CHAPTER 3

ANTHROPOLOGY

Doctoral Theses

01. ACHARYA (Subhendu Kumar)
Anthropological Study of Leprosy and Leprosy Associated Stigma among Selected Rural and Tribal Communities of Odisha.
Supervisor : Prof. Gautam K. Kshatriya
Th 23898

Contents

1. Introduction 2. Methodology 3. Demographics and pattern of manifestation of leprosy with its implications for affected individuals; Explorations in individual sufferings 4. Pattern of Manifestation of leprosy in community and its implications : Community members perspective 5. Culture and diseases : A case study of local context analysis of Haldipani village 6. Leprosy control in the context of rapid case detection campaigns in India : Findings on challenges and issues in implementation and management of leprosy care 7. As an outsider in a tribal village during working on leprosy among pauri bhuyans : An ethnographic account 8. Summary and conclusion .References, Annexures, Appendix and List of publications.

02. DEEPANI (VIJIT)
Anthropo-Forensic Dynamics of Handwriting.
Supervisor : Prof. A.K. Kapoor
Th 23891

Abstract
(Not Verified)

Aim : The present study has utilized anthropo-forensic perspective to assess variability in handwriting pattern in accordance to sex, population group and linguistic group of the writer. A comprehensive statistical procedure has also been proposed in the present study for prediction of age and sex of the writer through handwriting features. Method : Data (handwriting samples in roman script and socio-demographic information) has been collected from 1718 writers (male (n= 795); female (n= 923)) in the age range of 14 – 60 years belonging to twelve population groups inhabiting different regions of India. 18 handwriting (macro and micro) features have been extracted from each pre-processed handwritten sample. Data has been statistically analyzed using SPSS version 23.0. Result : Statistically significant difference has been observed among English writers of different population groups and linguistic groups for all macro- and micro-features of handwriting. In addition, significant sex difference has also been found in handwriting among different population groups for both macro and micro features of handwriting. Binomial and multinomial regression model have been formulated to predict sex and age-range of the writer respectively. It was observed that moderate skew or no skew (skew-less); inclined and vertical slant; small height of handwriting, circle (instead of dot) over lowercase letter 'i'; broad lower loop of 'g', looped 'd' stem dot and curved 'm' hump were prominent indicators of feminine handwriting. In case of age prediction of male writers, light pen pressure and looped 'd' stem have been found to be most prominent predictor of age range of 19-38 years and ≥39 years respectively. In case of age prediction of

female writers, lower loop of 'g' (cramped or broad) has served as prime predictor followed by shape of 'm' hump (curved) and height of handwriting (small) in prediction of age range of 19-38 years.

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1. Introduction 2. Area and people 3. Materials and methods 4. Results 5. Discussion 6. Summary, Conclusion and Suggestions. References and Annexures.

03. DEY (Sangeeta)
Anthropological and Forensic Dynamics of Human Hand in Indian Population.
Supervisor : Prof. A.K. Kapoor
Th 23897

Abstract
(Not Verified)

The human hand is the most versatile part of the human body which apart from anthropometric dimensions contains prints, creases and outlines. It is agreed that no part of the human body has been as neglected as has the hand. Thus, the aims of the present research is to study various anthropometric dimensions of the human hand and to derive hand characteristics and features from hand outlines and prints among the population groups of India. The study also attempt to derive population specific discriminant functions for classification accuracy. Participants within age range 18 – 60 years without any deformity of hand are collected with 1076 males and 1093 females who belong to nine population groups from five states of India. 18 hand dimensions are measured and hand outlines & prints are collected from each participant. SPSS software is used for analysis of data. The results indicated that the anthropometric dimensions of hand; hand indices; 2D :4D ratio;*rel2* ratio show significant sexual dimorphism. However, there isnon-significant difference in handedness. 14 hand characteristics and 10 hand features are derived. Profile of thumb; hand & finger shape; patterns of digital flexion crease has been also analysed. Hand length, fingertip spread between 2 -3 digit and 3 digit link length are better predictors of stature. One-way ANOVA shows significant variance between the population groups. Discriminant functions are derived and function 6 with classification accuracy 75% to 96% is more efficient in discriminating population groups. It is concluded that the study will provide worthwhile pursuit in anthropology, forensics and criminal identification, biometrics, and in ergonomics. It is suggested that more studies concerning human hand should be conducted which ultimately aid in the advancement of science and technology.

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1. Introduction 2. Materials and methods 3. Area of Study 4. Ethnographic profile of the population groups 5. Results. 6. Discussion. 7. Summary, Conclusion and suggestions. References, appendices and list of published research papers.

04. GARG (Shikha)
Genetic Association Study of Bone Mineral Density in Population of Rangareddy District, Andhra Pradesh, India.
Supervisor : Dr. Vipin Gupta
Th 23888

Abstract
(Not Verified)

Abstract background Bone mineral density (BMD) depends on growth and mineralization of the skeleton and the resultant peak bone mass achieved by the age of 30yrs. The rate of prevalence of osteoporotic fracture is 1 in 3 for women and 1 in 5 for men over the age of 50 worldwide. Thus, insights into the interaction of vulnerable traits provide fruitful ways

of identifying factors involve in osteoporosis. Therefore our aim is to validate the genetic variants related to BMD of spine and hip in Indian population. Objectives To study the prevalence of bone mineral density and its risk factors in study population. To calculate the allele frequencies of the selected genetic variants related to BMD in study population. To find association between BMD and selected genetic polymorphisms related to BMD. Methodology The study included 752 individuals i.e. 392 males and 360 females. Information on demographic and bone mineral density and its risk along with DEXA scans was collected from "*Andhra Pradesh Children and Parent Study*" (APCAPS). Saliva sample were used for DNA extraction and subjected to genotyping using Sequenom platform for 5 genetic markers i.e. *ZBTB40, MEF2C, LRP5, SP7 and TNFSF11*, related to BMD. Results We have found an association of *SP7* with BMD at femoral neck (*p*-value-0.03) and hip total (*p*value-0.02) among males. The association of other genetic variants was not observed in study population which might be due to small sample size. The studied anthropometric traits are found to be associated with measures of BMD at hip, spine and whole body. Conclusion The study has suggested that the association between the molecular markers and the osteoporosis could be an excellent diagnostic tool for the prediction of osteoporosis and fracture risk. Pathways related to genetic associations will be helpful for future pathophysiological research.

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05.   JOSHI (Shipra)
       Genetics of Cardiovascular Adversities in Two Different Environmental Settings : A Study Among Jat Community of Haryana.
       Supervisors : Dr. K.N. Saraswathy and Dr. Shantanu Sengupta
       Th 23895

Abstract
(Not Verified)

The aim of the present study was to estimate the distribution of various cardiovascular risk factors in different environmental settings and also to evaluate the differential distribution of selected genetic markers and their association with cardiovascular risk factors among Jats residing in two different environmental settings of Palwal district of Haryana. Cardiovascular risk factors included were obesity (BMI, WHR, WC), dyslipidemia, hypertension, pre-hypertension, metabolic syndrome, and hyper-homocysteinemia, micro-nutrient deficiencies. A total of 1634 participants, unrelated up to first cousins, where both males and females in the age group 30-65 years belonging to Jat community were recruited from two different environmental settings i.e. low polluted (N-823) and high polluted (N- 811). The study was approved by the Department Ethics Committee, Department of Anthropology, University of Delhi, New Delhi. Informed written consent was taken from the participants prior to recruitment and data collection. In high polluted areas, two metabolic pathways are being disturbed owing to air pollution i.e. homocysteine metabolizing pathway and lipid pathway. Whereas, in low polluted areas, only one carbon metabolic pathway seems to be disturbed owing to nutritional deficiencies leading to disturbance in other metabolic pathway (as glucose metabolism through low HDL-C). The result showed no significant differences between the two environmental settings with respect to all the analyzed SNPs except for two i.e. GSTZ1 (rs731346) and TBX2 (rs8064944). The differential association of genetic

polymorphisms with different phenotypes (hypertension, metabolic syndrome and hyperhomocysteinemia) indicates that a population with the same genetic architecture, when exposed to different environmental settings in terms of pollution, lifestyle and nutrition, responds differently. Thus, the study tries to emphasize on the fact that genes behave differently in different environmental settings.

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06.   KAPOOR (Mitali)
Anthropogenetics of Restrictive Cardiomyopathy : A Hospital Based Case-Control Study from Noth India .
Supervisor : Dr. Naorem Kiranmala Devi
Th 23896

Abstract
(Not Verified)

Restrictive cardiomyopathy characterised by hemodynamic abnormalities, with elevated systemic, pulmonary venous pressure and increased diastolic pressures. Till date, thirteen different sarcomeric and non-sarcomeric loci are mapped to be associated with the cause of RCM. Mutations in TNNi3 and MYH7 genes are observed to be associated. The objective of this study is to analyze the role of different parameters such as genetics, demographic, biochemical and lifestyle factors in causing RCM and to analyze the interaction among these parameters as a role in the etiology or as risk factors. This is a hospital based case-control study of RCM subjects from North India, which includes demographic, biochemical, anthropometric, quality of life assessment and genetic parameters. RCM cases were recruited after clinical examination done by expert cardiologist. Genetic analysis was done in three different parts; genetic markers done by PCR and restriction digestion (Seven markers), selected candidate genes sequencing by Sanger sequencing method (TNNi3 gene) and whole exome sequencing done by next generation sequencing. In the present study, more preponderance is seen in males than females with late onset of age and more symptomatic females with RCM. Central obesity (WHR) was found to be a risk factor rather than general obesity (BMI). Sedentary lifestyle observed to possess 10 fold increased risk in females than males. Among selected genetics risk markers, eNOS G894T, AGT1R A1166C, and AGT T174M genotype are found to be strongly associated with RCM as a risk factor. On sequencing, candidate gene, MYH7 gene mutations were found in 6.6% cases, TNNi3 gene mutations were found in 3.3% cases. Variants found were rare and novel found, were known to be associated with different phenotype of cardiomyopathies, revealing the phenotype and genotype heterogeneity in cardiomyopathies. However, on whole-exome sequencing in two trios, 100 percent success rate was found.

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07.   MISHRA (Divya)
       Aderse Cardiometabolic Phenotypes and their Candidate Gene Polymorphisms among Bhils.
       Supervisor : Dr. Naorem Kiranmala Devi
       Th 23887

Abstract
(Not Verified)

Adverse cardiometabolic phenotypes such as obesity, hypertension and dyslipidemia increases the risk for cardiovascular disease which has emerged as a major public health challenge. The present study was done to estimate the burden of adverse cardiometabolic phenotypes (obesity, hypertension and dyslipidemia) and to understand their genetic predisposition with respect to genetic polymorphisms [ACE (284 I/D), AGT (M235T), eNOS (Glu298Asp), LDLR (Val653Val) and IL10 (A2849G)] among Bhils. The present study is a population based cross sectional study. Total of 432 individuals of either sex (145 males and 287 females) and age between ≥25 to ≤65 years from Bhil tribal population, exclusively tracing their origin to Rajasthan were recruited. Data were collected on personal identification, household composition and lifestyle variables, further, measurements on height, weight, waist and hip circumference and blood pressure were taken. Fasting blood samples were collected for biochemical and molecular analysis. Prior to the recruitment, informed written consent from all the participants was taken. The ethical clearance for the research was obtained from the ethical committee, Department of Anthropology, University of Delhi. Of all the adverse cardiometabolic phenotypes, central obesity in terms of WHR was found to be most frequent (78%) followed by dyslipidemia (66%) and hypertension (44%). Dyslipidemia in the population was majorly represented by low HDL (an indicator of undernutrition). Different dyslipidemic variables were found to pose significant risk for both generalized and central obesity and also for hypertension. Of all the genetic polymorphism mutant homozygote and heterozygote genotypes of ACE (284 I/D), eNOS (Glu298Asp), and AGT (M235T) gene polymorphisms was found to pose significant risk for different dyslipiemic markers. The study reveals the genetic predisposition of Bhils to hypertension and dyslipidemia. Udernutrition seems to be the major problem in the population. However, study needs to be validated in other population groups with a bigger sample size

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08.   PANDA (Sampriti)
       Forest, Livelihood and Transformation : A Study of the Juangs of Keonjhar District, Odisha.
       Supervisor : Dr. R. P. Mitra
       Th 23892

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1. Introduction 2. Theoretical concepts 3. Methodology 4. Upara Champel : An introduction 5. Livelihood and forest 6. Juangs and development 7. Transformation and juangs .Conclusion, References, Annexure and List of Publications.

09.   RAWAT (Suchita)
Psychosocial and Genetic Determinants of Suicide Related Behaviour : A Population Based Study from Warangal District Telangana.
Supervisor : Dr. K. N. Saraswathy
Th 24283

Abstract
(Verified)

Aim the present study explored sociodemographic, psychosocial and genetic risk factors of suicide-related behavior among the population of Warangal district, Telangana. Methodology The study has three study designs, in the first study design analysis of 7 years (2010-2016) retrospective data of suicide decedents (N=1612) collected from Mahatma Gandhi Memorial hospital, Warangal, Telangana. In the second study design case profiling of suicide decedents and suicide attempters was achieved by analysing primary data on sociodemographic variables and suicidal behavior characteristics collected from suicide attempters (N=150) and key informants of suicide decedents (N=206). In the third case-control study design risk factors of suicide attempt was achieved by analysing difference between suicide attempters and matched controls (N=129) in domain of sociodemographic variables, psychosocial variables and genetic mutations of SLC6A4 gene. Results The Join point regression analysis of the 7-year retrospective data of suicide decedents (N=1612) found no significant change in the suicide rate from the time period (2010-2016) in overall population or stratification by gender for Warangal district, Telangana India. The case profiling illustrated gender paradox of suicidal behavior, a higher rate of male suicide while females suicide attempts were observed in the present study. The risk factor for suicide attempt as illustrated in case-control study design was a number of stressful life events, financial life events, and PHQ9 score while marital life events was negatively associated. The discriminative performance of PSLES scale was best with maximum accuracy in predicting suicide attempt. No association of 5HTTLPR and Stin (2) VNTR with suicide attempt was observed however the haplotype s10 of 5HTTLPR and Stin (2) VNTR posed a 3-fold risk of suicide attempt. Both the selected locus modulates the relationship between suicide attempt and stressful life events. Conclusion Suicide prevention strategies in the studied area could be initiated using the observation of the present study.

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10.   SAHA (Sweta)
Candidate Gene Approach in Understanding Stress, Depression and Suicide : Role of HPA Axis.
Supervisor : Dr. Vipin Gupta
Th 23894

Abstract
(Not Verified)

Depression is a major public health concern and the disease burden is projected to increase by 2020 to 5.7% of the total burden of disease. For a disease with huge disease burden and also high rates of suicide associated, such a scenario is a cause of concern and underscores for a need to understand the underlying biological mechanisms pertaining to the heterogeneity involved. Despite the high amounts of risk associated with major depression, not all depression patients experience suicidal ideation. Several predisposing factors have been characterized but have shown inconsistent results. Thus a deeper insight into the interaction of vulnerable traits might refine our understanding of major depression with high suicide risk. The current study was a step towards understanding the Genetic, Clinical and

Psychiatric risk factors with special reference to the stress response pathway and their interaction among Major depression patients with and without suicide risk patients in comparison to controls. The study also aims to identify intra-genic variation of stress response genes in the HPA axis (NR3C1, CRHR1, and CRHBP) through sequencing of specific hot spot regions to understand the role of endophenotypes in presenting clinical heterogeneity among the Major Depression patients. The study suggested that suicide risk among major depression patients are primarily predisposed by interaction of genetic variations in the HPA axis genes while depression is predisposed by psychiatric factors as stress and hopelessness. This finding of major depressive disorder with and without suicide risk patients exhibiting different endophenotypes is indicative of the pathophysiology of suicide ideation among MDD patients. It is thus imperative to study these endophenotypes carefully for a better understanding of the etiology and to identify MDD patients at risk of suicide. This would be beneficial in early treatment and also to develop appropriate prevention strategies for prevention of suicide among MDD patients.

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11.   SHALINI KUMARI
Anthropological Determinants Influencing the Fertility of Selected Tribes of Purbi Singhbhum District of Jharkhand, India.
Supervisor : Prof. Gautam K. Kshatriya
Th 23893

Abstract
(Not Verified)

Anthropologists have been interested in examining the demographic determinants and consequences of cultural process while Demographers have looked for the cultural causes and effect of the demographic processes of fertility, mortality, migration, marriage and social mobility. The aim of the present investigation was to study the anthropological determinants influencing the fertility of selected tribes of Purbi Singhbhum district of Jharkhand, India. A total of 2000 ever-married Santal, Oraon, Mahli and Ho women in their reproductive age (15 to 49 years of age) constituted the sample of the present study. The data is analyzed for various measures of population composition, basic measures of fertility, indices and rates pertaining to socioeconomic status and reproductive profile of women in 45 villages of Golmuri and Potka blocks of Purbi Singhbhum district. The main statistical tools used during the present study were measures of central tendency and dispersion, t-test, ANOVA, correlation and stepwise regression. The demographic, social and economic indicators clearly suggest that among the population group studied, Mahli and Santal were more progressive demographically. The estimates of fertility and other social and economic indicators suggest that Mahlis and Santals are ahead of Oraon and Ho. However, all the studied tribes of Santal, Oraon, Mahli and Ho are lagging behind the National and the State (Jharkhand) population in terms of various fertility measures. The present study highlights the presence of three determinants waiting time to conception number of educational year and age difference between spouses to be common determinants of fertility among all the studied tribes. The study suggests that a general improvement in terms of educational status, social and economic status, work participation rate, exposure to mass media, better knowledge and accessibility of family planning methods will bring about desired changes in reducing fertility visà-vis the population growth.

Contents

12. SHOBHA KUMARI
Reproductive Health and Cardiovascular Risk Factors : An Anthropogenetic Study among Gaur Brahmin Women of NCR/Delhi.
Supervisor : Dr. P. R. Mondal
Th 23889

Abstract
(Not Verified)

India is a diverse country with different ethnicity, dietary pattern and lifestyle variables that provide the unique opportunity to conduct demographic studies among Mendelian population inhibiting in the various ecological niches. Reproductive health of women affected on the one hand by the age at Menarche, age at marriage, age at first child, Gravidity, Parity, Miscarriage, Pre-term, Still birth, Induced Abortions, Menopause whereas, on the other hand socio-biological factors among women etc. These findings highlight the importance of understanding these reproductive variables in understanding the dynamics of cardiovascular diseases. The renin-angiotensin-Aldosterone system, one carbon Metabolic and lipid metabolic pathway are one of the well studied to reproductive and cardiovascular disease. In this study, 300 subjects who are unrelated up to first cousin, aged 30-65 years were studied. The ethical approval was obtained from the Ethical Committee, Department of Anthropology, University of Delhi. The findings of the present study reveal the prevailing of the gender disparities in the Gaur Brahmin Population. It is noticed that there is a cause- effect relationship between the biochemical, reproductive variables and cardiovascular adversities and suggest that the reproductive variables (age at menarche, gravidity/ parity, menopause, stillbirth) could be deployed as markers for cardiovascular diseases. Further, the genetic aspect showed that the significance of the renin-angiotensin-Aldosterone system, one carbon Metabolic and lipid metabolic pathway in the causation of both bad reproductive history as well as cardiovascular diseases. However, this needs further assessment in light of larger sample size.

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13. SINGH (Ningombam Somorjit)
Biochemical and Genetic Determinants of Obesity : A Study among the Liangmai and Mizo Tribes of Manipur.
Supervisor : Dr. P. R. Mondal
Th 23886

Abstract
(Not Verified)

World Health Organization has defined overweight/obesity as abnormal/excessive fat accumulation that may impair health. Obesity is a complex phenotype resulting from gene-environment interactions. The variability in the distribution of obesity in Indian context can be

attributed not only to lifestyle factors, but also to genetic predisposition, owing to their ancestry. Thus, the aim of the present study was to understand the prevalence of obesity; contribution of dyslipidemia (lipids) and genetic polymorphisms (FTO *rs9939609*, MC4R *rs17782313*, ACE I/D, MTHFR C677T) in the causation of obesity among Liangmai and Mizo tribal populations of Manipur. A total of 756 individuals (353 Liangmai and 403 Mizo) of either sex, aged 18-60 years, unrelated up-to first cousin were randomly recruited. Detailed data on demographic and somatometric variables were collected using an interview schedule and intra-venous blood (5mL) was collected for the biochemical (lipid profile) and genetic analysis. The study was approved by the Department Ethics Committee, Department of Anthropology, University of Delhi. General obesity and dyslipidemia were higher among Mizo tribe, central obesity was high among Liangmai. However, age-wise distribution of abnormal variables indicated higher risk of cardiovascular mortality among Liangmai tribe, because of their early onset in younger age. TC and LDL-C among Liangmai and TG, VLDL-C, HDL-C among Mizo; were common risk factors for obesity. ACE I/D and MTHFR C677T polymorphisms did not have any influence on obesity. FTO was associated with BMI among Liangmai and WHtR among Mizo. MC4R gene was negatively associated with WHtR among Liangmai and BMI in Mizo. In gene-environment interactions, LDL and MC4R were strongest predictors for general/central obesity among Liangmai. TG, HDL, FTO and MC4R polymorphisms were strongest predictors for obesity among Mizo. In conclusion, differential association between selected variables and obesity in two tribal populations hints towards the importance of gene-gene/gene-environment interactions in obesity.

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14. ZHIMO (Kitoholi V)
Social and Religious Construction of HIV/AIDS with Relation of Gender in Nagaland.
Supervisor : Prof. P. C. Joshi
Th 23890

Abstract
(Not Verified)

Since the early inception in the early 1980's to the contemporary scenario, the discourse on HIV/AIDS remained problematic with undue emphasis on morality and sexuality resulting in negative metaphors and social constructs. This not only undermines the physical dimension of the disease, but it creates huge lacunae between the afflicted population and the HIV/AIDS intervention programmes. Similar to the construction of 'gay cancer' in the western countries, 'disease of other' or 'otherness' among the Haitians, 'foreign disease' or 'sex worker disease' in India, etc. the discourse on HIV/AIDS is shaped by the socio-religious forces among the tribal communities in Nagaland. Globally, the metaphors on HIV/AIDS have played a critical role in social representation and understanding of the disease. Susan (1991) in her noted classic essay 'AIDS and its Metaphors' stressed that not only do the language on AIDS distorts the reality but worsens the general perception about the disease thereby reducing afflicted population to poverty, social stigma and discrimination particularly affecting women, sexual minorities and other marginalised population located on the fringes of the society. Nagaland belonged to top six HIV prevalence states in India occupying 3 position in overall adult HIV prevalence with 0.78% and tops general HIV prevalence of 1.29% in 2015. With the first case of HIV diagnosed among injecting drug users in the state in 1994, the present discourse of HIV/AIDS is redefined by sexual mode of transmission accounting 91 %. Despite

impending rate of HIV infection in the state, it is dominantly viewed as social issue rather than biological disease. Build upon ethnographic fieldwork of about 11 months between 2015 and 2017 in three phases among People Living with HIV (PLHIV) at ART Plus Centre, district hospital, Dimapur, the present study explores social and religious construction of HIV/AIDS with relation to gender in Nagaland.

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1. Introduction 2. Research methods and methodology 3. Area, people and the field 4. Social and religious construction of HIV/AIDS 5. Struggles and negotiations : Relevance of gender with special focus on women 6. Negotiating identity, sexuality and social existence : Situating transgender women in Nagaland 7. Stigma, discrimination and existing misconception 8. Summary, Discussion and Conclusion. References and Appendix.