An investigation of low ergonomics risk awareness, among staffs at early product development phase in Malaysia automotive industries.

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Abstract.  
Currently there are many automotive companies still unable to effectively prevent consequences of poor ergonomics in their manufacturing processes. This study purpose is to determine the surrounding factors that influence low ergonomics risk awareness among staffs at early product development phase in Malaysia automotive industry. In this study there are four variables, low ergonomic risk awareness, inappropriate method and tools, tight development schedule and lack of management support. The survey data were gathered from 245 respondents of local automotive companies in Malaysia. The data was analysed through multiple regression and moderated regression using the IBM SPSS software. Study results revealed that low ergonomic risk awareness has influenced by inappropriate method and tool, and tight development schedule. There were positive linear relationships between low ergonomic risk awareness and inappropriate method and tools, and tight development schedule. The more inappropriate method and tools applied; the lower their ergonomic risk awareness. The more tight development schedule is the lower ergonomic risk awareness. The relationship between low ergonomic risk awareness and inappropriate method and tools depends on staff’s age, and education level. Furthermore the relationship between low ergonomic risk awareness and tight development schedule depends on staff’s working experience and number of project involvement. The main contribution of this paper was identified the number of factors of low ergonomics risk awareness and offers better understanding on ergonomics among researchers and automotive manufacturer’s employees during product development process.

Key word: Ergonomics, ergonomics risk, product development

1. Introduction  
Low ergonomics risk awareness means that ergonomics risk are less identified in early product development stage, before design solution are finally decided. The employees have not proactively measured ergonomics risk in early product development stage. Traditionally in the automotive design process most of the ergonomics risk inputs was provided at the end of the styling process [1]. Low ergonomics risk awareness during design process encourages the corrective action made after design solution are finally decided and start of production. Certainly the corrective measures after finalized the design and production started were involved high cost. Research and experience show that as much as 10%-40% of the company’s total turnover is cost of poor quality [2; 3; 4]. In order to be competitive automotive manufacturers have a short time to market in the design new product. Therefore employees are forced to work quickly with complex product and process design. This scenario triggered design and production engineers lack of ergonomic concerns in product and process design. Eklund [5] and Falck [6] found that the ergonomics impact is caused by the product design at 60-70% and by manufacturing process at 30-40%. Previous researcher claimed that preventive
measures are very difficult to achieve if there is a lack of ergonomics competence and cross functional cooperation in early decision phases of new product and production development [7]. Therefore it is importance for management to identify the causes of lack of ergonomics risk awareness approaches in early product development phase. Either its sources come from employees or team management in the company.

The general objective of this research is to obtain a better understanding on the reasons for low ergonomics risk awareness and its difficulties to practice by employees during product development phase. There are two specific objectives of this research study. Firstly to determine the surrounding factors that influence employee’s low ergonomics risk awareness. Second objective is to examine the moderating effects influence employee’s background on low ergonomics risk awareness.

In achieving the above objectives, this research addresses the following questions:

i. Does inappropriate method and tools affect low ergonomics risk awareness among employees?

ii. Does tight development schedule affect low ergonomics risk awareness among employees?

iii. Does lack of management support affect low ergonomics risk awareness among employees?

iv. Do age, education level, working experience, working position, working department, and number of project involvement moderate above questions?

2. Literature review

Applying a scientific, evidence-based approach to ergonomics process is important. The goal is to identify ergonomic risk factors, quantify then, and then make measurable improvements to the workplace, ensuring that jobs and tasks are within workers’ capabilities and limitations. The best approach for doing that is to make ergonomics an ongoing process of risk identification and risk reduction based on objective, scientific analysis of workplace. Previous researchers shared performing jobs in prolonged standing has contributed numerous health effects and these injuries can be minimized through application of engineering and administrative controls [8]. With respect to MSD prevention, [9] argued that integration of MSD prevention into management system requires harmonized tools, approaches and concepts to match other methods used in management systems. Therefore it is required to acknowledge that there are specific techniques and approaches that organizations use to manage quality and other aspects of health, safety and environment [10].

There was suggestion to make ergonomics an “everyday tool” in workplaces and in design departments. A promising exception was Shephard and friends who developed and Ergonomics Failure Mode Effect Analysis (E-FMEA), [11]. As knowns FMEA has been widely used by quality and health and safety practitioners to assess different types of risk factors. The FMEA tool is a way to correspond ergonomics assessments with common risk assessment methods. Time and work pressure has become gradually leading today’s world of work. Previous research suggested that more than three fifths of the workforce in Europe are affected by time and work pressure and that the numbers are rising [12]. This research study purpose was to identify employee’s individual behavioural physiological responses to workload demands and deadlines associated with the ergonomics risk consideration during their working time. Evidence is growing that the prevalence of musculoskeletal symptoms increases with longer hours of computer work and exposure to psychosocial stressors such as high workloads and unrealistic deadlines [13]. Therefore how an employee behaves in response to such workloads may also be significant factors associated with low ergonomics risk awareness sign in automotive manufacturing company.

Previous researcher highlighted the importance of integrating ergonomics as general concept into a total quality management system [14]. Lewandowski suggested that to achieve the effects of constant improvements in occupational health and safety (OHS) and quality, ergonomics must be considered in management processes. According to Munck’s research group ergonomics is not a separate entity but a strategy [15]. The authors recommended that the involvement of managers and other employees in ergonomics work was much easier when they saw the link with the quality, delivery precision, and economy. Additionally, Caroly and others proposed that the integration of
quality, ergonomics, productivity and safety depends on a policy based on integration and involvement of all stakeholders [16]. The small literature did however indicate that incorporating MSD prevention into organizational level approaches could improve production in addition to preserving worker’s health in workplaces [17]. Obviously these showed that the responsibility of management to provide through anticipation, identification, valuation and control of a wide range of ergonomics condition in the workplace. Therefore through this study we have explored the effect of lack of management support to low ergonomics risk awareness among employees in automotive manufacturing company.

1.1. Conceptual framework

![Figure 1. The conceptual framework of the research study.](image)

1.2. Research hypotheses

1.2.1. Model variables hypotheses. The following model variable hypotheses are based on conceptual framework in Figure 1.

\[ H_1: \text{Inappropriate method and tools are discouraging employees to practice ergonomics measure at early product development stage.} \]

\[ H_2: \text{Tight development schedule is depressing employees to apply the ergonomics principle at early product development stage.} \]

\[ H_3: \text{Lack of management support prevents the proactive ergonomics measure approach at early product development stage.} \]

1.2.2. Respondent variables hypotheses. The hypotheses \( H_{4a} \sim H_{6f} \) had examined the effect of employee’s background (age, education level, working experience, working position, working department, and no of project involvement) in the relationship between low ergonomics risk awareness and ergonomics risk awareness variables.

\[ H_{4a} \sim H_{4f}: \text{Relationship between low ergonomics risk awareness and inappropriate method and tools is moderated by employee’s age, education level, working experience, working position, working department and no of project involvement.} \]

\[ H_{5a} \sim H_{5f}: \text{Relationship between low ergonomics risk awareness and tight development schedule is moderated by employee’s age, education level, working experience, working position, working department and no of project involvement.} \]

\[ H_{6a} \sim H_{6f}: \text{Relationship between low ergonomics risk awareness and lack of management support is moderated by employee’s age, education level, working experience, working position, working department and no of project involvement.} \]
3. Methodology
This research was using quantitative survey in the Malaysian Automotive companies. The study was a portion a large cross sectional ergonomics risk awareness study conducted on employees in five automotive manufacturers. The respondents of study consisted of employees in two automotive car manufacturers and three automotive car component manufacturers. They were from various background, different experience, multiple age groups, different sociocultural, different sociological, and different thinking. The unit of analysis of this survey research includes managers, engineers and technical executives of company. There are 31 items in the questionnaire comprising five sections. Respondents have to indicate their agreement by using four and five Likert scale. IBM SPSS software has been used to analyze the data. The sample size of this study was 245 respondents.

4. Result of study

1.3. Profile of respondent

| No. | Profile                  | Category | Frequency | Percentage, % |
|-----|--------------------------|----------|-----------|---------------|
| 1   | Age (years)              | <25      | 90        | 37.0          |
|     |                          | 26~30    | 86        | 35.4          |
|     |                          | 31~35    | 29        | 11.9          |
|     |                          | 36~40    | 16        | 6.6           |
|     |                          | 41~45    | 7         | 2.9           |
|     |                          | >45      | 15        | 6.2           |
| 2   | Working Experience (years) | < 4 years | 139 | 57.0 |
|     |                          | 4~8      | 57        | 23.4          |
|     |                          | 9~12     | 23        | 9.4           |
|     |                          | 13~16    | 13        | 5.3           |
|     |                          | 17~20    | 7         | 2.9           |
|     |                          | >20      | 5         | 2.0           |
| 3   | Working position         | Engineer | 63        | 28.3          |
|     |                          | Senior Engineer | 16 | 7.2 |
|     |                          | Manager  | 11        | 4.9           |
|     |                          | Ergonomist | 5   | 2.2 |
|     |                          | Supervisor | 49  | 22.0 |
|     |                          | Technical Executive | 50 | 22.4 |
|     |                          | Executive | 29  | 13.0 |
| 4   | Working Department       | Design Engineering | 32 | 13.7 |
|     |                          | Product Planning | 12 | 5.1 |
|     |                          | Production Control | 24 | 10.3 |
|     |                          | Production Engineering | 43 | 18.4 |
|     |                          | Process Engineering | 13 | 5.6 |
|     |                          | Operation  | 60 | 25.6 |
|     |                          | Quality Control | 14 | 6.0 |
|     |                          | Quality Engineering | 16 | 6.8 |
|     |                          | Quality Assurance | 20 | 8.5 |
| 5   | Education level          | Certificate | 36 | 15.3 |
|     |                          | Diploma   | 93        | 39.6          |
|     |                          | Bachelor Engineering | 66 | 28.1 |
|     |                          | Master    | 8         | 3.4           |
|     |                          | Bachelor science | 22 | 9.4 |
|     |                          | MBA       | 3         | 1.3           |
|     |                          | PHD       | 7         | 3.0           |
| 6   | Gender                   | Male      | 190       | 77.9          |
|     |                          | Female    | 54        | 22.1          |
1.4. Establishing reliability of scale

Once the scale and items have been accepted as valid, the reliability of this scale can be established. Reliability is a measure of how closely the various items that constitutes as scale correlate. In this research study we have focused on internal consistency using Cronbach’s Alpha as it is the most commonly used reliability index. The Cronbach’s Alpha estimates have been tabulated as illustrated in Table 2.

Table 2. Presenting reliability information and factor analysis outcomes.

| No. | Variables                              | Initial items | Items after FA | Cronbach’s Alpha |
|-----|----------------------------------------|---------------|----------------|------------------|
| 1   | Low ergonomics risk awareness          | 6             | 6              | 0.907            |
| 2   | Inappropriate method and tools          | 5             | 5              | 0.878            |
| 3   | Tight development schedule             | 4             | 4              | 0.802            |
| 4   | Lack of management support             | 6             | 6              | 0.931            |

Table 2 shows the factor analysis outcomes and reliability information for each variable item. Basically there is no deletion on variable items during factor analysis. The Cronbach’s Alpha values are high, value > 0.8 for all variables. According to Julie Pallant [18], the Cronbach’s Alpha above 0.7 are considered acceptable, however values above 0.8 are preferable.

1.4.1. Descriptive analysis. The goodness of the measures and distribution of the variables are completed, the means and standard deviation and where different the scale are used, the scale range have presented in a table as illustrated in Table 3.

Table 3. Presenting the mean, Standard deviation and scale information on model variables.

| No.  | Types of variables                              | Mean  | Std dev | Scale                               |
|------|------------------------------------------------|-------|---------|-------------------------------------|
| 1    | Low ergonomics risk awareness                   | 2.325 | 0.924   | 1=Completely Disagree 5=Completely Agree |
| 2    | Inappropriate method and tools                  | 3.155 | 0.899   | 1=Completely Disagree 5=Completely Agree |
| 3    | Tight development schedule                      | 3.124 | 0.819   | 1=Completely Disagree 5=Completely Agree |
| 4    | Lack of management support                      | 3.154 | 0.867   | 1=Completely Disagree 5=Completely Agree |

Table 4. Correlation between the model variables.

| No.  | Variables                              | M    | SD   | 1   | 2     | 3     | 4     |
|------|----------------------------------------|------|------|-----|-------|-------|-------|
| 1    | Low ergonomics risk awareness          | 2.325| 0.924| 1   |       |       |       |
| 2    | Inappropriate method and tools          | 3.155| 0.899| 0.373** | 1    |       |       |
| 3    | Tight development schedule             | 3.124| 0.819| 0.400** | 0.479** | 1    |       |
| 4    | Lack of management support             | 3.154| 0.867| 0.359** | 0.642** | 0.607** | 1    |
Table 4 is presenting the correlation matrix between the variables in this research study. Purpose of presenting the correlation matrix is to display the covariation and association between the variables in this study. The correlation not for testing of hypothesis but shows the correlation between among the four variables. There are high correlations between all variables.

1.5. Testing of assumptions

1.5.1. Normality test. The distributional characteristics of each variable i.e mean, median, standard deviation, range, skewness and kurtosis. The key aspects of the distributional characteristics that have impact on our findings have been stated and highlighted.

Table 5. Distribution of model variables

| No. | Variable                        | Skewness | Kurtosis |
|-----|---------------------------------|----------|----------|
| 1   | Low ergonomic risk awareness    | 0.416    | -0.277   |
| 2   | Inappropriate method and tools  | 0.029    | -0.102   |
| 3   | Tight development schedule      | -0.128   | 0.244    |
| 4   | Lack of management support      | -0.255   | 0.182    |

Table 5 shows the distribution of variables in term of kurtosis and skewness characteristics. The skewness statistic is well within the +/- 10 limit and kurtosis statistic is well within the +/- 10 limit. The skewness statistics and kurtosis statistics values for all variables are within limitation. Therefore the variables are normal and suitable for analysis.

1.6. Multiple regression

Multiple regression analysis was using as techniques for modelling and analyzing model variables. Focus is in relationship between dependent variable, low ergonomics risk awareness and three independent variables which are inappropriate method and tools, tight development schedule and lack of management support. The regression analysis is used to understand which among the three independent variables are related to employees low ergonomics risk awareness and to explore the forms of these relationships.

\[
Y = a + b_1x_1 + b_2x_2 + b_3x_3 + e
\]  
(1)

Y = Dependent variables  
\(x_n\) = Independent variables  
b\(_n\) = Standardized coefficient  
a = Unstandardized coefficient  
e = Standard error

In this research study,

Y = Low ergonomics risk awareness  
x\(_1\) = Inappropriate method and tools  
x\(_2\) = Tight development schedule  
x\(_3\) = Lack of management support
1.6.1. Multiple regression analysis results

Table 6. Regressing low ergonomics risk awareness on model variables

| No | Independent variables                | Unstd Coeff | Std error | Std coeff (β) | t      | Sig (p) |
|----|--------------------------------------|-------------|-----------|---------------|-------|---------|
| 1  | Inappropriate method and tools       | 0.210       | 0.078     | 0.204         | 2.676 | 0.008   |
| 2  | Tight development schedule           | 0.293       | 0.083     | 0.259         | 3.529 | 0.001   |
| 3  | Lack of management schedule          | 0.075       | 0.090     | 0.071         | 0.839 | 0.402   |

\[ R^2 = 0.205 \]
\[ F = 20.464 \]
\[ \text{Sig. } F = 0.000 \]

Table 6 shows the regression analysis results of employee’s low ergonomics risk awareness on independent variables. The results exhibit there are two independent variables were significant predictors \((p<0.05)\) and other one was not significant predictors \((p>0.05)\). Specifically, Table 6 reveals that low ergonomics risk awareness has strong influence by inappropriate method and tools \((F=20.464, \beta=0.204, p<0.05)\) and tight development schedule \((F= 20.464, \beta=0.259, p<0.05)\). Beside that these results showed that employees with low ergonomics risk awareness did not significantly relate with lack of management support. Therefore this study has formed below equation, in order to predict the relationship between low ergonomics risk awareness with lack of ergonomic knowledge and tight development schedule.

\[ Y = 0.512 + 0.204x_1 + 0.259x_2 + 0.238 \]  \( (2) \)

Figure 2. Positive linear relationship between low ergonomics awareness and inappropriate method and tools.

Figure 2 shows that employees low ergonomics risk awareness has positively significant relationship with inappropriate method and tools. This explains that the more inappropriate method and tools applied the lower ergonomics risk awareness among the employees.
Figure 3 show that employees low ergonomics risk awareness has positively significant relationship with tight development schedule. This explains that the more tight development schedule the lower ergonomics risk awareness among employees.

1.7. Moderated regression analysis results
In this research study moderated regression analysis purpose is to test the interactive effects of three independent variables with six moderator variables on employee’s low ergonomics risk awareness. The moderated regression analysis results were informed that there are moderating effect for inappropriate method and tools and tight development schedule. However there was no moderating effect for lack of management support.

Table 7. Moderated Regressing low ergonomics risk awareness on inappropriate method and tools

| No | Independent variables                              | Unstd Coef | Std error | Std coeff (β) | T       | Sig (p) |
|----|----------------------------------------------------|------------|-----------|---------------|---------|---------|
| 1  | Inappropriate method and tools                      | 0.367      | 0.070     | 0.357         | 5.244   | 0.000   |
| 2  | Inappropriate method and tools * age                | -0.050     | 0.027     | -0.159        | -1.832  | 0.069   |
| 3  | Inappropriate method and tools * education level    | 0.027      | 0.020     | 0.092         | 1.294   | 0.197   |
| 4  | Inappropriate method and tools * working experience | 0.033      | 0.027     | 0.109         | 1.226   | 0.222   |
| 5  | Inappropriate method and tools * working position   | 0.040      | 0.020     | 0.140         | 1.975   | 0.050   |
| 6  | Inappropriate method and tools * working department | 0.011      | 0.020     | 0.040         | 0.578   | 0.564   |
| 7  | Inappropriate method and tools * no of project involvement | 0.042      | 0.022     | 0.149         | 1.930   | 0.055   |

R2 = 0.196
F = 6.258
Sig. F = 0.000

Table 7 displays the moderated regression results of low ergonomics risk awareness on inappropriate method and tools and the dependence of moderator variables. The results reveals working position and number of project involvement have caused the moderation effect in the relationship between low ergonomics risk awareness and inappropriate method and tools (p<0.05). Even though the value p=
0.055 we have considered the number of project involvement also one of the moderated effect. Explicitly, Table 7 reveals that relationship between low ergonomics risk awareness and inappropriate method and tools does not depend on employee’s age (F=6.258, p=0.069), employee’s education level (F=6.258, p=0.197), employee’s working experience (F=6.258, p=0.222) and employee’s working department (F=6.258, p=0.564).

### Table 8. Moderated Regressing low ergonomics risk awareness on tight development schedule

| No | Independent variables | Unstd Coeff | Std error | Std coeff (β) | t     | Sig (p) |
|----|------------------------|-------------|-----------|---------------|-------|---------|
| 1  | Tight development schedule | 0.378       | 0.077     | 0.335         | 4.898 | 0.000   |
| 2  | Tight development schedule *age | -0.135      | 0.070     | -0.180        | -1.939| 0.054   |
| 3  | Tight development schedule *education level | 0.203       | 0.056     | 0.313         | 3.613 | 0.000   |
| 4  | Tight development schedule *working experience | 0.039       | 0.084     | 0.049         | 0.462 | 0.645   |
| 5  | Tight development schedule *working position | 0.080       | 0.072     | 0.083         | 1.107 | 0.270   |
| 6  | Tight development schedule *working department | 0.008       | 0.064     | 0.009         | 0.132 | 0.895   |
| 7  | Tight development schedule * No of project involvement | 0.002       | 0.080     | 0.002         | 0.021 | 0.983   |

R² = 0.242  
F = 8.266  
Sig. F = 0.000

Table 8 displays the moderated regression results of low ergonomics risk awareness on tight development schedule and the dependence of moderator variables. The results reveals age and education level have caused the moderation effect in the relationship between low ergonomics risk awareness and tight development schedule (p<0.05). Even though the value p=0.054 we have considered the age was one of the moderated effect. Explicitly, Table 8 reveals that relationship between low ergonomics risk awareness and tight development schedule does not depend on employee’s working experience (F=8.266, p=0.645), employee’s working position (F=8.266, p=0.270), employee’s working department (F=8.266, p=0.895) and employee’s no of project involvement (F=8.266, p=0.983).

### 1.8. Testing of hypotheses

Table 6 shows the regressing low ergonomics risk awareness on model variables. These results indicate that low ergonomics risk awareness affect by inappropriate method and tools and tight development schedule (F=20.464, p<0.05). It is consistent with hypothesis H₁ that inappropriate method and tools are discouraging employees to practice ergonomics measure at early product development stage. The regression analysis results also consistent with hypothesis H₂ that tight development schedule is depressing employees to apply the ergonomics principle at early product development stage. Refer to Table 6, no significant results was found for the other predictor variable (F=20.464, p>0.05). These results indicate that low ergonomics risk awareness does not affect by lack of management support (F=20.464, p=0.402). Therefore the H₃ could not be verified.

Further testing has been conducted on other hypotheses (H₄a, H₄b, H₄c, H₄d, H₄e, H₄f, H₅a, H₅b, H₅c, H₅d, H₅e, H₅f, H₆a, H₆b, H₆c, H₆d, H₆e, H₆f) in order to examine the relationship between low ergonomics risk awareness and predictors variables moderated by respondent variables (age, education level, working experience, working position, working department, no of project involvement). The relationship between the variables has evaluated by using the moderated regression analysis. There
was moderate effect results were found for predictor’s variables for inappropriate method and tools, and tight development schedule. Since there is no moderate effect found for lack of management support (Sign F>0.05) some hypotheses (H_4a to H_4e) could not be verified.

Table 7 displays the moderated regressing results for low ergonomics risk awareness on inappropriate method and tools. Relationship between low ergonomics risk awareness and inappropriate method and tools have interacted with working position and no of project involvement. Thus it was consistent with hypothesis H_4d, relationship between low ergonomics risk awareness and inappropriate method and tools is moderated by employee’s working position. The moderated regression analysis results also consistent with hypothesis H_4f, relationship between low ergonomics risk awareness and inappropriate method and tools are moderated by employee’s number of project involvement. However relationship between low ergonomics risk awareness and inappropriate method and tools has not interact with age, education level, working experience, and working department variables (F=6.258, p>0.05). Thus it is not consistent with several hypotheses (H_4a, H_4b, H_4c, and H_4e). These results indicate that relationship between low ergonomics risk awareness and inappropriate method and tools does not moderated by age, education level, working experience and working department.

Table 8 shows the moderated regression on low ergonomics risk awareness on tight development schedule. Relationship between low ergonomics risk awareness and tight development schedule has interact effect with age and education level (F=8.266, p<0.05). It is consistent with hypothesis H_5a and H_5b that relationship between low ergonomics risk awareness and tight development schedule is moderated by employee’s age and education level. There were results (Sign F=0.000, β=−0.159) indicate that the relationship between low ergonomics risk awareness and tight development schedule is strong for younger employees. These results also (Sign F=0.000, β=0.333) indicate that the relationship between low ergonomics risk awareness and tight development schedule is strong for non-degree holder employees. Refer to Table 8, there is no moderation effect were found for the other moderator variables (F=8.266, p>0.05). These results indicate that relationship between low ergonomics risk awareness and tight development schedule does not depend on working experience, working position, working department, no of project involvement. Therefore the other hypotheses (H_5c, H_5d, H_5e, H_5f) could not be verified.

5. Discussions
This study indicates that inappropriate method and tools are positively related to employees low ergonomics risk awareness. It is same findings with what has been found in previous studies, workers are not really aware that the levels of vibration transmitted to their hands exceed certain limits, which represents an additional risk [20]. Exposure assessment tools are used to quantify physical exposure and estimate the risk of developing a work-related musculoskeletal disorder (MSD) [21]. Basically the choice of assessment tools depends on the characteristics of the work task, but may also depend on training, familiarity, practicality, cost, and time required to use the tool [22].

The results study showed that tight development schedule was affecting the employees low ergonomics risk awareness. It is consistent with this study research hypothesis. Tight development schedule is depressing employees to apply the ergonomics principle at early product development stage. Nevertheless quick production schedules may add pressure to consistently heavy workload, willingness to stay flexible, less open minded and responsiveness to ergonomics’ request and needs. Moreover working in tight production schedule condition also will expose employees to the musculoskeletal disorders symptoms like body pain, shoulders, wrist or hand, lower back and other illness that can disturbing their focus on job task. In addition, high levels of psychosocial work stressors (high role conflict, low job control, and low safety-specific leadership) are associated with increased employee strain. Strain, in turn, related to higher levels of work related musculoskeletal disorders (WRMSD) symptoms of the wrist/hand, shoulders, and lower back [23]. The high level of WRMSD symptoms can be the reason for employees have low ergonomics risk awareness when they have tight deadlines for their job task. Previous study found that for individuals with lower back
disorders, additional focus should be to reduce tight deadlines, and work in hot/warm environments [24].

Moreover, this study has detected that lack of management support does not affect employees low ergonomics risk awareness. This result explains that lack of management support is not positively related to employees low ergonomics risk awareness. Basically this study reveals that the lack of management support not stop employees to conduct proactive ergonomics measure in early product development stage. Previous study had suggested that co-worker support and management commitment to safety can act as job resources that positively influence safety performance both directly and indirectly through job engagement [25]. Widanarko and other researchers also claimed that management support is needed by concluded to reduce musculoskeletal MSS and its consequences, employers need to adopt a multifaceted approach: concentrate on improving physical conditions as well as the psychosocial/organizational and environmental aspects of the working environment [26].

6. Conclusions
The important of this study is that factor of inappropriate method and tools, and tight development schedule are playing the significant roles in employee’s low ergonomics risk awareness. Thus company management needs to restructure the work practices and provide equipment and tools for employees to conduct ergonomics assessment. The management teams and employees who involved in project development must identify and review the development schedule. Consequences of the inappropriate method and tools, and tight development schedule caused employees have difficulty to study and evaluate the ergonomics risk in their job task.

This research study admittedly has certain limitations. Not all multiple regressions have produced significant results, explaining why the variance levels remain low. This tends to propose that other variables which were not taken into consideration in the research may influence low level ergonomics risk awareness. The next limitation is the use of certain variables measure by many categories. This may have affected the moderate regression analysis. Further limitation is the representative of our sample is undoubtedly biased owing to the voluntary overrepresentation of young and less experience employees.

Probably the more ergonomics risk study and evaluation required to employees will give them opportunity to get to know the correct and suitable method and tools for ergonomics assessment. The development schedule should illustrate each task involved in the project, the responsible department and person in charged and actual dateline stated. Employees need to manage their time in order to full fill job task requirements which included the human factor matters and the dateline as well. Prioritizing the task is important to employees and they should make ergonomics risk study as main as other items. Finally the relationship between ergonomics risk study and product quality will get more attention and create opportunity to improve design work, ergonomics assessment and manufacturing process at early stage.

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