Chapter - 6

SUMMARY AND CONCLUSIONS

Heath and safety of the employees is becoming an important aspect in industries all over the world. Even though there are several reports indicating the existence of work related stress among the industry professionals in India but only little work has been done for the evaluation of work stress. As part of the present study seven factors have been identified for evaluating the work stress and these factors are demand, control, manager support, peer support, relationship, role and change.

Further an instrument to measure the work stress (questionnaire) was developed, based on the above seven factors. The final draft of the questionnaire had 35 items and this was prepared in two languages, English and the local language. All the questions were Likert type with five fixed alternatives. Before the analysis of the result, the questionnaire was refined and validated. During this process, five items in the questionnaire were removed and the final refined scale had only 30 items. Confirmatory factor analysis was used for the scale refinement. The values of CFI and TLI and Cronbach alpha showed that the refined scale has good validity, and unidimensionality in addition to reliability. All the analysis were performed by using the software SPSS-15.

The analysis shows that no significant correlation exists between the variables and hence the above factors can be treated as independent factors for the purpose of research.
Five profit making public sector industries in Kerala were selected for the study. These industries were classified into two types—namely chemical and heavy engineering, based on the type of product manufactured, for further analysis. The total number of participants in the study was 830. For the purpose of analysis the age of the employees were grouped into seven categories namely 20-25yrs, 25-30yrs, 30-35yrs, 35-40yrs, 40-45yrs, 45-50yrs and 50-55yrs. Only three designation levels of the employees are considered, viz, engineers, supervisors and workers. Also a study is conducted by dividing the employees into seven categories based on their experience. The different categories were having experience up to 5yrs, 5-10yrs, 10-15yrs, 20-25yrs, 25-30yrs and 30yrs and above. The effect of the factors identified were analyzed in the above groups.

Among the industries selected, three were in the chemical sector and two in the heavy engineering sector.

The analysis of mean score of the various factors on different age groups shows the existence of work stress among all age groups. Relatively higher amount of demand, low control and low manager support were observed among the 40-45yrs age group. This points out that this age group is subjected to higher work stress than other age groups. The demand–control/support model (Karasek and Theorell, 1990) suits the age group 40-45yrs.

The analysis of the mean score at various designation levels, shows that the factors leading to work stress exist at all levels. Further it is noted that lack of control exists among the workers compared to engineers and supervisors.
Analysis of mean score of the factors at different experience groups, show that, factors leading to work stress exist in all the groups. Further higher job control is noted among groups having relatively longer experience. In general it is observed that employees of 15-20 yrs of experience groups have relatively higher ‘demand’, low ‘control’ and low ‘manager support’, irrespective of the type of industries.

The analysis of the factors was further carried out by considering the three chemical industries as one category and the two heavy engineering industries as another category. The total number of participants in the chemical industries were 554. The sample size of engineers, supervisors and workers in the chemical industries were 48, 77 and 429 respectively. The total number of participants in the heavy engineering industries were 276. The sample size of the engineers, supervisors and workers in these industries were 19, 29 and 228 respectively.

The analysis of factors among two categories of industries show the existence of work stress in these two categories of industries. Relatively higher amount of demand, low control and low manager support were observed among the 40-45yrs age group compared to other age groups. Lack of control was noted among lower designation levels namely workers compared to engineers and supervisors. The group with 15-20yrs of experience had relatively higher amount of work demand, low job control and low manager support at work.

Further an analysis of factors was done among the three chemical industries as well as among the two heavy engineering industries. Significant difference in the means score of the factors was observed among the chemical industries as well as among heavy engineering industries.
industries. The mean score of the factors point out the existence of work stress due to these factors in these industries. A comparative study between the chemical and heavy engineering industries using the same factors showed no significant difference in mean score of the factors between the two categories of industries.

Three different types of modelling of work stress was carried out. These are i) Factor modelling ii) Structural equation modelling and iii) Multinomial logistic regression modeling.

Factor modelling of work stress was carried out by means of the seven factors. Alpha method of factor analysis was used. This yielded a two-factor structure for work stress namely stress-personnel (Stress-P), and stress-team (Stress-T). This method of modeling is further extended to chemical and heavy engineering industries. The software used for this analysis was SPSS-15.

Structural equation modelling of work stress was done by using the seven factors for the entire data collected from all the industries selected for study by means of confirmatory factor analysis. This yielded two components for the work stress namely stress-personnel (Stress-P), and stress-team (Stress-T). Further separate structural equation models were developed for chemical and heavy engineering industries.

The above structural equation models were tested statistically by using, the following goodness of fit indices to assess the degree of fit, between the model and sample.
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i) Normed $\chi^2$ (between 1 and 3) (Hair et al., 1998)

ii) Normed Fit Index (NFI > 0.90 excellent) (Byrne, 2001; Hair et al., 1998).

iii) Tucker Lewis Index (TLI > 0.90 acceptable, > 0.95 excellent) (Tucker and Lewis, 1973)

iv) Comparative Fit Index (CFI >0.90 acceptable, >0.95 excellent) (Benter, 1990; Bentler and Bonnet, 1980)

v) Root Mean Square Error of Approximation (RMSEA <0.08 acceptable, <0.05 excellent) (Brown and Cudeck, 1998)

vi) Standard Root Mean Square Residual (SRMR <0.05 excellent) (Hu and Bentler, 1995)

The values obtained for NFI, CFI, and TLI, Normed $\chi^2$, RMSEA, SRMR were found to be well within the acceptable limit. Hence it can be concluded that the structural equation models are equally good in representing the work stress. The modelling was done by using AMOS-7 (Arbuckle, 2006).

Multinomial logistic regression models were developed for the different age groups, designation levels and experience levels using the seven factors. The models were developed for all the selected industries and further it is extended to chemical and heavy engineering industries separately. The multinomial odds of improvement in work stress due to unit increase in each of the variable is studied.
The multinomial odds of improvement in work stress due to unit increase in the factor/variable – demand is expected to

i) Increase among engineers and supervisors over the reference group in chemical industries (OR >1), and reverse trend is noticed in heavy engineering industries.

ii) Decrease in general for all the age groups over the reference group in all the selected five industries (OR <1).

iii) Increase among 40-45 yrs age group and 15-20 yrs experience group in chemical industries and reverse trend is noticed in heavy engineering industries.

The multinomial odds of improvement in work stress due to unit increase in the factor/variable – control is expected to

i) Increase among 40-45 yrs age group over the reference group in chemical industries, and a reverse trend is observed in heavy engineering industries.

ii) Increase among the employees having experience 20-25yrs over the reference group in heavy engineering industries and a reverse trend is noticed in chemical industries.

iii) Increase among engineers and supervisors over the reference group in all categories of industries

The multinomial odds of improvement in work stress due to unit increase in the factor/variable – manager support is expected to

i) Increase among 30-35yrs age group in all categories of industries.
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ii) Increase among all the groups having different experience levels considered for the study over the reference group in chemical industries, but a reverse trend is noticed for heavy engineering industries.

iii) Increase among engineers and supervisors over the reference groups in chemical as well as heavy engineering industries.

The multinomial odds of improvement in work stress due to unit increase in the factor/variable –peer support is expected to

i) Increase among 20-25yrs age group in chemical industries and among the age groups 30-35yrs and 35-40yrs in heavy engineering industries.

ii) Increase among the engineers over the reference group in chemical as well as heavy engineering industries. Similar result was obtained for the supervisors over the workers in chemical industries, but a reverse trend is noticed in heavy engineering industries.

The multinomial odds of improvement in work stress due to unit increase in the factor/variable –relationship is expected to

i) Increase among age group 40-45yrs over the reference groups in all categories of industries.

ii) Increase among the employees having experience 15-20yrs in all categories of industries.

iii) Increase among supervisors over the reference group in chemical as well as heavy engineering industries, however a reverse trend is noted for the engineers over the reference groups.
The multinomial odd of improvement in work stress due to unit increase in the factor/variable – role is expected to

- Increase among engineers over workers in chemical as well as heavy engineering industries.

The multinomial odds of improvement in work stress due to unit increase in the factor – change is expected to

1. Increase among age group 40-45yrs over the reference group in chemical as well as heavy engineering industries

2. Increase among the experience group 15-20yrs over the reference group among chemical industries but a reverse trend is noticed in heavy engineering industries.

The following conclusions are drawn from the present study:

- The results of the present study indicate that work stress exists among the employees in the public sector industries in Kerala.

- The instrument developed for the evaluation of work stress by using the variables/standards, namely demand, control, manager support, peer support, relationship, role, and change has validity, unidimensionality, and reliability and this instrument can be effectively used for the evaluation of work stress in different types of industries.

- Relatively higher amount of demand, low control, and low manager support were observed among the 40-45yrs age group, irrespective of the nature and type of industry. The demand-control/support model (Karasek and Theorell 1990), suits the age group 40-45yrs.

- It is observed that employees having 15-20 yrs of experience have relatively higher ‘demand’, low ‘control’ and low ‘manger support’, irrespective of the nature and type of industries. The demand-control/
support model (Karasek and Theorell 1990) suits the above experience groups.

- Lack of control was observed among lower designation levels particularly at the workers level compared to engineers and supervisors.
- The factor modelling yielded two factor structure namely stress-personnel (Stress-P) and stress-team (Stress-T) for work stress.
- The structural equation models proposed are equally good in representing the work stress in industries.
- Multinomial logistic regression models developed are also found equally good in predicting the work stress in industries.

6.1 Scope for further research

The present analysis of work stress was carried out among the employees in the public sector industries in Kerala, which leaves enough scope for further research.

i. The factors identified for the analysis of work stress can be used to analyze the work stress among male and female employees in the organization.

ii. The study can be extended further among the employees in the service sector by using the same factors identified for the evaluation of work stress.

iii. The present study is limited to selected public sector industries in Kerala, and the same factors can be used to analyze the work stress among the employees working in similar units in other states of India.

iv. The study can be extended to the private sector industries by using the same factors for the analysis of work stress.