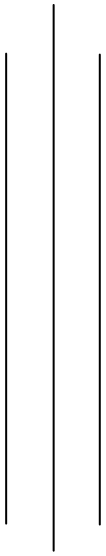
PROJECT REPORT

On

HEALTH STATUS OF AUTO-RICKSHAW DRIVERS PLYING IN IMPHAL CITY, MANIPUR

Submitted to:
Department of Science and Technology
Government of Manipur
Imphal



Submitted by:
Dr. Huidrom Suraj Singh
(Principal Investigator)
Assistant Professor

DEPARTMENT OF ANTHROPOLOGY
MANIPUR UNIVERSITY
CANCHIPUR
IMPHAL

1. Project Title: Health Status of Auto-Rickshaw Drivers Plying in Imphal City, Manipur

2. Name & Designation of Principal Investigator & Co-Investigator:

(i) Principal Investigator: Huidrom Suraj Singh, Assistant Professor, Department of Anthropology, Manipur University, Canchipur, Imphal

(ii) Co-Investigator: Nil

3. DST Sanction Order No. and date: Ref. No. 19/4/2011-R&D/DST/545 and Dated 27th January, 2018

4. Project Serial Number (as per DST Sanction Order):

5. Sanctioned Project cost and duration: Rs.95,000/- (One Year)

6. Actual Project cost and duration: Rs.95,000/- (One Year)

7. Date of Project start and completion: 6th December, 2018 and 18th of September, 2019

8. Signature of the Investigators:

(Principal Investigator)

B. PROJECT REPORT CONTENTS

1. Project proposal details as per formats PART 1 to PART 5

R&D Project proposal: PART – 1: IDENTIFICATION

1.	Project Title :	Health status of Auto-Rickshaw drivers plying in Imphal City, Manipur
2.	Scheme applied for :	DST-Manipur Short-term R&D Project
3.	DST Thrust Area for Short-term R&D projects (as listed in guidelines) :	Technologies and practices for provision for maintenance of health services, as well as leading to development of new drugs, medical devices and instrumentation, improved practices etc.
4.	Project duration : (not more than one year)	One Year
5.	Total project cost :	Rs.1,00,000/-
6.	**Principal investigator :** Name : Designation: Date of birth: Organization: Address for correspondence: Mobile No. Email:	 Huidrom Suraj Singh Assistant Professor 01-02-1985 Manipur University Department of Anthropology, Manipur University, Canchipur, Imphal – 795003 +91-8414011535 huidromsurajsingh@gmail.com
7.	**Co-Investigator** : Name : Designation: Date of birth: Organization: Address for correspondence: Mobile No. Email:	NA
8.	Self attested Passport size Photograph of Principal Investigator:	Self attested Passport size Photograph of Co-Investigator:
	Signature:	Signature:

R&D Project proposal: PART 2: SUMMARY OF PROJECT

Submit 8(eight) extra copies for circulation among Selection Committee Members.

1.	**Name of Institution:**	Manipur University
2.	**Principal investigator & Co-Investigator**	Dr. Huidrom Suraj Singh
3.	**Project Title:**	Health status of Auto-Rickshaw drivers plying in Imphal City, Manipur
4.	**Project Objective :**	To study the prevalence of cardiovascular disease outcomes and associated risk factors among the Auto-Rickshaw drivers
5.	**Outcome of the Project :**	The present study is expected to provide the health status of the auto-rickshaw drivers plying in Imphal city that are earning daily livelihood as well as supporting their family members. Moreover, it is also expected to understand the prevalence of different health outcomes and its associated risk factors which may be helpful in reducing the morbidity and mortality rate among the studied population. Findings of the present study may also be helpful and may be very important for those population groups who are continuously exposed to the environmental pollution such as traffic police, shopkeepers, street vendors, mothers who are selling vegetables and many other items in the main market areas of Imphal city.
6.	**Relevance of the outcome to socio-environment / economic development of the people of Manipur.**	Health is very important parameter for socio-economic development in every aspect of the state. Understanding risk factors for causing adverse health outcomes among the auto-rickshaw drivers who are exposed to environmental pollution for long term will also help in estimating the other sections of population who are also equally exposed to the same environment. In general, it will improve the socio-economic status by spending daily earned money in right directions such as on education and family planning instead of investing to the un-return treatment of diseases.
7.	**Work plan / Methodology ::**	The present study will be carried out among the Auto-rickshaw drivers plying in Imphal city for more than one year. A total of 500 auto-rickshaw drivers plying in the Imphal City will be screened for anthropometric, physiological and biochemical variables to understand the cardiovascular outcomes and lung capacity.
8.	**Proposed budget and project duration**	Budget – Rs.1,00,000/- Duration – 1 Year
9	**Any special point of significance.**	It is urgent need to monitor the health conditions particularly for those who are continuously exposed to the environmental pollutions (air and noise)

Signature of Principal Investigator:

R&D Project proposal: PART – 3: TECHNICAL DETAILS

Project Title: Health status of Auto-Rickshaw drivers plying in Imphal City, Manipur

1. Introduction

1.1. Origin of the Proposal

Manipur has high literacy rate with high educated unemployment status. Rise in educated unemployment particularly among the youths and adults make them to choose different ways of earning. Driving auto-rickshaw becomes one of the most common and easiest ways of earning in the state particularly in the plain districts of Manipur. It helps them to earn daily needs as well as to support their family members. It could be the one of the reasons for exponential growth of auto-rickshaw in recent years in the capital. In other way, it may also be due to the increase in mass population which accelerates the demand of public transport system in the city and nearby places. All of these factors are the major sources of uncontrolled traffic jams leading to environmental pollution such as air and noise pollution. Emission of pollutants from vehicles includes major components such as particulate matter, sulfur dioxides, nitrogen oxides, ozone, lead and carbon monoxide. Prolong exposure to such environmental pollutions, auto-rickshaw drivers are on the great risk of different health problems such as lungs and heart diseases besides other stressful working conditions such as occupational stress, increased workloads, overtime working, tension, anxiety, hostile work environment and others. Not a single systematic study is available on Auto-rickshaw drivers of Manipur particularly on their health status. Therefore, the present study aims to assess the health status of auto-rickshaw drivers plying in the Imphal city and also to find out the potential risk factors associated with the health outcomes.

1.2 Definition of the project

The auto-rickshaw drivers are directly and continuously exposed to the air pollutants being discharged from automobile exhaust. They are on the greater risk of health problems because of their nature of occupation. Some of the common health problems include respiratory and cardiovascular diseases. Moreover, it also leads to occupational stress. The occupational stress is physical and psychological disorder cause by the working environmental conditions, stressful workload, heavy and overtime working. It is also affected by socio-economic status. Some of the symptoms associated with occupational stress include extreme anxiety, tension, headache and problems in digestion.

1.3 Objectives of the project

i. To estimate the prevalence of cardiovascular disease outcomes and associated risk factors among the Auto-Rickshaw drivers
(with special reference to anthropometric, physiological and biochemical variables)

ii. To understand the extent of psychological stress among the Auto-Rickshaw drivers plying in Imphal City
(Psychological stress will be assess using standardised interview schedule in light of Data on potential risk factor for stress such as noise pollution, lower socio-economic status, unemployment, and urbanisation will be measured using standardised interview schedule)

iii. To estimate the influence of air pollution in the causation of lungs diseases
(*The objective will be achieved by measuring lungs volume, capacity and function using spirometer*)

iv. To provide awareness on cardiovascular disease outcomes and its associated risk factors among the Auto-Rickshaw drivers
(It will be achieved by providing awareness on ill effects of cardiovascular diseases and its severe outcomes. Potential risk factors found to be associated with cardiovascular diseases in the present study would be furnish among the Auto-Rickshaw drivers in order to reduce the mortality and morbidity caused by cardiovascular diseases)

1.4 Science Technology content of the proposal

Anthropometric, physiological, biochemical variables will be assess using sophisticated instruments to understand the health status of the auto-rickshaw drivers plying in the Imphal city.

1.5 Importance of the proposal with reference to Manipur

The present study will focus on the health status of the auto-rickshaw drivers who are earning for livelihood and supporting their family members. Unawareness of health condition due to continuous exposure to the stressful and polluted environment may affect the drivers leading to severe health conditions. They are prone to various lungs and cardiovascular diseases which may even claim their life if not diagnosed in time. When they suffer from any kind of diseases

then it affects whole family those who are dependent to him. It may also lower the economic conditions of the family in particular and society as a whole. Therefore, it is very important to understand and assess the health status of such group of population who are the main bread earner of the family.

2. Review status of the subject:

2.1 International status

Environmental pollution is one of the important determinants of health condition and it is estimated the air pollution causes 3.7 million premature deaths worldwide (WHO, 2014). The percentage of mortality induced by environmental pollution is especially higher in developing countries like in Asia-Pacific region. The burden of health problem on developing countries continues to increase every year.

Petroleum and diesel fumes contain hazardous air pollutants which are harmful to our body such as Particulate Matter (PM2.5 and PM10), Nitrogen Dioxide (NO2), Sulfur Dioxide (SO2), Carbon Monoxide (CO), and Ozone (O3) form the major source of these air pollutants (WHO, 2002). Exposure to such dangerous gases and particulates for long period of times increases risk of developing various health problems. Several studies reported cardiovascular and respiratory system related mortality to be the most common form of diseases associated with air pollution (Dockery et al., 1993, Pope et al., 2006).

It has been reported that vehicular drivers who spend 8-10 hours regularly in traffic pollution are at higher risk of lung disease (Khan, 2006). Epidemiological study conducted among the rickshaw drivers of Karachi, Pakistan reported respiratory infection, cardiac problems, headache, fatigue, stress, back pain and high blood pressure among the drivers who are exposed for long term in congested traffic air and noise pollution (Hany et al., 2015).

2.2 National status

Rapid urbanization and industrialization metropolitan areas have contributed to serious environmental pollution declining city's outdoor air quality. Automobile exhausts, is one of the major factor that continue to deteriorate the air quality. Exposure to these fumes has shown to negatively affect the health of the population. Research shows that long term exposure to the automobile exhausts attributed to heart diseases, chronic bronchitis, asthma attacks, and other respiratory illness (WHO, 2014). Auto-rickshaw is the primary mode of public transport in India. It is very common in urban, semi-urban and even in cities. Various studies reported that auto-rickshaw drivers suffer from various occupational stress and many other diseases. In a

study conducted among the auto-rickshaw drivers of Delhi reported high respiratory morbidity due to exposure to pollution (Rajkumar, 1999). High levels of psychological and physical stress have been reported particularly among the upper lower (29.8%) and lower middle class (34.5%) auto-rickshaw drivers of Bangalore (Sinha and Shashikala, 2015). In a recent study, effects of outdoor air pollution on pulmonary function causing lung disease have been reported among the auto-rickshaw drivers in Banglore city (Babu and Damodar, 2017).

2.3 Importance of the project in the context of current status

From the available literatures, it is well known that auto-rickshaw drivers are more prone to different types of heart and lungs diseases besides occupational stress. But, no research has been conducted and literatures are available on auto-rickshaw drivers plying in the Imphal city. Regular monitoring on their health status is essential to prevent from lungs and heart diseases attributed by long term exposure to the automobile exhausts and other pollutants. Therefore, it is an urgent need of high quality research to address the health status of the auto-rickshaw drivers plying in Imphal city to provide awareness on the risk factors associated with different health outcomes among the auto-rickshaw drivers.

3. Capability of the Organization

3.1 Specialists consulted/ to be consulted

Person expertise in environmental pollution particularly on air pollution will be consulted for measuring or identifying (from secondary data) air pollutants in the Imphal city.

3.2 Expertise available with the Investigating group

Expertise in various epidemiological studies focusing on prevalence of different diseases, health and nutritional status of different population groups across the country. Well experience in anthropological field work on many ethnic groups in different states of the country including Manipur, Gujarat and Himachal Pradesh. Investigator have the experience of data collection related with disease profile and their contributing risk factors both genetic and environment, epidemiological studies in a particular ethnic group, human genome diversity, and evolutionary history. Expertise in different field work techniques such as interview scheduled, questionnaire, case-study, and random sampling method for data collection.

3.3 List of on-going and completed projects of this group with the following details:

Title of the Project	**Month & Year of start**	**Month & Year of completion (Targeted)**	**Project cost**	**Name of sponsoring Organisation**
Prevalence of prediabetes and Type 2 Diabetes and its associated complications among the Meiteis of Manipur, India	23rd February, 2017	23rd February, 2019	Rs.8,00,000/-	UGC-BSR Research Start-Up-Grant

4. Work-plan

4.1 Methodology and experimental set-up to be adopted

The present study will be carried out among the Auto-rickshaw drivers plying in Imphal city for more than one year. Both diesel and petrol auto-rickshaw drivers will be considered in the study. Cross-sectional method will be employed in the study and subjects will be randomly selected after getting their consent in participating in the study.

4.2 Materials and data to be collected and examined

Data pertaining to socio-economic status, demographic profiles, educational status, medical history and life style habits will be administered in all the recruited individuals using structured interview schedules. A total of 500 auto-rickshaw drivers plying in the Imphal City will be screened for anthropometric, physiological and biochemical variables to understand the cardiovascular outcomes and lung capacity.

(i) Anthropometric Variables: It comprises of height measurements, weight measurements and their relationship i.e. body mass index (BMI) will also be calculated to assess the obesity. Central obesity will also be assessed by measuring waist and hip circumferences.

(ii) Physiological variables: Blood pressure and Heart rate will be measured using digital blood pressure measuring equipment providing heart rate. Lung capacity will also be measured using spirometer.

(iii) Biochemical variables: Random glucose level will be assessed for all the participants of the present study using Accu-Chek glucose meter. Prior informed and written consent will be obtained from each participant.

4.3 Method of analysis and conclusion

A master table will be prepared by entering all the collected data in MS-Excel 2007. Tabulation, graph preparation will be performed in the Excel. Descriptive statistical analysis of the collected data and samples will be performed using SPSS16 software. Relative risk and regression analysis will also be performed to check the level of risk and association of the considered variables with health outcomes. Statistical findings will be interpreted accordingly with the available and gathered information on the topic.

4.4 Time schedule of activities giving milestones

Period of study	**Achievable Targets**
3 Months	– Recruitment of Personnel - Pilot Survey and pretesting of interview schedule on at least 25 individuals - 1st Phase Field Work (at least 50 individuals will be screened)
6 Months	- 2nd Phase Field Work (at least 500 individuals will be screened)
9Months	- Data Entry - Data Analysis using appropriate statistical tools
12 Months	- Presentation of research findings in reputed journals and seminars - Report preparation and submission

5. Outcome and Assessment

5.1 Nature of outcome of the project

The present study is expected to provide the health status of the auto-rickshaw drivers plying in Imphal city that are earning daily livelihood as well as supporting their family members. Moreover, it is also expected to understand the prevalence of different health outcomes and its associated risk factors which may be helpful in reducing the morbidity and mortality rate among the studied population. Findings of the present study may also be helpful and may be very important for those population groups who are continuously exposed to the environmental pollution such as traffic police, shopkeepers, street vendors, mothers who are selling vegetables and many other items in the main market areas of Imphal city.

5.2 Anticipated contribution from the project towards increasing the state and knowledge on the subject.

The present study would be the first imitation in understanding the effect of environmental pollution and occupational stress among the Auto-rickshaw drivers who are continuously exposed to the automobile exhausts which is almost neglected by the researchers as well as by the policy makers. The concept of the present proposed study may be applied to different sections of the population who are working and living in and around the Imphal city.

5.3 Proposed academic benefits from the project in terms of number of research publications and manpower trained.

Findings of the present study would be communicated to the academic forum where ill effects of health caused by environmental pollution can be discussed. Research findings will be published in the relevant and reputed journals as well as in seminars. Scholars involved in the present study are expected to gain knowledge on field work, research techniques, data collection, data analysis and interpretation. They are expected to be expertise in such environmental health issues after the completion of the proposed research proposal.

5.4 Anticipated practical benefits resulting from the outcome/financings of the project.

All the participants of the present study would be given awarenees on various risk factors which may cause harmful to our health status. Awareness to use personal protective equipment from environmental pollution will be given to the auto-rickshaw drivers to reduce the rate of various health effects.

5.5 Anticipated practical benefits which are relevant particularly to the socio- economic development of the people of Manipur.

It is well known that 'Health is Wealth'. If the people of the Manipuri society are healthy than there will be development in the state. Health is very important parameter for socio-economic development in every aspect of the state. Understanding risk factors for causing adverse health outcomes among the auto-rickshaw drivers who are exposed to environmental pollution for long term will also help in estimating the other sections of population who are also equally exposed to the same environment. In general, it will improve the socio-economic status by spending daily earned money in right directions such as on education and family planning instead of investing to the un-return treatment of diseases.

5.6 Names and addresses of experts/ institutions interested in the project outcome of the project.

i. Directorate of Health Services, Government of Manipur, Imphal - 795004

ii. Directorate of Transport, Government of Manipur, Imphal – 795001

iii. Directorate of Environment, Government of Manipur, Imphal - 795001

5.7 Whether Patent is proposed. No

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R&D Project proposal: PART – 4: BUDGET ESTIMATES

1. TOTAL BUDGET:

Item	Budget Estimate (in Rs)
A. 1. Materials: 2. Consumables: 3. Project manpower: 4. Other Costs / contingencies	 Rs.10,000/- Rs.12,000/- Rs.48,000/- Rs.30,000/-
B. Equipments, if any (normally not supported)	NA
Grand Total (A+B) :	**1,00,000/-**

2. DETAILS OF MANPOWER:

Designation of manpower	Qualification	Monthly honoraria	No. of Months to be engaged
Field Assistant	Master in Anthropology	Rs.6,000/-	8
Total		**Rs.48,000/-**	

3. JUSTIFICATION:

a) The proposed budget for material will be used for purchasing material items such as glucometer, weighing machine, measuring tape and blood pressure measuring instrument.

b) Under the consumable head, the proposed budget would be used for purchasing consumable items required for analysing the collected samples.

c) One field assistant on temporary basis is required to assist the investigator in carrying out the field work and recruitment of subject. Field assistant would be employed purely for field work only for the first six months to collect socio-demographic characteristics as well as data collection.

d) The proposed budget against contingency would be used for buying stationary items, printing interview schedules as well as final project report. The budget would also be used for travel which includes local travels for data collection.

Note: Manpower will normally be treated as part-time engagement and the honoraria is to be proposed accordingly.

R&D Project proposal: Part 5: BIODATA OF INVESTIGATORS

Principal Investigator

A. Name & Designation	Huidrom Suraj Singh, Assistant Professor
B. Institution	Manipur University
C.: Date of Birth :	01-02-1985
D. Whether belongs to SC/ST/OBC :	OBC
E. Academic & Professional career : Academic career : Professional career :	- M.Sc. Anthropology, Ph.D. Anthropology from University of Delhi - Assistant Professor (Ad-hoc), Dept. of Anthropology and Tribal Development, GGU, Bilaspur, Chhattisgarh, India from 2013 to 2015 - Assistant Professor, Department of Anthropology, Manipur University, Imphal from 2015 to till date. - One year certificate course in Forensic Science, Dept. of Anthropology, University of Delhi
F. Title of Doctoral thesis :	Alcoholism: Its Genetics and Impact on Health - A Study among Meiteis of Manipur, India
G. Award/Prize/Certificate etc. won by the Investigator :	- Received Gold Medal in B.Sc. (H) Anthropology - UGC-JRF
H. Publications : Books :	- 1 Nos. - 25 Nos. - 1 Nos.

a) List of completed and on-going projects during the last five years (if any):

Sl.No.	Title of the Project	Duration From To	Total Cost	Funding Agency
1.	Prevalence of prediabetes and Type 2 Diabetes and its associated complications among the Meiteis of Manipur, India	23-02-2017 to 23-02-2019	8,00,000/-	UGC-BSR Research Start-Up-Grant

b) Project submitted for funding (if any): NA

Sl.No.	Title of the Project	Name of Organisation applied to	Funding Agency

Signature:

2. Deviations made from original objectives, if any, while implementing the project, and reasons thereof

The present research project was carried out keeping four major objectives and attempt was also made to achieve the original objectives in the present research work. No major changes were made in the original objectives. Though, there are slight changes in the field work methodology and sample size due to certain limitations faced while implementing the project. Some of the limitations include short duration of the project (since no intimation was made for the deposition of grant hence project was started lately then the stipulated time period), on spot data collection during peak hours from auto parking, time consumption while assessing different parameters considered in the present study and financial constraint.

3. Details of the project work

(i) Experimental Set-up and Methodology

The present study was carried out among the Auto-rickshaw drivers plying in different locations of Imphal city for more than one year. Both diesel and petrol auto-rickshaw drivers were considered in the present study. Auto-rickshaw drivers who drive for one or more than one year were included in the present study. Cross-sectional method was employed for data collection and subjects were randomly screened after getting their consent of participation in the study.

(ii) Materials and Data Collection

A total of 159 auto-rickshaw drivers plying in different locations of Imphal City were screened to understand the cardiovascular outcomes and lung capacity among the auto-rickshaw drivers. Data pertaining to Personal information (age, marital status, age at marriage, No. of family members and dependents), Socio-economic status (education, occupation, income, expenditure), Food habits (breakfast, frequency of meal, vegetarian/non-vegetarian, street foods), Substance abuse (pan, tobacco, smoke and alcohol), life style, and medical history were administered in all the recruited individuals using structured interview schedules. Apart from the above variables, anthropometric (BMI, WC, HC, WHR), Body composition analysis, physiological (blood Pressure, and lung capacity), biochemical variables (haemoglobin and blood glucose level) are also assessed using standard techniques to understand the health status of the auto-rickshaw drivers plying in the Imphal city.

Table 3.1: Distribution of Samples collected from different auto parking located in Imphal City

Sl. No.	Name of the Auto Parking
1	JNIMS Auto Parking
2	Khuman Lampak Auto Parking
3	Khurai Lamlong Auto Parking
4	Langon Auto Parking Auto Parking
5	RIMS Main Gate Auto Parking
6	Kongba Auto Parking Auto Parking
7	Wahengleikai Auto Parking Auto Parking
8	Liwa Lambi and Langthabal Auto Parking Auto Parking
9	Nagamapan Auto Parking Auto Parking
10	Cheirap Court Auto Parking
11	Polo Ground Auto Parking
12	MU Gate Auto Parking
13	Koirengei Auto Parking
14	ISBT Auto Parking Auto Parking
15	MantriPukhri Auto Parking
16	Kakwa Ningomthongjao Auto Parking

Blood Pressure

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured three times with an interval of 5 minutes after resting for 5 minutes sitting for all participants using mercury sphygmomanometers and stethoscope. The mean value calculated from the three measurements was used for analysis. Blood pressure measurement of all the participants was taken by same individual expertise in the field. Results of blood pressure measurements were categorise into different groups according to Joint National Committee 7 (JNC7) Guidelines for the Management of Hypertension in Adults.

Table 3.2: Classification of Blood Pressure into different categories according to JNC 7

Categories of Blood Pressure		Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Hypotension		<90	<60
Normal		90-119	60-79
Pre Hypertension		120-139	80-89
Hypertension	Stage I	140-159	90-99
	Stage II	160-179	100-109
	Stage III	≥180	≥110

Biochemical Test

- *Blood Glucose Level*

Random glucose level was assessed for all the participants of the present study using Accu-Chek Active glucose meter. Test was performed by pricking tip of the finger and applies the blood drop to the centre of the green field of test strip placed in the gluco-meter. The unit of blood glucose measurement was recorded in mg/dL. Random glucose level were categorised into different groups according to American Diabetes Association (ADA) guidelines.

Table 3.3: Classification of Random Blood Glucose level

Categories of Glucose Level	Glucose Level (mg/dL)
Hypo	<79
Normal	79-139.99
Pre-Diabetes	140-199.99
Diabetes	≥200

- *Haemoglobin Level*

Haemoglobin level was checked for each and every individual participated in the present study using Hemocheck which is based on colour scale method. One drop of blood sample obtained through finger pricking method was place on the hemocheck test strip and immediately (~30sec) match the colour of blood spot against the hemochek colour scale. Pricking was done after cleaning the finger with cotton swap containing spirit. Results of haemoglobin level was categorised into different groups based on the National Health Portal, India.

Table 3.4: Classification of Haemoglobin (Hb) level according to

Categories of Anaemia		Hb Level (mg/dl)
Normal		≥13
Anaemia	Mild	11-12.9
	Moderate	8-10.9
	Severe	<8

Anthropometric Variables

The anthropometric measurements comprises of height, weight, hip circumference and waist circumference. Moreover, anthropometric indices were calculated following standard equation as Body Mass Index (BMI) = Weight (kg) / Height (m^2); Waist Hip Ratio (WHR) = Waist circumference / Hip circumference. Nutritional status wrt BMI was categorised according to Asian guidelines as well as WHO guidelines; whereas central obesity were evaluated in all the participants using standard specific cut-off points of WHR.

Table 3.5: Classification of BMI according to Asia-Pacific and WHO Guidelines

BMI Categories	Asia-Pacific Guidelines	WHO Guidelines
Underweight	<18.5	<18.5
Normal	18.5-22.9	18.5-24.9
Overweight	23-24.9	25-29.9
Obese	≥25	≥30

Table 3.6: Classification of WC, HC, and WHR

Classification of Central Obesity		Cut-off point
Waist Circumference (WC), cm	Normal	≤94
	High	>94
Hip Circumference (HC), cm	Normal	≤102
	High	>102
Waist Hip Ratio (WHR),	Normal	<0.90
	High	≥0.90

Lungs Function Test

Spirometry was used to evaluate lungs function test to understand the health conditions of the lungs of auto-rickshaw drivers. Moreover, lungs function test was performed to help in early detection of lungs diseases as well as to identify the possible causing risk factors. Lungs function test was examine after demonstrating the whole procedures to all the Auto-rickshaw drivers. Participants were trained two-three times prior to actual test. They were asked to take maximum breathe in through the mouthpiece connected with spirometry and then asked to breath out forcefully at the maximum level as much as possible. Experiment was repeated three times and the best performance was recorded for lung function test analysis. Single use disposable paper mouthpiece was use for assessing lungs function test.

The spirometry measurements such as forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and their ratio FEV1/FVC were used for classifying different categories of lungs disease. Moreover, lungs age was also considered in the present study to understand the health condition of the lungs.

Table 3.7: Classification of Obstructive and Restrictive Lung Disease based on FCV and FEV1 spirometry test

Spirometry Test	Normal	Abnormal	
FVC and FEV1	≥80	Mild	70-79%
		Moderate	60-69%
		Severe	<60%
FEV1/FVC	≥70	Mild	60-69%
		Moderate	50-59%
		Severe	<50%

Body Composition Analysis

Data on body fat composition was assessed among the auto-rickshaw drivers using Tanita Body Composition Analyzer (TBF-300). The body fat percent was considered in the present study to see the relation (if any) with anthropometric variables, service duration, age, food habits, life style and others considered in the study. Finding of body composition analysis was compared with normal ranges given for body fat percent by Tanita.

(iv) Data Examination and Analysis

A master table was prepared entering all the collected data in MS-Excel 2007. Tabulation and graph preparation was made in the MS Excel and reproduced to MS word file. Data were analysed in two categories such as general characteristics and comparative analysis. In general characteristic analysis, all the variables considered in the present study was analysed to understand the frequency distribution and its percentage. Results are reproduced in the form of tables and graphs. This analysis was performed to understand the personal characteristics of the studied population, their socio-economic status, substance abuse, physical activity, haemoglobin level, diabetes status, lungs capacity and prevalence of cardiovascular disease and its outcomes.

In the second category of analysis, data were categorised into sub-groups based on the duration of possession of the occupation in terms of years. The studied population is sub-grouped into three categories such as Group A, Group B and Group C with respect to their service year. Auto-rickshaw drivers who are driving upto 5 years were categorised into Group A. Those who drive more than 5 years and upto 10 years were categorised into Group B and participants who drives more than 10 years are categorised into Group C. Comparative analysis between different groups on certain parameters considered in the present study were performed to understand any kind of differences among the groups (if any).

Descriptive statistical analysis was performed among the sub-groups of auto-rickshaw drivers to understand the effects of exposure towards the environmental pollution and its adverse health outcomes with respect to cardiovascular and lung diseases. Variables considered in the present study were further evaluated to identify the potential risk factors of the disease and association of the considered variables with health outcomes (if any). Association of long term exposure to the polluted environment with different categories of auto-rickshaw drivers was evaluated by Pearson's $\chi 2$-test followed by odds ratio (OR) at ninety-five percent confidential interval (CI), using the freely available 2×2 contingency table (http://vassarstats.net/odds2x2.html). Statistical significance was considered at five percent level.

(v) Data Collection Format / Questionnaire

Structured interview schedule was developed and pre-tested among the participants of the present study. Modified and formulated schedule were administered randomly among the subjects after getting their consent of participation in the present research project. Structured interview schedule and consent form used in the present study are enclosed as **Annexure I** and **II** respectively.

DATA COLLECTION AT DIFFERENT FIELD SITES

Photograph 1: Cheirap Court Auto parking

Photograph 2: Koirengei Auto parking



Photograph 3: Mantripukhri Auto Parking


Photograph 4: MU Gate Auto Parking


Photograph 5: RIMS Main Gate Auto Parking



Photograph 6: Khurai Lamlong Auto Parking

4. Outcome of the Project

The present study provides health status of the auto-rickshaw drivers (age ranges from 20 to 65 years) plying in Imphal city earning daily livelihood as well as supporting their family members. The number of years in service as auto-rickshaw drivers ranges from 1 to 34 years and most of them are married. They have good source of income from their occupation (₹15,000/- to ₹20,000/- per month) but it is greatly affected by frequently called of bandh and general strike in the state. They use to drive for more than 10 hours in a day and 7 days in a week. Drivers who have started driving 1 to 5 years have experienced morbidity conditions such as eye/vision problems (blurr, tearing, irritation & burning) and body pain (arm, leg, neck, back) more frequently than those who drives for more than 5 years may be because of lack of occupational adaptation. All the participants were provided the test reports and explained them according to their results. Majority of the participants who are not aware of their blood pressure, Hb level, blood glucose level, obesity status, lungs function test, body fat composition came to know only when assessing in the present study.

Lungs function test reveals high prevalence of lungs diseases among the auto-rickshaw drivers and estimated lungs age was significantly different from their actual age. Majority of the drivers were found to be anaemic and it is more frequent among those drivers who are driving more than 10 years. Prevalence of obesity (both high BMI and WHR), high blood glucose level and hypertensive cases was also found to be more frequent among the drivers who are driving more than 10 years. Findings of the present study indicates that driving for more than 10 years are more prone to have adverse health outcomes while compared with drivers who are driving for 1-5 years. Moreover, prevalence of different adverse health outcomes and its associated risk factors will be helpful in reducing the morbidity and mortality rate among the studied population.

5. Analysis of Results

Table 5.1: Age-wise distribution of auto-rickshaw drivers

Age (in Years)	Frequency	Percentage (%)	Mean±SD
≤20	1	0.63	-
21-30	23	14.46	27.0±9.84
31-40	63	39.62	35.70±9.73
41-50	49	30.82	45.16±9.68
>50	23	14.46	56.69±9.81
TOTAL	**159**	**99.99**	**-**

A total of 159 auto-rickshaw drivers were participated in the present study age ranging from 20 to 65 years. Of the 159 auto drivers enrolled in the present research work, maximum study participants were in the age group of 31-40 years with 39.42%. It is followed by 41-50 years (30.82%), and 14.46% of individuals were belong to both 21-30 years and >50 years of age group. However, the frequency of ≤20 years was found to be 0.63% which was quite low as compare to other four age groups (Table 5.1).

Table 5.2: Educational Status of the Auto-Rickshaw drivers

Education	Frequency	Percentage (%)
Illiterate	4	2.51
Upto 8^{th}	43	27.04
Upto 10^{th}	46	28.93
Upto 12^{th}	38	23.90
Graduate	27	16.98
Master	1	0.63
TOTAL	**159**	**99.99**

In the present research work, the percentage of illiterate individuals was found to be very less (2.51% only). Majority of the auto drivers were educated and they have studied till 8^{th}, 10^{th}, and 12^{th} with 27.04%, 28.93%, and 23.90% respectively. Moreover, approximately 17% of the auto drivers had completed their graduation and only one person (0.63%) had done master (Table 5.2).

Table 5.3: Marital Status of the Auto-Rickshaw drivers

Marital Status	Frequency	Percentage (%)
Unmarried	8	5.03
Married	151	94.97
TOTAL	**159**	**100**

Majority of the studied population were married. Out of the total 159 participants, 151 of auto drivers were married (94.97%) and only 8 of individuals were unmarried (Table 5.3).

Table 5.4: Age at Marriage of the Married Auto-Rickshaw drivers

Age at Marriage (in years)	Frequency	Percentage (%)
16-20	18	11.92
21-25	33	21.85
26-30	58	38.41
31-35	32	21.19
36-40	9	5.96
40+	1	0.66
TOTAL	**151**	**99.99**

Among the married auto drivers, 11.92% of them get married at their early age that is 16-20 years. Majority of the auto-rickshaw drivers were found to be married at the age of 26-30 years with 38.41%. It is followed by the age group 21-25 years with 21.85% and age group 31-35 years with 21.19%. The percentage of advance age at marriage was quite low in which 9(5.96%) individuals were found to be married at 36-40 years of age and very less 0.66 percentage of individuals married at the age of 40+ (Table 5.4).

Table 5.5: Distribution of Dependent Family Members of Auto-Rickshaw Drivers

No. of Dependent Family Members	Frequency	Percentage (%)
1-2	26	16.35
3-5	116	72.95
6-8	14	8.80
9-11	3	1.89
TOTAL	**159**	**99.99**

Out of 159 auto-rickshaw drivers, majority of them (72.95%) have 3-5 dependent family members. It is followed by 1-2 dependent family members with 16.35%, and 8.80% individuals have 6-8 dependent family members. However, very less percentage (1.89%) of individuals have 9-11 dependent family members (Table 5.5).

Table 5.6: Monthly Income of the Auto-Rickshaw Drivers

Income	Frequency	Percentage (%)
Upto ₹15,000/-	4	2.51
₹15,000- ₹20,000/-	112	70.44
Above ₹20,000/-	43	27.04
TOTAL	**159**	**99.99**

Auto-Rickshaw drivers plying in different locations of Imphal City generally earn a good amount of income. However, their income is greatly affected by bandh and general strike call by different organizations from time to time. More than 70% of the participants earns an income ranging from ₹15,000/- to ₹20,000/- per month and 27.04% of the participants have income above ₹20,000/- per month. Only few of the auto-drivers (2.51%) earn upto ₹15,000/- per month. The above figure of income earn by Auto-Rickshaw drivers are on average (Table 5.6).

Table 5.7: Mode of Saving Income practiced by Auto-rickshaw drivers

Saving of Income		Frequency	Percentage (%)
No		19	11.95
Yes	*Marup / Tender*	122	76.73
	LIC	8	5.03
	Bank Deposit	9	5.66
	Interest	1	0.63
TOTAL		**159**	**100**

Habit of practicing saving income and mode of saving are assessed in the present study. Interestingly, majority of the participants have practice saving their income in or other forms. A total of 19 individuals (11.95%) do not practice saving of their income due to low and insufficient income. Among the income saving groups, 76.73% of the total population save some percent of their income in tender and *Marup*, a method of saving money by contributing

monthly and drawn the lottery. Some of the participants were practicing bank deposition scheme as a kind of saving method and 5.03% were reported to invest in different LIC policies. Least number of individual (0.63%) is found in money lending system as means of saving their income (Table 5.7).

Table 5.8: Practice of taking Breakfast by Auto-Rickshaw drivers

Breakfast	Frequency	Percentage (%)
No	45	28.30
Yes	114	71.70
TOTAL	**159**	**100.00**

In present study, the habit of taking breakfast by auto-rickshaw drivers was assessed to understand the effects of it on health (if any). Auto drivers who eat breakfast regularly show higher in percentage 71.70% as compare to those who skip breakfast i.e. 28.30% (Table 5.8).

Table 5.9: Types of Food Habits followed by Auto-Rickshaw drivers

Food Habits	Frequency	Percentage (%)
Vegetarian	3	1.89
Both Vegetarian & Non Vegetarian	156	98.11
TOTAL	**159**	**100.00**

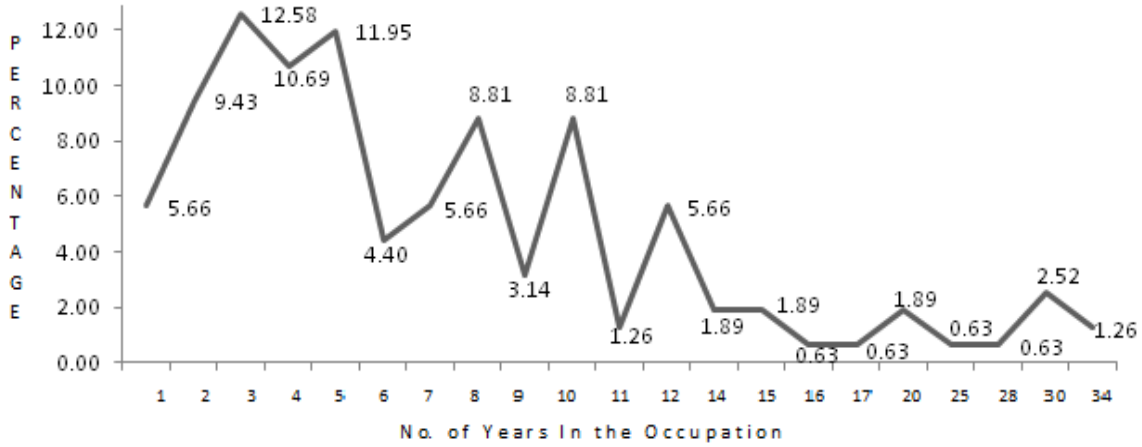
In general, most of the participants of the present research work consumed both vegetarian and non-vegetarian food. Very less individuals (1.89%) are reported to follow vegetarian diet (Table 5.9).

Table 5.10: Practice of Consumption of Street Food

Street Food	Frequency	Percentage (%)
No	72	45.28
Yes	87	54.72
TOTAL	**159**	**100.00**

In around 54.72% of studied participants had consumed street food regularly while 45.28% of individuals had not consumed street foods regularly (Table 5.10).

Figure 5.1: Distribution of Auto-Rickshaw Drivers based on their Service year



The above figure demonstrates the distribution of auto-rickshaw drivers according to their years of service. Maximum frequency of the participants were observed in 3 years of service (12.58%) which is followed by 5 years, 4 years, 8 years, 10 years and so on. In total, maximum of the participants have been working for upto 12 years as auto-rickshaw drivers. Nearly 12% of the total participants were driving auto-rickshaw more than 12 years. There are few participants (3.78%) who have been in the service for 30 years and above (Figure 5.1).

Table 5.11: Classification of Auto-Rickshaw drivers on the basis of year of Service in the occupation

Years of Service (in years)	Frequency	Percentage (%)
≤5	80	50.31
6-10	49	30.82
11-15	17	10.69
16-20	5	3.14
>20	8	5.03
TOTAL	**159**	**99.99**

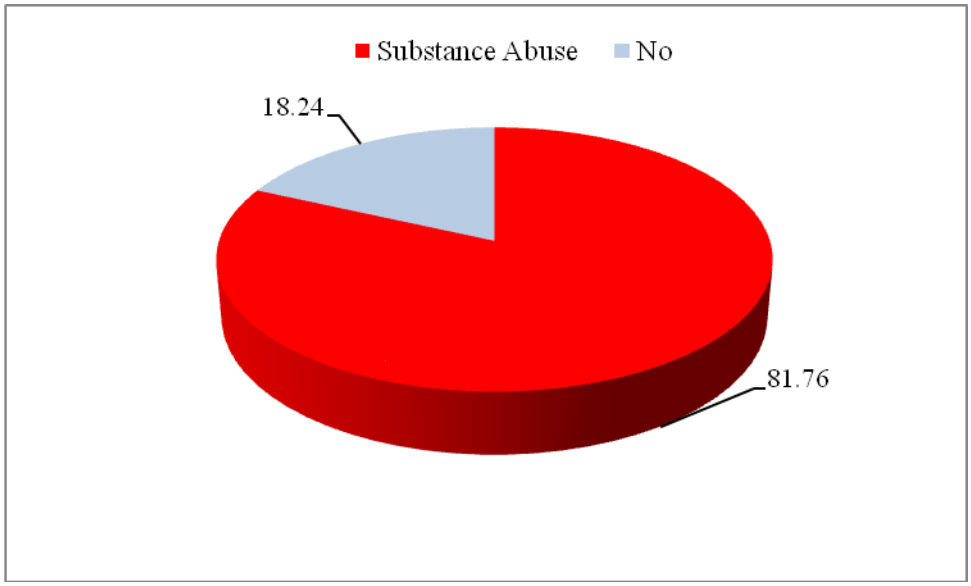
In the present study years of service engaged in driving as primary occupation was assessed and it was found that half of the studied population (50.31%) was driving auto for nearly 5 years. It is followed by 6-10 years of service with 30.82%, and 11-15 years by 10.69%. However, few of the population (less than 10%) drive auto for more than 15 years as primary occupation (Table 5.11).

Table 5.12: Ownership of the Vehicle

Vehicle Owner	Frequency	Percentage (%)
Owned	156	98.11
Rental	3	1.89
TOTAL	**159**	**99.99**

In the present research work, most of the studied population (98.11%) have their own auto-rickshaws and only three individuals (1.89%) of the total studied population are driving auto-rickshaw on rental basis (Table 5.12).

Figure 5.2: Pie-Chart Distribution of Substance Abuse among Auto-Rickshaw Drivers



In the present study, it was found that 81.76% of studied subjects reported that they have consume substances like pan, tobacco chewing, smoking and alcohol while 18.24% of the population do not consume any kind of substances (Figure 5.2).

Table 5.13: Assessment of different types of Substance Abuse among the Auto-rickshaw drivers

Substance Abuse		Frequency	Percentage (%)
Pan	No	61	38.36
	Yes	98	61.63
Tobacco Chewing	No	72	45.28
	Yes	87	54.72
Smoking	No	82	51.57
	Yes	77	48.43
Alcohol	No	69	43.40
	Yes	90	56.60
Consumed all together		45	28.30

The above table indicates the distribution of substance abuse by auto-rickshaw drivers plying in Imphal city. The types of substance abuse are found to be pan, tobacco, smoking, and alcohol consumption. More than 50% of the participants abuse substances in all the above mentioned substances except in smoking category. Consumption of pan is observed to be the most commonly abuse substance (61.63%) by auto drivers while compare with others. It is followed by alcohol consumption (56.60%), chewing tobacco (54.72%), and smoking (48.43%). Moreover, nearly 30% of the studied population consumed all the above substances simultaneously (Table 5.13).

Table 5.14: Number of Working Days per Week

No. of Working Days per Week	Frequency	Percentage (%)
4	3	1.89
5	7	4.40
6	20	12.58
7	129	81.13
TOTAL	**159**	**100**

In the present study, number of working days per week were analysed and it was found that, majority of the auto drivers (81.13%) had been working 7 days per week. Twenty individuals

(12.58%) out of the total studied population worked 6 days in a week and only few of the auto drivers worked 4 to 5 days in a week (Table 5.14).

Table 5.15: Working Hours of the Auto-Rickshaw drivers per Day

Working Hours per Day	Frequency	Percentage (%)
<5	2	1.26
5-10	76	47.80
>10	81	50.94
TOTAL	**159**	**100**

Working hours of the auto-rickshaw drivers in a day was analysed in the present study to understand the workload. Half of the studied population worked for more than 10 hours in a day and nearly half of the remaining population drives auto-rickshaw for 5-10 hours per day. A very least percentage was observed among <5 working hours per day as 1.26% (Table 5.15).

Table 5.16: Sleeping Hours among the Auto-Rickshaw drivers per Day

Sleeping Hours per Day	Frequency	Percentage (%)
<8	45	28.30
≥8	114	71.70
TOTAL	**159**	**100**

Sleeping hours in a day was assessed among the participants of the present study to understand the practice of amount of normal sleep per day. Most of the participants (71.70%) of study sleep normal amount of hours (more than 8 hours) per day and 28.30% of study subjects sleep less than 8 hours per day (Table 5.16).

Table 5.17: Assessment of Morning Walk among the Auto-Rickshaw drivers

Morning Walk	Frequency	Percentage (%)
No	122	76.73
Yes	37	23.27
TOTAL	**159**	**100**

In the present study habit of practicing morning walk was assessed to understand the physical health and activeness among the auto-rickshaw drivers. Findings shows that most of the participants (76.73%) do not practiced morning walk while 23.27% of auto-rickshaw drivers went for morning walks regularly (Table 5.17).

Table 5.18: Distribution of Morbidity conditions suffer by Auto-rickshaw drivers

Types of Morbidity Conditions		**Frequency**	**Percentage (%)**
Eye Problem	No	78	49.06
	Yes	81	50.94
	Blurring of Vision	51	62.96
	Tearing	12	14.81
	Irritation & Burning	10	12.34
	Mix	8	9.88
Hearing Impairment	No	149	93.71
	Yes	10	6.29
Headache	No	137	86.16
	Yes	22	13.84
Body pain (Arm, Back, Neck and Leg)	No	77	48.43
	Yes	82	51.57

Some of the common health problems generally encounter by auto-rickshaw drivers due to continuously expose in polluted environment includes vision effects, hearing problem, head ache, pain - leg, neck, back and arm. The most common type of health problem faced by auto-rickshaw drivers are eyesight problems (blurring, tearing, irritation & burning) and body pain (neck, leg, arm and back). Both of the problems were experienced by more than 50% of the total studied population (Table 5.18).

Table 5.19: Screening of symptoms related with diabetes and family history of illness among Auto-rickshaw drivers

Symptoms and Illness		Frequency	Percentage (%)
Excess Thirst	No	120	75.47
	Yes	39	24.53
Anxiety	No	108	67.92
	Yes	51	32.07
Weight Gain	No	82	51.57
	Yes	59	37.11
	Loss	18	11.32
Urination at Night	No	140	88.08
	Yes	19	11.95
Tired Constantly	No	130	81.76
	Yes	29	18.24
Family History of Illness	No	115	72.33
	Yes	44	27.67
	Hypertension	20	45.45
	Diabetes	19	43.18
	Other (Asthma, Cancer)	5	3.14

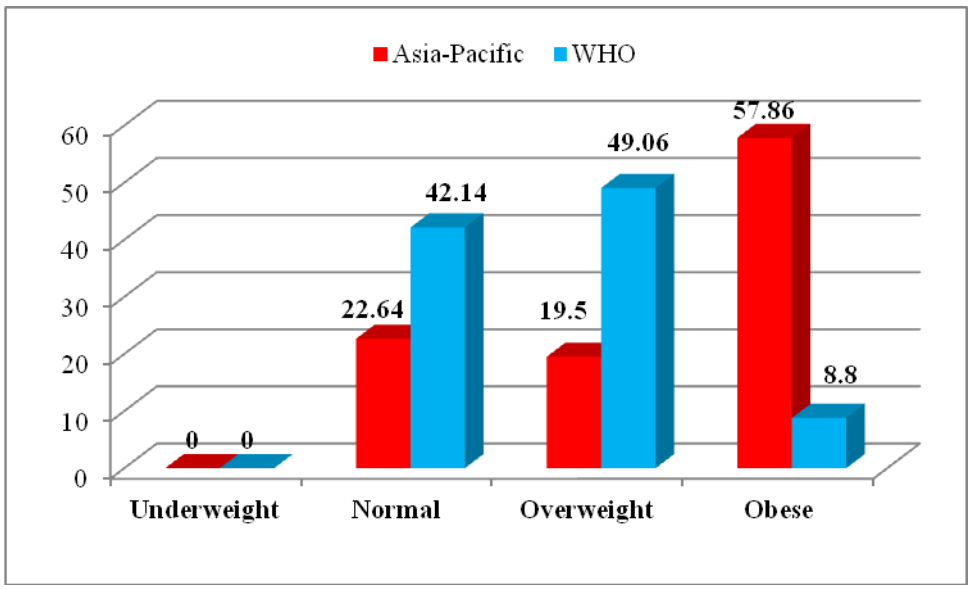
Auto-rickshaw drivers were assessed regarding some of the significant symptoms of onset of diabetes as well as family history of illness. More than 10% of the studied population possess the symptoms of diabetes. Among the different kinds of symptoms, weight gain is the most common type of symptoms (37.11%) observed among the auto-rickshaw drivers. Anxiety is the next frequent symptoms (32.07%) as reported by the participants. Feeling of excess thirst, tired constantly and urination at night are the other symptoms reported comparatively lower than above symptoms with 24.53%, 18.24% and 11.95% respectively. On the other hand 27.67% of the studied population have family history of illness. Of which, hypertension (45.45%) and diabetes (43.18%) are most of the common type of illness suffers by the family members of the auto-rickshaw drivers (Table 5.19).

Table 5.20: Classification of BMI according to Asia-Pacific Guidelines

BMI Category	Frequency	Percentage (%)
Underweight (<18.5)	0	0
Normal (18.5-22.9)	36	22.64
Overweight (23-24.9)	31	19.50
Obese (≥25)	92	57.86
TOTAL	**159**	**100.00**

Body Mass Index (BMI) was assessed to understand the distribution of obesity among the studied auto-rickshaw drivers. On examination of BMI according to Asia-Pacific Guidelines, it was found that majority of the participants were obese (57.86%) and 19.50% of the total population were fall under overweight category. Less than one-third of the participants (22.64%) are fall under normal BMI category (Table 5.20).

Figure 5.3: Comparative classification of BMI using both Asia-Pacific and WHO guidelines



Comparision of body mass index (BMI) was made between Asia-pacific and WHO guidelines to understand variation in distribution patterns among the studied population. Frequency of obesity among auto-rickshaw drivers is significantly higher when calculated through Asia-pacific guidelines (57.86%) than BMI calculated according to WHO guidelines (8.8%). Distribution of both normal and overwight BMI were recorded higher in WHO classification than Asia-pacific classification system. Findings of the study suggest that obese individuals according to Asia-pacific are classified into overweight according to WHO classification. Classification of BMI accoriding to Asia-pacific guidelines helps in classifying more number of individuals who are at risk for metablic diseases associated with obesity than the WHO classification system. Further, it would be helpful to many individuals in diagnosing of various diseases associated with obesity much earlier than classifying them as obese according to WHO classification (Figure 5.3).

Table 5.21: Assessment of variables risk for central obesity

Parameter	Normal		High		Total (%)
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Waist Circumference (Normal≤94; High>94)	110	69.18	49	30.82	159 (100)
Hip Circumference (Normal≤102; High>102)	151	94.97	8	5.03	159 (100)
Waist Hip Ratio (WHR) (Normal<0.90; High≥0.90)	30	18.87	129	81.13	159 (100)

Waist circumference, hip circumference and their relationship in terms of waist hip ratio (WHR) was assessed among the participants of the present study to understand the distribution pattern of central obesity. More than 30% of the participants were observed to have high waist circumference indicating high risk of developing diseases related with obesity. However, most of the participants (94.97%) are found to have normal hip circumference. As per analysis of WHR, majority of the participants (81.13%) were found in higher category of WHR indicating presence of high frequencies of central obesity among the studied population (Table 5.21). It is one of the major risk factors for developing complex diseases associated with central obesity in their future life (Table 5.21).

Table 5.22: Distribution of normal and hypertensive individuals among Auto-Rickshaw drivers

Blood Pressure Category		Range of SBP/DBP (mmHg)	Frequency	Percentage (%)
Hypotension		<90/<60)	-	
Normal		90-119/60-79	13	8.18
Pre-hypertension		120-139/80-89	44	27.67
Hypertension	Stage I	140-159/90-99	53	33.33
	Stage II	160-179/100-109	36	22.64
	Stage III	≥180/≥110	13	8.18
TOTAL			**159**	**100**

Assessment of blood pressure among the participants of present study reveals that only 8.18% of the total population were found to have normal blood pressure in both systolic and diastolic.

Pre-hypertension was observed among 27.67% of the participants. In general, majority of the studied population (64.15%) are falls under hypertensive category of blood pressure. Among the hypertensive category, stage I hypertension is the most frequent among the auto-rickshaw drivers (33.33%), followed by stage II and stage III with a frequency of 22.64% and 8.18% respectively (Table 5.22). Moreover, most of the pre-hypertensive and hypertensive individuals observed in the present study were undiagnosed cases. Participants of the present study are not aware of their blood pressure and they came to know only when assessing their blood pressure in the present study.

Table 5.23: Assessment of Blood glucose level among the Auto-Rickshaw drivers

Glucose Level (mg/dl)	Frequency	Percentage (%)
Hypo (<79)	6	3.77
Normal (79-139.99)	123	77.36
Pre-Diabetes (140-199.99)	18	11.32
Diabetes (≥200)	12	7.55
TOTAL	**159**	**100**

Random blood glucose level was assessed among the participants of the present study to examine the prevalence of diabetes status. Majority of the individuals (77.36%) were found to have normal glucose level and 11.32% individuals are diagnosed with pre-diabetes condition. Lest number of the studied population (7.55%) were found to have high glucose level and they were categorised into diabetics (Table 5.23).

Table 5.24: Assessment of Haemoglobin (Hb) level among the Auto-Rickshaw drivers

Hb Level (gm/dl)		Frequency	Percentage (%)
Anaemia	Severe (<8)	-	-
	Moderate (8-10.9)	7	4.40
	Mild (11-12.9)	94	59.12
Normal (≥13)		58	36.48
TOTAL		**159**	**100**

In the present study anaemic status was assessed among the auto-rickshaw drivers. Majority of the participants (63.52%) were found to be anaemic and only 36.48% were found to have

normal haemoglobin level. Out of the anaemic individuals, mild anaemic (11-12.9gm/dl) were the most frequent type of anaemia which constitutes 59.12% of the studied population. Moderate type of anaemia was observed among 7 individuals with 4.40%. No cases of sever anaemic was found in the present studied population (Table 5.24).

Table 5.25: Assessment of Lungs Function Test among the Auto-Rickshaw drivers

Type of Lungs Problem		**Frequency**	**Percentage (%)**
Obstructive	Mild	16	10.19
	Moderate	12	7.64
	Sever	5	3.18
Normal		34	21.66
Restrictive	Mild	72	45.86
	Moderate	16	10.19
	Sever	2	1.27
TOTAL		**157**	**99.99**

In the present study, lungs function test was performed to understand the health condition of lungs of auto-rickshaw drivers. Only 21.66% of the total population are having normal lungs function test. Majority of the participants are found to have poor lungs health according to lungs function test carried out by spirometry. They have one or other form of lungs diseases as per the interpretation of the instrument. Both obstructive and restrictive lungs disease are observed in the present study. However, the restrictive form of lungs diseases is more frequent among the studied population (57.32%) than obstructive lung disease (21.02%). All the sub-categories of both obstructive and restrictive lungs diseases such as mild, moderate and severe forms are also present among the studied population. Maximum of them are observed among the mild group in both obstructive (10.19%) and restrictive (45.86%). It is followed by moderate and sever conditions in both cases (Table 5.25).

Table 5.26: Assessment of lungs age of the auto-rickshaw drivers

Categories of Lungs Age	Frequency	Percentage (%)	Mean Age±SD		t-test (p-value)
			Actual Age	Lung Age	
Normal	1	0.67	65	65	-
1-10 years advance	9	6.04	54.67±10.03	64.44±7.36	0.032*
11-20 years advance	30	20.13	46.90±9.67	63.90±7.43	0.0001*
21-30 years advance	92	61.74	38.83±9.67	65.63±7.37	0.0001*
31-40 years advance	17	11.41	33.41±9.68	66.94±6.93	0.0001*
TOTAL	**149**	**99.99**	**-**	**-**	**-**

*Statistically significant ($p<0.05$)

Participants of the present study were examined for lungs age using lungs function test. Individuals with age less than 25years are not included in the lungs age analysis. Therefore, a total of 149 individuals were assessed for lungs age. Lungs ages of all the participants of the present study have exceeded or advances than their respective actual age. The advance in lungs age is categorised into four groups of 10 years cohort such as 1-10 years, 11-20 years, 21-30 years and 31-40 years. Maximum of the participants have advances their lungs age 21-30 years than their actual age (61.74%). Mean of the actual and lungs age were calculated for each group and compared. Mean lungs age of all the participants were significantly higher than the mean actual age ($p<0.05$) in all the four groups (Table 5.26).

Table 5.27: Age-wise body fat percent distribution among the auto-rickshaw drivers

Age Group (in years)	Normal Range of Body Fat Percent (according to TANITA)	Body Fat Percentage		Overall Fat Percent Distribution	
		Normal (n, %)	High (n, %)	Normal (n, %)	High (n, %)
20-39	8-20%	35 (45.45)	43 (52.44)	77 (48.43)	82 (51.57)
40-59	11-22%	38 (49.35)	37 (45.12)		
60 and above	13-25%	4 (5.19)	2 (2.44)		
TOTAL		**77 (99.99)**	**82 (100)**	**159 (100)**	

Body composition analysis with respect to body fat percent was examined among the auto-rickshaw drivers. Age-wise body fat classification was made to understand the age specific body fat distribution. No significant difference was observed with respect to distribution of body fat percent between normal and high fat percent. Maximum of the high fat percent

distribution was observed among the age group 20-39 years (52.44%) and least among the age group 60 years and above (2.44%). On the other hand, normal body fat percent distribution was found to be highest among the age group 40-59 years (49.35%) (Table 5.27)

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Table 5.28: Age at Marriage, Educational Status and Substance abuse among different groups of auto-rickshaw drivers

Characteristics		Group A (n, %)	Group B (n, %)	Group C (n, %)	Chi Square (p-value)	
					p1	p2
Age (years)	Mean±SD	36.02±9.73	42.84±9.67	47.53±9.57	0.0002 [a*]	0.0001 [a*]
Age at Marriage	Mean±SD	26.43±5.30	27.81±5.27	28.77±5.17	0.161 [a]	0.04 [a*]
Educational Status	Illiterate	01 (1.25)	02 (4.08)	01 (3.33)	0.000*	0.000*
	Secondary	03 (3.75)	11 (22.45)	08 (26.67)		
	Higher Secondary	64 (80.0)	23 (46.94)	18 (60.00)		
	Graduate & above	12 (15.0)	13 (26.53)	03 (10.00)		
Smoking Status	Yes	41 (51.25)	20 (40.82)	16 (53.33)	0.249	0.846
	No	39 (48.75)	29 (59.18)	14 (46.67)		
Tobacco consumption	Yes	43 (53.75)	24 (48.98)	20 (66.67)	0.599	0.223
	No	37 (46.25)	25 (51.02)	10 (33.33)		
Pan	Yes	47 (58.75)	30 (61.22)	21 (70.00)	0.781	0.279
	No	33 (41.25)	19 (38.77)	09 (30.00)		
Alcohol Consumption	Yes	46 (57.5)	24 (48.98)	20 (66.67)	0.346	0.382
	No	34 (42.5)	25 (51.02)	10 (33.33)		

p-value: p1 – Group A vs Group B; p2 – Group A vs Group C

[a]Unpaired t-test

*Statistically Significant ($p<0.05$)

From the above comparative analysis table, it is observed that mean age of the auto-rickshaw drivers shows significant differences among the groups ($p<0.05$). The auto-rickshaw drivers of Group A get married at their early age which is significantly lower than age at marriage of Group C ($p=0.04$). Therefore, early age at marriage could be one of the factors for choosing auto-rickshaw driving as their primary occupation to support their family members.

Comparison of educational status among the three groups taking group A as reference group reveals highly significant differences. Both illiteracy and secondary level education were observed to be higher among the drivers who had more years in the service (Group B & Group C) than those of group A auto-drivers who have recently started the job. However, the overall illiteracy rate of the studied population is significantly very low. Most of the auto-rickshaw drivers of group A were fall under higher secondary group (80.0%) which is significantly

higher than group B and group C. A very high frequency of auto-rickshaw drivers have completed graduation and master degrees indicating higher incidence of educated unemployed (Govt.) among the studied population. On the other hand, no significant difference was observed for substance abuse (smoking status, Tobacco consumption, Pan, and Alcohol consumption) while compared among the different sub-groups of auto-rickshaw drivers (Table 5.28).

Table 5.29: Distribution of Morbidity conditions among the different groups of Auto-rickshaw drivers

Health Problems		Group A (n, %)	Group B (n, %)	Group C (n, %)	Chi-square (p-value)	
					p1	p2
Eye Problem	Yes	43 (53.75)	26 (53.06)	12 (40.00)	0.939	0.199
	No	37 (46.25)	23 (46.94)	18 (60.00)		
Hearing Problem	Yes	06 (7.50)	03 (6.12)	01 (3.33)	0.766	0.425
	No	74 (92.50)	46 (93.88)	29 (96.67)		
Headache	Yes	14 (17.50)	05 (10.20)	03 (10.00)	0.256	0.332
	No	66 (82.50)	44 (89.79)	27 (90.00)		
Body Pain (arm, back, neck, leg)	Yes	44 (55.00)	26 (53.06)	12 (40.00)	0.830	0.161
	No	36 (45.00)	23 (46.94)	18 (60.00)		
Anxiety	Yes	23 (28.75)	20 (40.82)	08 (26.67)	0.158	0.829
	No	57 (71.25)	29 (59.18)	22 (73.33)		
Weight Gain	Yes	29 (36.25)	17 (34.69)	13 (43.33)	0.494	0.013*
	No	46 (57.5)	26 (53.06)	10 (33.33)		
	Loss	05 (6.25)	06 (12.24)	07 (23.33)		
Tired Constantly	Yes	13 (16.25)	09 (18.37)	07 (23.33)	0.756	0.391
	No	67 (83.75)	40 (81.63)	23 (76.67)		

p-value: p1 – Group A vs Group B; p2 – Group A vs Group C

*Statistically Significant ($p<0.05$)

Most of the auto-rickshaw drivers irrespective of their service year have high percentage of all the considered morbidity conditions except hearing problems. The most common form of morbidity suffer by different groups of auto-rickshaw drivers includes eye problems (eye tearing, blur vision, irritation, burning etc), body pain (arm, leg, neck, back), and weight gain. Moreover, the rate of prevalence of morbidity conditions such as eye problem, hearing problems, headache, and body pain are found to be comparatively higher among those auto-rickshaw drivers who had lower service year (i.e. Group A) while compared with other two groups who are servicing more than 5 years (i.e. Group B and C). It could be because of adaptation to their working environment. The comparative analysis between different

categories of auto-rickshaw drivers did not show any significant differences. Though, the auto-rickshaw drivers working in the same occupation for more than 10 years of service (Group C) have significantly increase in their weight while compared with those who has less working service year i.e. group A (p=0.013). It may be due to their occupational sitting nature of their work as well as less engaged in physical activity (Table 5.29).

Health status with respect to anthropometric, physiological, biochemical and body composition analysis was examined among the sub-groups of auto-rickshaw drivers to understand the risk of adverse health outcomes among those drivers who are working continuously for more than 5 years in the same occupation. Comparison was made between those groups of auto-rickshaw drivers who are driving upto 5 years and those who are driving 5 to 10 years. Moreover, comparison was also made between drivers upto 5years of service and those who are driving more than 10 years. Findings are shown in the following tables.

Table 5.30: Comparison of mean values of anthropometric, physiological, and biochemical variables among different categories of auto-rickshaw drivers

Parameters (Cut-off point)		Group A (Mean±SD)	Group B (Mean±SD)	Group C (Mean±SD)	t-test (p-value)	
					p1	p2
BMI (<23)		25.37±3.26	25.79±3.27	26.11±3.24	0.479	0.291
WC (<90)		87.79±9.65	89.35±9.67	89.67±9.68	0.375	0.365
WHR (≤0.9)		0.95±0.07	0.95±0.07	0.96±0.07	1.00	0.506
SBP (<120)		131.36±16.16	134.82±16.05	138.53±16.10	0.239	0.041*
DBP (<80)		89.06±12.29	89.71±12.29	95.43±12.52	0.771	0.018*
Hb Level (≥13)		12.26±1.03	12.14±1.02	11.8±1.03	0.520	0.039*
Random Blood Glucose (<140)		115.19±65.98	125.71±65.39	174.9±68.57	0.379	0.0001*
Lungs Function Test[1] (FEV1/FVC) (<70)		81.28±15.69	82.12±15.61	84.23±14.16	0.769	0.370
Lungs Age[2]		63.27±7.44	66.49±7.43	68.76±7.37	0.022*	0.001*
Body Fat Percent[3]	8-20%	19.09±5.43	20.6±5.48	28.22±5.50	0.321	0.0007*
	11-22%	21.19±5.57	21.27±5.59	21.39±5.66	0.959	0.904
	13-25%	35	21.83±6.21	23.8±5.93	-	0.748

p-value: p1 – Group A vs Group B; p2 – Group A vs Group C

[1]Sample size – Group A=79, Group B=48, Group C=30; [2] Sample size – Group A=74, Group B=47, Group C=29

[3]Sample size for 8-20% - Group A=55, Group B=17, Group C=5; For 11-22% - Group A=23, Group B=29, Group C=23; For 13-25% - Group A=1, Group B=3, Group C=2

*Statistically Significant (p<0.05)

In table 5.30 mean values of variables considered in the present study such as anthropometric, physiological, biochemical and body composition analysis were compared among the different sub-groups of auto-rickshaw drivers. From the below table, it is observed that BMI, WHR, SBP, DBP, FEV1/FVC, and lungs age were above the normal cut off values in all the sub categories of auto-rickshaw drivers. Moreover, haemoglobin level is significantly lower than the normal cut off point suggesting high prevalence of anaemia among the auto-rickshaw drivers (Table 5.30).

Lungs age estimated through spirometry shows remarkable differences with respect to the participant's actual age. Estimated lungs age shows significantly more advance than their respective actual age among groupc while compared with group A. It may be because of various factors and one of the possible factors could be due to presence of high frequencies of lungs diseases such as obstructive and restrictive among the studied population.

Auto rickshaw drivers who are driving more than 10 years shows significantly increase in mean values of SBP, DBP, random blood glucose level, and lungs age while compared with other two groups of auto-rickshaw drivers who are driving upto 10 years (Table 5.30). Results of the present study suggest that long term service as auto-rickshaw drivers are more prone to have adverse health outcomes and other associated complex diseases such as cardiovascular diseases.

In the present study, odds ratio (OR) was calculated to understand the association (if any) between service year as auto-rickshaw drivers and variables considered in the present study such as anthropometric (BMI, WC, WHR), physiological (SBP, DBP, Lungs Function Test), biochemical (Hb level, random glucose level) and body composition analysis (Body Fat percent). Comparison was made among the three sub-groups of auto-rickshaw derivers taking those drivers who drive upto 5 years as reference group. Findings are shown in below table 5.31.

Auto-rickshaw drivers who are driving 5-10 years as well as more than 10 years are found to have more than one fold increased risk of having obesity, abdominal obesity (high WHR), hypertension, anaemic, diabetes, lungs diseases (both obstructive and restrictive), and body fat percent while compared with auto-rickshaw drivers who drives upto 5 years. However, significant increased risk was observed only in random blood glucose levels between the auto-rickshaw drivers who are driving upto 5 years and those who are driving more than 10 years ($p=0.002$).

Table 5.31: Odds ratio between different categories of auto-rickshaw drivers and anthropometric, physiological, and biochemical variables

		Group A	Group B	Group C	OR[1] 95% CI (p-value)	OR[2] 95% CI (p-value)
BMI	Normal	17 (21.25)	11 (22.45)	06 (20.0)	0.93 CI 0.39- 2.20 (0.86)	1.08 CI 0.38- 3.06 (0.89)
	Overweight & Obese	63 (78.75)	38 (77.55)	24 (80.0)		
WC	Normal	58 (72.5)	31 (63.26)	21 (70.0)	1.53 CI 0.71- 3.27 (0.27)	1.13 CI 0.45- 2.84 (0.79)
	High	22 (27.5)	18 (36.73)	09 (30.0)		
WHR	Normal	23 (28.75)	09 (18.37)	06 (20.0)	1.79 CI 0.75- 4.28 (0.18)	1.61 CI 0.58- 4.46 (0.35)
	High	57 (71.25)	40 (81.63)	24 (80.0)		
Blood Pressure	Normal	06 (7.50)	06 (12.24)	01 (3.33)	0.58 CI 0.18- 1.91 (0.368)	2.35 CI 0.27-20.39 (0.425)
	Hypertension	74 (92.5)	43 (87.75)	29 (96.67)		
Hb Level	Normal	32 (40.00)	19 (38.77)	07 (23.33)	1.05 CI CI 0.51- 2.18 (0.89)	2.19 CI 0.84-5.70 (0.10)
	Anaemic	48 (60.00)	30 (61.22)	23 (76.67)		
Random Blood Glucose level	Normal	69 (86.25)	42 (85.71)	18 (60.0)	1.04 CI 0.38- 2.91 (0.92)	4.18 CI 1.59-11.02 (0.002)*
	High	11 (13.75)	07 (14.28)	12 (40.0)		
Lungs Function Test[1]	Normal	19 (24.05)	10 (20.83)	5 (16.67)	1.20 CI 0.50- 2.86 (0.67)	1.58 CI 0.53-4.71 (0.41)
	Obstructive & Destructive	60 (75.95)	38 (79.17)	25 (83.33)		
Advance Lungs Age	Normal	0	1 (2.13)	0	0.63 CI 0.09- 4.66 (0.652)	0.11 CI 0.02-0.57 (0.002)*
	1-10yrs	2 (2.74)	1 (2.13)	6 (20.69)		
	11-40yrs	71 (97.26)	45 (95.74)	23 (79.31)		
Body Fat Percent	Normal	41 (51.25)	21 (42.86)	15 (50.0)	1.40 CI 0.68- 2.87 (0.35)	1.05 CI 0.45-2.43 (0.92)
	High	39 (48.75)	28 (57.14)	15 (50.0)		

OR^1 – Group A vs Group B; OR^2 – Group A vs Group C

[1]Sample size – Group A=79, Group B=48, Group C=30

*Statistically Significant ($p<0.05$)

In case of advance lungs age, most of the auto-rickshaw drivers who are driving upto 5 years are found to have more advance age of lungs i.e. 11-40 years than their actual age (97.26%). This frequency is higher than the other two sub-categories of auto-rickshaw drivers (Table 5.31). This could probably be due to many factors of which smoking may be one of possible reasons as most of them are smoked.

6. Conclusion, summarizing the achievements and indicating scope of future work.

In the present study, a total of 159 auto-rickshaw drivers age ranges from 20 to 65 years (Mean age=40.29±9.64) were screened for their health status with respect to cardiovascular and other occupationally related health problems. Data were collected only among the auto-rickshaw drivers who are plying in Imphal City assuming that they are continuously exposed to highly polluted environment. Most of the participants were educated and approximately 17% of the auto drivers had completed their graduation and master degree. Only 2.51% of the total studied auto-rickshaw drivers are illiterate. Most of the participants are married (94.97%) and majority of them get married at the age of 26-30 years. However, 11.92% of them get married at their early age that is 16-20 years. Generally, the auto-rickshaw drivers live in small family with 3-5 dependent family members (72.95%). Most of the auto-rickshaw drivers earned a good amount of income ranging from ₹15,000/- to ₹20,000/- per month. Though, it is greatly affected by bandhs and general strike called by different organizations on different issues. They used to save small amount of their income in different forms such as marup/tender, LIC, bank deposit and others.

Regarding food habits, most of the participants of present study are non-vegetarian (98.11%) and half of the total studied population used to consume street food regularly. Nearly 82% of the participants use substances in the following sequences in terms of frequency of consumption rate like pan (61.63%)>, alcohol (56%) > tobacco chewing (54.72%) > smoking (48.43%). The number of years of service ranges from 1 year to 34 years among the participants of the present study. More than 50% of the auto-rickshaw drivers of the present study belong to the group of drivers who are driving for 1-5 years. Most of the auto-rickshaw drivers of the present study drive their own vehicles and only 1.89% was driving on rental. They use to drive for 10 or more hours in a day (50.94%) and majority of them work the whole week (81.13%).

Most of the participants of the present study sleep normal amount of hours i.e. more than 8 hours per day at night but only 23.27% of them went for morning walk regularly. Among the different types of morbidity conditions, eye/vision problems (blurr, tearing, irritation & burning) and body pain (arm, leg, neck, back) are experienced by half of the total studied population. Some of the common early diabetes symptoms were assessed among the studied population as the prevalence of diabetes is very high in the state. Among the considered symptoms, weight gain (37.11%), anxiety (32.07%), and excess thirst (24.53) were experienced by auto-rickshaw drivers in high frequencies as compared to tired constantly (18.24%) and urination at night (11.95%). Therefore, prevalence of obesity and central obesity (WHR) is

observed significantly in high frequencies among the auto-rickshaw drivers 57.86% and 81.13% respectively. Moreover, more than 60% of the participants are fall under hypertensive category. Similar trend is observed for haemoglobin level that majority of the participants have mild to moderate form of anaemia (63.52%). Random blood glucose test reveals that 18.87% of the auto-rickshaw drivers have above the normal range of blood glucose level as given by ADA guidelines.

Lungs function test using spirometry reveals that majority of the auto-rickshaw drivers (78.34%) have abnormal lungs function test. Of which, restrictive is more frequent (57.32%) than obstructive lungs disease (21.02%). Therefore, calculated lungs age by lungs function test of all the participants have exceeded significantly than their actual age ($p<0.05$). Body composition analysis reveals that 51.57% of the participants have high body fat percent and distribution is more common among the age group 20-39 years.

On the basis of service year, the studied population is sub-grouped into three categories such as Group A (1-5 years), Group B (6-10 years) and Group C (>10 years). Mean age of the auto-rickshaw drivers shows significant differences among the sub-groups ($p<0.05$) and Group A get married at their early age significantly lower than age at marriage of Group C ($p=0.04$). Early age at marriage could be one of the possible factors for choosing auto-rickshaw driving as their primary occupation enable to support their family members. Moreover, educational status of group A is significantly low and majority of them are fall under higher secondary level (80%).

The morbidity conditions such as eye problem, hearing problem, headache, and body pain are found to be comparatively higher among group A auto-rickshaw drivers while compared with other two groups i.e. Group B and C. It could be because of adaptation to their working environment. The auto-rickshaw drivers working in the same occupation for more than 10 years of service (i.e. Group C) have significantly increase in their weight while compared with those who has less working service year i.e. group A ($p=0.013$). It may be due to their occupational sitting nature of their work as well as less engaged in physical activity.

The anthropometric, physiological, biochemical and body composition analysis among the three different groups of auto-rickshaw drivers reveals that BMI, WHR, SBP, DBP, FEV1/FVC, and lungs age were above the normal cut off values in all the sub categories of auto-rickshaw drivers. Moreover, haemoglobin level is significantly lower among group C while compared with group A suggesting high prevalence of anaemia among drivers who are driving for more than 10 years. Moreover, group C shows significantly increase in mean values

of SBP, DBP, random blood glucose level, and lungs age while compared with other two groups of auto-rickshaw drivers who are driving upto 10 years.

Odds ratio analysis reveals that auto-rickshaw drivers who are driving 6-10 years as well as more than 10 years are found to have more than one fold increased risk of having obesity, abdominal obesity (high WHR), hypertension, anaemic, diabetes, lungs diseases (both obstructive and restrictive), and body fat percent while compared with auto-rickshaw drivers who drives upto 5 years. Significant increased risk was observed only in random blood glucose levels between the group A auto-rickshaw drivers who are driving upto 5 years and group C who are driving more than 10 years ($p=0.002$).

Results of the present study suggest that long term service as auto-rickshaw drivers plying in Imphal city are more prone to have mild to moderate form of anaemic conditions. Moreover, they are also risk for adverse health outcomes and other associated complex diseases such as cardiovascular diseases with respect to obesity, WHR, hypertension, high blood glucose and level.

Further studies can be carried out to explore the health status as well as to indentify other potential occupationally related risk factors for causing adverse health outcomes among different sections of the population such as mothers who are working in the Ima Market for many years, other shopkeepers, traffic police, and people working and living in and around the Imphal city who are also equally exposed to the same environment as auto-rickshaw drivers.

7. Benefits accorded from the Project

a) Academic benefits

(i) List of Research Publication Not Yet

(ii) Scientists interacted with, Scientific manpower trained, indicating Names with qualifications and dates.

Scientists Interacted

During the present research work, one scientist was interacted who is expertise in the field of epidemiological study of non-communicable diseases. The analysis and interpretation of lungs function test was done consulting through the scientist.

Sl. No.	Name of the Scientist	Qualification	Dates
1	**Dr. Suniti Yadav** Scientist C Division of Non-Communicable Diseases, ICMR	M.Sc. Ph.D	Data Collection, Analysis and Interpretation of Lungs Function Test

Scientific Manpower Trained

One post of Project Assistant was advertised and selected on temporary basis through personnel interview by selection committee constituted for the project. The project assistant with other three research scholar of the Department of Anthropology, Manipur University was engaged in conducting the field work. They were trained on different fields including scientific methods of data collection, measurement of various parameters using scientific instruments such as blood pressure, biochemical tests (haemoglobin level and blood glucose level), body composition examination and spirometry test for measuring lungs function. They are expertise to conduct field work on such occupational and environmentally related health issues. Knowledge gained through participation in the project would definitely be helpful in their research work.

Sl. No.	Name of the Scientific manpowers trained	Qualification	Dates
1	Khuraijam Geetamani Devi	M.Sc. (Project Assistant)	Whole Project
2	B. Surajkumar Sharma	M.Sc., Research Scholar	Field Works
3	Khangembam Taibanganba Meitei	M.Sc., Research Scholar	Field Works
4	Thangjam Chitralekha Devi	M.Sc., Research Scholar	Field Works

(iii) Non-Scientific manpower trained, indicating Names and dates. Nil

b) Contributions towards socio-economic development

(i) Practical benefits resulting from the project outcome

All the participants of the present study were informed about their health status. Test results of the anthropometric (BMI, WHR), physiological (Blood Pressure), biochemical (Hb & blood glucose level), body composition examination (body fat percent) and lungs function are also provided to all the participants of the present research project. Counselling was done based on individual's test results and made them understand the possible adverse health outcomes. All the participants were also advice to use anti-pollution mask in order to prevent from harmful effects of pollutants and continuous expose to automobile exhausts. Individuals possessing more risk factors are advice to take precautions and suggested them to modify their life style, and also to keep physically active. Some of the participants who were diagnosed with severe health conditions were instructed to visit nearby hospital to start proper treatment in time.

(ii) Specific benefits, if any, to the people of Manipur

Findings of the present study would be helpful in identifying and understanding risk factors for causing adverse health outcomes among different sections of the population who are also equally exposed to the same environment by auto-rickshaw drivers. Moreover, people living in and around the Imphal city will be benefited from the outcomes of the present study while preventing from occupationally related health problems. Health check-up of auto-rickshaw drivers as well as diagnosis of un-diagnosed health problems reduces the mental and financial burden of the driver as well as the immediate family members. Early diagnosis and understanding of risk factors helps them in taking preventive measures in time as well as in improving socio-economic status of the family members by saving huge expenditure to be spent on treatment.

(iii) Patents taken/proposed, if any. No

Annexure I

Health Status of Auto-Rickshaw Drivers plying in Imphal City, Manipur

R & D Project under Department of Science & Technology, Manipur

Sl.No.: Date:

Personal Information

Name: **Sex**: **Age/DOB**: **Contact No./Email**:

Address:

Marital Status: **Age at Marriage** (if married): **Educational Qualification**:

No. of Family Members: **No. of dependent Family Members**: **Occup.** (how long): **M Yr.**

Owner/Hire:

Income: (per day/month) **Expenditure** (per month): **Methods of Saving**: (Deposit/Marup/Tender/LIC etc)

Food Habits

Breakfast (Yes/No): **Frequency of Meal** (in a day): 1 2 3

Food Habit: (Veg./ Non-Veg./Both) **Timing of Meal**: Morning Afternoon Evening

Street food(Yes/No): **Pan/Tobacco/Smoke** (Yes/No): **Alcohol** (Yes/No):

Physical Activity

Morning Walk/ Exercise (Yes/No): **Duration** (if yes):

Working Hour From: To: **No. of Working Days**: (in a week)

Sleeping Hour From: To:

History of Health & Illness

Vision (Eye Irritation/Blur, Tearing) (if yes, how long.)

Excessive Thirst

Hearing Problem (if yes, how long.)

Headache (if yes, how long.)

Back pain/Leg pain (if yes, how long.)

Anxiety/Tension/Worried (if yes, how long.)

Gaining/Loosing of Weight (if yes, how much kg.)

Urination at Night (if yes, how long.)

Being Tired Constantly

Family history of Illness (CVD, Diabetes, HTN etc)

Any other history of Illness

Any Comment:

Anthropometric & Biochemical Measurement

Height

Weight

Waist / Hip Circumference

Chest Circumference

Chest Expansion

Breathe hold (in sec.)

SBP/DBP

Blood Glucose Level (Random)

Hb Level

Spirometry

Body Composition Analysis

(Signature of the Subject) **(Signature of Interviewing Person)**

Annexure II

CONSENT FORM

HEALTH STATUS OF AUTO-RICKSHAW DRIVERS PLYING IN IMPHAL CITY, MANIPUR

(R & D Project under Department of Science & Technology, Manipur)

I have been explained the aims and objectives of the present research work carried out by Dr. H. Suraj Singh, Assistant Professor, Department of Anthropology, Manipur University. I have been made conscious about all the possible risks and benefits of participation in the research work.

I have understood the purpose for which the personal information, food habits, physical activity, history of health & illness and anthropometric & biochemical measurement being collected from me as a part of the research work.

I am free from any pressure whatsoever and hereby give my consent voluntarily to:

i) Collect personal information, food habits, physical activity, history of health & illness, anthropometric & biochemical measurement.
ii) Do all types of research analysis from the above collected data for non-profit research purposes for acquisition of knowledge for the benefit of mankind

I have the right to know the results and outcomes of data analysis and I am not giving any consent for disclosure of any personal information related to me, either directly or indirectly.

I have been informed that my consent will be sought prior to any for-profit action (including filing of patents) that may be taken by the investigator or their collaborator on the basis of any information derived from the data collected from me.

Subject:
(Signature / Thumb Impression)
Name:
Age: Sex:
Date:

Investigator:
Signature:
Name:
Date:

Witness:

I made the subject understand the contents of the consent from his/her own language.

Signature:

Name: Date:

FORM GFR 19-A

(See Government of India's Decision (1) below Rule 150)

FORM OF UTILISATION CERTIFICATE

(to be submitted in duplicate to DST-Manipur)

Sl. No.	Letter No. & date	Amount (Rs.)	
1.	19/4/2011-R&D/DST/545 and Dated 27th January, 2018	95,000/-	Certified that out of **Rs. 95,000/-** of Grants-in-aid sanctioned during the year **2018** under the Ministry/Department letter given in the margin, and **Rs NIL** on account of unspent balance of the previous year, a sum of **Rs. 95,000/-** only has been utilised for the purpose for which it was sanctioned and that the balance of **Rs NIL** remaining unutilised at the end of the year has been surrendered to Government (**vide No. NA dtd NA**) / will be adjusted towards Grants-in-aid payable during the next year ……**NA**……
	Total:		

Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly / are being fulfilled and that I have exercised the following check to see that the money was actually utilised for the purpose for which it was sanctioned.

Kinds of Checks exercised **Applicable**

1. Purchase Register
2. Cash Book
3. Sanction Order
4. Fund Register
5. —

H. Suraj Singh

Signature
of Principal Investigator
Name & Designation
Huidrom Suraj Singh
Assistant Professor, Dept. of Anthropology, MU
Date: 18/09/2019

Asst. Professor
Department of Anthropology
Manipur University, Canchipur

Signature
of Accounts Officer
Name & Designation
Sandhyarani Ningthoujam
Finance Officer
Manipur University
Date:

वित्त अधिकारी,
मणिपुर विश्वविद्यालय
Finance Officer,
Manipur University

20.9.19

Signature
of Head of Institution
Name & Designation
Prof. W. Chandbabu Singh
Registrar
Manipur University
Date:

Registrar
Manipur University

STATEMENT OF EXPENDITURE

(As on 18th Sept. 2019)

(To be submitted in duplicate to DST, Manipur)

Name of the Project	Health status of Auto-Rickshaw drivers plying in Imphal City, Manipur
Name of the Principal Investigator	Huidrom Suraj Singh
Name of the Institute	Department of Anthropology, Manipur University, Canchipur, Imphal
DST letter No. & date of sanctioning the project	Ref. No. 19/4/2011-R&D/DST/545 and Dated 27th January, 2018

Sl. No.	Items	Amount Sanctioned	Actual Expenditure	Variation (if any)	Remarks
1	Materials	Rs.10,000/-	Rs.10,000/-	NIL	Not Applicable
2	Consumables	Rs.22,000/-	Rs.22,000/-	NIL	Not Applicable
3	Project Manpower	Rs.48,000/-	Rs.48,000/-	NIL	Not Applicable
4	Other Costs / Contingencies	Rs.15,000/-	Rs.15,000/-	NIL	Not Applicable
	TOTAL	**Rs.95,000/-**	**Rs.95,000/-**	**NIL**	

H. Suraj Singh

Signature
of Principal Investigator
Name & Designation
Huidrom Suraj Singh
Assistant Professor, Dept. of Anthropology, MU
Date: 18/09/2019

Asst. Professor
Department of Anthropology
Manipur University, Canchipur

Signature
of Accounts Officer
Name & Designation
Sandhyarani Ningthoujam
Finance Officer
Manipur University
Date:

वित्त अधिकारी,
मणिपुर विश्वविद्यालय
Finance Officer,
Manipur University

20.9.19

Signature
of Head of Institution
Name & Designation
Prof. W. Chandbabu Singh
Registrar
Manipur University
Date:

Registrar
Manipur University