

## ORIGINAL ARTICLE

# Factors of Job Satisfaction among Workers Exposed to Occupational Noise

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## ABSTRACT

**Introduction:** Noise was evident to reduce job satisfaction among workers which will negative impacts to workers including increase job turnover, decrease motivation and increased number of accidents. This study aims to explore job satisfaction and its risk factors among workers working in a noisy workplace. **Method:** The study design was cross-sectional study which involved 167 workers in a cable manufacturing factory selected by simple random sampling. MSQ was used to assess employee's satisfaction with their job on seven facets and sound level meter was used to measure workplace noise level. **Results:** All respondents were exposed to noise above permissible exposure limit. Most workers (49%) were moderately satisfied with their work. Factors that were rated as lowest level of satisfaction were work itself (the ability to work alone) (40%) and the way company system policies are implemented (40%). Factors with the highest level of satisfaction were their freedom to implement their judgement (responsibility) (51%) and the supervision quality of their superiors (51%). The most dominant facet predicting total satisfaction level was recognition followed by advancement and company policy and administration. All variables in socio-demographical and job characteristics were not significantly associated with their level of job satisfaction except noise. Noise was significant in predicting one facet of job satisfaction which was physical work condition. **Conclusion:** Overall, the average level of job satisfaction among respondents were moderate and they were exposed to occupational noise which was the only significant study variable correlated with their job satisfaction.

**Keywords:** Job satisfaction, Noise, Industrial workers

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## INTRODUCTION

Job satisfaction is commonly defined as the pleasurable emotional state resulting from workers' appraisal on their job (1). Workers with high level of job satisfaction feels good about their job, while a dissatisfied person feels negative. Job satisfaction will influence how people work and how they perceived their work environment as those who are more satisfied with their work have better job motivation (2), better work productivity (3), better organisational performance (4) and better work-life quality (5). In contrast, those who dissatisfied with their work had increased work absences (5), increase job turnover intention (6,7) and increased number of accidents (8).

Job satisfaction is known to be affected by multiple factors. Through an adaption of the Herzberg's Motivator-Hygiene Theory (9), there are two factors affecting job satisfaction which are motivator factors and hygiene

factors. The motivator factors are related to job content which include: a) responsibility; b) achievement; c) work itself; d) advancement; and e) recognition. While, the hygiene factors are related to job context which include: a) supervision; b) salary; c) company policy and administration; d) working conditions; and e) interpersonal relations. Hygiene factors may include noise, lighting, ergonomic, ventilation and chemical exposure. Previous study found that job satisfaction was lesser in those exposed to occupational noise (10) as noise can disturb communication among workers, restrict speech privacy and making them uncomfortable with their work environment (11). Similarly, when workers are not comfortable with their surroundings which is in this case high noise exposure level, their level of noise sensitivity and annoyance are higher and when they are exposed to that noise for a longer period, their level of job satisfaction is lesser (12).

Moreover, background factors including age, sex and work experience may affect how workers perceived about their work. According to Hsu (13), workers who are older and have been working for a longer time at one's place have higher level of perseverance and adapt better to their work environment. They perceived that

the condition is part and parcel of their working life hence they have better job satisfaction than the younger workers. Consistent findings found in another study but if workers have been working in the same organization for a longer time, their level of job satisfaction will be lesser (14). A previous study found that female workers have lower level of job satisfaction and this difference explained how nation's dominant gender ideology and traditional value influence their perception on their work (15).

Therefore, besides noise exposure, this study hypothesised that workers' background influence the job satisfaction level of workers. The present study explores how background factors including socio-demographical and work factors and also noise exposure level in manufacturing factory affect the level of job satisfaction among workers.

## **MATERIALS AND METHODS**

### **Study Design/Study Location**

This cross-sectional study was done at a cable factory at Selangor, a high density industrial area in Malaysia. This factory is principally involved in the manufacturing and distribution of an extensive range of power cables. Since this study aims to explore how a noisy work environment affect job satisfaction of exposed workers, factory with high noise exposure level was chosen. The selection was based on findings from a walkthrough survey. In the survey, it was found that workers were having difficulties to talk to each other even though they were standing approximately only one meter from apart. As a rule of thumb, when workers were having this difficulty, workers in the factory were predicted to have high noise exposure level. Thus, further noise measurement was required to confirm the finding.

### **Sampling Population**

The sampling population in this study was among 400 production workers who are directly exposed to noise from processing activities. Based on the formula by Lemeshow (16) for two proportion population, the desired sample size was 152. This sample size was added by 10% to overcome problem of non-responses rate which give the total number of sample size to 167. Simple random sampling was applied to select respondents based on the list name that was provided by the company. All workers in the production department had equal chances to be selected as participants. Foreign workers were excluded in this study to prevent language barrier.

### **Instruments and Procedures**

#### **Survey**

The main instrument is a 50-items self-administered which included the adapted Malay version of self-administered Minnesota Satisfaction Questionnaire (MSQ) to measure an employee's satisfaction with their particular job. The

survey was divided into two section; Section A covers demographic information, while section B assess two domains of job satisfaction. First, the motivator factors which include; a) achievement (feeling successful); b) advancement (career development opportunities); c) workplace policies and administration; d) salary (feelings about pay in contrast to the amount of work completed); e) the work itself (the opportunity to work alone). Second is the hygiene factors which include; a) recognition (being recognized for a job well-done); b) responsibility (the autonomy to implement one's judgment); c) interpersonal relation (relationship among employees); d) supervision (the quality of supervision); and e) physical work condition (physical aspects of one's work).

Choices of answers were in the form of 5-Likert scale (1 = very dissatisfied to 5 = very satisfied). The total scores were determined by the summation of scores from each items. Raw scores for each MSQ scale were computed to percentile scores. When percentile scores are used, a score of  $\geq 75$  represent a high degree of satisfaction. While a pcores of 26 to 74 indicated moderate level of satisfaction. Lastly, a score of 25 or lower represent a low level of satisfaction. The reliability of MSQ, Cronbach alpha values ranged from 0.85 to 0.91 (17). Furthermore, concurrent validity has also been tested for the MSQ by comparing group differences (18).

#### **Noise monitoring**

Noise monitoring were conducted using sound level meter, an instrument that measures the environmental noise level. The model of sound level meter was SoundPro Quest Technologies. The Sound Level Meter (SLM) takes the sound pressure level with measurement unit of decibel (dBA). Noise measurement was conducted for three times at one point source in each processing department and the average value was taken. This method of measurement was selected as the sound level produced from the machines were continuously the same and consistent throughout 8 hours of working duration. The SLM was placed at 1m above the floor and as closed as possible to the workers breathing zone which were within 1 meter from the noise source, the machine.

#### **Data Analysis**

The Statistical Software Package for Social Sciences (SPSS), Version 22.0 was used to run data analyses to study the association between work characteristic and noise with job satisfaction among cable manufacturing workers. The descriptive statistics (mean, median, frequency percentage, standard deviation) and bivariate analyses (correlation, chi-square, and independent T-test analysis) was used to explore the relationship between variables.

#### **Research Ethics**

The participation to this research was simple random

sampling. The respondents were informed that information provided is confidential and have got permission from the UPM Ethic Committee (UPM/TNCPI/RMC/1.4.18.1(JKEUPM) F2) and permission from factory management. Informed letter also has been given to the respondent to explain more about the research which includes the research background and the purpose of this research. Later on all respondent were asked to complete their written permission using agreement form.

## RESULTS

### Socio-Demographic Distribution

This study involved 167 workers who agreed to participate in this study. Of the 167 respondent, the sample mean for age is  $33.8 \pm 8.9$  years old. The response rate was 100%. All of the respondents were male 167 (100%). Most of the respondent were married which were 111 (66.5%) of them and followed by 56 (33.5%) single. The work characteristic included job tenure and job position. The sample means for job tenure was  $8.9 \pm 7.9$  years. The minimum job tenure was 1 year and maximum was 33 years. While, for job position was divided into two which was machine operator and technician. Of the 167 respondent, 111 (66.5%) production workers were machine operators and 56(33.5%) were technician (Table I).

**Table I: Distribution of socio-demographic and work characteristics among respondents. (N = 167)**

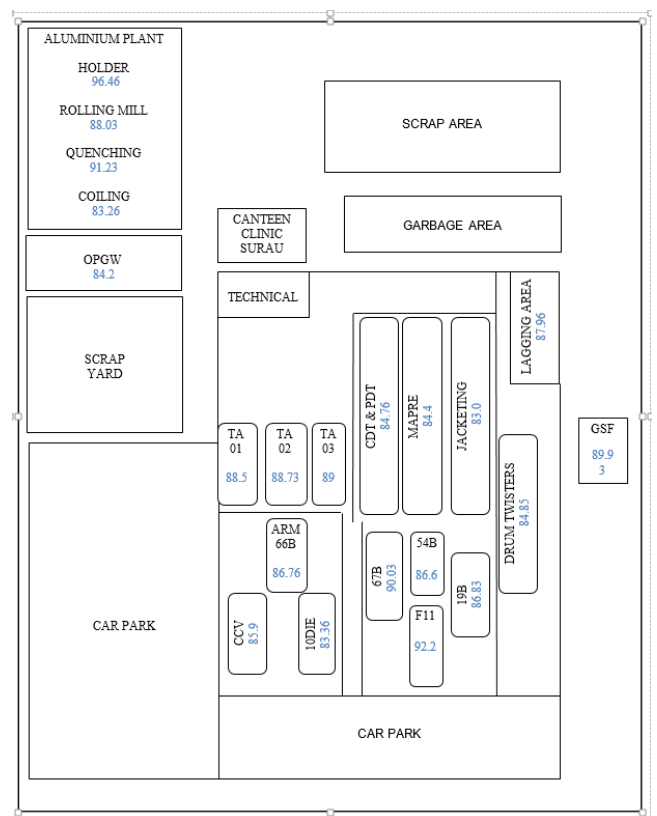
Variables	Frequency (n)	Percentage (%)	Mean ( $\pm$ SD)	Min	Max
<b>Age (years)</b>			33.80 $\pm 8.90$	20	56
<b>Marital Status</b>					
Single /Divorces	56	33.50			
Married	111	66.50			
<b>Job tenure (years)</b>			8.90 $\pm 7.90$	1	33
<b>Job Position</b>					
Machine operator	111	66.50			
Technician	56	33.50			

### Noise exposure level

The average noise level measured ( $87.3 \pm 3.1$ ) exceeded the action level which was 82 dB(A). The noise level at work unit dealing with holder furnaces machine was identified as the highest which was 96.46 dB(A) while the noise level at the work unit under jacketing machine was identified as the lowest which was 83 dB(A) (Figure 1).

### Satisfaction level

Table II shows that the distribution on psychosocial factors. There are twelve factors after including hygiene and motivator factors. The level of satisfaction were divided into three groups; low, moderate and high. Overall, 26% of respondents were highly satisfied with their work, 49% were moderately satisfied and another 26% had low level of job satisfaction. Satisfaction facets



**Figure 1: Noise level and layout plan of working site**

**Table II: Scores on of job satisfaction among respondents (N = 167)**

Satisfaction Facets	Level of satisfaction					
	Low (%)		Moderate (%)		High (%)	
	f	%	f	%	f	%
Achievement	37	22	87	52	43	26
The work itself	67	40	44	26	56	34
Advancement	45	27	65	39	57	34
Recognition	43	26	73	44	51	31
Responsibility	43	26	39	23	85	51
Supervision	45	27	37	22	85	51
Interpersonal Relations	44	26	52	31	71	43
Salary	49	29	50	30	68	41
Company Policy And Administration	66	40	50	30	51	31
Physical Working Conditions	45	27	75	45	47	28
Motivators Factors	45	27	75	45	47	28
Hygiene factors	42	25	80	48	45	27
<b>Total</b>	<b>43</b>	<b>26</b>	<b>81</b>	<b>49</b>	<b>43</b>	<b>26</b>

with the highest percentage of high job satisfaction were responsibility, interpersonal relationship and supervision. These results indicated that majority of workers were very satisfied with their freedom to implement their judgement (responsibility) (51%), their relationship among employees (interpersonal relationship) (43%) and the supervision quality of their

superiors (51%). Satisfaction facets with the highest percentage of low satisfaction levels were the work itself (the ability to work alone) (40%), company policies and administration (40%) and their salary (feelings about pay in contrast to the amount of work completed) (29%). More than 50% of workers were moderately satisfied with their achievement, and around 45% were moderately satisfied with their physical working condition and recognition.

In correlation analyses, the hygiene factors ( $r=0.93$ ,  $p < 0.01$ ) were slightly more dominant than the motivational factors ( $r = 0.90$ ,  $<0.01$ ) in predicting job satisfaction among respondents. However, when exploring individually, the most dominant facet predicting total satisfaction level was recognition followed by advancement and company policy and administration (Table III).

**Table III: Correlation between satisfaction facets with total level of satisfaction (N = 167)**

Satisfaction Facets	r-value	p-value
Achievement	0.38**	<0.01
The work itself	0.44**	<0.01
Advancement	0.75**	<0.01
Recognition	0.78**	<0.01
Responsibility	0.61**	<0.01
Supervision	0.67**	<0.01
Interpersonal Relations	0.72**	<0.01
Salary	0.67**	<0.01
Company Policy And Administration	0.73**	<0.01
Physical Working Conditions	0.66**	<0.01
Motivators Factors	0.90**	<0.01
Hygiene factors	0.90**	<0.01

\*\*significant at  $p < 0.01$

**The association between socio-demographical factors, work characteristics and noise with job satisfaction**

There is no relationship between all variables of socio-demographical factors (age, marital status) and work factors (job tenure and job position) with job satisfaction among respondents. Results showed that noise levels were only significantly correlated with physical working condition which indicating that the level of satisfaction on physical working condition were significantly lower with higher noise level. Since only one factor significantly correlated with job satisfaction, further analyses involving multivariate analyses were not conducted (Table IV).

**DISCUSSION**

The sample size in this study was sufficient to indicate the representativeness of the respondents for all 400 workers in the manufacturing companies. Overall, almost half of them (49%) moderately satisfied with their job. Only 26 % of them highly satisfied and

**Table IV: Correlation between noises with satisfaction variables (N = 167)**

Satisfaction Facets	r-value	p-value
Achievement	-0.12	0.11
The work itself	0.01	0.93
Advancement	0.01	0.90
Recognition	-0.05	0.51
Responsibility	-0.03	0.70
Supervision	-0.06	0.42
Interpersonal Relations	-0.13	0.09
Salary	-0.09	0.26
Company Policy And Administration	0.03	0.71
Physical Working Conditions	-0.23*	<0.01
Motivators Factors	-0.05	0.52
Hygiene factors	-0.14	0.06
Total	-0.10	0.19

\*significant at  $p < 0.05$

another 26% had low level of satisfaction on their job. Hygiene factors were more dominant than motivational factors. Of all satisfaction facets, workers’ satisfaction on the company policies and administration were the lowest and also was determined to be the top three most dominant factors of the total job satisfaction. Therefore, this factor needs to be given the first priority in an effort to increase total job satisfaction among workers on their workplace.

Moreover, results also indicated that all respondents were exposed to noise level exceeded the action limit proposed by the Department of Occupational Safety and Health. Type of noise that produced at the target area could be categorized as continuous noise which was emitted from machine. According to Factories and Machinery Act (FMA) (Noise Exposure) Regulations (2019), action level means equivalent continuous sound level of 82 dB(A) or daily noise dose equal to 0.5. The level of noise was highest at holder furnaces machine (96.46 dB(A)). This sound was originated from the high power machine which continuously operating to maintain the very high temperature in a furnace in which metal was melted. Based on the FMA, further noise measurement needs to be conducted to determine if workers health are affected by the noise exposure.

Findings of this study found that none of the motivator factors (responsibility, achievement, work itself, advancement, and recognition) was significant in predicting job satisfaction. According to the Maslow’s Hierarchy of Needs theory (19), a person will only achieve high job satisfaction after his or her physiological and safety needs were fulfilled. In this study, a safety need of having safe noise exposure level was not being provided for the workers and therefore, until the noise level is made to be safe it is less likely for motivational factors to be dominant in predicting workers job satisfaction.

In the current study, noise a hygiene factor was the only variable found to be significantly correlated to job satisfaction specifically to respondents' satisfaction towards workplace condition. This finding was similar with those of previous studies (10,20,21,22). Exposure to noise will affect both psychological and physiological health of workers (23). For example, a study among 14639 respondents showed that higher noise exposure significantly associated with higher level of annoyance (24) which was found to be the cause of lower level of job satisfaction (12). The reason is when workers having the related psychological and physiological health problems related to noise, they are no longer be pleased working at their workplace which significantly reduce their level of job satisfaction (25).

In the present study, when looking into the relationship between socio-demographical factors and work characteristics with job satisfaction, none of them were significant. Findings that job tenure was not significantly correlated with job satisfaction is consistent with those found in a previous studies (26,26) but in contrary with those found by (28). Findings on the relationship between marital status and job satisfaction supports the previous findings (29,30). Similarly with age, the present results were consistent with those found by (31) but not with those found in another study (32). Findings of previous studies regarding the relationship between socio-demographical characteristics were inconsistent hence calling for more related studies to understand better about this relationship.

## CONCLUSION

Overall, majority of workers had moderate level of job satisfaction. The only factors found significant in predicting job satisfaction among respondents was noise in which higher level of noise significantly correlated with lower level of job satisfaction particularly to physical working condition which were consistent with the findings of previous studies. The most dominant facet predicting total satisfaction level was recognition followed by advancement and company policy and administration. Also, findings indicated that only physical work condition was significant in predicting job satisfaction. Therefore, the study hypothesis stating that socio-demographical factors and job factors significantly correlated with job satisfaction was rejected. Moreover, results of the study showed that respondents were exposed to hazardous sound level during their working hours. The sound generated by machine exceeds the action levels proposed by the Department of Occupational Safety and Health. Although respondents have been provided with earplugs, management should take into consideration the existing technology, economic factors, benefits and practically when evaluating the implementation of any control in reducing noise at source. According to Factories and Machinery (Noise Exposure) Regulations (1989), further monitoring of noise at the workplace is

therefore needed.

This study only took consideration few variables which is regarded as one of the study limitations. Further studies including more variables of socio-demographical characteristics including gender, educational levels and total house income and more variables on work characteristics including more variation in work position and previous work experience will give better information on how these two groups of factors influence job satisfaction among workers. Furthermore, this study only included point measurement of noise which did not represent the 8 hours average noise exposure level among workers which is another limitation of this study. Total eight hours weighted average ((8hr TWA) better represents the noise exposure level of workers and is recommended to be included in the future study.

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