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The Effort of a Decrease Fatigue Level on Computer User Employees at State University of Medan

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Abstract: ***Computer exhaustion due to long computer usage is a complex criterion which is not only concerns physiological and psychological fatigue but the dominant relationship with the decline in physical performance, the feeling of fatigue, decreased motivation and decreased work productivity. This research was aim to developed an intervention model for decreasing occupational fatigue for computer user employees of the central administration bureau of Unimed. It was conducted by Quasi Experiment with design of Two*Group DesignPretest-Posttest With Control Group sample were 67 peoples. In *this design there were two groups determined consisting of 34 people as the treatment group and 33 peoples as a control group. Data analysis was performed to see before and after intervention and its effect on age, sex and years of service. The data were processed by t-test analysis and f-test. The result of this research showed that there was influence intervention of EMRC toward decreased mental and physical fatigue at the rate of work speed, work accuracy, work consistency and physical exhaustion with a significance value smaller than the value of α = 0.05.***

Keywords: Fatigue, Application of EMRC Model , Batak Toba Instrumental,Bourdon Wiesma, Whole Body Reaction Tester (WBRT)

1. Introduction

Computer is one of technology development. The use of computers around the world has increased over time.Based on a survey in the United States, The average working time used to work with computers is 5.8 hours or69% of total 8 working hours (Wasisto, 2005). It is estimated that nearly 60 million people suffer *of Computer Vision Syndrome* (CVS) global andAbout one million new cases occur each year (Sen dan Richardson, 2007). About 70% of computer workers in the world experience vision problemsanda very sharp improvemnet (Blehm et al., 2005). In addition of CVSfound another disorder in the computer user that is neck pain defined in the study as a natural pain from the base of the skull spread to the top of the back of the shoulder blade (J Can CA, 2008).

State University of Medan (UNIMED) is one of state University in North Sumatera which data processing is by using computer services. The unit that handles this assignment directly is Administration Central Bureau of UNIMED.

Based on the first administration which conductedthere were some administration Central Bureau employee of UNIMED obtained information that the most experienced fatigue of eyes, neck, shoulders, back, waist and mental fatigue. The Employee work start from 08.00 a.m - 16.00 p.mandgiven one break time at 12.00 - 13.00 p.m. while doing their daily tasks and other additional tasks, the time for rest will be shorter and the end of the work will be longer than the time specified.

The tasks that assigned to the employees of the Central Bureau of Administration in Unimed are heavier where the number of jobs is inversely proportional to the number of employees. Information obtained through question and answer by direct interviews to employees that they often complain to the muscles of the eyes, neck, shoulders, back, waist and mental fatigue while working. If the impact of computer use in the form of complaints on the neck muscles, shoulders, back, waist andMental fatigue while working, If it is not resolved properly it will happen down motivation of work, low performance, low quality of work, many mistakes, job stress, occupational diseases, injuries, accidents due to work, Tarwaka (2004). These were complaints resulted in their performance declining so that job completion targets were delayed, often with data revisions because some of the data had typing errors.

Based on the results of interviews conducted on the employees of the Central Bureau Administration of Unimed who experienced a lot of physical fatigue and mental fatigue due to the impact of monotonous computer use needs to be done an action that is by applying a standard model that starts from Explain, Music, Relaxation and Colaboration (EMRC).

This research was aimed to implementation of a model of decreasing the level of work fatigue for employees of computer users in State University of Medan. It was conducted by *Quasi Experiment* with design of *TwoGroup DesignPretest-Posttest With Control Group* sample were 67 peoples.In this design there were two groups determined consisting of 34 people as the treatment group and 33 peoples as a control group. Data analysis was performed to see before and after intervention and its effect on age, sex and years of service. The data were processed by *t*-test analysis and *f*-test.

2. The Result of the Research

Respondents in this study were civil servants and honorary staff who use computers in the central building

administration unimed. The samples in this study were 67 people consisting of 34 people as treatment group and 33 people as control group. Samples taken based on computer user criteria over 4 hours in 1 day.

Table 1: T-TestMental Fatigue Data At the Level of Control Group Work speed and Intervention Group on Computer User Employees at Administrative Center of State University of Medan

		t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Postest speed	Equal variances assumed	18.208	65	.000	2.12206	1.88930	2.35481
	Equal variances not assumed	18.182	63.979	.000	2.12206	1.88889	2.35522

Table 2: T-TestMental Fatigue Data Accuracy At Level Working Group and the Control Group Intervention On Employee Computer Users in the Administration Center, State University of Medan

		t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Postest of Accuracy	Equal variances assumed	10.428	65	.000	8.952763	7.238213	10.667313
	Equal variances not assumed	10.361	53.815	.000	8.952763	7.220220	10.685306

Table 3: T-TestMental Fatigue Data Consistency At Level Working Group and the Control Group Intervention On Employee Computer Users in the Administration Center, State University of Medan

		t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Postest of work Consistency	Equal variances assumed	33.404	65	.000	5.885410	5.533537	6.237283
	Equal variances not assumed	33.355	63.961	.000	5.885410	5.532909	6.237911

Table 4: T-TestPhysical Fatigue Data and Control Group Intervention Group Employee Computer Users in Administrative Center of State University Medan

		T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Postest Visual	Equal variances assumed	18.785	65	.000	319.724	285.732	353.715
	Equal variances not assumed	18.710	59.847	.000	319.724	285.540	353.907

Table 5: Summary of F-Test on Average Physical Exhaustion Intervention Results Based on Age Group, Sex and Employee Period Computer User in Administrative Center State University of Medan

Group	F_{count}	F_{table}
Age	15,769	3,3074
Sex	0,104	4,1536
Work period	1,185	3,3074

Table 6: Average Physical Fatigue Intervention Results Based On Age Group Employee Computer Users Administration Center, State University of Medan

Age	Mean	Std. Deviation	N
20 ≤ age< 30 year	385.32	59.608	12
30 ≤ age< 40 year	451.97	86.812	13
ager ≥ 40 year	549.67	29.861	9
Total	454.31	91.400	34

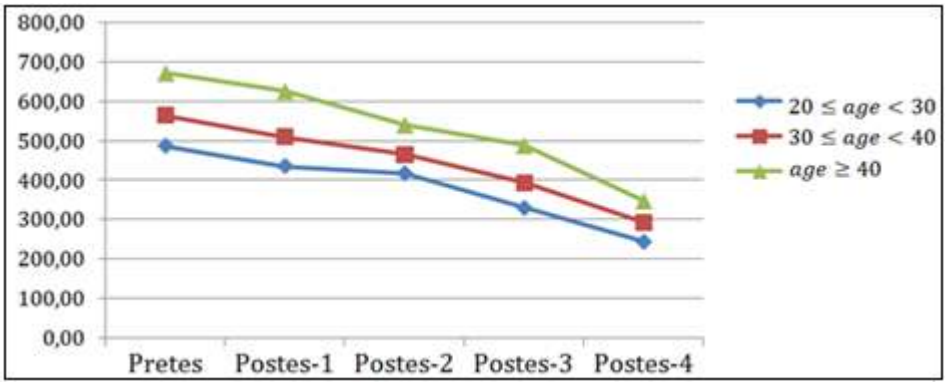

Figure 1: Diagrams of Fatigue Physical Measurement Result by Age

Table 7: Summary of Test-F against Mean Mental Fatigue Speed Level Working On Intervention Results Based On Age Group, Gender and Tenure Employees Computer Users In Central Administration of the State University of Medan

Group	F_{count}	F_{tablel}
Age	11,457	3,3074
Sex	0,752	4,1536
Work period	2,508	3,3074

Table 8: Average Mental Fatigue at Level Of Speed Of Work Intervention Results Based On Age Group Employees Computer Users in Administrative Center State University of Medan

Age	Mean	Std. Deviation	N
20 ≤ age < 30 year	7.4608	.27298	12
30 ≤ age< 40 year	7.6731	.27633	13
Age ≥ 40 year	8.1033	.38396	9
Total	7.7121	.39198	34

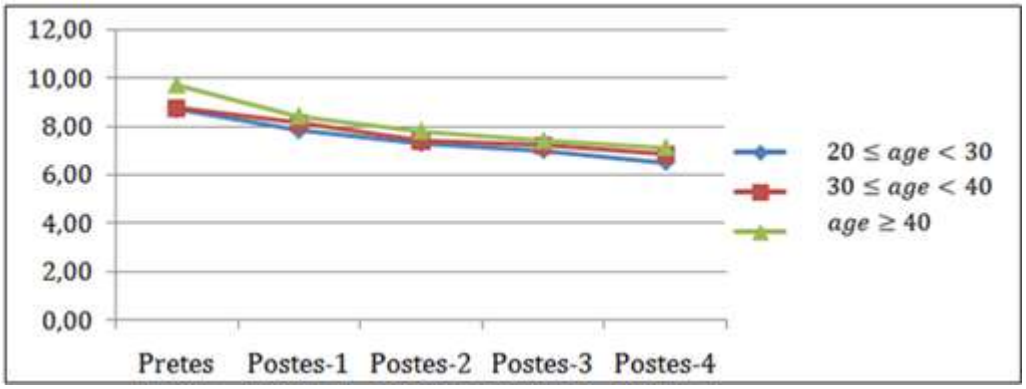

Figure 2: Line Diagram of Mental Fatigue Measurement Results Level of Working Speed Based on Age

Table 9: Summary of F-Test on Average Mental Fatigue At Level of Work Accuracy Intervention Results Based on Age Group, Sex And Employee Period Computer User In Administrative Center State University of Medan

Group	F_{count}	F_{table}
Age	5,021	3,3074
Sex	0,776	4,1536
Work period	0,407	3,3074

Table 10: Mean Mental Fatigue at Work Accuracy Level Intervention Results Based On Age Group Employee Computer Users Administration Center, State University of Medan

Age	Mean	Std. Deviation	N
20 ≤ age < 30 year	13.8500	2.48651	12
30 ≤ age< 40 year	15.3692	2.05888	13
Age ≥ 40 year	17.3333	3.03645	9
Total	15.3529	2.78004	34

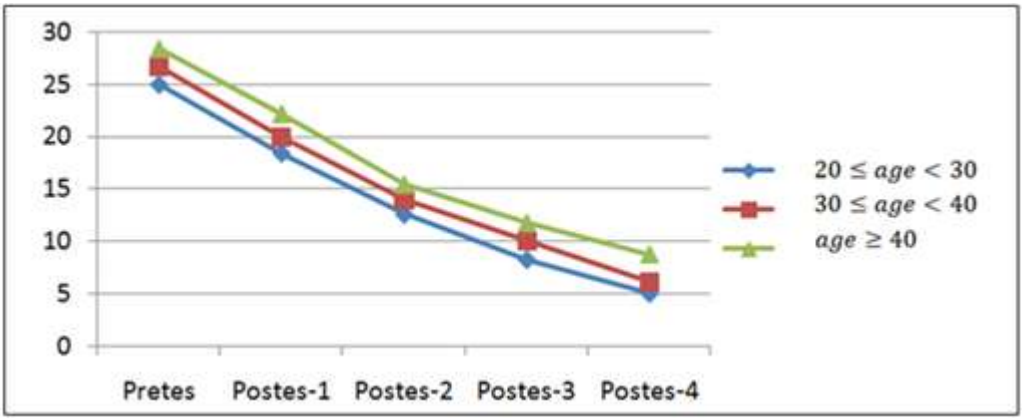

Figure 3: Line Chart Mental Fatigue Measurement Result Accuracy Level Job Based On Age

Table 11: Summary of F-Test on Average Mental Fatigue at Level of Consistency of Work Intervention Results Based on Age Group, Sex And Employee Period Computer User In Administrative Center State University of Medan

Group	F_{hitung}	F_{table}
Age	16,897	3,3074
Sex	0,813	4,1536
Work period	2,638	3,3074

Table 12: Mean Mental Fatigue Working On Consistency Level Intervention Results Based On Age Group Employee Computer Users Administration Center, State University of Medan

Age	Mean	Std. Deviation	N
20 ≤ age< 30 year	5.39833	.408831	12
30 ≤ age< 40 year	5.79615	.354837	13
Age ≥ 40 year	6.53778	.595457	9
Total	5.85206	.625929	34

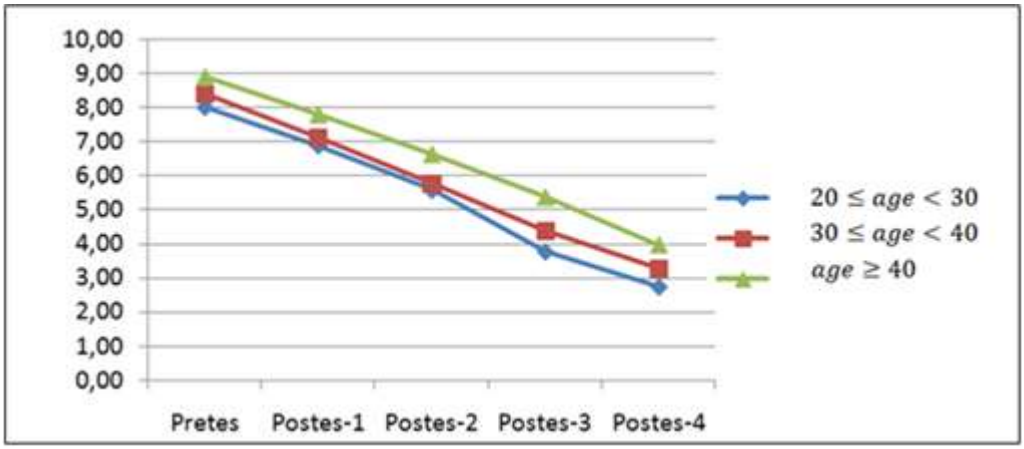

Figure 4: Lineage Diagram of Mental Fatigue Measurement Results at Age-Based Consistency Level

3. Discussion

The result of data analysis showed that it was 95% confidence level, there were difference of fatigue level of respondent (Physical and mental) in the control group and intervention group. At the end of the intervention of respondents significantly the physical and mental fatigue level of respondents from the intervention group was lower than the physical and mental fatigue level of the respondents from the control group. It showed that by given interventions can significantly decrease the fatigue rate of computer user Administration Center Bureau employees of UNIMED.

It was in accordance with the recommended OSHA (2003) mentions for repetitive work and long static posture, should be given short breaks (micro breaks) and during the rest of the worker must stand to do muscle relaxation and walking around the workplace.It can restore muscle stiffness due to work. Furthermore, the opinion of Nasution (1998) and Suma'ur (1994), that one way to reduce work fatigue is the provision of intermission in the middle of work, and work that is monotonous can be reduced by giving music and rest time for physical exercise (light relaxation) for Workers while sitting.

Implementation of EMRC intervention model in design to be done by all employees of computer users, from the previous explanation it is known that the implementation of the intervention model can improve the physical fatigue and mental fatigue of computer users. Respondents in the intervention group consisted of 16 womens respondents and 18 man respondents. The results of data analysis at each fatigue level indicate that the implementation of intervention period model gives the same effect on man respondents and women respondents, as well as seen from the working period of respondents, respondents in the intervention group consisted of 13 respondents with 1 ≤ Working Period <5 years, 13 respondents with 5 ≤ Working Period <10 years and 8 persons with Work Period ≥ 10 years. The results of the analysis showed that the implementation of the intervention model gives the same impact on the three working groups.

Viewed from the age of respondents in the intervention group consisted of 12 people 20 ≤ age <30 years, 13 respondents 30 ≤ age <40 years and 9 respondents age ≥ 40 years. The results of data analysis on each aspect of fatigue showed that the application of the intervention model gave different effects on the three age groups.

After 4 interventions, the average physical fatigue level of respondents in the 20 ≤ age group <30 years was always better than the other two age groups, 30 ≤ age <40 years and age ≥ 40 years. Similarly, the level of mental fatigue of respondents on the aspect of speed, accuracy and consistency of data analysis showed that respondents from the 20 ≤ age group <30 years better, then group 30 ≤ age <40 years and age group ≥ 40 years. The results of this analysis showed that the intervention could decrease the fatigue level of the more dominant computer user in group of 20 ≤ age <30 years, then group 30 ≤ age <40 years and age group ≥ 40 years.

These results are in accordance with opinion (Suma'mur, 2014) that the need for power substance continues to increase until finally decline at the age of 40 years. Reduced power requirement is because the substance has been declining physical strength so that the activities carried out usually also reduced and slower. Age is related to the performance, because of the increased age will be followed by the process of degeneration of organs so that in this case the organ's ability to decrease, by the reduced ability to cause labor organ will be more susceptible to fatigue.

4. Conclusions

1) The application of intervention could reduce the level of mental and physical fatigue with a significance value smaller than the value of α = 0.05. The results of mental fatigue measurements before intervention was given at the rate of work of the intervention group with good category was 82.4%, good enough category was 14.7% and 2.9% category enough, after a given intervention level increased to a good working speed by 100%. At the level of work accuracy before the intervention given the category of doubt in the amount of 85.3% and fewer categories was 14.7%, after the intervention given the level of work accuracy increased to either of 2.9%, good enough categories was 11.8% and enough catagory was 85.3%.At the level of consistency of work before being given intervention by category was 100%, after being

given intervention, the level of work consistency has increased to 44.1% and the category is quite 55.9%.

2) The results of physical fatigue measurements before the intervention given weight category was 44.1% and Medium category was 55,9%, after physical moderate fatigue intervention was 2,9%, easy category was 79,4% and normal category was 17,6%.
3) The results of data analysis on each aspect of fatigue showed that the intervention gave the same effect on gender variable and length of service, but in the age interval variable EMRC gave different effect.

5. Suggestions

1) For further research it is necessary to design different instrumental and muscle relaxation techniques in order to give different effects on sex variables and work period.
2) Implementation of the EMRC intervention model may be applied elsewhere whose respondent characteristics are similar to that of a computer user in the administration bureau of UNIMED.
3) However, further research can be done by assessing the independence of the respondents in the application of intervention models decreased level of fatigue-related attitudes and behaviors.

References

[1] Blehm, C., Vishnu, S., Khattak, A., Mitra, S., dan Yee RW. 2005. Computer Vision Syndrome: a review. Surv. Ophthalmol. 50(3): 253-262.
[2] Can, J., CA. 2008. A Literature review of neck pain associated with computer use: Public health implications, 52(3): 161-168.
[3] Nasution, H.R, 1998. Kelelahan Tenaga Kerja Wanita dan Pemberian Musik Pengiring di Andiyanto Batik Yogyakarta, Tesis, Universitas Gajah Mada, Yogyakarta.
[4] OSHA, " Computer Workstasions" 2003. Di akses 5 Mei 2015; http://www.osha.gov/SLTC/etools/computerworkstations/workprocess.html.
[5] Sen. A, Richardson S. 2007 . A study of computer-related upper limb discomfort and computer vision syndrome. J. Hum. Ergol (Tokyo). 36(2): 45-50.
[6] Suma'mur P.K. 1994. Higiene Perusahaan Dan Kesehatan Kerja. Jakarta: Haji Masagung.
[7] Suma'mur.,dan Soedirman.2014. Kesehatan Kerja Dalam Perpektif Hiperkes dan Keselamatan Kerja. Jakarta : Erlangga.
[8] Tarwaka, Solichul,HA.,dan Lilik,S., 2004. Ergonomi untuk Keselamatan Kesehatan Kerja dan Produktivitas . Surakarta: UNIBA Press .
[9] Wasisto, S.W. 2005 , Komputer Secara Ergonomis dan Sehat . Di akses 17 November 2015; http://www.wahana.com.