CHAPTER III
METHODOLOGY

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CHAPTER - III

METHODOLOGY

The validity and dependability of any research work is judged on the basis of the soundness and scientificness of its methodology. Therefore, the next step is to chalk out a suitable methodology to seek a scientific solution to the research problems through verification of its hypotheses. In the present research work, following methodological steps have been taken to obtain the empirical evidences in favour or against the problems and hypotheses stated in chapter II.

3.1 RESEARCH DESIGN :-

Research design is the plan and structure of investigation so conceived as to obtain answers to research problems (Kerlinger, 1986). It enables the researcher to arrive at as valid, objective, accurate and economic solution of a research worthy problem through empirical verification of its related hypotheses by way of collecting the ‘disciplined data’. In this sense, it has been technically referred as a mechanism of controlling variances through the
principle of "Max-Con-Min". "Max" part of this principle guides the researchers to go for maximization of the systematic or experimental variance by way of varying independent variable to such levels that the variations stand too apart from each other and the various experimental conditions could be as different as possible. "Con" refers to control over all such extraneous variables that would presumably influence the dependent variable. "Min" part stands for the minimization of error variance. Error variances are produced from those factors which are beyond manipulative control of the researcher. The best way to minimize these error variances is to execute the proper control over the independent and extraneous variables and to use objective and reliable measures in the investigation.

A 2 x 2 x 2 factorial design was thought to be best suited as the independent variables, viz., career status of couples, shift working and type of organization were to be varied at two levels in order to study their main and interactional effects of two factors and three factors on dependent variable, viz., occupational stress. Therefore, a \( (2)^3 \) factorial design was employed to verify the
relationship between occupational stress and aforesaid independent variables or factors.

In the present investigation it was felt necessary to control certain extraneous variables, e.g. in dual career couples viz., wives and husbands, both the partners are employed, the status of employment is almost the same. In single career couples only husbands are employed and wives are housewives. They are neither in government nor in private jobs. Education was also identified as a potential extraneous variable that may influence the level of occupational stress. Therefore, variance attributed to the factor ‘educational level’ was eliminated by holding the educational level of all the supervisors and their spouses constant. All of them are graduates or above. The remaining possible factors were kept under control through the process of randomization.

The investigation undertaken was of “ex post facto” in nature because the independent variables, viz., career status, shift working and type of organization were beyond purposive manipulation of the investigator and the values of career status, shift working and type of organization were manipulated through selection procedure,
not directly. Since, the level of each independent variables are fixed before conducting the investigation, the investigator is interested only to find out the effect of a particular fixed value of the independent variables or factors. That is why, it is referred as fixed model in which the levels of factors are arbitrarily selected by the investigator who wished to generalize only these specific levels of the factors.

**FACTORIAL DESIGN pqr - 2x2x2 TYPE**

- **A - Type of Organization**
  - $a_1$ - Public sector organization
  - $a_2$ - Private sector organization

- **B - Career status of couples**
  - $b_1$ - Single career couples
  - $b_2$ - Dual career couples

- **C - Shift working**
  - $c_1$ - Day work
  - $c_2$ - Shift work

$p$ levels of $A$, where $p = 2$ (or $a_1$, $a_2$)
$q$ levels of $B$, where $q = 2$ (or $b_1$, $b_2$)
$r$ levels of $C$, where $r = 2$ (or $c_1$, $c_2$)
Fig. No. 3.1 (a)

BLOCK DIAGRAM OF pqr (2x2x2) FACTORIAL DESIGN

<table>
<thead>
<tr>
<th>A</th>
<th>Type of Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a₁) - Public sector organization</td>
<td></td>
</tr>
<tr>
<td>(a₂) - Private sector organization</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Career status of couples</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b₁) - Single career couples</td>
<td></td>
</tr>
<tr>
<td>(b₂) - Dual career couples</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>Shift working</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c₁) - Day work</td>
<td></td>
</tr>
<tr>
<td>(c₂) - Shift work</td>
<td></td>
</tr>
</tbody>
</table>

Groups/Strata/Treatment combinations = 2 x 2 x 2 = 8

<table>
<thead>
<tr>
<th>a₁b₁c₁</th>
<th>a₁b₂c₁</th>
<th>a₂b₁c₁</th>
<th>a₂b₂c₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>a₁b₁c₂</td>
<td>a₁b₂c₂</td>
<td>a₂b₁c₂</td>
<td>a₂b₂c₂</td>
</tr>
</tbody>
</table>

No. of Ss in each stratum = 60
Total No. of subjects = 8 x 60 = 480
A SCHEMATIC DIAGRAM OF 2x2x2 FACTORIAL DESIGN

Fig. No. - 3.1 (b)
3.2 UNIVERSE AND SAMPLE :-

Universe means all the number of any well defined class of people, events or objects. Thus, the whole group from which the sample has been drawn, is termed as universe or population. Because of its large size, it is either impossible or impractical for investigators to produce statistics based on all members of the universe. Therefore, it seems necessary to select a representative sample for estimating population characteristics, so that, generalization of inferences can be scientifically made. Goode and Hatt (1952) has pointed out the two main basic characteristics of a good research sample. These are representativeness and adequacy. Representativeness of a sample means that it must include all such possible characteristics of the population that divide it into mutually exclusive segments. Adequacy of the sample refers to its size. An adequate sample is one that ensures reliable results to whatever may be its size. Thus, in the present study stratified random sampling technique, based on probability principles is used to select an unbiased representative sample from the universe. To have homogenous and unbiased sample, in the present study the sample
has been drawn from the supervisors from one public sector organization, i.e., Bhilai Steel Plant, Bhilai (Chhattisgarh) and one private sector steel plant, i.e., Jindal Steel Factory, Raigarh, Chhattisgarh within the age range of 30 to 50 years.

A stratified random sampling is that sample plan in which the researcher randomly takes subjects in his sample according to some known or specific characteristics of the population. In this method, the universe is divided into various homogenous subclass or strata according to one or more specific characteristics of the population. Each stratum consists of the members who are very much alike or homogenous. In the present study, the population of supervisors is split into a number of categories on the basis of three specific characteristics-

1. Type of organization - Public sector vs Private sector organization
2. Career status of couples - Single vs Dual career couples
3. Shift working - Day work vs Shift work

This type of stratification is known as complex stratification.

Thus, in this study we have 2x2x2 or 8 strata as mentioned below-

The male supervisors who are -

(1) Employed in public sector organization, having single career status and work in day time only.
(2) Employed in public sector organization, having single career status and work in shifts.

(3) Employed in public sector organization, having dual career status and work in day time only.

(4) Employed in public sector organization, having dual career status and work in shifts.

(5) Employed in private sector organization, having single career status, work in day time only.

(6) Employed in private sector organization, having single career and work in shifts.

(7) Employed in private sector organization, having dual career couples and work in day time only.

(8) Employed in private sector organization, having dual career status and work in shifts.

A list of all supervisors of all categories is prepared and each one is assigned only to one stratum. Then after, a random sample of the supervisors within each stratum is drawn. That is why this type of sampling is known as stratified random sampling.
Hence, stratified random sampling is reckoned suitable and more advantageous over simple random sampling because its each stratum is homogenous which admits small variations within it. Therefore, a small sample within each stratum is very likely to be a representative of that subclass within the population. Thus, the total sample of a much smaller size would then represent the entire population which reduces the cost of study. Furthermore, the stratification of the population is likely to produce more precision than simple random sampling but requires a more thorough and detailed knowledge of the population for the stratification to be successful (Mohsin, 1984).

In the present study each factor is to be varied at two levels. In case of type of organization, two types of organization, viz., private and public sector organization were taken. Career status was varied to two levels, i.e., (1) the supervisors who are male partner of the single career couples and (2) the supervisors who are the male partner of the dual career couples and shift working i.e., (1) the supervisors who work in shifts and (2) the supervisors who are day workers.
Thus in a 2x2x2 factorial design having at least 60 adult subjects in each cell, a total number of 480 subjects were randomly drawn following the stratified random sampling technique. The particulars of the finally selected sample is shown in Table No. 3.3.
### Table No. 3.2
PARTICULARS OF THE SAMPLE

<table>
<thead>
<tr>
<th>Groups</th>
<th>Public Sector Organization</th>
<th></th>
<th>Private Sector Organization</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day Workers</td>
<td>Shift Workers</td>
<td>Day Workers</td>
<td>Shift Workers</td>
<td></td>
</tr>
<tr>
<td>Single Career Couples</td>
<td>(S₁)</td>
<td>(S₂)</td>
<td>(S₃)</td>
<td>(S₄)</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Dual Career Couples</td>
<td>(S₅)</td>
<td>(S₆)</td>
<td>(S₇)</td>
<td>(S₈)</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>480</td>
</tr>
</tbody>
</table>

N = 480, n=60
3.3 **TOOLS** :-

**DEPENDENT MEASURE :-**

**Occupational Stress Index (OSI) :-**

To measure the dependent variable i.e. occupational stress, the Occupational Stress Index (OSI) constructed and standardized by Shrivastava and Singh (1984) was used. The tools purports to measure the extent of stress which employee perceive arising from various constituents and conditions of their job. The tool may conveniently be administered to the employees of every levels operating in context to industries and other non-productional organization. The scale consists of 46 items each to be rated on the five point scale, out of 46 items 28 are ‘True keyed’ and rest 18 are ‘False keyed’. The items related to almost all relevant components of job life which cause stress in some way or the other, such as, role over load, role ambiguity, role conflict, group and political pressure, responsibility for persons under participation and powerlessness, poor peer relations, intrinsic impoverishment, low status, strenuous working conditions and unprofitability.
The reliability index ascertained by split half (odd-even) method and Cronbach's alpha coefficient for the scale were found to be 0.935 and 0.90 respectively. The reliability indices at the 12 sub scales were also computed on the (split half) method.

The convergent validity coefficient of the scale have been reported to be firmly high.
3.5 PROCEDURE :-

After explaining the objectives of the research work, permission was obtained from the Managing Director of Jindal Steel Plant and Bhilai Steel Plant to administer the occupational stress index on the supervisors included in the sample. After establishing a good rapport with the subjects they were assured that their responses and their identities will be kept under strict confidence and will not be disclosed anywhere. Thus, they are free to give their answers comfortably and honestly whatever they felt. In this way, Ss were encouraged to give their proper co-operation during the testing.

To get a final sample of at least 60 subjects in each cell of a 8 cell 2 x 2 x 2 factorial design, stratified random sampling was made. From an initial sample of 2476 supervisors (1220 from Jindal Steel Plant and 1246 Ss from Bhilai Steel Plant), in all 480 Ss were randomly selected on the basis of three specific criteria: (i) Type of organization, (ii) Career status and (iii) Shift working.
Finally identified 480 Ss were subjected to Occupational Stress Index constructed and standardized by Singh and Srivastava (1984) to assess the occupational stress index of the subjects.

At a time 10 subjects in a group are asked to sit comfortably in a quiet and calm laboratory like situation. After establishing rapport following instructions were given to each of the groups.

"In this questionnaire, the items are related to your work environment activities. Next to each statement five alternative answers are written, choose which best describes how frequently you behave or act that way. Please give the first response which comes to your mind and do not omit any question. Please feel free to give your response, your response will be kept confidential.

After giving the instructions to each group Ss were asked to give their response on any one option by putting a (√) mark before every statement. Thus, for all 46 items, Ss responses are obtained. Generally each group took 30-35 minutes to complete the test.
After completing the test, the responses of all 480 cases on Occupational Stress Index (OSI) were put for scoring as prescribed by the author of the questionnaire. Thus, the total scores of each 480 cases were separately computed on OSI and put to statistical treatment.