CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research design and method used to conduct this study, including a study area, research design, study sample, sampling design, data collection and instrument, data analysis, quality control, study ethnics and limitation.

3.0 STUDY AREA

The study had been conducted at a wooden furniture manufacturing industry, which is located in Muar, Johor. The permission was gained from the managers of this company and assessment for their employees' participation. This company is a wooden furniture manufacturing industry, which is among furniture factories in Muar engaged not only in furniture manufacturing, but also including the kiln drying and treatment of wood. This company uses latest technology to conduct their work and manufacturing operation. This industry product was exported to the Canada, United Kingdom, United States, Taiwan, Japan and Australia. There are four main work processes such as molding, drilling, shaping, and brushing. The industry consists approximately 500 employees and working in one shift (8.30 am until 5.30 pm) per day.

3.1 RESEARCH DESIGN

Research design is the pattern and procedures for collecting and interpreting the data. This study is cross-sectional study, which to assess the noise level exposure by workers and factor of influence hearing loss symptoms. A cross-sectional study defined as the descriptive study of a situation measured at one particular time or simultaneously.
with a representative group over a population. Besides that, this study also assessed the prevalence of getting NIHL symptoms in a population. Furthermore, the instrument used in the study includes sound level meter (SLM) and personal noise dosimeter which to conduct noise monitoring in term of personal and environmental. The dosimeter used to assess the personal noise exposure level and the device was attached to the participants during work shift. The dosimeter was attached to the employees for eight hours in order to obtain the noise level exposed by the participant during carry their work task. In this study, multistage sampling used as sampling strategy. The multistage samplings consist of two stages. At the first stage, a purposive sampling was used to select study area (Block), whereas in second stage random sampling was used to choose respondents. There consist of ten respondents were randomly chosen from selected Block to participate in the monitoring each day.

Furthermore, environmental noise monitoring is essential due to the workers are not only exposed to noise from its work task or operating equipment, but the workers also may possibility exposed high levels of noise from equipment or work process use by trade workers nearby (Medina-Tiencken, 2013). The sound level meter (SLM) used to monitor the environmental noise level and draw a noise mapping of the industry. Besides that, a set of proper questionnaire distributed to the participants in order to answer a series of question which to obtain information regarding on nature of work, department, awareness of the workers about the workplace hazard, duration of work, experience, health effect, hearing ability, use of protective equipment and personal information of the respondents. Face-to-face interview was conducted to gather data and minimize non-response and maximize the quality of the data collect. The face-to-face interview allows collecting more complete and accurate data and easier for the respondent to either clarifies answer or asks for clarification for some of the items on the questionnaire.
3.2 STUDY SAMPLE

A sample of the population selected randomly, which ensure every single unit consists of same and equal chance being selected as a respondent. This industry consists of a number of blocks and the respondents were randomly chosen from an identified work area such as molding and sanding working area to conduct personal noise exposure measurement. In this industry consist of around 500 workers, but only around 80 workers exposed to the noise. The number of respondents identified by using Cochran’s sample size calculation expresses in Eq. (3.1) and Eq. (3.2) (Cochran, 1997). Assume the level of acceptable error at 5%. Therefore, 67 of the respondents were randomly chosen to conduct personal noise level sampling. The respondents were divided into two groups: low and high exposure. Low exposure group is exposed to 85-90 dBA, whereas highly exposed group is exposed over 90 dBA.

\[ n_0 = \frac{t²pq}{d²} \]  
\[ n_0 = (1.96)² (0.5) (0.5) / (0.05)² \]  
\[ n_0 = 384 \]  
\[ n_1 = n_0 / 1 + [(n_0 - 1) / N] \]  
\[ n = 384 / 1 + [(384 - 1) / population] \]  
\[ n = 384 / [1 + (383 / 80)] = 67 \text{ samples} \]

Where:
\( t \) = normal curve that cuts off area, selected alpha level of 0.025 in each tail = 1.96 for 95 percent confidence level.
\( d \) = acceptable margin of error for proportion being estimated = 0.05
\( p \) = estimated proportion of an attribute that is present in the population
\( q \) = 1-p
\( n_0 \) = is a satisfactory approximation to the \( n \) required return sample size according to Cochran formula = 384
\( n_1 \) = required return sample size because sample > 5% of the population