RESEARCH METHODOLOGY

The flowchart below illustrates the methodology for the current study presented in subsequent pages:

I. ASSUMPTIONS FOR THE STUDY

II. GENERAL PROBLEM

III. SPECIFIC OBJECTIVES OF THE STUDY

IV. SCIENTIFIC HYPOTHESIS OF THE STUDY

V. SCOPE OF THE STUDY

VI. CONCEPTUAL AND OPERATIONAL DEFINITIONS

VII. RESEARCH DESIGN

VIII. POPULATION AND SAMPLING

IX. CONSTRUCTION OF MEASURING INSTRUMENT

X. DESIGNING AND DEVELOPING MODULES FOR INTERVENTION

XI. DATA COLLECTION

XII. DATA REDUCTION, ANALYSIS AND INTERPRETATION
I. Assumptions for the present study:

- More and more women become economically & emotionally independent through business career.
- Women entrepreneurs are facing difficulties in getting financial support to launch their enterprises.
- Training & exposure brings awareness to women entrepreneur regarding the business/venture startup.
- Women are security oriented rather than growth oriented.
- Women prefer stabilization of income & minimization of risk over maximization of income.
- Though the trend is changing, it is not uncommon to find enterprises owned by women but run by men.
- There has been noticeable change in the socio-psychocultural and economic norms for women entrepreneur due to increase in the educational level of women.

II. General Problems:

- Many women entrepreneurs face traditional gender-roles which society still has on women even though female Entrepreneurship and the formation of women business networks are steadily rising. Indian society is patriarchal society and Indian women are traditionally considered to be home makers and not business women. This is the biggest deterrent still for most of the women entrepreneurs who wants to make it big on their own and also create employment for others.
• Women entrepreneurs face more difficulty getting finance than men for the same business opportunity since women have lower personal financial assets than men.

• North-East women entrepreneurs are very active and expert in their native skills and craftsmanship; however, because of lack of suitable training, women entrepreneurs have remained backward.

III. Specific objectives of the study:

• To elicit information on factors that motivates a woman to be an entrepreneur.

• To elicit information from the women entrepreneurs on the knowledge of various skills and qualities required to be a successful entrepreneur

• To draw out information on the problems faced by women entrepreneur in Assam and Manipur region of India.

• To find out the extent of importance given by Assam and Manipur women to entrepreneurial goals.

• To elicit information on the extent of participation and support given by the family members to women entrepreneurs of Assam and Manipur.

• To analyze the factors contributing to success or failure of an enterprise as envisaged by the women entrepreneurs.

• To study the level of personal satisfaction derived from women managing an enterprise.
• To assess the impact of training in entrepreneurship development towards motivating women from Manipur to be self employed

IV. Scientific Hypothesis:
• There is no difference in the problems faced by the women entrepreneurs of Manipur and Assam.
• Providing Training on Entrepreneurship development will encourage more women of Assam and Manipur to take up self employment

V. Scope of the study:
Manipur and Assam are states situated in the northeast corner of India. Due to geographic isolation, insurgencies and immigration from neighbouring countries and lots of other problem, Manipur and Assam are still backward states of India, virtually crippled with the grim of unemployment problem. The only way out of the present situation is systematic self employment. Many times, one finds that the income is not sufficient and the strain is felt by the person who manages the house. Due to rapid increase in socio-economic political unrest and unemployment problem, a large number of women of both Manipur and Assam are supplementing their family income by starting small enterprise to fulfill their aspiration and also to improve their socio-economic status.
Entrepreneurship is essential for national self-reliance. The factor that contributes to the development of women is the
social mobility. Women’s mobility depends on the active participation and involvement in any developmental activities especially economic development. Women entrepreneur and labourer is a major thrust in the present economic scenario of Assam and Manipur. Hence the present study has been taken up with the following objectives:

- To gather information regarding the various reasons that motivates a woman to be an entrepreneur.
- Find out the problems faced by women entrepreneurs in Manipur and Assam state.

This study is one of its kinds focusing extensively on self employment of women.

VI. Conceptual and operational definition:

Module:
A series of standardized unit for use together as educational units that cover a single subject or topic.

Participant:
Those who agreed to participate in the intervention program at the time of EDPs training program and participated in at least 90% of the training class within the duration of the program

Women entrepreneur:
A confident, innovative and creative woman capable of achieving self economic independence individually or in collaboration, generating employment opportunities for others through initiating, establishing and running the enterprise by keeping pace with her personal, family and social life
Packaging:
Packing is the art, science and technology of preparing goods for transport and sale.

Development:
Development may be defined as the overall economic and social empowerment of women. Their avenues for economic independence, education and training in computers, access to information, better social status and self esteem.
RESEARCH DESIGN

I. REVIEW OF LITERATURE EXAMINING CURRENT STATUS

II. WOMEN ENTREPRENEUR SURVEY

I. SOCIO-ECONOMIC
II. BUSINESS UNIT
III. ATTITUDE TOWARDS BUSINESS
IV. PROBLEMS OF BUSINESS UNITS
V. EXPECTATION OF BUSINESS UNIT

INTERACTION WITH SPECIALISTS

DEVELOPMENT OF TOOLS

SURVEY OF ENTREPRENEURS

INFORMAL DISCUSSION & INTERVIEW SCHEDULES ADMINISTRATION

DATA ANALYSIS

SELECTION OF PLACE

SAMPLE SELECTION

DEVELOPMENT OF MODELS

PRE-TEST DATA

INTERVENTION

POST-TEST DATA

ANALYSIS OF DATA

REPORT WRITING

MAIN SURVEY

PRE-TEST DATA

POST-TEST DATA
VII. Research design

A research design is the arrangement of the condition for collection and analysis of the data in a manner that aim to combine relevant to the research purpose with economy in procedure it constitute the blueprint for the collection, measurement and analysis of the data the major issue in research is the preparation of the research design for the research project decision regarding what, where, when, how, by what mean concerning and enquiry or a research study constitute a research design.

The present study has been designed around two basic parameters- survey and intervention. During the survey data was collected and used for research. The research program had three components.

- The survey of the women entrepreneurs in Assam and Manipur
- The development of the tools and
- The intervention program.

VIII. Population and sampling:

Samples are smaller groups selected from population. Samples are used in the research when it is not feasible to study the entire population since the sample is intended to reflect the characteristics of the population; special care is taken in its selection. Member of the sample are usually selected randomly
from the population, a procedure that usually, but not always yields a sample representative of the population.

**Selection of place to conduct the preliminary survey of women entrepreneur:**
Initially a survey was carried out at DIC (Manipur and Assam). The name lists of the women entrepreneurs who are registered under SSI unit were taken from two states (Manipur and Assam). From these two states 37 districts were randomly identified, the researcher than personally checked the name list of the registered women entrepreneurs and personally visited the business location of the selected name to seek their cooperation in giving interview to assess the information about how they set up their enterprise, and the problem they faced while managing, and future expectation then nine districts were being selected for the survey of the women entrepreneurs since the name of women entrepreneur who were readily agreed are from these nine districts, four districts from Manipur and five from Assam. Women having their sales outlets at fairs or similar gatherings were the other source for listing the samples of women entrepreneurs. Selected ones were further added to the lists which come under these selected nine districts.

**Stage 2: standardizing the interview schedule developed.**
An interview schedule was developed to elicit information on the Profile of Women Entrepreneurs of the North East Region of India: A Comparative Study of Manipur and Assam.
This schedule was standardized after consultation with women entrepreneurs, entrepreneurial venture experts, commerce department and Economic department in the University of Manipur. Their inputs were incorporated into the schedule developed and the tool finalized.

**Stage 3: Selection of place to carry out the intervention program**

The selection of women to carry out the intervention program was done through purposive random sampling. Purposive random sampling is one, in which the selection of the sample is based on the judgement of the researcher as to which subjects best fit the criteria of the study.

For selecting the place which would be conducive to conducting the experimental design, the researcher set certain norms. They were logistic convenience, whole hearted co-operation from women/program officer, medium of instruction and similarities in the type of language they speak.

Imphal-west from Manipur state was short-listed for the experimental study. Unfortunately due to law and order problems and insurgencies problems, intervention program was limited only to Imphal-west, Manipur
Stage 4: Selection of Participants (women) to participate in the intervention program.

Purposive sampling was used to identify the participants for the intervention program.

Voluntary participation of the respondents was the criteria for selecting the samples for the program as researcher opined that voluntary participation would yield results than captive participation. Out of 120 women who had applied for the EDPs program organized by MSME development institute, Imphal-West, 80 women who had not participated in the program was purposively selected. They were personally contacted and motivated to attend the intervention program, 60 women indicated their willingness to participate in the intervention program.
Population & Sampling

SAMPLING (RESPONDENTS)

572

SELECTION OF PLACE 2 (STATES) - 9 (DISTRICTS)

MANIPUR 4 (DISTRICTS)

BASHNUPUR (18)

IMPHAL-WEST (137)

IMPHAL-EAST (68)

THOUBA L (31)

ASSAM 5 (DISTRICTS)

DHEMAJI (52)

KAMRUP (116)

JORHAT (14)

LAKHIMPUR (14)

TINSUKIA (2)
IX. Construction of measuring instrument:
Two tools were developed (in English) for the study

Tool 1: Women entrepreneur survey interview schedule:
A self designed questionnaire was developed by the researcher to elicit profiles of women entrepreneurs of northeast region of India (Manipur and Assam). After an extensive review of related literature 100 statements were shortlisted for developing the interview schedules. These short listed statement were given to subject expects for scrutiny and review. The statement for scrutiny and review were presented in the following format to the subject experts.

<table>
<thead>
<tr>
<th>Statements</th>
<th>To be retained</th>
<th>To be modified</th>
<th>To be deleted</th>
</tr>
</thead>
</table>

Following the review by the subject experts' 65 statement were finally shortlisted for the survey of women entrepreneur’s. The final statements shortlisted had both open ended and close ended questions.
The finalized women entrepreneur survey schedule assessed the women entrepreneurs for the following dimensions.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Number of Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Background information</td>
<td>9 Statements</td>
</tr>
<tr>
<td>2</td>
<td>Socio Economic Identification</td>
<td>13 Statements</td>
</tr>
<tr>
<td>3</td>
<td>Business Unit Identification</td>
<td>27 Statements</td>
</tr>
<tr>
<td>4</td>
<td>Attitude Towards Business Unit</td>
<td>7 Statements</td>
</tr>
<tr>
<td>5</td>
<td>Problems and outcome of the Business Unit</td>
<td>7 Statements</td>
</tr>
<tr>
<td>6</td>
<td>Expansion of Business Unit</td>
<td>2 Statements</td>
</tr>
</tbody>
</table>

**Tool 2: Intervention Program (EDPs)**

A self designed interview schedule was developed by the researcher to elicit information on the impact of EDPs training program to women entrepreneur. After an extensive review of related literature 50 statements were shortlisted for developing the interview schedules. These short listed statement were given to subject expects for scrutiny and review. The statement for scrutiny and review were presented in the following format to the subject experts.
Following the review by the subject experts' 18 statements were finally shortlisted for the survey of women entrepreneurs. The final statements shortlisted had both open-ended and close-ended questions.

The finalized intervention program schedule assessed the women entrepreneurs for the following dimensions.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Generation Information</td>
<td>4 Statements</td>
</tr>
<tr>
<td>2</td>
<td>Socio-Economic Information</td>
<td>4 Statements</td>
</tr>
<tr>
<td>3</td>
<td>Knowledge on Entrepreneurship</td>
<td>4 Statements</td>
</tr>
<tr>
<td>4</td>
<td>Attitude Towards EDPs</td>
<td>4 statements</td>
</tr>
</tbody>
</table>
X. **Designing and developing modules for intervention:**

**EDPs-PROGRAM SCHEDULE FOR 15 DAYS**

Date: 2\textsuperscript{nd} February 2011 to 16\textsuperscript{th} February 2011

**Core Content of Modules**

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Topic</th>
<th>Resource person</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/2/2011</td>
<td>S1 to S3</td>
<td>Registration of the candidate Program inauguration</td>
<td>MSME Members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expectation from trainees</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aim and objectives of EDPs</td>
<td></td>
</tr>
<tr>
<td>3/2/2011</td>
<td>S1 to S3</td>
<td>Achievement motivation (Empowerment) training</td>
<td>MIDC/AMFA</td>
</tr>
<tr>
<td>4/2/2011</td>
<td>S1 to S3</td>
<td>Project Ideas-Step in Starting Industries</td>
<td>MIDC/AMFA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Block making</td>
<td></td>
</tr>
<tr>
<td>5/2/2011</td>
<td>S1 to S3</td>
<td>Role of DIC and Schemes</td>
<td>DIC Official(S. Birendra Singh)</td>
</tr>
<tr>
<td>6/2/2011</td>
<td></td>
<td><strong>Sunday Holiday</strong></td>
<td><strong>Sunday</strong></td>
</tr>
<tr>
<td>7/2/2011</td>
<td>S1 to S3</td>
<td>Interaction with bank, Role of National Small Industries Corporation(NSIC)</td>
<td>From SBI, NSIC</td>
</tr>
<tr>
<td>8/2/2011</td>
<td>S1 to S3</td>
<td>Costing and Pricing</td>
<td>MSME Official(Ng maniroton Singh)</td>
</tr>
<tr>
<td>9/2/2011</td>
<td>S1 to S3</td>
<td>Marketing Techniques &amp; Selling Skills</td>
<td>Haridas Sharma) MSME Official</td>
</tr>
<tr>
<td>Date</td>
<td>Group</td>
<td>Activity Description</td>
<td>Instructor</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>10/2/2011</td>
<td>S1 to S3</td>
<td>How to prepare mix vegetable pickle / selection of vegetables and Preparation</td>
<td>AFST (I)/Food technologist.(Shamungao Singh)</td>
</tr>
<tr>
<td>11/2/2011</td>
<td>S1 to S3</td>
<td>Preparation of fruit jam/jelly and dry fruit pickle</td>
<td>AFST(I)/Food technologist(Sanjaoba Singh)</td>
</tr>
<tr>
<td>12/2/2011</td>
<td>S1 to S3</td>
<td>How to prepare Amla candy and finger candy</td>
<td>AFST(I)/Food technologist (Tonjao Singh)</td>
</tr>
<tr>
<td>13/2/2011</td>
<td></td>
<td>Sunday Holiday</td>
<td>Sunday</td>
</tr>
<tr>
<td>14/2/2011</td>
<td>S1 to S3</td>
<td>Method of packaging for various products, Project Report Preparation</td>
<td>MSME Official(Haridas Sharma)</td>
</tr>
<tr>
<td>15/2/2011</td>
<td>S1 to S2</td>
<td>Exposure (Industrial) Visit/Analysis of Exposure Visits</td>
<td></td>
</tr>
<tr>
<td>16/2/2011</td>
<td>S1 to S2</td>
<td>Achievement motivation /Feed backs for training programmed</td>
<td>MSME-Official (Ng Maniroton Singh)</td>
</tr>
<tr>
<td></td>
<td>S1 to S3</td>
<td>Valedictory Function</td>
<td></td>
</tr>
</tbody>
</table>
Data collection:

Data collection for the present study was carried out in three phases.
Phase 1- Survey of women entrepreneurs
Initially 37 districts were identified altogether from Assam and Manipur. From these 37 districts shortlisted, 9 districts (4-Manipur, 5-Assam) were randomly picked according to the women entrepreneur population identified in these 9 districts. Thus 4 districts namely Imphal-West, Imphal-East, Thoubal and Bishnupur from Manipur and 5 districts namely Dhemaji, Jorhat, Kamrup, Tinsukia and Lakhimpur were identified for data collection (Refer sample Selection-Stage). The researcher personally approached the women who had their business enterprise in these districts to obtain their consent to carry out the survey using the interview schedule developed in phase-2. The researcher initially established good rapport with women entrepreneur identified for the present study by talking to them about the purpose of the survey and the need for such data collection. The developed schedule to elicit profiles of women entrepreneurs of northeast region of India (Manipur and Assam) was used while taking their interview. Interview was done each day according to the availability of the women. Since the women were spread in different districts of Manipur and Assam, the data collection proceed till 5 month.

Phase 2- Pre-test Data Collection
In the pre-test phase of data collection, the tools development during “construction of measuring instrument” were used to interview of the women identified to participate in the intervention program. Interview was taken at the residence of women in a quiet room to collect the required data.
The participants were assured that there were no rights or wrong answers. They were informed that there was no time limit to answer the interview schedule.

**Phase 3- post test data collection.**
The post test data was collected at the end of the intervention which was after a break of one month. The same tools and procedure followed in pre-test phase was used to elicit information on the impact of the EDPs from the participants who attended the intervention program.

**Phase-4-Implementation of the Intervention program**
60 women who had applied for EDPs program organized by the researcher with the assistance from MSME Development institute, who volunteered to participate in the intervention program were identified for the study. During the introductory interaction, the outline of the proposed research study and program schedule was communicated to the women participants. They were enthusiastic to get information about the benefit given by EDPs. All the doubts were addresses by the researcher at the start of intervention program. The program was designed to be offered for 15 days daily for one and half hours per session. Considering the needs and expectation of the participant, various experts (referred core content of modules) from the different field were invited to provide information and training. Lectures were given by the expert of the specific subjects according to the modules of the EDPs. During each session, lectures were given to encourage and motivate women, awareness regarding the importance
and scope of self employment was highlighted. Assistance and facilities provided by the government to promote self employment were explain in detail to the participant. With the exposure of the industrial visit the participant were more aware of new technology, facilities and information of handling the machinery for running their enterprise. Skill development program was added in order to attract the participant and also to increase their interest for EDPs. Expert from food technologist (ASFT(I)) demonstrating various items which can be store and prepared for domestic used and which can used for setting up business ventures within their home of the participant. Preparation of mixed vegetable pickle, selection of vegetable, preparation of amla candy, ginger candy, jam & jelly, and dry pickle which are popular locally and more demanding in the local area was done in the program.

In the last session, the valedictory program was organized by the members of the MSME development institute. The program was addressed by Assistant director Mrs Ng. Manirotton who was the program officer for EDPs. Along with participation certificates which were given from MSME development Institute, thank-you gifts were distributed by researcher to women who participated in the intervention program.

In order to find out the impact of intervention program the participant were contacted after a break of one month. While taking their personal interview it was found that they were more motivated and confident to start up their enterprise. Earlier they were hesitant to start the enterprise since they were not aware of facilities available which are
provided by the government. From this study it can be concluded that education and training encourage more women to start an enterprise. EDP is essential to motivate and build confidence in women to be a successful entrepreneur.

XII. Data reduction analysis and interpretation:

Statistical Methods: Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. The following assumption on data is made, Assumptions: 1. Dependent variables should be normally distributed, 2. Samples drawn from the population should be random, Cases of the samples should be independent

Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients, Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (intergroup analysis) on metric parameters. Leven1s test for homogeneity of variance has been performed to assess the homogeneity of variance. Chi-square/Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. Pearson correlation between the different dimensions of profile of women entrepreneurs between two states (Manipur and Assam).
1. **Analysis of Variance: F test for K Population means**

Objective: To test the hypothesis that K samples from K Populations with the same mean.

The mathematical model that describes the relationship between the response and treatment for the one-way ANOVA is given by

\[ Y_{ij} = \mu + \tau_i + \varepsilon_{ij} \]

Where \( Y_{ij} \) represents the \( j \)-th observation \((j = 1, 2 \ldots n_i)\) on the \( i \)-th treatment \((i = 1, 2 \ldots k \text{ levels})\)

Limitations: It is assumed that populations are normally distributed and have equal variance. It is also assumed that samples are independent of each other.

Method. Let the \( j \)-th sample contain \( n_j \) elements \((j=1, 2\ldots K)\). Then the total number of elements is

\[
N = \sum n_j \quad x_{.j} = \sum \frac{x_{ij}}{n_j}
\]

\[
S_1^2 = \frac{\sum_{i=1}^{n_1} (x_{1i} - \overline{x_{.j}})^2}{N - K} \quad S_2^2 = \frac{\sum_{i=1}^{n_1} n_j (\overline{x_{.j}} - \overline{x_{..}})^2}{K - 1}
\]

\[
F = \frac{S_2^2}{S_1^2} \quad \text{which follows F distribution (K-1, N-K)}
\]
2. Student t test (Two tailed, independent)

Assumptions: Subjects are randomly assigned to one of two groups. The distributions of the means being compared are normal with equal variances.

Test: The hypotheses for the comparison of two independent groups are:

H₀: \( u_1 = u_2 \) (means of the two groups are equal)

Hₐ: \( u_1 \neq u_2 \) (means of the two group are not equal)

The test statistic for is \( t \), with \( n_1 + n_2 - 2 \) degrees of freedom, where \( n_1 \) and \( n_2 \) are the sample sizes for groups 1 and 2. A low p-value for this test (less than 0.05 for example) means that there is evidence to reject the null hypothesis in favor of the alternative hypothesis. Or, there is evidence that the differences in the two means are statistically significant. The test statistic is as follows
t-Test: Two-Sample Assuming Equal Variances

\[
S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}
\]

In all work with two-sample t-test the degrees of freedom or df is:

\[df = n_1 + n_2 - 2\]

The formula for the two sample t-test is:

\[
T = \frac{\overline{X} - \overline{Y}}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

Pre-test: Test for variance assumption: A test of the equality of variance is used to test the assumption of equal variances. The test statistic is F with \(n_1-1\) and \(n_2-1\) degrees of freedom.

**t-Test: Two-Sample Assuming Unequal Variances**

\[
T = \frac{\overline{X} - \overline{Y}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}
\]

Note in this case the Degree of Freedom is measured by

\[
df^* = \frac{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)^2}{\left(\frac{S_1^2}{n_1}\right)^2 \frac{1}{n_1-1} + \left(\frac{S_2^2}{n_2}\right)^2 \frac{1}{n_2-1}}
\]

and round up to integer.
Results of the t-test: If the p-value associated with the t-test is small (< 0.05), there is evidence to reject the null hypothesis in favor of the alternative. In other words, there is evidence that the means are significantly different at the significance level reported by the p-value. If the p-value associated with the t-test is not small (> 0.05), there is not enough evidence to reject the null hypothesis, and you conclude that there is evidence that the means are not different.

3. Chi-Square Test
The chi-square test for independence is used to determine the relationship between two variables of a sample. In this context independence means that the two factors are not related. In the chi-square test for independence the degree of freedom is equal to the number of columns in the table minus one multiplied by the number of rows in the table minus one

\[ \chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \], Where O_i is observed frequency and E_i is Expected frequency

With (n-1) df

The Assumptions of Chi-square test

The chi square test, when used with the standard approximation that a chi-square distribution is applicable, has the following assumptions:

- Random sample – A random sampling of the data from a fixed distribution or population.
• Sample size (whole table) – A sample with a sufficiently large size is assumed. If a chi square test is conducted on a sample with a smaller size, then the chi square test will yield an inaccurate inference. The researcher, by using chi square test on small samples, might end up committing a Type II error.

• Expected Cell Count – Adequate expected cell counts. Some require 5 or more, and others require 10 or more. A common rule is 5 or more in all cells of a 2-by-2 table, and 5 or more in 80% of cells in larger tables, but no cells with zero expected count. When this assumption is not met, Fisher Exact test or Yates' correction is applied.

4. Mean Formula

\[ \bar{X} = \frac{\Sigma x f}{\Sigma f} \]

Where

\( X = X \text{ bar is the mean} \)

\( x = \text{midpoint value} \)

\( f = \text{frequency} \)

\( \Sigma f = \text{total number of frequency} \)

Standard Deviation

\[ S = \sqrt{\frac{\Sigma (x - \bar{x})^2 f}{n}} \]
Where

\[ x = \text{midpoint value} \]
\[ X = \bar{X} \text{ is the mean value} \]
\[ f = \text{frequency} \]
\[ n = \text{total number of frequency} \]

5. **Pearson correlation and t-test of a correlation coefficient**

Objective: To investigate whether the difference between the sample correlation co-efficient and zero is statistically significant.

Limitations: It is assumed that the x & y values originates from a bivariate normal distribution and that relationship is linear. To test an assumed value of population co-efficient other than zero, refer to the Z-test for a correlation co-efficient.

\[
r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - x)^2 \sum (y - y)^2}}
\]

Spearman Correlation Co-efficient

\[
rs=1- t = \frac{r\sqrt{(n-2)}}{\sqrt{1-r^2}}
\]

is calculated and follows student t distribution with \(n-2\) degrees of freedom
6. **Classification of Correlation Co-efficient (r )**

Up to 0.1 Trivial Correlations
0.1-0.3 Small Correlation
0.3-0.5 Moderate Correlation
0.5-0.7 Large Correlation
0.7-0.9 V. Large Correlation
0.9- 1.0 Nearly Perfect correlation
1. Perfect correlation

7. **Significant figures**

+ Suggestive significance (P value: 0.05<P<0.10)
* Moderately significant ( P value:0.01<P ≤ 0.05)
** Strongly significant (P value : P≤0.01)

**Statistical software:** The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1 ,Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.