CHAPTER 3

RESEARCH DESIGN

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The research is the plan, structure and strategy of investigations of answering the research question, it is the overall plan or blueprint for the researchers to carry out the study.

The present study was undertaken to find out the symptoms associated with musculoskeletal disorders among library professionals working in the affiliated colleges of Anna University, Chennai. The methodology followed is discussed below under the following headings:

3.1 OBJECTIVES OF THE STUDY

The Study was undertaken in view of the following objectives:

- To find out the general health status of library professionals
- To identify the symptoms associated with work related musculoskeletal disorders among library professionals
- To find out the severity of the work related musculoskeletal disorders among library professionals
- To analyze the risk factors such as work station, work environment, body posture, job control, job demand, break
time and other work related individual psycho social factors leading to musculoskeletal disorders among library professionals

- To suggest measures to overcome the musculoskeletal disorders among library professionals.

### 3.2 HYPOTHESES OF THE STUDY

Based on the objectives of the present study the following hypotheses were formulated. The demographic variables such as gender, age, experience, different sections in which they work working hours / day and work days /week were taken in to consideration.

1. There is no significant difference between demographic variables and the general health status of the respondents.

2. There is no significant difference between demographic variables and the prevalence of musculoskeletal disorders among the respondents for the last 12 months.

3. There is no significant difference between demographic variables and the work station of the respondents.

4. There is no significant difference between demographic variables and the body posture of the respondents.

5. There is no significant difference between demographic variables and the job control of the respondents.

6. There is no significant difference between demographic variables and the job demand of the respondents.

7. There is no significant difference between demographic variables and the break time of the respondents.
8. There is no significant difference between demographic variables and the work environment of the respondents.

9. There is no significant difference between demographic variables and the social support of the respondents.

10. There is no significant difference between demographic variables and the work related risk factors of the respondents.

11. There is no significant difference between demographic variables and the work related psychosocial factors of the respondents.

12. There is no significant difference between demographic variables and the individual psychosocial factors of the respondents.

13. There is no significant difference between demographic variables and methods adopted by the respondents.

14. The risk factors such as work station, body posture, job control, job demand, break time, work environment, social support, work related risk factors, work related and individual psycho social factors does not contribute to musculoskeletal disorders of the respondents.

3.3 DESIGN OF THE STUDY

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is a plan for collecting and utilizing data so that desired information can be obtained with sufficient precision or so that a hypothesis can be tested properly (Kothari 2007).
The design adopted for the present study was ex-post facto research. This type of research design is used to investigate possible cause and effect relationships by observing some existing consequences and searching back through the data for plausible causal factors.

3.4 INSTRUMENTS USED FOR THE STUDY

![Figure 3.1 Instruments used for the Study]

3.4.1 SF 36 v2 health survey tool

The instrument used for the study was a questionnaire. SF 36 v2 health survey tool (short form – GHQ) developed by Ware and Kosinski (2001) was refined for the present study and used to find out the general health status of the respondents. Nordic musculoskeletal questionnaire (Palmer et al, 1999) was also adopted for the present study. The questionnaire framed for the purpose was validated before put into use. The questionnaire contained the closed-end questions.

The reliability of the SF 36 has been estimated using both internal consistency and test-retest methods. According to Ware and Kosinski (2001), the reliability was found to be 0.90. SF-36 scales have been shown to achieve
about 90% of their empirical validity in studies involving physical and mental health criteria.

3.4.2 Nordic questionnaire

Nordic questionnaires have been widely used and can be considered as an international standard. In the present study, a slightly modified version of the Nordic Questionnaire was used. When defining the incidence of a symptom, such as neck pain, one has to consider which cases are truly incident cases. For the identification of a symptom-free study population, a relevant time-period without symptoms before the occurrence of a new episode of pain has to be defined. No consensus of the optimal length of such a time period exists in the literature. A commonly used symptom-free time period has been 12 months. The reporting of symptoms in the past year has proven to be more reliable than reports of recent symptoms (e.g. in the past month). In general, the Nordic questionnaire has high repeatability and sensitivity and, hence, it is a highly utilizable tool in screening and surveillance (Palmer, Smith, and Kellingray, 1999).

Pain is an unpleasant sensory and emotional experience in one or more parts of the body. Pain is always subjective. Many people report pain in the absence of tissue damage or any likely physiological cause. When the question is about musculoskeletal pain, it is often widely spread and not easy to locate. Hence, it is difficult, if not impossible, to measure pain objectively. Self-reported symptoms collected with questionnaires have been the outcome in the majority of epidemiological studies on musculoskeletal disorders. The criteria for the duration and localization of the pain have varied in different studies. Standardized questionnaires such as the Nordic Questionnaire have been developed in order to facilitate comparison between studies (Cook et al 2000).
3.5 DESIGN OF THE QUESTIONNAIRE

- In the first section, general information such as gender, age, section were work, current position, years worked, days in a week worked, hours worked in a day, break time, were collected from the subjects, this information was used to relate it with other variables for a critical evaluation.

- The second part of the questionnaire intended to collect details on general health status of the respondents. The SF-36V2 (short form - GHQ), a standardized questionnaire, available in the internet was used.

- Prevalence of work related musculoskeletal disorder symptoms were obtained from the third section of the questionnaire. The longest period of complaint in upper and lower extremity complaints (during the last one year), treatment given by the physician were also inquired.

- The next section of the tool dealt with the symptoms associated with work related musculoskeletal disorders.

- Occupational risk factors such as work station, body posture, job control, job demand, break time, work environment and social support were also recorded from the respondents themselves. Also, work related and individual psycho social factors were collected.

- The last section of the questionnaire obtained on methods that were followed by the respondents to reduce health complaints musculoskeletal disorders due to work.
3.6 VALIDATION

Before proceeding to the main study, the instruments were modified to suit the present study. However the Nordic questionnaire was used as such as it was validated now and then by many users. The other questionnaires were sent to experts for their comments. All the experts returned the questionnaire with their comments. The comments were incorporated and the questionnaire was finalized. Thus the questionnaire has the requisite content validity, which is considered to be important for this type of survey.

3.7 METHOD OF DATA COLLECTION

The cross sectional survey was chosen as the method for the present study to find out the musculoskeletal disorder symptoms among the library professionals as their job mostly involves repetitive work. Stal and Englund (2005), IJzelenberg et al (2004) and Smith et al (2003c) in their cross sectional studies of musculoskeletal disorders gathered data on symptom descriptions by means of self reported questionnaires. In this line, the present survey was conducted by using the validated questionnaire.

Questionnaire methods were used to elicit information from the library professionals who were working in the affiliated colleges of Anna University, Chennai. The questionnaires were distributed to the users personally and through mail were collected from the respondents by giving sufficient time to fill up the questionnaire (Appendix 1). The investigator clarified the doubts raised by the respondents. They respondents were assured that the data provided by them would be kept strictly confidential and will be used for research purpose only. Every effort was made by the investigator to get reliable and accurate data from the respondents.
3.8 PILOT STUDY

Before proceeding with the main study, a preliminary survey was undertaken in order to test the reliability and validity of the interview schedule used. The pilot study was done by selecting 50 library professionals working in the affiliated colleges of Anna University, Chennai. The purpose of the study was explained to the subjects meanwhile establishing a good rapport with them. Thus co-operation of the subjects were gained and pilot study was completed successfully.

The pilot study helped in refining the questionnaire to avoid biased or incorrect information thus obtaining reliability of the tool. The validity of the questionnaire was done through subject experts.

3.9 MAIN STUDY

The cross sectional survey was conducted among 675 library professionals working in all the affiliated colleges of Anna University, Chennai (Appendix 2) to assess the symptoms associated with musculoskeletal disorders. Out of the 675 respondents 540 respondents were responded to the questionnaire, this resulted in the response rate of 80%. 40 questionnaires were incomplete; hence they were not taken into consideration for analysis.

The survey process was completed during the period August 2008 to September 2009. During this period the researcher directly met the respondents and explained the purpose of the research and cleared the doubts raised by them and collected the questionnaire filled in all respect. The researcher also sent some questionnaire through mail to the respondents where he was unable to meet the respondents personally in their colleges.
Samples represent the library professionals of affiliated colleges of Anna University, Chennai. The purpose of the study was explained to the subjects and a good rapport was created, which helped in easy collection of data.

3.10 ANALYSIS OF THE DATA

The data collected through questionnaires were coded and tabulated by using Statistical Software SPSS 10 Version (Statistical Package for Social Sciences). Interpretations were drawn based on the analysis. The findings and observations were the result and outcome of the interpretations made during the course of analysis.

The data obtained from the questionnaire was coded and subjected to statistical analysis. The following statistical analyses are carried out:

- Arithmetic mean
- Standard deviation
- ‘t’ test
- One-way analysis of variance
- Factor analysis

3.11 APPLICATION OF STATISTICAL TOOLS

The data obtained from the questionnaire was coded and this was subjected to statistical analysis using statistical software SPSS 10 Version (Statistical Package for Social Sciences). The following statistical analyses were carried out for the present study.
Arithmetic mean was used to obtain average values of the general health status, work related psychosocial factors and methods adopted to reduce musculoskeletal disorders by the respondents of the study.

Standard deviation was employed to know how far the mean values were dispersed.

‘t’ test was done to compare the prevalence of symptoms of musculoskeletal disorders with dichotomous variables.

One-way analysis of variance was utilized to compare the difference in work station, body posture, job control, job demand, break time and work environment among the respondents.

Factor analysis was performed to know the factors responsible for musculoskeletal disorders.

Percentage analysis: Percentage refers to a special kind of ratio. Percentages are used in making comparison between two or more series of data to describe the relationships. Percentages can also be used to compare the relative terms, the distribution of two or more series of data.

Tests of significance: A very important aspect of the sampling theory is the study of tests of significance, which enable us to decide on the basis of the sample results if:

1. The deviation between the observed sample satisfaction and the hypothetical parameter value is significant.

2. The deviation between two sample statistics is significant.
Null hypothesis ($H_0$): For applying the test of significance, we first set up of a hypothesis a definite statement about the population parameter. Such a hypothesis is usually a hypothesis of no difference and it is denoted by $H_0$.

Alternative hypothesis ($H_a$): Any hypothesis, which is complementary to the null hypothesis, is called an alternative hypothesis usually denoted by $H_a$.

The results are discussed in the analysis and interpretation.