were enquired of the respondents included *cancer, diabetes, cardiovascular disease* and *stroke*. There were very few individuals suffering from these conditions as per self-report, for example 5 diagnosed cancer patients were found – among them 3 were males and 2 females. Only 3 were continuing with anti-cancer treatment. Most of the cancers were oral and all of them had exposure to tobacco consumption. Similarly only seven cardiovascular disease patients were found – three of them were taking medications. Two diagnosed with diabetes patients were found – one of the patients is taking medication. Only one paralysis case was found. This unexpectedly low prevalence of these chronic diseases in these PVTGs may not be a true reflection of the low burden of these diseases affecting these communities as there is a strong likelihood of under-diagnosis of these conditions in these groups because of lack of awareness and serious lack of access to health services for such conditions; especially given the considerable prevalence of precursors of these diseases in those communities such as hypertension (19%), abdominal obesity (12%) and overweight BMI (6.6%). Future disease-specific studies may be contemplated to estimate the burden of these diseases among the PVTGs more elaborately, for targeting and public health policy-making. But, it can be conclusively narrated that communicable disease burden especially due to malaria and TB outstrips the problem of non-communicable diseases in these communities by manifolds currently, highlighting that these populations are lagging behind in epidemiological transition than the rest of the state and the country, a reflection of their delayed economic transition perhaps.

About 25% had dental problem, which is mostly link with oral hygiene and tobacco consumption. Around 37% had symptom of bitot's spot in eye, which is equally distributed between male and female.

3.3.5 Prevalence of injury during last twelve months

The prevalence of injury was 21% (n=143) during the last twelve months, which was higher among the males (35%) than females (12%). About 80% (n=113) injuries were related to fall. Apart from fall, there were incidents of animal/snake bite, drowning, electric shock, thunder strike and burn; but, all in small numbers. Overwhelming cases of injuries were due to unintentional accidents and none of the cases were self-inflicted. Out of 143 injury cases 53% (n=76) sought medical care. Only 13 persons suffered physically disability – mostly unable to use hand or leg and few cases suffered loss of vision.

In Table 3.8, health status (diarrhea, skin infection, malaria, tuberculosis, asthma, injury and malnutrition) among adults at each Micro-Project Area is given. Although, micro-project areas specific comparative health status is provided, it is very difficult to generalize the finding because of small sample size in this study.

3.3.6 Micro project area specific health status

Table 3.8. Health status at each Micro-Project Area among adults

	Micro Project area (Development Agency)	Diarrhea (N=190) n (%)	Skin Infection (N=204) n (%)	Malaria (N=295) n (%)	Tuberculosis (N=35) n (%)	Asthma (N=135) n (%)	Injury (N=143) n (%)	Malnutrition (N=242) n (%)
1	KutiaKandha, Lanjigarh	11 (6)	7 (3)	8 (3)	0	8 (6)	7 (5)	11 (4)
2	ChuktiaBhunjia, Sunabeda	10 (5)	5 (3)	17 (6)	1 (3)	8 (6)	3 (2)	14 (6)
3	PaudiBhuyan, Khuntagaon	5 (3)	7 (3)	6 (2)	0	6 (4)	4 (3)	15 (6)
4	PaudiBhuyan, Rugudakudar	16 (8)	13 (6)	16 (5)	2 (6)	6 (4)	12 (8)	18 (7)
5	PaudiBhuyan, Jamardihi	10 (5)	12 (6)	24 (8)	4 (11)	8 (6)	9 (6)	13 (5)
6	Lodha, Moroda	1 (1)	7 (3)	7 (2)	4 (11)	7 (5)	4 (3)	11 (4)
7	Kharia-Mankirdia, Jashipur	23 (12)	17 (8)	35 (12)	6 (17)	16 (12)	17 (12)	17 (7)
8	Juang, Gonasika	10 (5)	16 (8)	16 (5)	3 (9)	8 (6)	9 (6)	37 (15)
9	Bonda, Mudulipada	10 (5)	15 (7)	17 (6)	5 (14)	10 (7)	7 (5)	8 (3)
10	Didayi, Kudumuluguma	17 (9)	16 (8)	19 (6)	3 (9)	11 (8)	14 (10)	23 (9)
11	DongariaKandh, Kurli	8 (4)	9 (4)	10 (3)	0	5 (4)	6 (4)	6 (2)
12	DongariaKandh, Parsali	2 (1)	2 (1)	4 (1)	0	3 (2)	2 (1)	5 (2)
13	LanjiaSoura, Puttasinghi	2 (1)	5 (3)	8 (3)	1 (3)	1 (1)	1(1)	1 (0.4)
14	LanjiaSoura, Seranga	13 (7)	10 (5)	31 (11)	0	7 (5)	5 (3)	8 (3)
15	Soura, Chandragiri	16 (8)	24 (12)	22 (8)	1 (3)	7 (5)	9 (6)	13 (5)
16	Tumba, Tumba	23 (12)	25 (12)	44 (15)	3 (9)	15 (11)	25 (17)	36 (15)
17	KutiaKandha, Belghar	13 (7)	14 (7)	11 (4)	2 (6)	9 (7)	9 (6)	6 (2)

3.3.7 Nutritional practices

The summary of food intake during last three days is presented in (Table 3.9). The study shows that the most common used cereals were rice (98%) and mandia (22%) and about 60% had taken only one cereal during last three days of the survey. The most commonly used pulses were black gram (21%), pigeon pea (20%) and red lentils (16%). About 24% had not eaten any pulse at all during last three days of the survey. Almost 25% of the individual had not consumed both cereals and pulse together during last

three days, the combination of which is often considered as an adequate source of necessary protein and amino acids in resource-poor settings.

About 93% individuals had consumed more than one vegetable. The most commonly used vegetables were potatoes (84%), tomatoes (73%) and brinjal (61%) and 62% had also consumed leafy vegetables and flowers. About 66% people had not consumed any root and tube; the most commonly used roots and tubes being radish (19%).

Only 43% of the individual seat any meat and the most commonly consumed meat was chicken (36%), which was followed by fish (22%). Consumption of egg (17%) and milk (4%) was surprisingly low in these populations given their ubiquitous availability and reasonably low-cost than other non-vegetarian food items. Above 71% people had not consumed any fruit in the past 72 hours. Above 18% had eaten sweets and 15% consumed calorie-dense commercially available food (the so-called "junk food") during the past three days.

The qualitative finding shows that mainly the PVTGs were dependent on locally cultivated seasonal cereals, pulses and vegetables for survival. Most of them also divulged during the discussions that they were dependent on only rainwater for their agriculture as there was hardly any irrigation facility. Many members of the PVTGs family had domestic poultry farm.

Table 3.9. Food intake during last three days

Cereals	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n(%)
None of the cereals	2 (0.7)	6 (1.5)	8 (1.2)
Only one cereals	161 (59.2)	249 (60.4)	410 (59.9)
More than one cereals	109 (40.1)	157 (38.1)	266 (38.9)
Most commonly used cereals: rice (98%) and mandia (22%)			
Pulses	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n(%)
None of the pulses	63 (23.2)	102 (24.8)	165 (24.1)
Only one pulse	165 (60.7)	263 (63.8)	428 (62.6)
More than one pulses	44 (16.2)	47 (11.4)	91 (13.3)
Most commonly used pulses: black gram (21%), pigeon pea (20%) and red lentils (16%)			
Both cereals and pulses	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n(%)
	209 (76.8)	305 (74.0)	514 (75.1)
Vegetables	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n(%)
None of the vegetables	7 (2.6)	20 (4.9)	27 (3.9)
Only one vegetable	9 (3.3)	12 (2.9)	21 (3.1)
More than one vegetables	256 (94.1)	380 (92.2)	636 (93.0)
Most commonly used vegetables: potatoes (84%), tomatoes (73%) and brinjal (61%)			
Leafy vegetables/flowers	Male (N= 270), n(%)	Female (N=410), n(%)	Total (N=680), n (%)
	154 (57.0)	269 (65.6)	423 (62.2)
Roots and tubes	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n (%)
None of the root and tubes	170 (62.5)	284 (68.9)	454 (66.4)
Only one root or tube	65 (23.9)	91 (22.1)	156 (22.8)
More than one root or tubes	37 (13.6)	37 (9.0)	74 (10.8)

Most commonly used root is radish (19%).			
Fruits	**Male (N= 272), n (%)**	**Female (N=412), n (%)**	**Total (N=684), n (%)**
None of the fruit	165 (60.7)	323 (78.4)	488 (71.3)
Only one fruit	78 (28.7)	57 (13.8)	135 (19.7)
More than one fruits	29 (10.7)	32 (7.8)	61 (8.9)
Most commonly used fruits: guava (7%) and banana (6%).			
Meat	**Male (N= 272), n (%)**	**Female (N=412), n (%)**	**Total (N=684), n (%)**
None of the meat	127 (46.7)	261 (63.3)	388 (56.7)
Only one type of meat	131 (48.2)	141 (34.2)	272 (39.8)
More than one type of meat	14 (5.1)	10 (2.4)	24 (3.5)
Most commonly used meat: chicken (36.1%). About 57% people had not consumed any meat.			
Other food	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**
Milk (N=679)	13 (4.8)	17 (4.1)	30 (4.4)
Nuts ((N=678)	10 (3.7)	7 (1.7)	17 (2.5)
Mushroom (N=680)	11 (4.1)	7 (1.7)	18 (2.6)
Tamarind (N=677)	50 (18.6)	87 (21.3)	137 (20.2)
Egg (N=682)	47 (17.4)	72 (17.5)	119 (17.4)
Fish (N=672)	56 (20.9)	93 (23.0)	149 (22.2)
Sweets (N=678)	63 (23.4)	62 (15.2)	125 (18.4)
Access to "junk food" (N=677)	57 (21.3)	45 (11.0)	102(15.1)

To conclude, this study indicates that the burden of communicable diseases that mainly malaria and Tuberculosis were remarkably higher in comparison to non-communicable diseases, though the risk factors for the non-communicable diseases were present in substantial scale in these PVTGs which include hypertension, central obesity, increased body weight, high substance abuse such as tobacco and alcohol. The study also shows that the prevalence lack of well-being was considerable in this population and increased significantly with age, reflecting the lack of fulfillment of life's aspirations as the entrenched poverty and a life of under-privilege often prevented them from optimal attainment. The study finds that the PVTGs had 35% as underweight among them, coexisting with ~7% overweight among them; likely early signs of beginning of a transition towards "double disease burden", a condition exemplified by under and over-nutrition in the same homogenous society, albeit the under nutrition far outstrips the over nutrition component at least contemporaneously. The nutritional uptake assessment indicates that about one fourth of people were not consuming both cereals and pulse together, a balanced staple for resource-constrained communities. The PVTGs were mainly dependent on locally cultivated seasonal cereals, pulses and vegetables for survival through subsistence farming which often lack irrigation facility.

Annexure 3.1. Detail food intake during last three days

Cereals	Male (N= 272), n(%)	Female (N=412), n(%)	Total (N=684), n(%)
Rice	265 (97.4)	405 (98.3)	670 (98.0)
Puffed rice	27 (9.9)	39 (9.5)	66 (9.6)
Beaten rice	11 (4.0)	23 (5.6)	34 (5.0)
Wheat	19 (7.0)	23 (5.6)	42 (6.1)
Maize	13 (4.8)	25 (6.1)	38 (5.6)
Millets	12 (4.4)	6 (1.5)	18 (2.6)
Mandia	64 (23.5)	84 (20.4)	148 (21.6)
Palua/Sagu	13 (4.8)	3 (0.7)	16 (2.3)
Others	2 (0.7)	6 (1.5)	8 (1.2)
Pulses	**Male (N= 272), n(%)**	**Female (N=412), n(%)**	**Total (N=684), n(%)**
Pigeon pea	63 (23.2)	76 (18.4)	139 (20.3)
Brown chick peas	30 (11.0)	21 (5.0)	51 (7.5)
Split bengal gram	3 (1.1)	4 (1.0)	7 (1.0)
Broken wheat	6 (2.2)	4 (1.0)	10 (1.5)
White chic peas	2 (0.7)	2 (0.5)	4 (0.6)
Horse gram	16 (5.9)	16 (3.9)	32 (4.7)
Red lentils	47 (17.3)	66 (16.0)	113 (16.5)
Pea	5 (1.8)	6 (1.5)	11 (1.6)
Green gram	20 (7.4)	30 (7.3)	50 (7.3)
Turkish gram	0 (0.0)	5 (1.2)	5 (0.7)
Sesame	1 (0.4)	2 (0.5)	3 (0.4)
Black gram	42 (15.4)	100 (24.3)	142 (20.8)
Others	33 (12.1)	49 (11.9)	82 (12.0)
Vegetables	**Male (N= 272), n(%)**	**Female (N=412), n(%)**	**Total (N=684), n(%)**
Potatoes	225 (82.7)	352 (85.4)	577 (84.4)
Tomatoes	205 (75.4)	296 (71.8)	501 (73.2)
Brinjal	166 (61.0)	249 (60.4)	415 (60.7)
Pumpkin	66 (24.3)	49 (11.9)	115 (16.8)
Raw papaya	38 (14.0)	72 (17.5)	110 (16.1)
Raw banana	14 (5.0)	20 (4.9)	34 (5.0)
Cabbage	109 (40.1)	172 (41.7)	281 (41.1)
Cauliflower	108 (39.7)	159 (38.6)	267 (39.0)
Onions	211 (77.6)	294 (71.4)	505 (73.8)
Chilli	210 (77.2)	290 (70.4)	500 (73.1)
Lime	21 (7.7)	41 (10.0)	62 (9.1)
Beans	15 (5.5)	20 (4.9)	35 (5.1)
Drumstick	3 (1.1)	8 (1.9)	11 (1.6
Root & Tubes	**Male (N= 272), n(%)**	**Female (N=412), n(%)**	**Total (N=684), n(%)**
Raddish	52 (19.1)	80 (19.4)	132 (19.3)
Carrot	15 (5.5)	10 (2.4)	25 (3.7)
Sweet potato	18 (6.6)	14 (3.4)	32 (4.7)
Ground potato	16 (5.9)	19 (4.6)	35 (5.1)
Saru	33 (12.1)	45 (10.9)	78 (11.4)
Aquatic root or flowers	1 (0.4)	1 (0.2)	2 (0.3)
Others	14 (5.1)	6 (1.5)	20 (2.9)
Fruits	**Male (N= 272), n(%)**	**Female (N=412), n(%)**	**Total (N=684), n(%)**
Jackfruit	22 (8.1)	4 (1.0)	26 (3.8)
Banana	15 (5.5)	25 (6.1)	40 (5.8)
Apple	5 (1.8)	15 (3.6)	20 (2.9)
Papaya	20 (7.4)	23 (5.6)	43 (6.3)
Mango	0 (0.0)	0 (0.0)	0 (0.0)
Berries	10 (3.7)	16 (3.9)	26 (3.8)
Cucumber	12 (4.4)	5 (1.2)	17 (2.5)
Guava	31 (11.4)	19 (4.6)	50 (7.3)
Custard apple	12 (4.4)	8 (1.9)	20 (2.9)
Others	16 (5.9)	17 (4.1)	33 (4.8)
Meat	**Male (N= 272), n(%)**	**Female (N=412), n(%)**	**Total (N=684), n(%)**
Goat	21 (7.7)	14 (3.4)	35 (5.1)
Pig	3 (1.1)	1 (0.2)	4 (0.6)
Cow	1 (0.4)	3 (0.7)	4 (0.6)
Buffalo	1 (0.4)	0 (0.0)	1 (0.1)
Chicken	115 (42.3)	132 (32.0)	247 (36.1)
Any Bird	1 (0.4)	0 (0.0)	1 (0.1)
Insects	0 (0.0)	0 (0.0)	0 (0.0)
Snail	1 (0.4)	0 (0.0)	1 (0.1)
Crab	1 (0.4)	4 (1.0)	5 (0.7)
Others	15 (5.5)	7 (1.7)	22 (3.2)

Chapter 4

4 Health Status of Under Five Children

4.1 Background

The under five children remain one of the most vulnerable group health-wise, even in emerging economies such as India; development of nations being contingent upon these very critical sub-population. If they fare well during their childhood the future human resources of the country enrich nations by their educational and skill attainment, otherwise a nation becomes burdened with relatively less achieving manpower which becomes a drag on the overall socio-economic development of its constituents. Hence under-5 health is targeted with many public health and social welfare as well as nutritional programmes to facilitate the optimum development of this group. Hence, we also studied the health of the under-5 children of PVTGs with separately, with different parameters, from their older and adult counterparts.

4.2 Methods

The questionnaires for the under-five age-group were administered among the mother of the respective child; in case of absence of mother the prime caretaker of the child was interviewed. The data for all the children present in the household during the survey were captured.

Objective data were collected for height (in cm) and weight (in gms) using infant-meter. At the analysis stage weight was converted into kilogram and height was converted into meter to derive Body Mass Index (BMI), which was calculated by dividing the weight (in Kg) with height (in m^2). Other measures namely – underweight (weight for age), stunting (height for age) and wasting (weight for height) were also derived to report the nutritional health status of the children <5 age. These were presented in the form of *z-score* that was calculated using data analysis software and all the children for whom the data were available were grouped under one of the three scales: <-3 SD (severe), -3 SD to _2 SD (moderate), -2 SD to mean (normal); for each measure of nutrition health. The feeding practices of the under-five children were also recorded. But, the data regarding the same was collected on the basis of food consumed in the last three days in order to avoid recall bias and presented for three broad categories- 0 – 5 months, 6 – 24 months and 2 – 5 years.

The immunization status of the under-five was also captured.

Data was collected regarding the current childhood illness signs present during the survey, such as- fever, inability to drink/breastfed, convulsion, lethargy and signs for possible bacterial infection- fast breathing, chest wall in-drawing, stridor, cough, wheezing, etc. data with regards to fatal diseases such as diarrhoea, pneumonia, anaemia and measles were also collected. All these above-mentioned information were reported mostly as yes/no variable. The WHO-UNICEF Integrated Management of

Childhood Illness (IMCI) format was followed for data collection of the above-mentioned signs, symptoms and diseases.

Figure 4.1. Assessing health of children

The data was presented as frequency tables mostly, for categorical data with number and percentages in parenthesis, and for quantitative data summarizing statistic such as mean (and SD) or median (and interquartile range) were used. The software R (3.0.1) was used for data analysis.

4.3 Results and Interpretation

This section provides findings, thematically, on various areas that hold importance with regards to health of the under-five age population.

4.3.1 Child birth related health information

Table 4.1 Childbirth related health information

Childbirth related information	Total (N = 230)
Weight at birth	**2.57± 0.52**
Low birth weight	86 (37.3%)
Post natal home-based newborn care	
Got 3 IMNCI visit within 10 days of delivery by ANM	119 (52.2%)
Got 3 IMNCI visit within 10 days of delivery by AWW	118 (52%)
Got 3 HBNC visit within 10 days of delivery by ASHA	147 (64.2%)

The responsibility of the parents, or the state or nation does not end with bringing a life to this world but begins with the same. Literature across the world say that the place and mode of delivery and the initial few hours to months after the birth of a child are the most crucial period for the new life, since, it is during this time that the probability of birth related ailments and contracting infections are high due to adverse underlying causes such as under-nutrition of the mother, unhygienic environment which are either often fatal or have lasting impact on development of children as they grow.

Programmes have been launched in India under various schemes under which various safe child-birth and post-natal (immediately post child-birth) and critical child-survival services are provided to the mothers and the newborns such as safe institutional delivery or home delivery assisted by safe birth attendants (SBA), growth and nutrition monitoring of pregnant mothers and children; and periodic

illness assessments through home-visits by the frontline health workers In our survey we have attempted to capture health of newborn children of the Particularly Vulnerable Tribal Groups (PVTGs) and coverage of these communities by the childbirth, post-natal and child-survival programmes; these ethnic groups perhaps needing these services the most in the state.

Our study shows that the proportion births taking place in institutions is comparatively low (37%). But, it has modestly increased among this ethnic group with elapsing time, because those aged 1 year or more at present, the proportion, who were delivered at an institution was 34.8% whereas for older birth cohorts that include the infants, aged less than one year at present, the proportion was 43.9% (p value). Therefore, it would not be wrong to comment that the proportion of PVTGs opting for institutional delivery has increased over the years. However, among the population still opting for home delivery, it was found that, less than 40% of the deliveries were conducted in the presence of a formally trained Skilled Birth Attendant (SBA) or, to put it the other way, more than 60% of the home deliveries were still unfortunately being conducted without a trained SBA; which perhaps also increases the chance of unfavorable birth outcomes to both the mother and the newborn immensely. These rates of unsafe deliveries are definitely greater than the proportion in the rest of the state.

The corresponding percentage of under-fives with birth certificate, among the infants and the one year older cohort, was 28.8% and 19.5% respectively, thus, clearly depicting that the population has also become increasingly aware with regards to registration of vital events to which many developmental and public welfare schemes are critically linked. Although the proportions of registration show signs of improvement, relatively, but in absolute terms, they still have a lot to achieve for complete registration of all the births occurring in this community.

Since, birth weight is the most vital indicator of the child's vulnerability to contracting various diseases and also risks of survival, it was carefully recorded in the survey. As per the current scenario among the PVTGs it was found that average weight at birth among the under-five age-group was 2.57 ± 0.52 and that among the stratified subgroups was – 2.44 ± 0.54 among the infants aged <1 year of age and 2.62 ± 0.51 among the 1 – 5 years age group children. Nearly 40% - 86 out of 230 under-five children had recorded weight of which every third child was found to be of low birth weight. Forty two percent of the guardians reported that their child was not weighed at birth. One of the reasons is perhaps home delivery without SBA. In most cases, in absence of an SBA, as already discussed above, weighing the baby might not be possible on the part of other members as a result the baby goes without being recorded in the Mother and Child Protection (MCP) card, a vital document to longitudinally track the growth of the child over time. And, one of the reasons can also be that, this proportion of the population may be the typically "left-out" from maternal and child survival programmes, so that they could not be reached-at all by the service providers or have "dropped-out" after initial contact.

4.3.2   Immunization

The Universal Immunization Programme (UIP) was launched to ensure that each and every child of the country is ensured a life free from the deadly vaccine-preventable diseases namely- tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, measles and Hepatitis B. The survey attempted at determining the immunization status among children of the PTG population.

It was found that more than 95% of the under-five population was administered at least one form of immunization- oral drops or inject able vaccines. The proportion portrays the achievement of the immunization programme, given the difficulty in reaching the PTG beneficiaries, often residing in such hard-to-reach and less-accessible terrains.

While going through the above figures with regards to immunization, one must note that the same is not representative of a proportion of eligible children receiving the full course of the immunization as per the UIP schedule. Rather, this proportion represents the self-report of immunization received by the children, at least one injection and/or one oral drop, based on their respective guardian's memory. Our cross-sectional survey had to resort to this limited data and could not rely on the recall power of guardian for events of immunization that took place a considerable time ago. Moreover, in most cases either the guardian did not possess any MCP card or it was not updated properly by the local public health system, the crucial document where the vital maternal child health related activities get recorded, and which in ideal circumstances should have fed the survey with accurate data regarding immunization status of children in the community. This experience of the survey, of inappropriate maintenance of such a vital piece of individual health document was similar to the findings of others studies conducted by us in this genre; hence commentary on appropriate immunization status of children commensurate with their age is not possible from our data. All we can comment from our study is that approximately 95% children were contacted by UIP and had received at least one dose of some vaccine, which is a somewhat proxy indicator for immunization coverage.

4.3.3   Nutritional health status

Nutrition and health are inseparable subjects. The growth and development of any individual mostly depends on the nutrition one has acquired during the early period of his/her life. Therefore to ensure that a child is provided with all the required nutrition essential for his/her growth various programmes have been introduced by the government such as Integrated Child Development Scheme (ICDS) that aims to address the nutritional aspect of the children by providing supplementary food, organizing meetings in regular intervals to generate awareness and counsel parents with regards to the feeding practices of the children. But whether the nutritional requirement is met or not can be examined by measuring the growth of the child with respect to some set standards.

In usual practice the following are measured to determine the nutritional health of children aged <5 years- underweight (weight for age), stunting (height for age) and wasting (weight for height). These are measured in terms of z-score; distance in terms of standard deviation from the ideal reference population of the particular age.

Table 4.2 Nutritional health status

Nutritional health status	Total (N=212)		
	< -3SD	-3SD to -2SD	-2SD to Mean
	Severe (%)	Moderate (%)	Normal (%)
Underweight (weight for age)	34.9	21.2	43.9
Stunting (height for age)	31.5	21.7	46.8
Wasting (weight for height)	17.9	13.2	68.9

As per the analysis of the data from the survey, it was found that 34.9% of the under-five age-group children were severely malnourished and 21.2% were moderately malnourished. Stunting was severe among 31.5% of the population in this age group and moderate among 21.7%. Nearly 18% presented with severe wasting and 13.25% presented moderate wasting.

There can be, not one, but many factors contributing to this substantial proportion of malnourishment among the children of the Particularly Vulnerable Tribal Groups (PVTGs), which has remained, more or less, stagnant in the population. Low weight of children at birth, discussed in the above section, has implications on their health, while they are still in their early stage of growth. As reported by available literature; infants of low birth weight are particularly at higher risk for poor feeding and inadequate growth.

Low birth weight is mainly attributable to two factors- short gestation period or restricted foetal growth; otherwise known as intra-uterine growth retardation. In either case the cause stems from the mother's poor nutrition and health during the pregnancy, which is fathomable to some extent given the comparatively low socioeconomic status of the tribal groups, which restricts their choice of food in terms of both quality and quantity. Apart from this other cultural and behavioral practices towards health, to be discussed in subsequent chapters, of mother and the newborn also act as drivers of under-nutrition. The problem of malnourishment is perhaps only the tip of the iceberg whereas the root cause with regards to the health of the under-five age- group, of the particularly vulnerable tribes, lies entrenched in their society and are inherited by the subsequent generations through practices, beliefs, behaviour and lifestyle pattern.

With regards to stunting, a report by UNICEF states that India has the highest number of under-five stunted children. Stunting is usually an outcome of long-term insufficient nutrient intake and frequent

infections. Since presence of such conditions cannot be denied to be rife in the particularly vulnerable tribal groups due to inadequate feeding of the child as evident from the status of under-nutrition, inappropriate water sanitation and hygiene practices as discussed in previous chapter dealing with household information and other cultural practices that lead to poor care practices (although the data regarding this aspect were not quantitatively collected but speculated on the basis of related finding from the survey).Therefore, stunted growth among the children of <5 years age is not an absolutely unexpected phenomena; the numbers are a matter of concern though.

If sources are to be believed, although stunting and wasting share common underlying causes – high rates of infection, inadequate caring and feeding practices, lack of food security; but, wasting confers double the risk of mortality than stunting. And, in most cases the outcomes of wasting are irreversible since, it leads to loss of appetite making the child more susceptible to morbidity and mortality.

Among the under-five, lack of nutrition in requisite amount leads to under-nutrition which increases the chances of infection leading to wasting and persistence of such condition for longer duration leads to stunting as a result of which the child loses appetite and hence the cyclic relationship continues.

Therefore, the prime solution to this entrenched problem lies in addressing the nutritional need of the under-five and more importantly the mother during pregnancy since, the nutritional status of the child is mostly determined by the nutritional status of the respective mother while carries the foetus in her womb and hence is the only source of nutrition to it. Hence, proper nutrition and care to the mother would reduce the chance of low birth weight and subsequent sequel of malnutrition and also break the vicious cycle of under-nutrition, stunting and wasting that ultimately lead to mortality resulting in substantial shrink in the proportion of this population; as already evident from the age-pyramid of the PTG population.

The extent of the proportion that is under-nourished, or stunted or wasted might raise concern and given the comparability of the under-nutrition data with the findings of other tribal studies in India and also other reports such as NFHS-III, focusing on this aspect of health might drive policy makers and programme implementers to act promptly.

4.3.4   Feeding practices

The feeding practice of the neonates, infants and 2 – 5 years children for the last three days was recorded. Mostly the mothers of the respective children were enquired about the feeding practice of their respective child/children over the last three days.

One of the important findings that emerged from the analysis was that, among the <6 months age infants although nearly 95% mothers claimed to be breastfeeding their children but, only 60% exclusively breast-fed their child, which should be the only source of food to them; whereas among the 2 – 5 years age-group still 20% of the children were found to be exclusively breastfed without any

supplementary food. This might also be one of the drivers of the current nutritional status of the under-five.

4.3.5   Current health status

The initial years after birth, especially the first five years are very vital for any child under five years of age, because it is during this period when the immunity of the body is not at its optimum level as a result the child is vulnerable to various infectious diseases debilitating the child. Therefore the danger signs for such diseases were studied in our survey to determine the health status of the under-five age-group population of the Particularly Vulnerable Tribal Groups (PVTGs).

From the results it was found that overall among the under-five age-group 70% were unable to drink or be breastfed properly and 28% had vomiting tendency. With regards to fever it was found that nearly, overall, 50% of the mothers did not even know that their children were suffering from fever whereas fever is the symptom for most of the infectious diseases.

Diarrhea is one of the lone leading causes of mortality among the under five years of children. Therefore, in the survey has tried to determine the point prevalence of diarrhoea among this subgroup of the PTG population.

It was found that, overall, nearly one fifth of the under-five children suffered from dysentery.

With regards to the current heath status, it is perhaps the cultural practices, living condition and poor water sanitation and hygiene practices that increase the chances of contracting infections and related diseases among the under-five. Perhaps by improving the coverage of this population by various health services and social mobilization would pay great dividends in reducing the incidence of infectious diseases among this community and improve the over health paving way for a healthier generation of theirs in future.

Chapter 5

5   Health Status of Six to Fourteen (6 – 14) years Children

5.1   Background

The age from six to fourteen is a crucial period for development of child. This is the period of middle childhood and early adolescence. During this age, various social and biological changes occur in human lives, which include exposure to formal education, which leads to increasing exposure to the outer world beyond the confines of the home surrounded by family members and being forced into situations where they have to make decisions for themselves. They also navigate puberty during this period, a watershed milestone for biological, psychosexual and mental changes in one's life. Health remains central during this critical period of life, contingent upon which remain one's educational and skill training attainment and professional fulfillment in life. This study assessed the educational attainment, communicable and non-communicable disease burden, and prevalence of injury, nutritional health status as well as nutritional uptake practices among six to fourteen year children.

5.2   Methods

The questionnaire for the six to fourteen age groups was administered to the mother of the respective children; in case of absence of mother the prime guardian/caregiver of the child was interviewed. The data for all the children present in the household during the survey were captured. The questionnaire contains the educational attainment, medically diagnosed communicable disease (malaria, skin infection, diarrhea, tuberculosis (TB) and leprosy) and non-communicable disease (chronic lung diseases, cancer, diabetes, heart disease, paralysis and bitot's spot).

The data regarding occurrence of injury (accident related bodily injury) during last twelve months was also collected. The intention behind the injury (unintentional/intentional/self-inflicted) and cause of injury (fall, struck, stabbed, gun shot, electricity shock, drowning, poisoning, burn as well as snake and animal bite) were also enquired. In case of disability related to injury type of disability such as "unable to use hand or arm", "walk with limp", "loss of hearing or vision", "weakness of breath", "loss of memory" and "inability to chew" were also reported.

The anthropometric data – height (in cm), weight (in kg), mid upper arm and waist circumference (in cm) were measured. The World Health Organization (WHO) BMI-for-age (15-19 years) reference was used for calculation of the Body Mass Index (BMI). Z scores of the BMI were calculated using WHO reference population and <-3SD were considered as "severe thin", -3SD to -2SD was considered "thin". The nutritional intake practices during last three days were also assessed. Pre-designed photo book was used for nutritional assessment.

5.3   Results and Interpretation

Health status of total 162 six to fourteen years children were assessed –among them 77(47.5%) were male and 85(52.5%) were female.

5.3.1   Educational attainment

This study shows that 11% of the six to fourteen years children were illiterate. It was also found that although 89% of the children of the above age group attained the school, 23% were drop out especially during or after primary school. This indicates that about 66% of the parents were aware about education of their children, which is a positive sign for educational development among the PVTGs. The illiteracy and school drop out was more among the girls than the boys. This study suggests that there is need of special educational awareness programme for the girls in these communities, since girls' education is more significant for the achievement other developmental indicators such as maternal and child health. The detail of the educational attainment is given in Table 5.1.

Table 5.1 Educational attainment among six to fourteen years' children

Education	Male (N= 77) n(%)	Female (N=85) n(%)	Total (N=162) n(%)
Illiterates	8 (10)	10 (12)	18 (11)
Literate (current schooling status)			
Primary	44 (58)	43 (50)	87 (54)
Middle school	11(14)	10(12)	21 (13)
High school	4 (5)	9 (11)	13 (8)
School drop out	10 (13)	13 (15)	23 (14)

5.3.2   Nutritional health status

The mean height and weight were 121.8 (14.9) and 22.2 (8.3) respectively. In Table 5.2, detail anthropometric assessment is presented.

Table 5.2 Anthropometric assessment of the six to fourteen years children

Anthropometric Assessment	Total (N=162) Mean (sd)
Height in cm	121.8 (14.9)
Weight in Kg	22.2 (8.3)
Mid upper arm circumference in cm	18.03 (7.6)
Waist circumference in cm	52.3 (9.4)

The anthropometric assessment showed that total 12% of the children had severe thinness (< -3SD) and 22% thinness (< -2SD). About 12% overweight and about 2% obesity were found among the children. About 52% of the children had normal BMI. In table 4.4 classifications of Body Mass Index (BMI) is presented.

Table 5.3 Classifications of Body Mass Index (BMI) among the six to fourteen years children

BMI	Male (N= 68)	Female (N=77)	Total (N=145)
	(%)	(%)	(%)
Severe thinness (< -3SD)	13.2	11.7	12.4
Thinness (-2SD to -3SD)	25	19.5	22.1
Normal (-2SD to +1SD)	38.5	55.5	
Overweight (+ 1SD to +2SD)	11.8	11.7	11.7
Obesity (>+2SD)	1.5	1.3	1.4

Source: World Health Organization (WHO) growth reference 5-19 years, BMI-for-age (15-19 years)

5.3.3   Communicable diseases burden

In this study prevalence of communicable disease – malaria, skin infection, diarrhea, tuberculosis (TB) and leprosy were assessed. The burden of malaria was high (43%) followed by skin infection (28%) and diarrhea (20%).

The prevalence of malaria (diagnosed by trained person) was 43% during the last twelve months. The key diagnosed personnel were AHSA (13%) and medical doctor (87%). Out of 70 malaria-diagnosed children 65 (94%) had completed the full course of malaria. Among the remaining 92 children none of them were suffering from prolonged fever resembling malaria symptoms during last twelve months. The detail prevalence of malaria is given in Table 5.4.

Table 5.4 Malaria among 6 to 14 years children during last 12 months

Morbidity patterns	Male (N=77)	Female (N=85)	Total (N=162)
	n(%)	n(%)	n(%)
Self diagnosed by physician with malaria (N=162)	35 (45)	35(42)	70(43)
Diagnosed by (N=70)			
ASHA	4(11)	5(14)	9(13)
Medical doctor	31(89)	30(86)	61(87)
Completed full course (N=70)	33(97)	32(91)	65(94)

Total 28% (n=45) suffered skin infection (severe itching, boils or ulcers) during last twelve months – among them 17% were currently suffering skin infection. The prevalence of current skin infection was high among the girls (21%) than boys (13%). This indicates that there is a need for awareness on sanitation and hygiene among the six to fourteen children. Figure 5.1 shows the symptoms of skin infection in the body of a thirteen years old Juang boy who is pursuing upper primary education. He is suffering this infection since last six months. He is taking traditional treatment. The field team took the picture during assessment with the consent of parent of the child.

Figure 5.1 Thirteen years boy suffering skin infection (PVTG – Juang)

The diarrhea burden among six to fourteen year children was 20% (n=32) – male 19% and female 21%. Among them 53% (n=17) had more than one episode of diarrhea during the last twelve months. Out of 162 children three female were diagnosed with tuberculosis and all of them continuing treatment. Out of 159 children five had symptoms of chronic cough and weight/appetite loss for more than two weeks or more, however, none of them undergone sputum or TB related examination nor treatment. Among 162 children only three female children were diagnosed with leprosy and they had completed the multi drug therapy (MDT).

5.3.4   Non-communicable diseases burden

In this study prevalence of non-communicable disease such as chronic airway disease and bitot's spot were assessed. It was found that 6% (n=10) of children suffered from episodic asthma and four were medical diagnosed chronic lung disease. Ten children had reported shortness of breath at rest. Two children were diagnosed with cancer and both of them are continuing with treatment. Twelve children had symptoms of bitot's spot in their eye.

5.3.5   Prevalence of injury

The prevalence of injury was 15% (n=24) during last twelve months. All the injury cases were unintentional (accident). Out 24, 22 (92%) injury cases were related to fall. Only one case of animal bite and one case of burn were reported. Among all the injury cases (n=24), 43% were had medical care and only four of them had physical disability.

5.3.6   Food intake practices during last three days

In Table 5.5, food intake during last three days among six to fourteen year children is given. It was found that most commonly used cereals were rice (100%) and mandia (24%) and about 52% children had taken more than one cereal. Approximately 90% of the children had consumed one of the pulses and the most commonly eaten pulses were black gram (21%), pigeon pea (15%) and green gram (12%). But, the most striking feature is about 10% of the children had not taken cereals and pulse together. The qualitative finding shows that mainly the PVTGs were depended on locally cultivated cereals and pulses.

Figure 5.2 Local market available vegetables

The most commonly eaten vegetables were potato (86%), tomato (75%), and brinjal (55%) and 65% of the children had consumed leafy vegetables and flowers. Most commonly consumed roots and tubes were locally available traditionally consumed roots and tubes (45%) and radish (19%), which were mostly seasonal.

Above 38% had not consumed any fruit in the past 72 hours and the most commonly eaten fruits were local forest fruit (38%) and guava (11%). The qualitative observations findings illustrate that most of the PVTGs were depend on seasonal vegetable and fruits. They had usually taken own garden-cultivated or forest-acquired vegetables and fruits.

The most commonly taken meat was – chicken (36%) and other forest animal meat (34%). Only 10% children drank milk during past 3 days, 29% had eaten egg and 19% had taken fish. Many PVTGs family had domestic poultry farm. They also sold the poultry on local market and bought other necessary food. About 16% eaten sweets and 11% had accessed to "snacks".

Figure 5.3 Local market – shelling poultry

For further reference, in annexure 4.1, the details of food intake during last three days among the six to fourteen years children were given.

Table 5.5. Food intake during last three days among six to fourteen years children

Cereals	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
Only one cereals	42 (54.5)	36 (42.4)	78 (48.1)
More than one cereals	35 (45.5)	49 (57.6)	84 (51.9)
Most commonly using cereals: rice (100%) and mandia (24%)			
Pulses	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
None of the pulse	6 (7.8)	9 (10.6)	15 (9.3)
Only one pulse	62 (80.5)	68 (80.0)	130 (80.2)
More than one pulses	9 (11.7)	8 (9.4)	17 (10.5)
Most commonly using pulses: black gram (21%), pigeon pea (15%) and green gram (12%)			
Both cereals and pulses	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
	71 (92.2)	76 (89.4)	147 (90.7)
Vegetables	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
None of the vegetable	3 (3.9)	1 (1.2)	4 (2.5)
Only one vegetable	1 (1.3)	1 (1.2)	2 (1.2)
More than one vegetables	73 (94.8)	83 (97.6)	156 (96.3)
Most commonly using vegetables: potatoes (86%), tomatoes (75%), and brinjal (55%)			
Leafy vegetables/flowers	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
	50 (64.9)	56 (65.9)	106 (65.4)
Roots and tubes	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
None of the roots and tubes	33 (42.9)	37 (43.5)	70 (43.2)
Only one roots and tubes	38 (49.4)	43 (50.6)	81 (50.0)
Greater than one roots and tubes	6 (7.8)	5 (5.9)	11 (6.8)
Most commonly using roots and tubes: local available roots and tubes (45%) and radish (19%)			
Fruits	Male (N=77), n (%)	Female (N=85), n (%)	Total (N=162), n (%)
None of the fruits	33 (42.9)	29 (34.1)	62 (38.3)

Only one fruit	38 (49.4)	44 (51.8)	82 (50.6)
Greater than one fruit	6 (7.8)	12 (14.1)	18 (11.1)
Most commonly using fruit: local forest fruit (38%) and guava (11%)			
Meat	**Male (N=77), n (%)**	**Female (N=85), n (%)**	**Total (N=162), n (%)**
None of the meat	24 (31.2)	15 (17.6)	39 (24.1)
Only one meat	52 (67.5)	66 (77.6)	118 (72.8)
Greater than types of meat	1 (1.3)	4 (4.7)	5 (3.1)
Most commonly using meat: chicken (36%) and other forest animal meat (34%)			
Other food intakes	**Male (N=77), n (%)**	**Female (N=85), n (%)**	**Total (N=162), n (%)**
Milk	10 (13.0)	6 (7.1)	16 (9.9)
Nuts	3 (3.9)	2 (2.4)	5 (3.1)
Mushroom	5 (6.6)	2 (2.4)	7 (4.3)
Tamarind	18 (24.3)	25 (29.4)	43 (27.0)
Egg	22 (28.6)	25 (29.4)	47 (29.0)
Fish	14 (18.2)	17 (20.0)	31 (19.1)
Crab	1 (1.3)	0 (0.0)	1 (0.6)
Sweets	7 (9.1)	20 (23.5)	27 (16.7)
Access to junk food	8 (10.4)	10 (11.8)	18 (11.1)

5.3.7 Heath status among six to fourteen years children at each Micro-Project Area

Table 5.6. Heath status among six to fourteen years children at each Micro-Project Area

	Micro Project area (Development Agency)	Diarrhea (N=32) n (%)	Skin Infection (N=45) n (%)	Malaria (N=70) n (%)	Tuberculosis (N=3) n (%)	Asthma (N=10) n (%)	Injury (N=24) n (%)
1	KutiaKandha, Lanjigarh	1 (3)	3 (7)	3 (4)	1 (33.3)	0	2 (8)
2	ChuktiaBhunjia, Sunabeda	1 (3)	1 (2)	4 (6)	0	2 (18)	0
3	PaudiBhuyan, Khuntagaon	2 (6)	2 (4)	3 (4)	0	0	1 (4)
4	PaudiBhuyan, Rugudakudar	0	1 (2)	5 (7)	0	1 (9)	1 (4)
5	PaudiBhuyan, Jamardihi	2 (6)	2 (4)	5 (7)	0	0	1 (4)
6	Lodha, Moroda	2 (6)	2 (4)	0	0	1 (9)	1 (4)
7	Kharia-Mankirdia, Jashipur	2 (6)	2 (4)	3 (4)	0	2 (18)	1 (4)
8	Juang, Gonasika	1 (3)	3 (7)	5 (7)	0	0	0
9	Bonda, Mudulipada	3 (9)	3 (7)	3 (4)	1 (33)	2 (18)	3 (12)
10	Didayi, Kudumuluguma	2 (6)	1 (2)	1 (1)	0	2 (18)	2 (8)
11	DongariaKandh, Kurli	2 (6)	1 (2)	2 (3)	0	0	1 (4)
12	DongariaKandh, Parsali	0	0	0	0	0	0
13	LanjiaSoura, Puttasinghi	1 (3)	5 (11)	5 (7)	0	0	0
14	LanjiaSoura, Seranga	1 (3)	1 (2)	7 (10)	0	0	1 (4)
15	Soura, Chandragiri	6 (25)	7 (16)	8 (11)	0	0	2 (8)
16	Tumba, Tumba	1 (3)	5 (11)	11 (16)	1 (33)	0	6 (25)
17	KutiaKandha, Belghar	5 (15)	6 (13)	5 (7)	0	0	2 (8)

Annexure 5.1. Details of food intake during last three days

Cereals	Male (N=77), n(%)	Female (N=85), n(%)	Total (N=162), n(%)
Rice	77 (100)	85 (100)	162 (100)
Puffed rice	10 (13.0)	14 (16.5)	24 (14.8)
Beaten rice	5 (6.5)	5 (5.9)	10 (6.2)
Wheat	7 (9.1)	10 (11.8)	17 (10.5)
Maize	8 (10.4)	12 (14.1)	20 (12.3)
Millets	1 (1.3)	3 (3.5)	4 (2.5)
Mandia	18 (23.4)	21 (24.7)	39 (24.1)
Palua/Sagu	0 (0.0)	5 (5.9)	5 (3.1)
Others	1 (1.3)	2 (2.4)	3 (1.9)
Pulses	**Male (N=77), n(%)**	**Female (N=85), n(%)**	**Total (N=162), n(%)**
Pigeon pea	14 (18.2)	11 (12.9)	25 (15.4)
Brown Chick peas	5 (6.5)	7 (8.2)	12 (7.4)
Split bengal gram	3 (3.9)	1 (1.2)	4 (2.5)
Broken wheat	1 (1.3)	0 (0.0)	1 (0.6)
White chic peas	1 (1.3)	1 (1.2)	2 (1.2)
Horse gram	4 (5.2)	2 (2.4)	6 (3.7)
Red lentils	10 (13.0)	7 (8.2)	17 (10.5)
Pea	0 (0.0)	2 (2.4)	2 (1.2)
Green gram	8 (10.4)	11 (12.9)	19 (11.7)
Turkish gram	2 (2.6)	0 (0.0)	2 (1.2)
Black gram	14 (18.2)	20 (23.5)	34 (21.0)
Others	22 (28.6)	23 (27.1)	45 (27.8)
Vegetables	**Male (N=77), n(%)**	**Female (N=85), n(%)**	**Total (N=162), n(%)**
Potatoes	64 (83.1)	76 (89.4)	140 (86.4)
Tomatoes	53 (68.8)	68 (80.0)	121 (74.7)
Brinjal	41 (53.2)	48 (56.5)	89 (54.9)
Pumpkin	9 (11.7)	6 (7.1)	15 (9.3)
Raw papaya	13 (16.9)	16 (18.8)	29 (17.9)
Raw banana	3 (4.7)	4 (3.9)	7 (4.3)
Cabbage	25 (32.5)	34 (40.0)	59 (36.4)
Cauliflower	25 (32.5)	34 (40.0)	59 (36.4)
Onions	54 (70.1)	57 (67.1)	111 (68.5)
Chilli	49 (63.6)	50 (58.8)	99 (61.1)
Lime	4 (5.2)	10 (11.8)	14 (8.6)
Beans	3 (3.9)	3 (3.5)	6 (3.7)
Drumstick	1 (1.3)	0 (0.0)	1 (0.6)
Roots and tubes	**Male (N=77), n(%)**	**Female (N=85), n(%)**	**Total (N=162), n(%)**
Raddish	17 (22.1)	15 (17.6)	32 (19.8)
Carrot	6 (7.8)	0 (0.0)	6 (3.7)
Sweet potato	6 (7.8)	8 (9.4)	14 (8.6)
Ground potato	5 (6.5)	3 (3.5)	8 (4.9)
Saru	2 (2.6)	6 (7.1)	8 (4.9)
Others (local)	21 (27.3)	24 (28.2)	45 (27.8)
Meat	**Male (N=77), n(%)**	**Female (N=85), n(%)**	**Total (N=162), n(%)**
Goat	5 (6.5)	6 (7.1)	11 (6.8)
Cow	1 (1.3)	0 (0.0)	1 (0.6)
Chicken	23 (29.9)	36 (42.4)	59 (36.4)
Insects/snail/any bird/ pig/buffalo	0 (0.0)	0 (0.0)	0 (0.0)
Others	25 (32.5)	31 (36.5)	56 (34.6)
Fruits	**Male (N=77), n(%)**	**Female (N=85), n(%)**	**Total (N=162), n(%)**
Banana	2 (2.6)	7 (8.2)	9 (5.6)
Apple	0 (0.0)	2 (2.4)	2 (1.2)
Papaya	4 (5.2)	7 (8.2)	11 (6.8)
Berries	5 (6.5)	5 (5.9)	10 (6.2)
Cucumber	3 (3.9)	7 (8.2)	10 (6.2)
Guava	9 (11.7)	9 (10.6)	18 (11.1)
Others	28 (36.4)	33 (38.8)	61 (37.7)

Chapter 6

6 Reproductive Health Status of Women

6.1 Background

Reproductive health is a state of complete physical, mental and social well-being, and not merely the absence of reproductive disease or infirmity. Reproductive health deals with the reproductive processes, functions and system at all stages of life. It is a universal concern, but is of special importance for women particularly during the reproductive years. In this section we explored the reproductive health of the women so that unfavourable underlying determinants can be identified, policy informed and targeted intervention instituted for mitigation of problems.

6.2 Methods

Other than the usual data collection that was applicable for adults, these women had undergone some special measurements which included parity, which was probed for all household female members (usual residents) irrespective of their age. For those who were married, the date of first marriage was recorded. Using this, age at first marriage, which has a direct impact on child bearing as women marrying early have on an average a longer period of exposure to pregnancy and a greater number of lifetime births, was obtained. Using the age data, the mean age at marriage for males and females has been worked out and included in the tables. The number of children ever born and surviving has been also collected for all ever-married women aged 15-49 years; and also age at first childbirth. The study undertook hemoglobin estimation in women in reproductive age group using haemocue method.

6.3 Results and Interpretation

In this study the reproductive health status of total 338 reproductive age women were assessed. Among them 25% (n=86) were young adults (15 to 25) and 75% (n=252) adults (26 to 49). In Table 6.1 the age distribution for women is given.

Table 6.1 Age distribution for women in the sample

Age	Female (N=338) n(%)
Young adults (15-25)	86 (25.4)
Adults	
26-35	126 (37.3)
36-49	126 (37.3)

6.3.1 Family and reproductive patterns

Out of the 268 women 244 (91%) were married and two were widowed. All the married women had first marriage. There were no women who lived together with a male partner without marriage or had been divorced. Total 25 (10%) were pregnant.

In India, one of the important factors responsible for the present high population growth is the persistence of markedly low level of age at marriage in many of the India states. NFHS III shows that nearly half (44.5%) of young women in India marry (begin cohabiting with their husband) before age 18, the legal age at marriage for women. A majority (63%), marry before age 20. This study shows young adults (15 to 25 years) had average age at marriage as 14.8 (SD9.9), the data for age at marriage from other age groups could not be properly collected due to recall bias and absence of documents supporting such vital events.

The parity (3 to 5 children) was proportionately higher (56.9%) among adults in the age group of 35 to 49 years as would be expected as they were exposed to probabilities of childbirth for longer periods of time. Within the age group of 26 to 35, 48.2% of women had parity of 1 to 2 children and 46.4% of women had parity of 3 to 5 children.

Table 6.2 Parity

Age		Parity*			
		1-2	3-5	Greater than 5	Total
		n(%)	n(%)	n(%)	n(%)
Young adults (15-25)		31 (86.1)	5 (13.9)	0 (0.0)	36 (16.4)
Adults					
	26-35	54 (48.2)	52 (46.4)	6 (5.4)	112 (50.9)
	36-49	18 (25.0)	41 (56.9)	13 (18.9)	72 (32.7)

* There was no married woman with 0 parity

About 90% (n=206) of married women delivered at least one child and among those women, almost one third (n=61) of them had lost at least one child. Out of 61 women having lost children, 31 (49%) lost newborns and 20 (39%) lost children aged below two years.

Table 6.3 Loss of children

Age		Lose of Children			
		No loss of Children	1-2 Children lost	>3 Children lost	Total
		N(%)	n(%)	n(%)	n(%)
Young adults (15-25)		33 (91.7)	3 (8.3)	0 (0.0)	36 (16.5)
Adults					
	26-35	77 (69.4)	31 (27.9)	3 (2.7)	111 (50.9)
	36-49	44 (62.0)	25 (35.2)	2 (2.8)	71 (32.6)

This indicates that these communities are still being plagued by early marriage, early cohabitation with husband, early childbirth and subsequent high rates of loss of children, that too during their early lives; a "high fertility, high mortality" demographic pattern.

6.3.2 Antenatal care

Antenatal care (ANC) refers to pregnancy-related health care, which is usually provided by a doctor, an ANM, or another health professional. Ideally, antenatal care should monitor a pregnancy for signs of complications, detect and treat pre-existing and concurrent problems of pregnancy, and provide advice and counseling on preventive care, diet during pregnancy, delivery care, postnatal care, and related issues.

The effectiveness of antenatal care in ensuring safe motherhood depends in part on the tests and measurements done and the advice given as part of antenatal care.

This study shows that out of the PVTG women, who received ANC, 60% were weighed and their blood pressure measured, Urine sample and Blood sample was collected for less than 50% of the women, but these figures were not very different from national averages as reported in other studies. Our study findings also show that less than 50% of women received Tetanus Toxoid (44%) and Iron folic acid tablets (48%) during pregnancy, which was again very much comparable with national coverage. Abdominal examination rates were though significantly less at less than half. Less than 50% of the women received information on importance of institutional delivery (44%), Cord care (40.0), Breastfeeding (48.0), Keeping the baby warm (40.0), Family planning or delaying or avoiding another pregnancy (32%).

Table 6.4 Antenatal care (currently pregnant woman)

Antenatal Care (currently pregnant woman)	n (%)
ANM (N=18)	
Yes, >=3 months	15 (8.3)
Yes, <3 months	2 (11.1)
Examination (N=25)	
Weighed	15 (60.0)
Blood pressure measured	15 (60.0)
Give a urine sample	12 (48.0)
Sample of your blood taken for testing	11 (44.0)
Abdomen examined	7 (28.0)
Given an injection in the arm to prevent the baby from tetanus	11 (44.0)
Given any iron folic acid tablets or syrup	12 (48.0)
Received advice (N=25)	
Importance of institutional delivery	11 (44.0)
Cord care	10 (40.0)
Breastfeeding	12 (48.0)
Keeping the baby warm	10 (40.0)
Family planning or delaying or avoiding another pregnancy	8 (32.0)

6.3.3   Anaemia status

Anaemia is the most common nutritional deficiency disorder in the world. Globally, anemia affects 1.62 billion people, which corresponds to 24.8% of the population. The highest prevalence is in preschool-age children (47.4%), and the lowest prevalence is in men (12.7%). However, the population group with the greatest number of individuals affected is pregnant women (41.8%) (WHO Global database on anemia). In women, anaemia may become the underlying cause of maternal mortality and perinatal mortality. Women of reproductive age group of 15-59 years in India are physiologically susceptible to suffer from anemia. NFHS III shows that 62.7% women are anemic in Odisha. Although the primary cause of anaemia is iron-deficiency, it is seldom present in isolation. More frequently it coexists with a number of other causes, such as malaria, parasitic infection, nutritional deficiencies. Other social reasons range from poor food quality, low status of women, poverty, lower literacy, poor living condition, repeated births, and limited access to health care facilities make the women more prone to suffer from this disorder.

This study found that 54% of women are anemic (Table 6.5) which is an improvement of NFHS III figures, but a caveat that NFHS III was conducted a decade ago and perhaps more progress in combating anaemia was expected in this period. The prevalence of anaemia did not differ significantly by age but displayed a consistent pattern as shown in Table 6.6.

Table 6.5 Distribution of Haemoglobin

Haemoglobin	Female (N=191), n(%)
Anaemia	
Very severe (lower than 4)	1 (0.5)
Severe (lower than 4-6.9)	5 (2.6)
Moderate (7.0-10)	42 (22.0)
Mild (10-10.9)	56 (29.3)
Non-Anemia (11 or high)	87 (45.5)

Source: The Indian Council of Medical Research Categories of anemia

Table 6.6 Anaemia with women characteristics

	Anemia (N=104)[*]		No Anemia
	Moderate to severe (lower than 10.0)	**Mild (10.0 -10.9)**	**(11.0 or high) (N=87)**
Age			
Young adults (15-25)	8 (17.4)	17 (37.0)	21 (45.7)
Adults			
26-35	23 (28.0)	25 (30.5)	34 (41.5)
36-49	17 (27.0)	14 (22.2)	32 (50.8)
Parity			
1-2	13 (22.0)	17 (28.8)	29 (49.2)
3-5	23 (36.5)	13 (20.6)	27 (42.9)
Greater than 5	6 (37.5)	3 (18.8)	7 (43.8)

*Source; The Indian Council of Medical Research Categories of anemia

6.3.4 Menstruation management

The onset of menstruation, menarche, is a life changing event for girls across the world. Women form 49.6% of the world population, and will menstruate on average a cumulative 6-7 years of their life (World Bank, 2011). Menstrual hygiene and management is an issue that is insufficiently acknowledged and has not received adequate attention, especially in countries like India. The lack of menstrual hygiene among rural population is alarming. Unclean rags and old clothes increase the chances of Reproductive Tract Infections (RTIs) including urinary, vaginal, and perineal infection. Very often, serious infections are left untreated and may some times lead to potentially fatal toxic shock syndrome. Untreated RTIs are responsible for 10-15% of fetal wastage and 30-50%of prenatal infection. Increasingly, RTIs are also linked with the incidence of cervical cancer, HIV/AIDS, infertility, ectopic pregnancy, and a myriad of other symptoms.

Study from Odisha has also shown that nearly 60% of women diagnosed with Bacterial Vaginitis and Urinary Tract Infection use reusable absorbents. This study shows that majority (90.6%) of women use reusable cloth as absorbent material during menstruation. (Table 6.7)

Findings from the study also show that 88.5% of women change the absorbent material at least twice or three times in a day, while more than 50% of women have to change the absorbent material at the bush/field/ground/river or stream-site. 89.3% women reused the cloth and majority (93.6%) of the respondents indicated that they washed the reusable cloth with water and soap or detergent.

Table 6.7 Menstruation management

Characteristics	n (%)
Currently undergoing menstruation (N=336)	267 (79.5)
Common absorbent material used during the last 6 cycles (N=267)	
Disposable sanitary pads	20 (7.5)
Reusable cloths	242 (90.6)
Nothing	2 (0.7)
Frequency of changing absorbent material on the heaviest day (n=262)	
Once a day	1(3.4)
Twice a day	131 (50.0)
Three times a day	101 (38.5)
More than three times	21 (8.0)
Place of changing absorbent material (N=262)	
In a household toilet	11 (4.2)
In a private room in the house	78 (29.8)
In a neighbours /public facility outside the house or yard	28 (10.7)
In the bush/field/ground/river/streamside	144 (55.5)
Dispose of absorbent material (N=262)	
Dispose it	26 (9.9)
Reuse it	234(89.3)
In case of reuse, washing	227 (97.8)
Materials use for wash of sanitary cloths (N=227)	
With water	12 (5.3)
With water and soap or detergent	211 (93.6)
With water and mud/ash	4 (1.8)

6.3.5   Sexually Transmitted Diseases (STD) and Reproductive Tract Infection (RTI)

The study shows that out of the respondents interviewed for signs and symptoms of STD & RTI, 31.1% of the women in the age group of 15 to 25 complained of either bad smelling abnormal genital discharge or Genital sore/ulcer. Higher rates of signs and symptoms were among the age group of 26 to 35 years (32.2%).

Effective management of RTI/STD needs diagnosis, prevention and treatment. The diagnostic pillar has been the least supported and the diagnosis in India is primarily clinical. The study showed that, only 2.9% of the respondents reported for being ever diagnosed with STD.

None of the women had undergone female genital mutilation (FGM) though.

Table 6.8 Sexual Transmitted Diseases (STD) and Reproductive Tract Infection (RTI) during last twelve months

STD & RTI	Age group			
	15-25 (N=74) n (%)	26-35 (N=121) n (%)	36-49 (N=77) n (%)	Total (N=272) n (%)
Diagnosed STD	2 (2.7)	4 (3.3)	2 (2.6)	8 (2.9)
Bad smelling abnormal genital discharge	16 (21.6)	20(16.5)	15 (19.5)	51 (118.8)
Genital sore or ulcer	7 (9.5)	19 (15.7)	8 (10.4)	34 (12.5)

Chapter 7

7   Older population

7.1   Background

The older segment of the population is gradually assuming an important role in the human population with demographic transitions, marked with increasing lifespan and lower fertility, leading to ageing of the populace. Although the "high fertility, high mortality" demographic pattern of the Particularly Vulnerable Tribal Groups (PVTGs) have not given rise to a remarkable ageing of the population as had been evident in other more affluent regions in India, but a substantial older population has to be cared for; their health being the major determinant for their well-being in later life and their position in the society. Hence, we set out to assess the health of the older members of these communities as an additional vignette to the main study.

7.2   Methods

While defining the older section of the population – males older than 54 and females older than 49 were considered. We collected the data on *timed walk*, *grip strength, verbal recall* and *activities of daily living* (ADL) for the analysis. Timed walk was measured as time taken for both normal walk (in sec) of 4 meters and fast walk time (in sec) of 4 meters. For measuring grip strength we considered left hand and right hand. To get the left or right hand grip strength we added first left/right hand test in kg with second left/right hand test in kg and also to get the both handgrip strength added the left with right hand grip strength. For summarizing these three variables we calculated median and inter quartile range (IQR) as the statistic. To find how much difficulty the older person has to do the daily living activities, the five activities of daily living in the last 30 days such as bathing or washing body, getting dressed, eating, getting to and using the toilet and getting up from lying down were considered for this analysis. These variables are categorical variables with categories such as none, mild, moderate, severe and extreme. Verbal recall, a proxy for memory in old age, was also measured using 10 local words from standardized questionnaire. The software R (3.0.1) was used for data analysis.

7.3   Results and Interpretation

Health status of total 117 older age persons was assessed, among them 44 (37.6%) were males and 73 (62.4%) were females. Pie chart for age distribution is given in Figure 7.1.
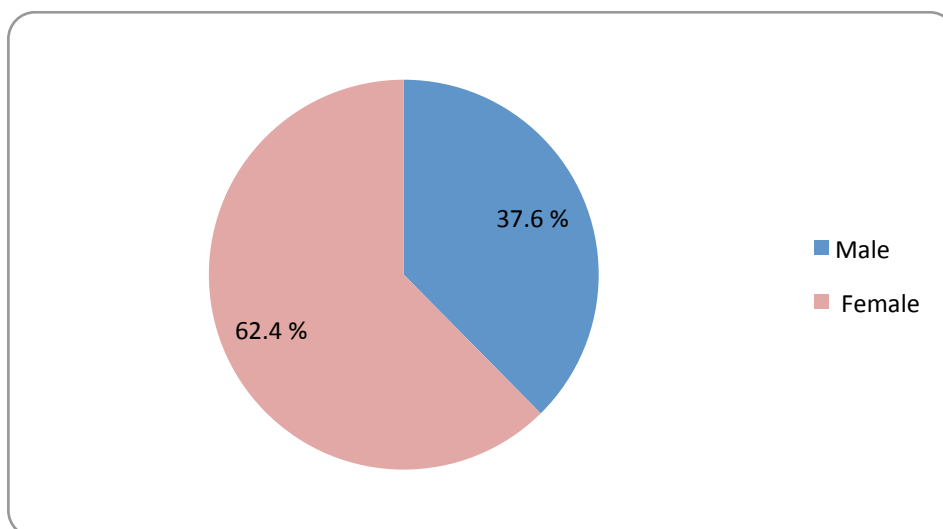
Figure 7.1 Age distribution of old people

7.3.1 Timed walk

In Table 7.1 timed walk for older age people is given. It was found that about 19% (n=20) were at high risk – the prevalence of high risk in timed walk was higher among female (23%) than male (13%).

Table 7.1 Timed Walk

Timed Walk	Older male (N=39)	Older Female (N=66)	Total (N=105)
Low risk	34 (87.2)	51 (77.3)	85 (81.0)
High risk	5 (12.8)	15 (22.7)	20 (19.0)

Cut off point: high risk; >18 seconds and None/low/moderate; ≤18 seconds
Source: http://www.physio-pedia.com/Timed_Up_and_Go_Test_(TUG)

7.3.2 Grip strength

Above 84% of older female and 78% of older male grip strength had weak to intermediate condition. Below 22% had normal strength (male 22% and female 16%). The detail grip strength assessment is given in Table 7.2.

Table 7.2 Grip strength

Grip Strength	Older male (N=32)	Older Female (N=57)
Weak to intermediate	25 (78.1)	48 (84.2)
Normal strength	7 (21.9)	9 (15.8)

Cut off Point: for male – weak (<26), intermediate (26-32), normal strength (>32) and for female – weak (<16), intermediate (16-20), normal strength (>20)
Source: Alley DE, Shardell MD, Peters KW, Mclean RR, Dam TL, Kenny AM, et al. Grip Strength Cut points for the Identification of Clinically Relevant Weakness. 2014: 559–66.

7.3.3   Verbal Recall

Immediate or delayed verbal recalls among the older participants were presented verbally with ten locally used words, which repeated three times to saturate the learning curve. In order to find out the delayed recall the participants were asked to recall as many of the ten words as possible.The verbal recall was expressed as the average number of words recalled by assessing learning capacity and memory retrieval (Welsh et.al 1994). This study shows that only 6% of older age people could recall more than 6 words, among them males (8%) were slightly more than females (5%). Prevalence of five to six verbal recalls was 22%, three to four verbal recall was 34% and less than 2 verbal recall was 39% among this females (45%)were having more difficulty to recall the words than males (27%). The detail grip strength assessment is given in Table 7.3.

Table 7.3 Verbal recall

Verbal recall	Older male (N=37)	Older female (N=64)	Total (N=101)
	n (%)	n (%)	n (%)
Less than two or two words	10 (27)	29 (45)	39 (39)
Three to four words	19 (51)	15 (23)	34 (34)
Five to six words	5 (14)	17 (28)	22 (22)
More than six words	3 (8)	3 (5)	6 (6)

Source: Measuring cognitive status in older age group (World Health Organization)

7.3.4   Activities of daily living in the last 30 days

The level of disability among older population was assessed using Katz' (1963) Index of Independence in Activities of Daily Living (ADL) scale, which is commonly referred to as the Katz ADL. This scale has been widely used in the literature. The Katz ADL Index assesses basic activities of daily living. The Index ranks adequacy of performance in the six functions – bathing, dressing, toileting, transferring, continence, and feeding. Clients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment. This study found that around 18% (n=19) of the older people were unable to perform their daily living activities – bathing and washing (18%), getting dressed (13%), eating (14%), getting to and using the toilet (18%) and getting up from lying down (12%) independently. The finding also showed that the rate of poor daily living activities was more among older female (around 21%) in comparison to older male (around 13%). The detail activity of daily living assessment is given in table 7.4.

Table 7.4 Activities of daily living

Disability in Activities of Daily Living (ADL)	Older male (N=39) n (%)	Older female (N=66) n (%)	Total(N=105) n (%)
Bathing/washing the body			
None	12 (31)	12 (18)	24 (23)
Mild	22 (56)	40 (61)	62 (59)
Moderate	4 (10)	14 (21)	18 (17)
Severe	1 (3)	0	1 (1)
Getting dressed			
None	14 (36)	14 (21)	28 (27)
Mild	21 (54)	42 (64)	63 (60)
Moderate	3 (8)	10 (1)	13 (12)
Severe	1 (3)	0	1 (1)
Eating themselves			
None	13 (33)	15 (23)	28 (27)
Mild	21 (54)	41 (62)	62 (59)
Moderate	5 (13)	9 (14)	14 (13)
Severe	0	1 (6)	1 (1)
Getting to and using the toilet			
None	12 (31)	14 (21)	26 (25)
Mild	22 (56)	38 (58)	60 (57)
Moderate	5 (13)	10 (15)	15 (14)
Severe	0	4 (6)	4 (4)
Getting up from lying down			
None	9 (23)	12 (18)	21 (20)
Mild	26 (68)	45 (68)	71 (68)
Moderate	4 (10)	7 (11)	11 (10)
Severe	0	2 (3)	2 (2)

Sources: Shelkey M, Wallace M. Katz index of independence in activities of daily living. J Geron Nursing 1999; 25:8-9.

Chapter 8

8   Salient findings and Suggestions

We have interpreted the results in each previous chapter, within the relevant sections; the salient points of which are being summarized below for recommendations.

8.1   Salient findings

The following section summarizes the salient findings from our study of health status of Particularly Vulnerable Tribal Groups (PVTGs) of Odisha.

The overall findings showed that there was an increasing trend in literacy rate over the generations – 15% among above 50 years old, 40% among 15 to 50 years old and 88% among 6 to 14 years. In relation to sanitation, about 60% of the study populations had access to improved drinking water sources such as tube-well or public water supply but only 13% access had access to latrine.

The study showed that the risk of well-being declined significantly with age with a steady gradient. The blood pressure records of the respondents show that 19% suffered from hypertension. It was reported that the burden of infectious diseases such as malaria (43%), skin infection (30%), diarrhea (20%) and tuberculosis (5%) was significantly more in comparison to non-communicable diseases and also as compared to prevalence of those diseases in the general population of the state.

A crucial finding was the health-seeking behavior of the PVTG community members. Only 7% of the study population perceived acceptability (social norms) as a barrier to access modern and predominantly public health care indicating that the PVTGs are keen to accept modern medicine, which is perhaps an important change in their health seeking behaviour. However, above 40% perceived that road connectivity and above 30% perceived that service-availability in the health facilities as major obstacle for accessing public health services. This indicates that the health service because of its inadequacy of infrastructure such human resources, medicines and consumables are often falling short of providing appropriate services to these vulnerable groups. This study also showed that around 52% study population perceived that "affordability" as the key barrier for accessing health services. The results also showed that 63% mothers delivered at home and 36% children did not receive any formal post-natal care from public health system. The above findings perhaps imply that nearly half of the PVTGs were either unaware of their public health entitlements or struggle to access such free entitlements due to access barriers, and such hindrances often force them to seek healthcare from traditional healer or inappropriate home-based care.

Malnutrition was found as one of the major causes of health concern in this community. In this study, among children less than 5 years, 32% were under the category of severe stunting, 35% severe underweight, and 18% severe wasting. Among the reproductive age women (15 to 49 years) 38% were

under-weight (BMI <18.50), and 3% suffered severe (Hb < 7.0), 22% moderate (Hb 7 – 10) and 29% mild (10 – 10.9) anemia.

8.2 Suggestions

This study suggests, nutritional health intervention is crucial for breaking the vicious cycle of malnutrition, in particular, we target those most vulnerable to malnutrition – infants and young children – through nutrition counseling and breastfeeding promotion, growth monitoring, and supporting positive nutrition models within the local community. Reproductive women, as malnutrition among mother often lead to poor nutritional status of children especially low birth weight and stunting. This study also recommends an integrated approach – the combine effort of Department of health and family welfare, Integrated Child Development Services (ICDS), Integrated Tribal Development Agencies (ITDA) and civil society platform to improve knowledge, attitudes and practices on optimal nutrition, strengthen the nutrition surveillance, monitoring and evaluation systems, and evidence-based decision-making through operations research to address the issue of malnutrition.

Standalone nutrition intervention seldom delivers any result, intervention on water, sanitation and hygiene is essential to prevent diarrhea and other waterborne diseases.

This study also implies the requirement of micro-project area specific disease algorithm for the control of communicable diseases among the PVTGs that includes:

- Awareness on advantages of community participation in malaria control. Health education on malaria control should be reinforced particularly through training of community health volunteers, informal and traditional healthcare providers. In order to achieve a long-term control of malaria – emphasis should be given on elimination of the breeding sites of mosquitoes in the community.

- Community awareness on preventive measure for tuberculosis and free treatment guideline through informal healthcare providers and community mobilizers.

Finding also indicates that about half of the PVTGs were either unaware about the public health entitlements or struggle to access the free entitlements, and that forces them to seek healthcare from traditional healer. It emphasizes the need for strengthening the linkages of these PVTGs with multiple Government health programs through social mobilization for awareness generation among the community members in order to access the government entitlements.

The training and involvement of traditional healers in mainstream of health system could support the formal system in increasing the coverage, early detection and prevention of various health related morbidity and mortality.