RESEARCH METHODOLOGY
CHAPTER – III

RESEARCH METHODOLOGY

Broadly speaking, research includes gathering of any data, information and facts for the advancement of knowledge. Research is a “careful investigation or inquiry especially through search for new facts in any branch of knowledge”\(^{202}\). Clifford woody said research comprises of defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last testing the conclusions to determine whether they fit into the formulating hypothesis. Research is an original contribution to the existing stock of knowledge making for its advancements. Research also provides the basis for government policies of economic system and there by solving social problems. Research methodology is a way of systematically solving the problems through research.

In this chapter the research methodology used for the study is explained. It includes the research design, construction of questionnaire, QWL model, sample design and appropriate tools and techniques used for analysis. In this study a conceptual model was designed based on various dimensions of the Quality of Work Life and its impact on nurses. The respondents were asked for subjective assessments of their working condition using a Likert’s five point scale of agreement and disagreement.

3.1 RESEARCH DESIGN

“A research design is the arrangement of conditions for collection and analysis of data in a manner which aims to combine relevance to the research purpose with economy in procedure”\(^{203}\)

The researcher has adopted the descriptive design for this study. It has been used for analyzing the Quality of Work Life which exists in the industry. Descriptive study is a research study that describes the characteristics of any individual or of groups. Here it describes the characteristics in terms of the various dimensions of

\(^{202}\) The advanced learner ‘s dictionary of current English, oxford, 1952,p.1069

\(^{203}\) Claire seltiz et al (1962) “research methods in social sciences” p.50
Quality of Work Life of nurses. The descriptive study is used to describe the characteristics of Nurses in Hospitals, Nurses’ perceptions about Life quality, work quality dimensions and their relationship with QWL, perceived QWL and its impact on nurses’ performances.

3.2 STUDY AREA

The study was conducted in Madurai and Dindigul districts. There are about 532 hospitals in Madurai and Dindigul districts and they are detailed below:

Table No: 3.1 List of Hospitals in Madurai and Dindigul Districts

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Type of Hospitals</th>
<th>Number(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Medical College Hospital - Madurai</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Taluk Government hospitals</td>
<td>39</td>
</tr>
<tr>
<td>3.</td>
<td>Primary health centers</td>
<td>91</td>
</tr>
<tr>
<td>4.</td>
<td>Private hospitals and Nursing Homes</td>
<td>401</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>532</td>
</tr>
</tbody>
</table>

Source: DPH, Chennai

3.2.1 MADURAI DISTRICT

Madurai district is one of the important districts of the Tamil Nadu state. This district has 13 blocks. The total land area of the district is 3,696 sq.km. As per 2001 census, population of Madurai district is about 26 lakhs and it constitutes four percent of the population of the TamilNadu. The sex ratio of the district is 978 females for 1000 population. According to 2001 census, the population of is 25.8 lakhs out of which 13.0 lakhs are males and 12.8 lakhs are females. About 56 percent of the population of the district lives in urban areas. The sex distribution of the population shows that 5.7 lakh are males and 5.6 lakh are females in rural. In urban the male and female populations are 7.3 lakh and 7.1 lakh respectively. The proportion of Scheduled caste and Scheduled tribe population is 12.7 percent, 6.9 percent of the urban and 19.7 percent of the rural population belongs to SC/ST.

As on June 2008, Madurai district has 42 primary health centers, One district hospital, five sub divisional hospitals, six first referral units, three mobile medical units ,one CHC, 17 public maternity homes and four other public sector hospitals like
Medical College hospital, ESI and Railway hospitals are also available for medical services.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Type of Hospitals</th>
<th>Number(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Medical college hospital - Madurai</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>District hospital and &amp; Taluk Government hospitals</td>
<td>27</td>
</tr>
<tr>
<td>3.</td>
<td>Primary health centers</td>
<td>42</td>
</tr>
<tr>
<td>4.</td>
<td>Private hospitals and Nursing Homes</td>
<td>298</td>
</tr>
</tbody>
</table>

Source: Tamilnadu government website

3.2.2 DINDIGUL DISTRICT

Dindigul district is bound by Erode, Coimbatore, Karur and Tiruchi districts in the North; Sivaganga and Tiruchi districts in the East; Madurai district in the South and by Theni and Coimbatore districts and Kerala in the West. It is spread over on an area of 6266.64 square km. It comprises three revenue divisions, eight taluks and 14 panchayat unions, According to the 2001 information; its population is 19, 23, 014. It is urbanized as per Census 2001. Dindigul district has a literacy of 69.83% and is below the average in the state.

According to 2001 census, the population of is 19.23 lakhs out of which 9.68 lakhs are males and 9.54 lakhs are females. About 35.01 percent of the population of the district lives in urban areas. The sex distribution of the population shows that 6,29,073 are males and 6,20,689 are females in rural. In urban the male and female populations are 3.39 lakh and 3.34 lakh respectively. The proportion of Scheduled caste and Scheduled tribe population is 15.80 percent, .44 percent of the urban and 21.59 percent and .28 of the rural population belongs to SC/ST.

As on June 2008, Dindigul district has 49 primary health centers, one district hospital, 11 GH and other public sector hospitals like ESI, Railway hospitals are also available.
Table No: 3.3 List of Hospitals in Dindigul district

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Type of Hospitals</th>
<th>Number(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>District hospital</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Taluk Government hospitals</td>
<td>11</td>
</tr>
<tr>
<td>3.</td>
<td>Primary health centers</td>
<td>49</td>
</tr>
<tr>
<td>4.</td>
<td>Private hospitals and Nursing Homes</td>
<td>103</td>
</tr>
</tbody>
</table>

Source: Tamilnadu government website

3.3 CONSTRUCTION OF QUESTIONNAIRE

In this study the researcher used a model to assess the nurses perceived Life Quality, perceived Work Quality, perceived Quality of work life and its impact on hospital services. The respondents are asked for the subjective assessments of their working condition using Likert’s five point scale of agreement and disagreement.


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210 CAN report on quality of work life indicators workshop indicators for nurses in Canada (2002)

69
Due to the composite and multifaceted nature of QWL, the technique of multidimensional attitudinal scaling was adopted. Initially 26 dimensions were chosen for analyzing the concept. In attitude scales the respondent does not describe his/her position on the dimension under consideration; rather he/she expresses his agreement or disagreement with a number of statements relevant to the issue (Wilkinson and Bhandarker, 1979). The researcher derived 26 dimensions in the first step based on the Richard Walton’s (1979) eight factors and after clubbing the overlapping dimensions together he finally arrived at 17 dimensions to construct a conceptual model. Such dimensions derived are further split into indicators in order to make appropriate response statements. These statements most of them with positive polarity and few with negative polarity are framed into a questionnaire which is explained below.

The researcher decided to have 12 dimensions viz., Autonomy, Pay-Pay equity and Reward & recognition, Resource adequacy, Training & Development, Work Load, Coworker, Management and supervisor Relation & Respect at work, Professional Promotion, Job discrimination, Job stress, Job safety, Job satisfaction, Participation in union, Work Life Balance in union to measure the perception regarding the Work Quality, the dimensions of Health and Well being, Self-society-friends and Family support were used to measure the perception regarding the Life Quality.


3.3.1 The final dimensions considered to develop the conceptual model are:

**Work Life Components**: It comprises indicators like Autonomy Innovation and creativity, Control Over Nursing Practice, Pay-Pay Equity, Reward & Recognition, Resource Adequacy, Training & Development, Work Load, Hours of Work, Management, Supervisor and Coworker Relation, Respect at Work, Professional Promotion, Job Discrimination, Job Stress, Job Safety, Job Satisfaction, Participation in Union, Work Life Balance,

**Life Quality Components**: It comprises indicators like Health and Well being, Self Actualization -Society-Friends and Family support,

**Perceived Work Quality, Perceived Life quality, Perceived Quality of work life and…**

**Nurses Performance**: The perceptions about Quality of work life impact on nurses performance

As a basis for measurement, the researcher identified QWL-conditions, comprised of a set of objective indicators revealing the prevailing conditions, policies and practices at work place. This approach allows for the drafting of QWL statements (items) in such a way that they are descriptive of organizational realities leaving little scope for the influence of opinions and affective reactions. Therefore in order to have some degree of objectivity in this subjective measure, QWL – conditions were used as the basis for the construction of the questionnaire. Questions were formulated in such a fashion as to bring out cognition or recall of empirical realities. Therefore, a pool of 118 items (QWL statements) was initially generated for clarifying the meaning of the various above said dimensions.

Responses on the ‘items’ were sought to be recorded on ‘interval mode of measurement’. To mark differences in degree, each statement was followed by a five point disagreement-agreement continuum indicating ‘strongly disagree’ to ‘strongly agree’ status of QWL in the organization. To be more specific a Likert-type summated scale was developed for assessing QWL and attitudinal concepts. This type of scaling technique not only helps in avoiding any kind of confusion among the respondents, but also makes it easier to calculate their total score under a dimension by the simple procedure of addition of the scores of relevant ‘terms’ directly. The
preliminary QWL scale so developed was administered to nurses. Overall, 108 respondents could be persuaded to mark their responses on the instrument. Discussions and interviews were also held with them to elicit their views about the instrument. After careful examinations of the responses and holding deliberations with the knowledgeable people in the field, the final questionnaire was arrived at the following the steps below:

- The Items (statements) that were found to be lengthy, ambiguous and confusing were reformulated to provide clarity and precision.
- Items (statements) that were considered to be contextually less relevant were dropped.
- Items (statements) that were considered as needed were added. As a result, the new version of the instrument carried 132 items (questions).
- 16 more questions were incorporated to collect the data regarding the demographic variables of the respondents.

3.4 TESTING STAGE

This stage involved a detailed investigation of the revised version of instrument. Before the administration of the instrument on the target sample, the 17 dimensions of 132 items are intended to measure QWL, which were shuffled like a pack of cards. As a result, the items changed their original position. The aim was to minimize the chance of respondent’s bias creeping in while marking the responses. Another purpose of this exercise was to facilitate the use of split – half test of reliability.

The questionnaire so prepared was utilized to conduct the pilot study with 108 nurses of Dindigul and Madurai district.
3.4.1 RELIABILITY

Reliability concerns the extent to which any measuring device yield the same results on repeated trials. It is a measure of internal consistency of an instrument and indicates whether variations in the responses (scores) of individuals are due to inconsistencies in the items included in the scale.

Internal consistency of an instrument has two aspects:

- Relationship of an item score across the items; and
- Relationship of an item score across the respondents.

3.4.2 RELATIONSHIP OF ITEM SCORE ACROSS THE ITEMS.

It is necessary that the items are internally consistent not only at the level of entire instrument but also at the level of each dimension of factor for the sample as a whole. Therefore, to make the instrument more rigorous it was subjected to further item analysis.

3.4.3 RELATIONSHIP OF ITEM SCORE ACROSS THE RESPONDENTS

It is vital to assess the adequacy of inter rater agreement, before adding the response of different in individual to construct composite group. Item content in the scale should be clear and precise. Differences in their evaluation should not arise due to the understanding and perception of the meaning differently by different individuals. Perception agreement among respondents must precede aggregation of responses.

“Test reliability indicates the extent to which individual differences in test scores and attributable to chance errors of measurement, and the extent to which they are attributable to true differences in the characteristic under consideration. Every measure of reliability denotes what proportion of the total variance of test scores are error variance” - Anastasi\textsuperscript{218}.

Cronbach\textsuperscript{219} has suggested “coefficient of equivalence” as a designation for this type of reliability. It is based on the equivalence of independently assembled sets.


of items, chosen to sample the same “item universe”. To an extent that each set of items adequately represents such an item universe, Scores on any two sets will agree closely and the reliability co-efficient of the test will be high.

A more widely used approximation to parallel forms reliability is a split half reliability. For this technique a test is split in two to mate two half size versions of the test. If this is done in random fashion, a sort of pseudo-parallel forms is obtained where they are not necessarily parallel items within each cell of the test specification; there is no systematic bias in the way in which items from the two forms are distributed with respect to the specification. The reliability of the whole test is arrived with the Spearman-Brown formula to this correlation:

\[ r_{test} = \frac{2 \times r_{half}}{1 + r_{half}} \]

Where ‘r half’ is the correlation between the two halves of the questionnaire. Reliability was checked by conducting reliability analysis both at the level of the entire QWL scale and at the level of each dimension of the scale. Reliability of the entire scale was estimated by the researcher with the help of a popular method called Gutman Split-half method involving the use of Gutman Split-half test and Spearman-Brown Prophecy Formula. The values of co-efficient derived from these tests were found to be sufficiently high.

\[ r_{xy} = 0.918 \] i.e The questionnaire is found to be 91.8 % reliable.

### 3.4.4 VALIDITY OF THE INSTRUMENT

Validity of the scale implies the extent to which the construct (empirical indicators) reflects and measures the underlying concept successfully. A measuring device is in general valid if it does (measures) what it is intended to do (to measure). This calls for the critical examination of the content, i.e., items and factors (dimensions) chosen for the construction of the scale. Content validity depends on the extent to which an empirical measurement reflects specific domain of content relating to the concept. Determining the content validity requires knowing the relevance and rationale of various dimensions (factors) and their representative statements (items) in scale. There are two main aspects of content validity one is the face validity and the other is the sampling validity. On the face of it the instrument developed here appears to be representing the concept of QWL. Various dimension and items constituting the
scale have a sufficient literature support. These also have the approval of co-researchers and the respondents. Many of these dimensions have already been used by researchers in the Indian context (Kalra and Ghosh, 1984; Srinivas, 1994; Gani and Ahmed, 1995). Construction of the items (QWL statements) in the scale is based on the work done by Cacioppe and Mock, 1984 and Camman et.al, (1983). Sampling validity, the other aspect of content validity, also seems to be there in ample measure in the instrument. Sampling validity requires the researcher to become acquainted with all the items that are known to the content population of a concept (Nachimias and Nachimias, 1976). It is impossible to specify exactly how many items need to be developed for any particular content population. However, it is always preferable to construct too many items rather than too few (Carmine and Zeller, 1979) this is so because dimensions and items which are not relevant can always be eliminated later on. Therefore, as mentioned earlier, 17 dimensions consisting of 132 items were chosen for testing after a careful analysis of a pool of 26 dimensions and 118 items generated initially at the pre-testing stage. Adequate care was taken by the researcher to ensure the face validity, criterion related validity and predictive validity in the instrument.

The questionnaire so developed was circulated among nursing superintendents, matterens, staff nurses and HR executives of various hospitals and the content validity was confirmed before designing the final scale. The scale developed in this manner was subjected to further analysis to know whether an item indeed captures the factor (dimension) under which it has been included (i.e, item validity); and if a dimension really belongs to the concept of QWL (i.e, dimension validity)

**3.5 FINAL SCALE**

After excluding the items lacking in reliability and validity and hence, responsible for negative co-efficient, the final version of the scale comprised 132 items representing 17 different dimensions of QWL. The main aim of this exercise was to secure contextually relevance and allow least scope for the influence of individual opinions, biases and subjective evaluations in the process of measurement of the dimension under consideration. Treating the concept as an attitude at cognitive level, this purpose was achieved by taking QWL conditions as the basis for
developing the scale. The Indicators factored into the scale after carrying out in depth analysis based on extensive review of literature and responses obtained at the pilot testing stage the researcher includes more number of scales that suggests employee concern for a wide range of issues encompassing job context, life context (financial and non-financial), job content and relational factors in the work life.

3.6 SAMPLING DESIGN

3.6.1 SAMPLING METHOD

Two stage cluster sampling method was applied for selection of respondents. Out of 532 hospitals in Dindigul and Madurai Districts 54 hospitals were selected and 610 nurses were selected from these 54 hospitals located in various areas of Dindigul and Madurai Districts. The total population was divided in to two major clusters as Madurai and Dindigul Districts.

From Madurai district 4 Government hospitals, 10 PHC and 10 private hospitals were selected at random in the first stage. Then from selected hospitals 285 sample units were selected by simple random sampling method. From Dindigul district 4 Government hospitals, 10 PHC and 16 private hospitals were selected at random in the first stage. Then from selected hospitals 325 sample units were selected by simple random sampling method.

3.6.2 SAMPLING FRAME

The list of hospitals in Dindigul and Madurai Districts are obtained from the office of Deputy Directorate of Public Health, Dindigul and Madurai Districts.

3.6.3 SAMPLING UNIT

A nursing professional working in hospital.

3.6.4 SAMPLE SIZE

For the purpose of study, a sample size of 610 nurses were selected.

3.6.5 PERIOD OF THE STUDY

The period of the study was 2008 -2011
3.6.6 PERIOD OF DATA COLLECTION

The data was collected from the nurses of Madurai and Dindigul districts during the period of November 2010 – April 2011.

3.7 FRAME WORK OF THE ANALYSIS

3.7.1 SOURCES OF THE DATA

The study was based on both Primary and secondary sources. Primary data was collected from 610 respondents. The interview and informal talks with the official and experts formed primary sources of information. Books, journals, newspapers, published and unpublished M.Phil, Ph.D dissertations and thesis, government publications, notifications, records of Directorate of Public Health and Preventive Medicine (DPHPM) and Directorate Medical Sciences (DMS) formed the secondary sources of information.

3.7.2 DATA COLLECTION TOOL

For collecting the primary data, a field survey was conducted with the help of a questionnaire. Primary data were collected by the researcher himself from the hospitals. Also the researcher had informal discussions with the Nurses, Head Nurses, Matron and Nursing Superintends for obtaining the necessary basic data. The secondary data was collected from the books, magazines and from related websites.

3.7.3 PILOT STUDY

A pilot study was conducted with 108 respondents. Then the questionnaire was restructured and the irrelevant questions were removed.

3.7.4 PROCESSING OF DATA

The respondents were asked to tick mark the chosen option in the statements of the questionnaire. In order to convert the responses into objective measure, scores were assigned to each option based on its polarity or level of agreement and the scores were summarized for further treatment. Most of the options for the statement were in the Likert’s Scale, the most favorable option was assigned with a score of 5 points and the least with 1 point. The maximum score 5 was assigned to the positive polarity and the minimum score of 1 was assigned to the negative polarity of the statements. Then the scores of all indicators were summed up based on the criteria and it was processed for further analysis.
3.8 TOOLS OF ANALYSIS

The data collected through the questionnaire was tabulated, analysed and interpreted. For analyzing the data, SPSS (Statistical Package for Social Sciences) was used by the researcher. Relevant tools such as Custom Tables, ‘Z’ Test, One way ANOVA, Correlations, Regression, Canonical Correlation, Discriminant Analysis and Path Analysis were used in this study.

3.8.1. Z' - TEST

Z-test is a way to test for comparing two sample means, on the assumption that both populations are normally distributed. Here we consider two populations, each with a mean and a standard deviation. The test statistic is used to determine the difference between the sample means. In most cases we do not know the actual variance or standard deviations. Assumptions are made that the samples are randomly and independently drawn from respective populations that are normally distributed and that population variances are equal.

Based on the Z-test the Zo value is calculated and it is compared with the Ze value for the significance level of $\alpha = 0.05$ (two tail). If the calculated Zo value is greater than the Ze value (1.96), the NH is rejected and we can infer that there is a significant difference between the two means. The Zo value is calculated from the formula:

$$Z_0 = \frac{(X_1 - X_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where $X_1$ = Mean of the sample taken from population 1
$\mu_1$ = Mean of population 1
$\sigma_1^2$ = Variance of population 1
$n_1$ = Size of the sample taken from population 1
$X_2$ = Mean of the sample taken from population 2
$\mu_2$ = Mean of population 2
$\sigma_2^2$ = Variance of population 2
$n_2$ = Size of the sample taken from population 2

Note: All Z tests are carried out to the 5% level of significance.
3.8.2 ANOVA

It is a technique whereby the total variation present in a set of data is partitioned into several components. Associated with each of these components, there is a specific source of variation, so that, in the analysis. It is possible to ascertain the magnitude of the contribution of each of these sources to the total variation. It is used to test the equality of the means of three or more populations. The purpose of Analysis of Variance (ANOVA) is to test for significant differences between means. The interest lies in testing the null hypothesis that the category means are equal in the population. In other words,

\[ H_0 : \mu_1 = \mu_2 = \mu_3 \ldots \ldots = \mu_c \]

Under the null hypothesis, \( SS_x \) and \( SS_{\text{error}} \) come from the same source of variation. In such a case, the estimate of the population variance of \( Y \) can be based on either ‘between category’ variation or ‘within-category’ variation. In other words, the estimate of the population variance of \( Y \),

\[
S_y^2 = \frac{SS_x}{(c-1)} = \text{mean square due to } X = MS_x \\
S_y^2 = \frac{SS_{\text{error}}}{(N-c)} = \text{mean square due to error} = MS_{\text{error}} \\
F = \frac{SS_x}{(c-1)} / SS_{\text{error}} / (N-c) = MS_x / MS_{\text{error}}
\]

The null hypothesis may be tested by the F statistic based on the ratio between these two estimates with \( (c-1) \) and \( (N-c) \) degrees of freedom (df).

One-way ANOVA tests differences in a single interval dependent variable among two, three, or more groups formed by the categories of a single categorical independent variable. Also known as univariate ANOVA, simple ANOVA, single classification ANOVA, or one-factor ANOVA, this design deals with one independent variable and one dependent variable.

It tests whether the groups formed by the categories of the independent variable seem similar (specifically that they have the same pattern of dispersion as measured by comparing estimates of group variances). If the groups seem different, then it is concluded that the independent variable has an effect on the dependent (example: if different treatment groups have different health outcomes). All these ANOVA tests are carried out at 5% significance level.
3.8.3 CORRELATION ANALYSIS

One of the most widely used statistics is the coefficient of correlation ‘r’ which measures the degree of association between the two values of related variables given in the data set. It takes values from +1 to −1. If two sets or data have r = +1, they are said to be perfectly correlated positively if r = -1 they are said to be perfectly correlated negatively; and if r = 0 they are uncorrelated.

The coefficient of correlation ‘r’ is given by the formula

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

3.8.4 REGRESSION ANALYSIS

If two variables are significantly correlated, and if there is some theoretical basis for doing so, it is possible to predict values of one variable from the other. This observation leads to a very important concept known as ‘Regression Analysis’.

Regression Analysis in general sense, means the estimation or prediction of the unknown value of one variable from the known value of the other variable. It is one of the most important statistical tools which is extensively used in almost all sciences – natural, social and physical. It is specially used in business and economics to study the relationship between two or more variables that are related casually and for the estimation of demand and supply graphs, cost functions, production and consumption functions so on.

Suppose we have sample of size ‘n’ and it has two sets of measures, denoted by ‘x’ and ‘y’. We can predict the values of ‘y’ given the values of ‘x’ by using the equation called the regression equation. \( Y^* = a + bX \)

Where the coefficients ‘a’ and ‘b’ are given by

\[
b = \frac{n \sum xy - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}
\]

\[
a = \frac{\sum y - b \sum x}{n}
\]
The symbol ‘Y*’ refers to the predicted value of ‘y’ from a given value of ‘x’ from the regression equation.

### 3.8.5 CANONICAL CORRELATION

A canonical correlation is the correlation of two canonical (latent) variables, one representing a set of independent variables, the other a set of dependent variables. Each set may be considered a latent variable based on measured indicator variables in its set. The canonical correlation is optimized such that the linear correlation between the two latent variables is maximized. Whereas multiple regressions are used for many-to-one relationships, canonical correlation is used for many-to-many relationships. There may be more than one such linear correlation relating the two sets of variables, with each such correlation representing a different dimension by which the independent set of variables is related to the dependent set. The purpose of canonical correlation here is to explain the relation of the two sets of variables called Work Quality and Life Quality. Simply put, it involves the calculation of a set of weights for each group of variables which, when applied yields a linear composite or synthetic score, for each set.

Canonical Function of the Criterion Composite (Life Quality variables, i.e dependent variables) is obtained from linear composite canonical functions by SAS.

\[ Z_{LQ} = HW + SSFS \]

Where \( HW \) = Health and Wellbeing, \( SSFS \) = Self-Society-Friends and Family Support

Canonical function of the predictor composite (work quality, i.e independent variables) is

\[ Z_{WQ} = AUT + PPERE + RATD + WL + SMCRRW + PP + JD + JST + JSF + JBS + PU + WLB \]

Where \( AUT \) = Autonomy, \( PPERE \) = Pay-Pay Equity and Reward & Recognition, \( RATD \) = Resource Adequacy, Training & Development, \( WL \) = Work Load, \( SMCRRW \) = Supervisor-Management and Coworker Relation & Respect at Work, \( PP \) = Professional Promotion, \( JD \) = Job Discrimination, \( JST \) = Job Stress, \( JSF \) = Job Safety, \( JBS \) = Job Satisfaction, \( PU \) = Participation in Union, \( WLB \) = Work Life Balance,
3.8.6 DISCRIMINANT ANALYSIS

It is a statistical technique used to determine the set of variables associated with a given subject which can be used to discriminate or classify the objects (individual, Respondents, firms etc) belonging to two or more naturally occurring groups.

In other words, discriminant analysis is used to find the group differences and predict the group membership. It extensively uses discriminant function which is a linear combination of the independent variables, which will best discriminate between the categories of the dependent variables.

It is a linear combination of the independent variables, which will best discriminate between the categories of the dependent variables and it is explained by the following formula.

\[ D = B_0 + B_1 X_1 + B_2 X_2 + \ldots + B_N X_N \]

Where,

- \( D \) = Discriminant score
- \( B_n \) = Discriminant co-efficients or weights
- \( X_n \) = Predictors or independent variables.

The co-efficients or weights (\( b \)) are estimated so that the groups differ as much as possible on the values of the discriminant function. This occurs when the ratio of ‘between group’ sum of squares to ‘within-group’ sum of squares for the discriminant scores is at a maximum.

3.8.7 PATH ANALYSIS

In path analysis, path diagrams are set up and the causal relationship between variables are attributed according to the theory or hypothesis of a researcher. Then the path analysis is carried out to test these relationships. It is a series of regression analyses conducted simultaneously to test a set of theorized relationships.

Pearson correlation (product moment correlation) ‘\( r \)’ is used in this study to calculate the correlation co-efficients. It is an index used to determine whether a linear, or straightline, relationship exists between X and Y. It indicates the degree to which the variation in one variable, X is related to the variation in another variable, Y.
From the sample of \( n \) observations, \( X \) and \( Y \), the product moment correlation, \( r \), can be calculated as:

\[
r = \frac{\sum_{i=1}^{n} \left( X_i - \overline{X} \right) \left( Y_i - \overline{Y} \right)}{\sqrt{\left( \sum_{i=1}^{n} \left( X_i - \overline{X} \right)^2 \right) \left( \sum_{i=1}^{n} \left( Y_i - \overline{Y} \right)^2 \right)}}
\]

\[
r = \frac{\text{COV}_{xy}}{S_x S_y}
\]

In these equations, \( X \) and \( Y \) denote the sample means, and \( S_x \) and \( S_y \), the standard deviations. \( \text{COV}_{xy} \), the covariance between \( X \) and \( Y \), measures the extent to which \( X \) and \( Y \) are related. The Covariance may be either positive or negative. Division by \( S_x S_y \) achieves standardization, so that \( 'r' \) varies between -1.0 and +1.0. All correlation is significant at the 0.01 level (2-tailed).

The path analysis is best explained by considering a path diagram. To construct a path diagram we simply write the names of the variables and draw an arrow from each variable to any other variable we believe that it affects. An input path diagram is one that is drawn to help plan the analysis, which represents the causal connections that are predicted by our hypothesis. An output path diagram represents the results of a statistical analysis, and shows what was actually found and it is known as a Model. The model of Quality of Work Life of nurses is established with this path analysis.