

Prevalence of Cumulative Trauma Disorders Within Office Workers in Palestine

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Supervisors:
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Content

- Definition
- Types
- Symptoms
- Causes
- Phases
- Problem Statement
- Methodology
- Results & Analysis
- Recommendations & Conclusion

Definition of Cumulative Trauma Disorders

According to Rell , CTD can be defined as the injuries of the musculoskeletal system, which includes joints, muscles, tendons, ligaments, nerves, and blood vessels.



Jodi M. Rell

Types of CTD



- Tendon disorders
- Nerve disorder
- Others

Symptoms of CTD



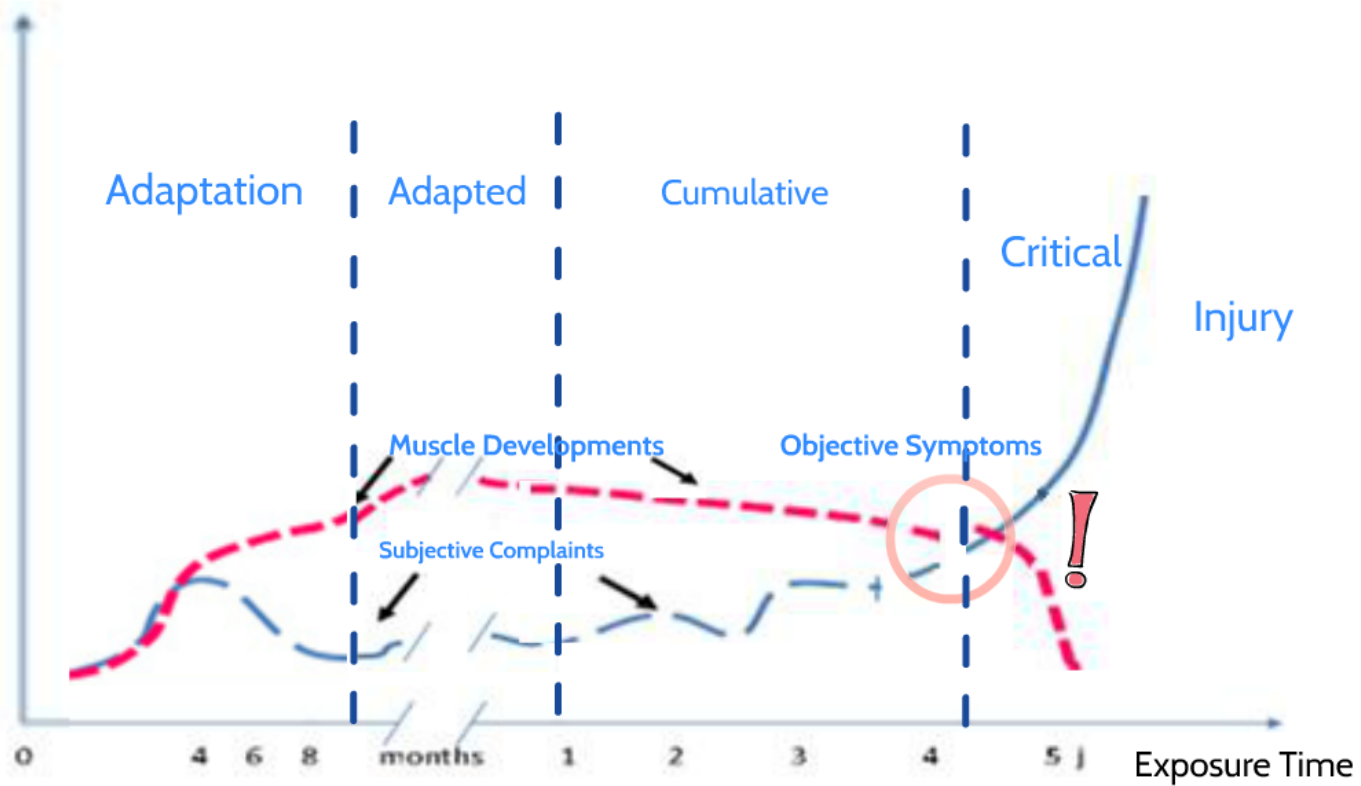
1. Numbness
2. Itching
3. Redness
4. Prickle
5. Tumescence
6. Miniaturization
7. heat

Causes Of CTD

- Repetitive movements. 
- Wrong design for workstations. 

Phases of CTD

Complaints/Problems

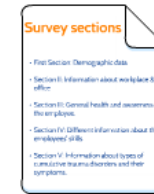


Problem Statement

- Identify the most common types of CTD that may appear on office workers.
- Determines the main causes and symptoms of such disorders.
- Provide some practical solutions and recommendations.



Methodology



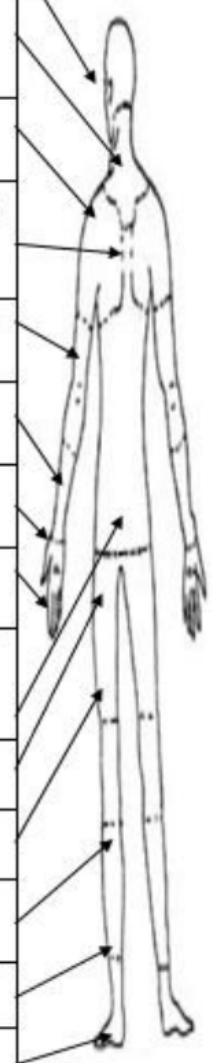
- Designing the questionnaire: We have been studying many articles, which help us in setting the bases for the questionnaire.
- Survey was verified and checked by several reviewer.
- 1,000 questionnaires were distributed to different office workers through Nablus, Ramallah, and Tulkarem city.
- 850 questionnaires were received from all cities, 506 valid questionnaires were analyze.
- Template has been designed by SPSS program.
- The analyses were completed by the SPSS in addition to some tests were done by MINITAB program, such normality, hypotheses test and Regression analysis.

Survey sections

- First Section: Demographic data
- Section II: Information about workplace & office
- Section III: General health and awareness of the employee.
- Section IV: Different information about the employees' skills.
- Section V: Information about types of cumulative trauma disorders and their symptoms.

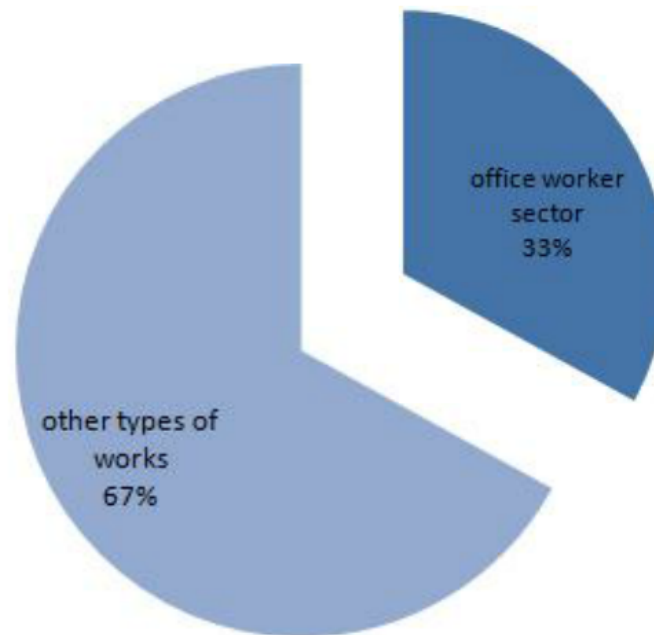


اعراض الالام							مكان	الحدود
سقونة	تشنجة	وخز	احمرار	التطخ	حكة	خبر	الام	
							الايمن	العين
							الايسر	
							الأوسط	الرقبة
							الايمن	
							الايسر	
							الايمن	الكتف
							الايسر	
							الأوسط	الجزء العلوي من الظهر
							الايمن	
							الايسر	
							الايمن	الجزء العلوي من اليد
							الايسر	
							الايمن	العضلات
							الايسر	
							الايمن	الرسغ
							الايسر	
							الايمن	الاصبع
							الايسر	
							الأوسط	الجزء السفلي من الظهر
							الايمن	
							الايسر	
							الايمن	الورك
							الايسر	
							الايمن	الفخذ
							الايسر	
							الايمن	الركبة
							الايسر	
							الايمن	الجزء السفلي من الرجل
							الايسر	
							الايمن	القدم
							الايسر	



Sample Size

The office-working sector accounted for 33% of the total in Palestine, and the total number of workers in different institutions is 858,200 workers. As a result of this data, a total number of office workers is 283,206. A sample of 384 has been considered.

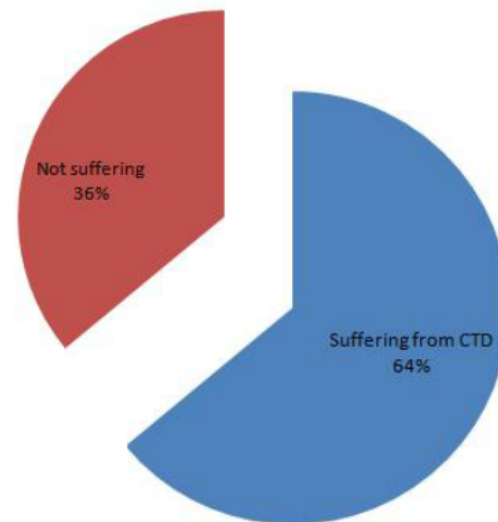


The Obstacles

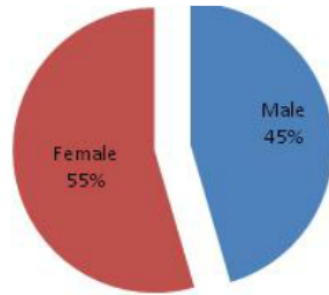
- The lack of many institutes to facilitate the process or to provide enough assistance.
- Few organizations refuse to complete or even receive the questionnaire. Because of that, some of the surveys were lost and other has missing section so they have been eliminated.
- Some workers reject the questionnaire while others were absent, busy or careless.
- There was also misunderstanding for the last section in the surveys and the response was not that much.

Results & Analysis

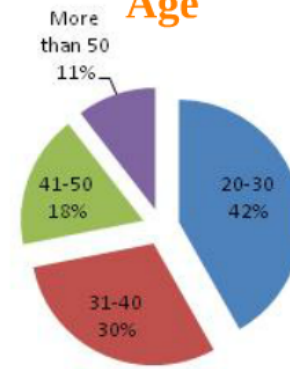
- 64% of office workers complain from at least one type of cumulative trauma disorders.
- The reliability factor (alpha) of the last section is 96%, so we can say that the tested items are related to one another.



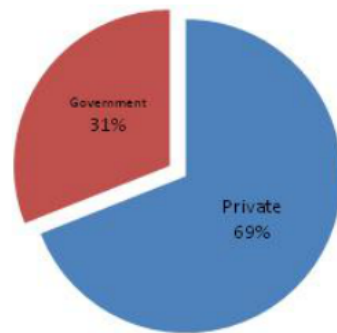
Gender



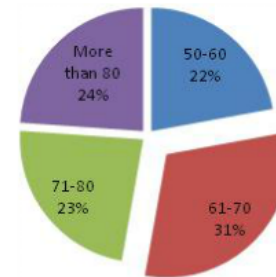
Age



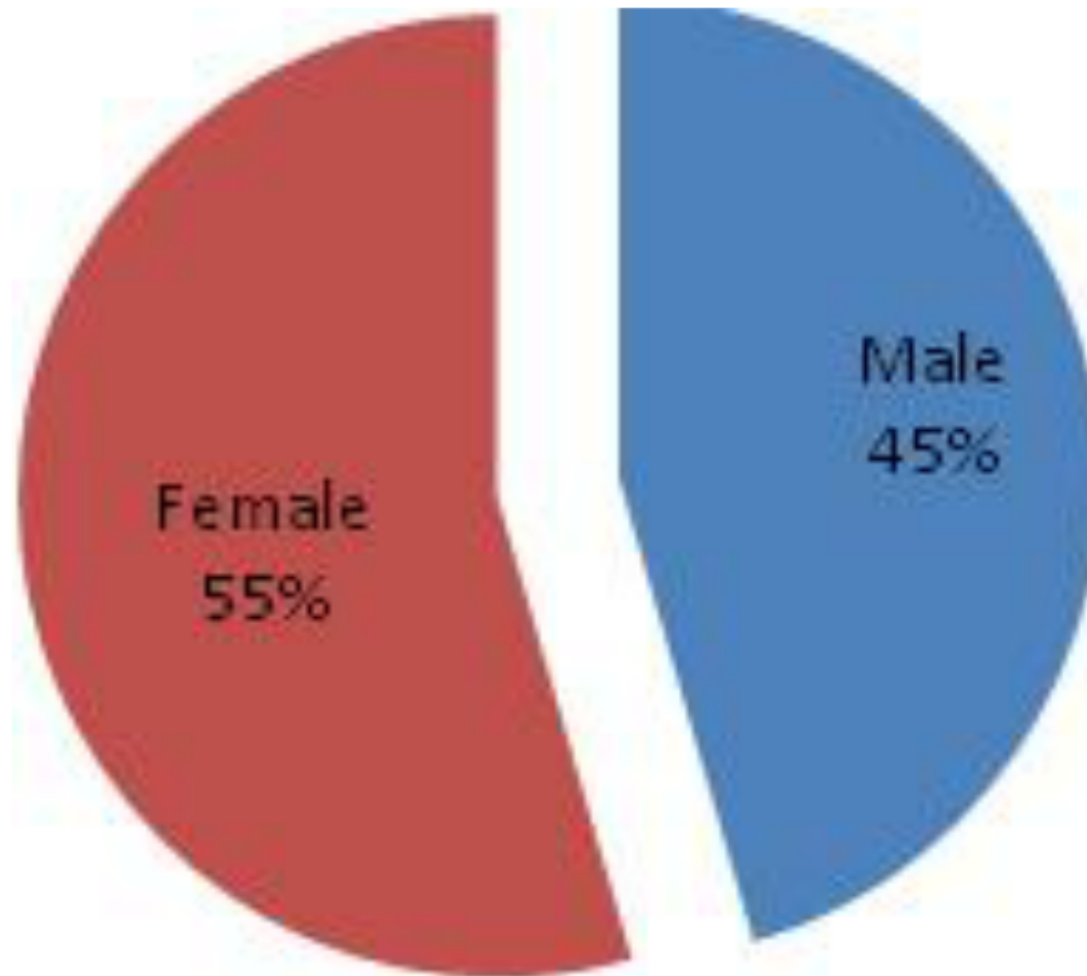
Sector



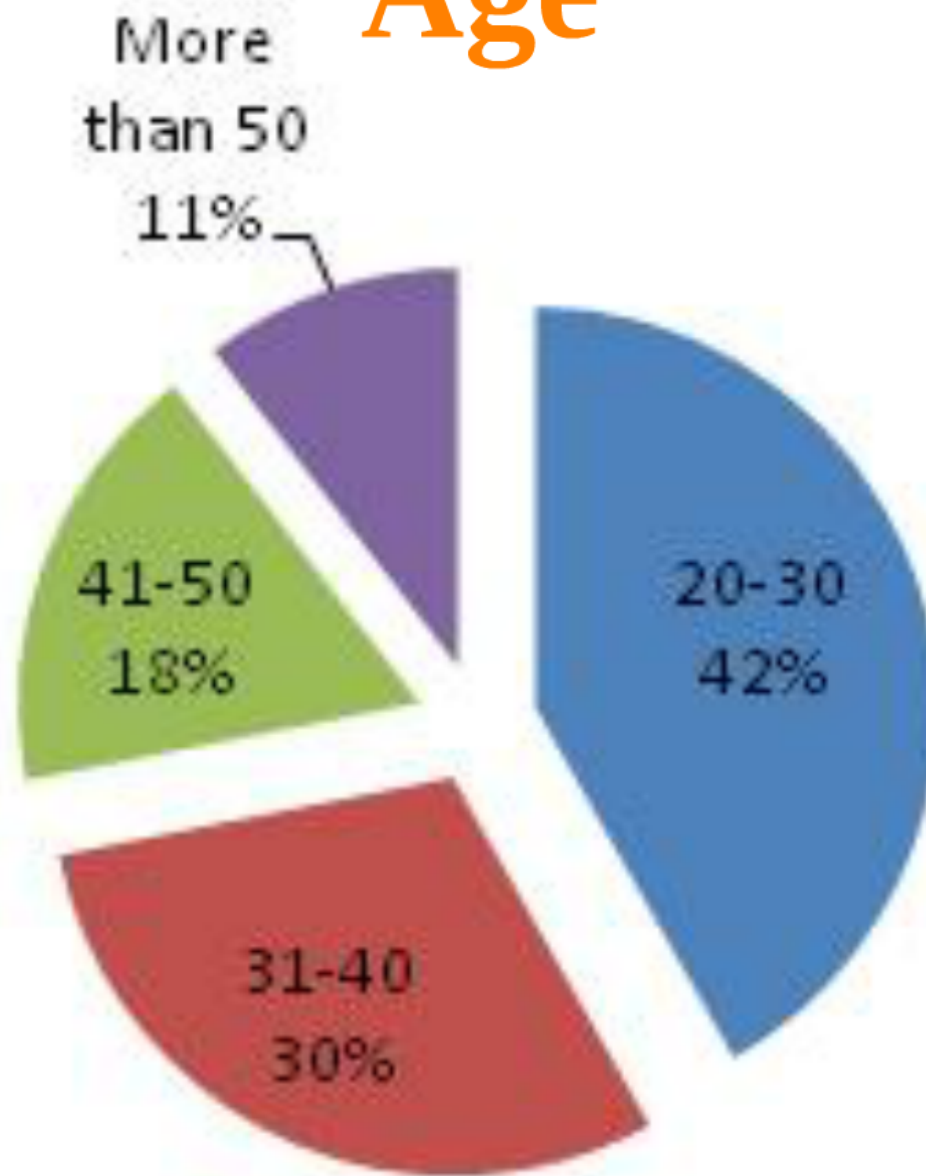
Weight



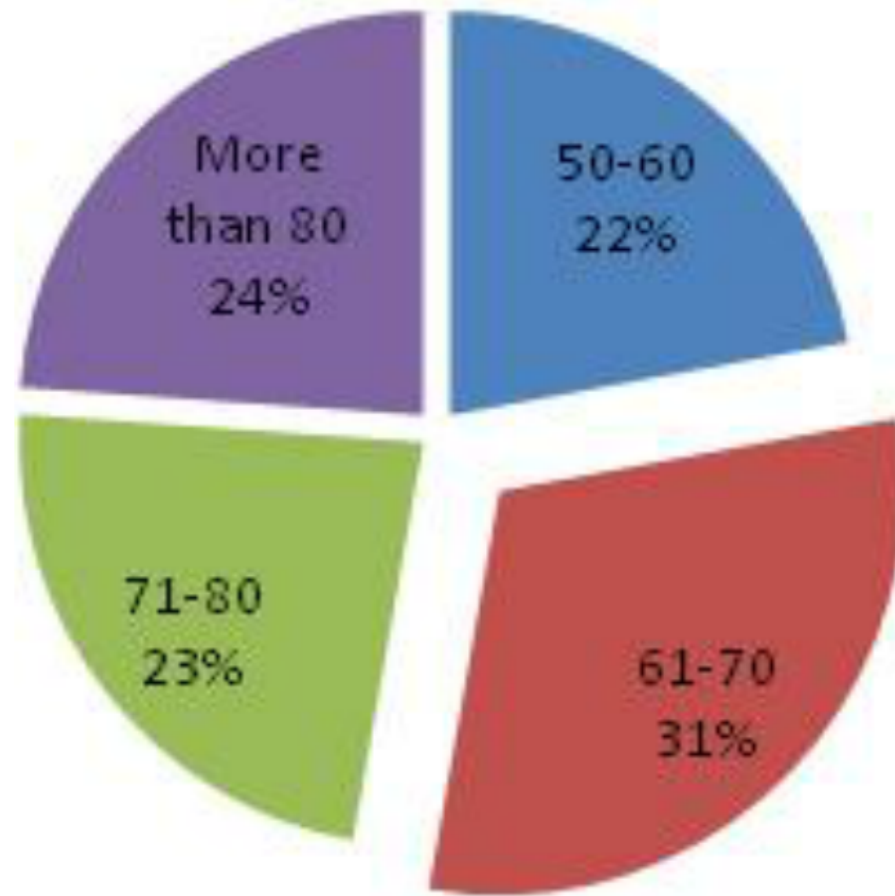
Gender



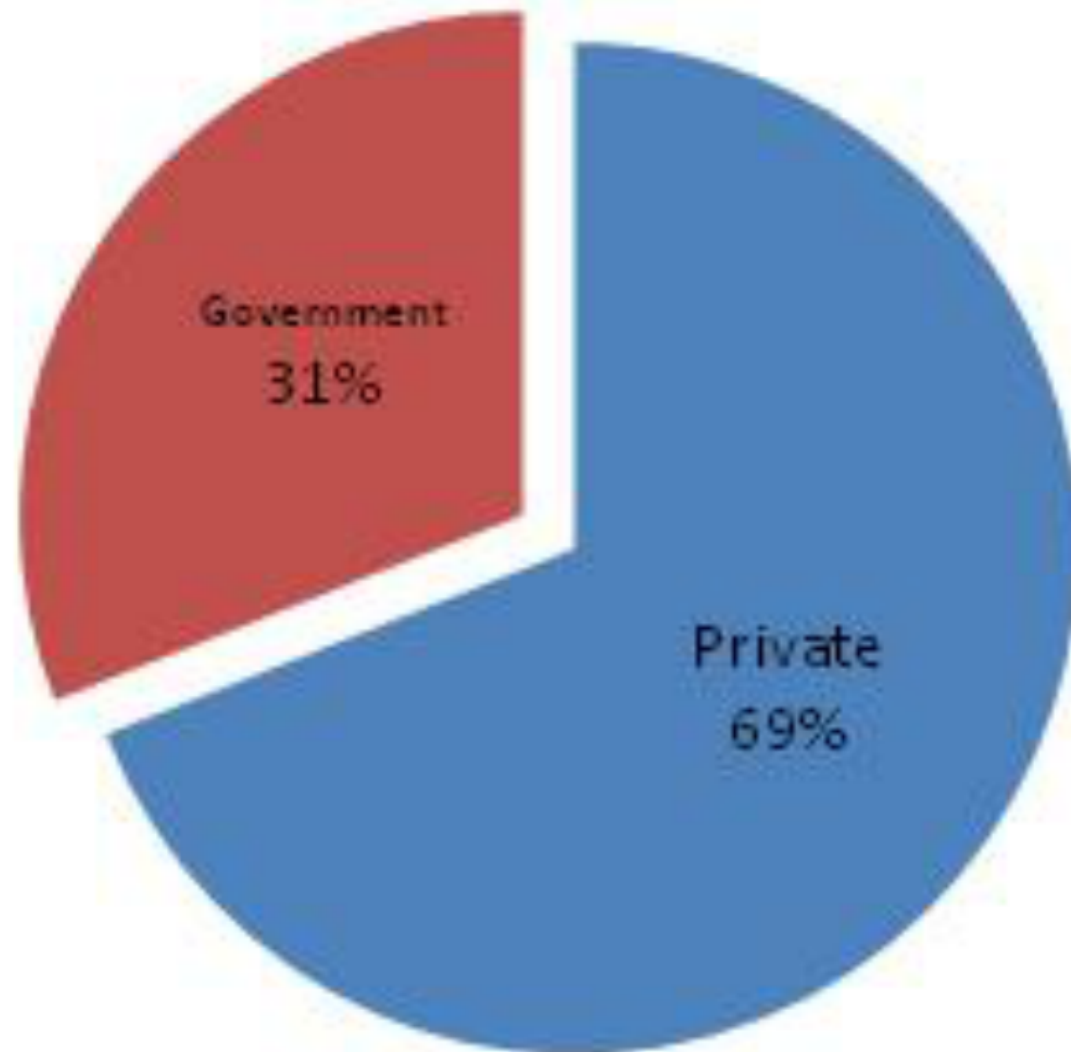
Age



Weight



Sector



Hypothesis Tests

- Since $\alpha = 0.05$, the null hypothesis will be rejected if the P-value was less than 0.05, otherwise, it failed to be rejected.
- Hypothesis testing provide that the prevalence of cumulative trauma disorders among office workers differ depending on either their gender, age, weight, the sector they work for, or working years period.

Hypothesis testing related to Gender

Organs	Male	Female
E	2.26	3.69
N	1.95	3.61
S	1.88	3.45
UB	2.02	3.80
UH	2.01	3.13
A	1.64	3.45
W	1.72	3.51
F	1.81	3.54
LB	2.33	3.95
H	1.59	3.39
T	1.70	3.04
K	1.92	3.97
L	2.24	3.44
FF	2.19	4.09

- P-value equals to zero (less than 0.05)
- Null hypothesis was rejected, which mean that there is a significant difference.
- The biggest significant difference of the incidence rate between males and females appeared at knee limb and it was 2.05

Hypothesis testing related to the Sector

Organs	Private	Government
E	2.70	3.52
N	2.31	3.59
S	2.29	3.62
UB	2.3	4.34
UH	2.23	3.91
A	2.05	4.15
W	2.42	3.02
F	2.39	4.14
LB	2.60	4.66
H	2.17	3.57
T	2.12	3.22
K	2.41	5.22
L	2.57	4.16
FF	2.58	4.68

- P-value equals to zero (less than 0.05)
- Null hypothesis was rejected, which mean that there is a significant difference.
- The greatest difference between office workers who works for the governmental sector and office workers who works for the private sector was in the knee limb (2.806), whereas the smallest difference was in the hand wrist (0.597).

Hypothesis testing related to the worker's age

- P-value equals to zero (less than 0.05)
- Null hypothesis was rejected
- Office workers aged between 20-30 years suffer greatly from foot disorders, but for ages between 31-40 years or more than 50 years, the main disorder was in the knee limb. However, low back disorder was the major disorder that many office workers who has an age between 41-50 years complained from. Moreover, office workers aged between 41-50 years have the biggest incidence rate for the whole types of CTDs, whereas, the smallest average of CTDs injuries was for office workers aged between 20-30 years. Moreover, the greatest difference between the four age ranges was detected to be in the knee limb, and the smallest difference was in the arm limb.

Organs	20-30	31-40	41-50	More than 50
E	2.42	3.49	4.17	2.39
N	2.06	3.28	4.24	2.43
S	1.82	3.46	4.37	3.11
UB	2.01	3.57	4.67	2.81
UH	1.95	3.42	4.00	2.71
A	1.68	3.51	3.35	2.32
W	2.07	2.93	4.26	2.36
F	2.26	3.05	3.42	2.36
LB	2.51	3.63	5.09	2.89
H	1.89	3.01	3.74	2.49
T	1.76	3.03	3.54	2.33
K	1.99	4.03	4.41	3.42
L	2.26	3.61	3.88	2.48
FF	2.53	3.67	4.5	2.46

Hypothesis testing related to the Worker's Weight

- P-value equals to zero (less than 0.05)
- Null hypothesis was rejected, which mean that there is a significant difference.
- Greatest incidence rate for workers whose weights ranged between 50-60 (Kg), for the same ranges of weights, the smallest incidence rate was for the upper hand limb.

Organs	50-60	61-70	71-80	More than 80
E	3.57	2.86	2.71	2.53
N	2.55	3.20	2.65	2.11
S	2.46	3.18	2.27	2.28
UB	2.84	3.04	2.31	2.44
UH	1.84	2.76	2.77	2.28
A	1.89	2.83	2.10	2.01
W	2.76	2.39	2.74	1.96
F	2.80	2.70	2.99	1.90
LB	2.38	3.01	3.16	2.92
H	2.17	2.59	2.28	2.20
T	2.24	2.16	2.56	1.94
K	2.09	3.00	3.44	2.50
L	2.4	2.39	3.30	2.82
FF	2.81	3.01	3.02	2.84

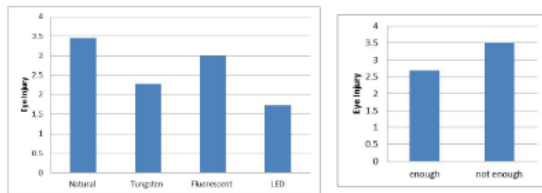
Hypothesis testing related to the Working Years

- P-value equals to zero (less than 0.05)
- Null hypothesis was rejected, which mean that there is a significant difference.
- The prevalence of cumulative trauma disorders affected significantly by the number of working years for each office worker.

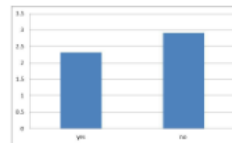
Organs	Work Years	
	(1-5)	More than 5
E	2.67	3.80
N	2.34	3.55
S	2.28	3.64
UB	2.35	3.67
UH	2.19	3.28
A	2.06	3.03
W	2.24	3.33
F	2.53	2.88
LB	2.36	4.22
H	1.57	3.84
T	1.68	3.36
K	2.11	4.23
L	2.20	3.92
FF	2.10	4.39

General Effective Factors with CTD Prevalence

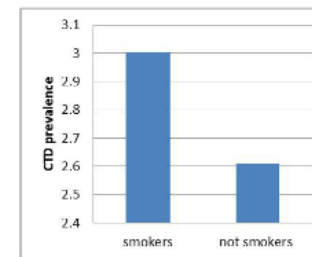
Lighting



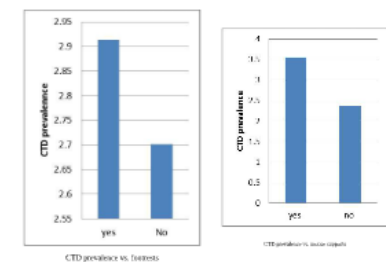
Sports



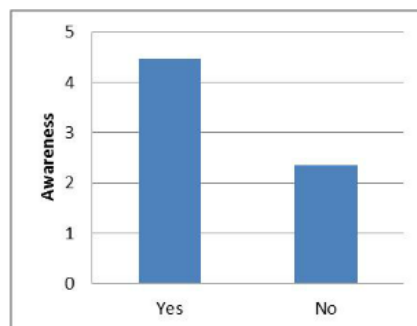
Smoking



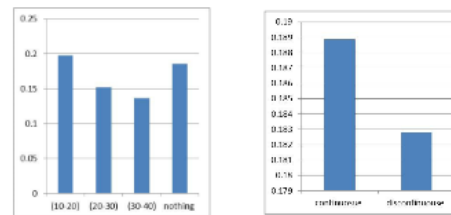
Footrest & Mouse Supports



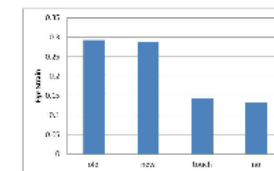
Employee awareness



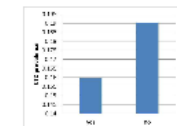
Breaks Time



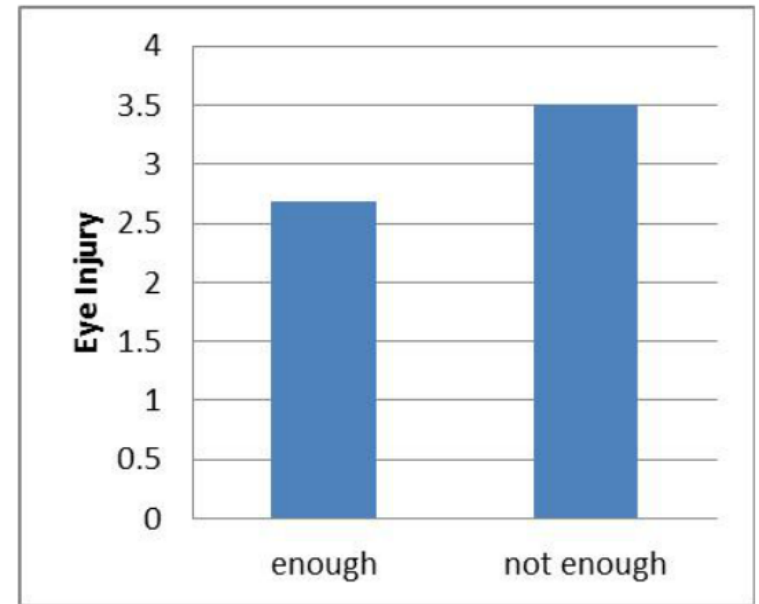
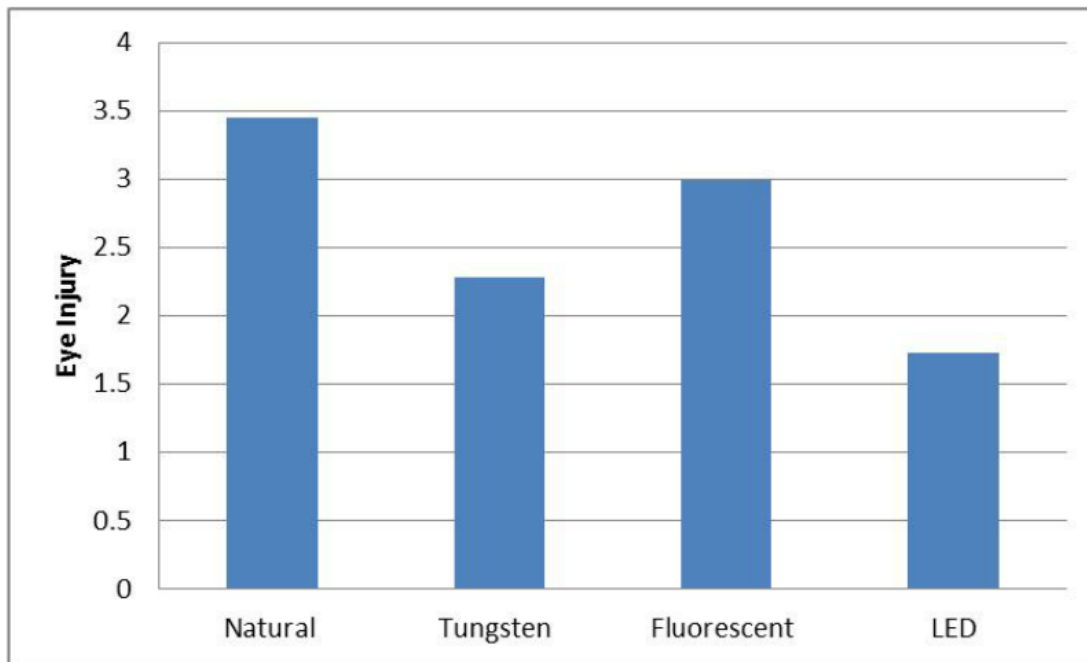
Computer Screens



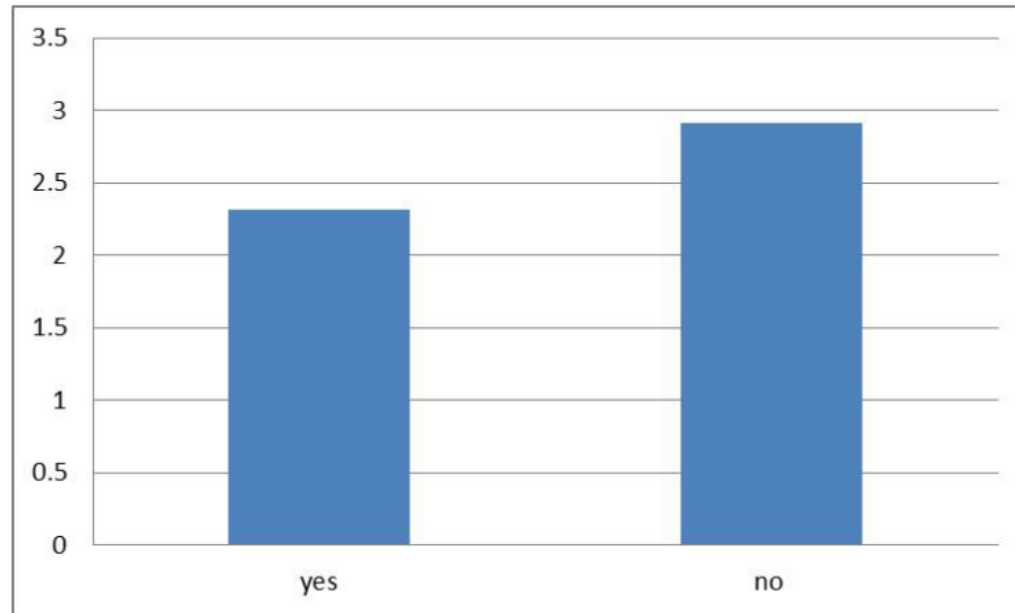
Training programs



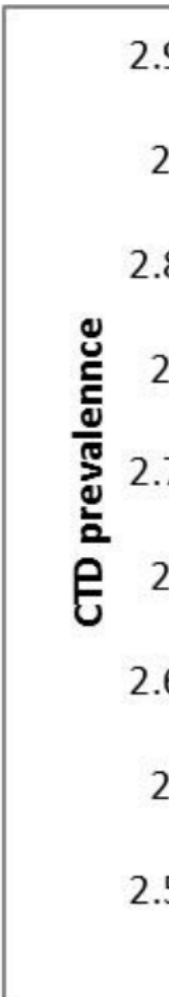
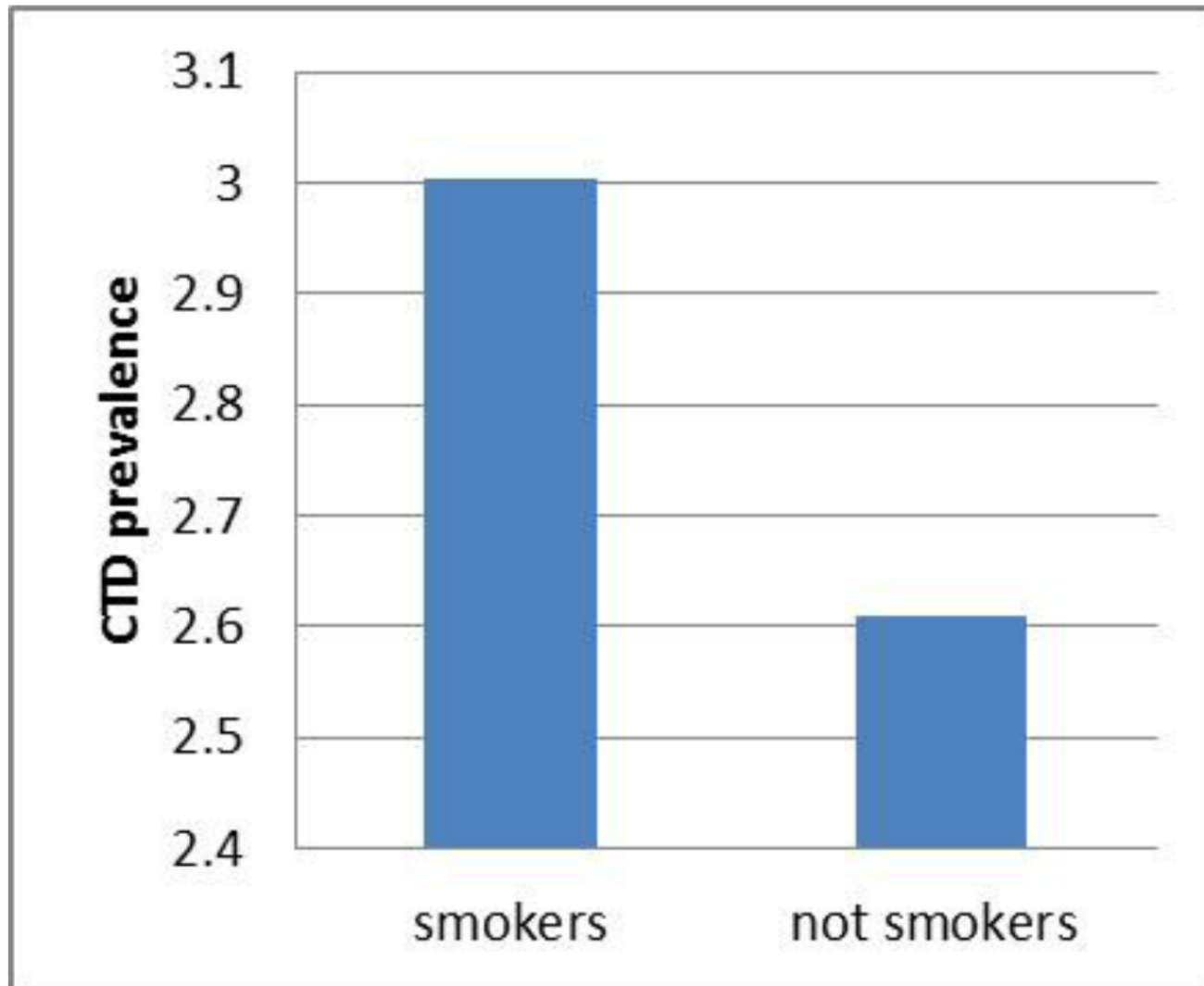
Lighting



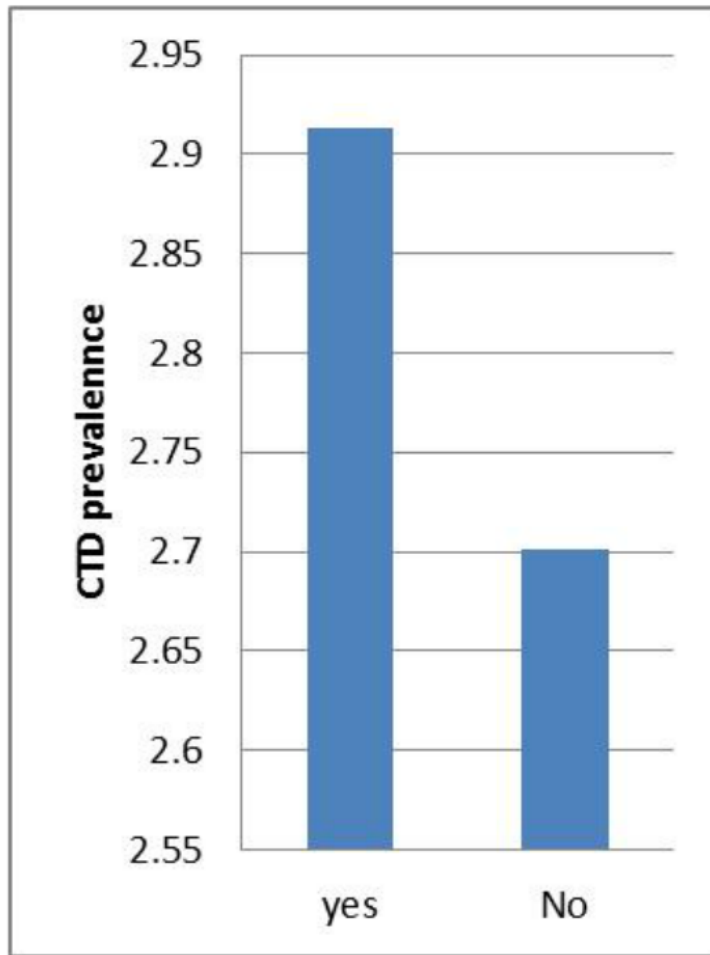
Sports



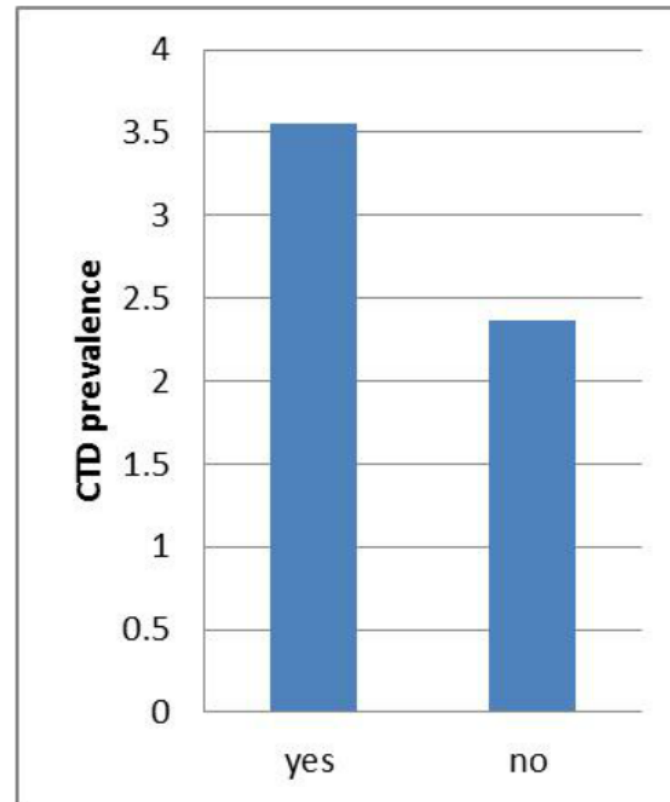
Smoking



Footrest & Mouse Supports

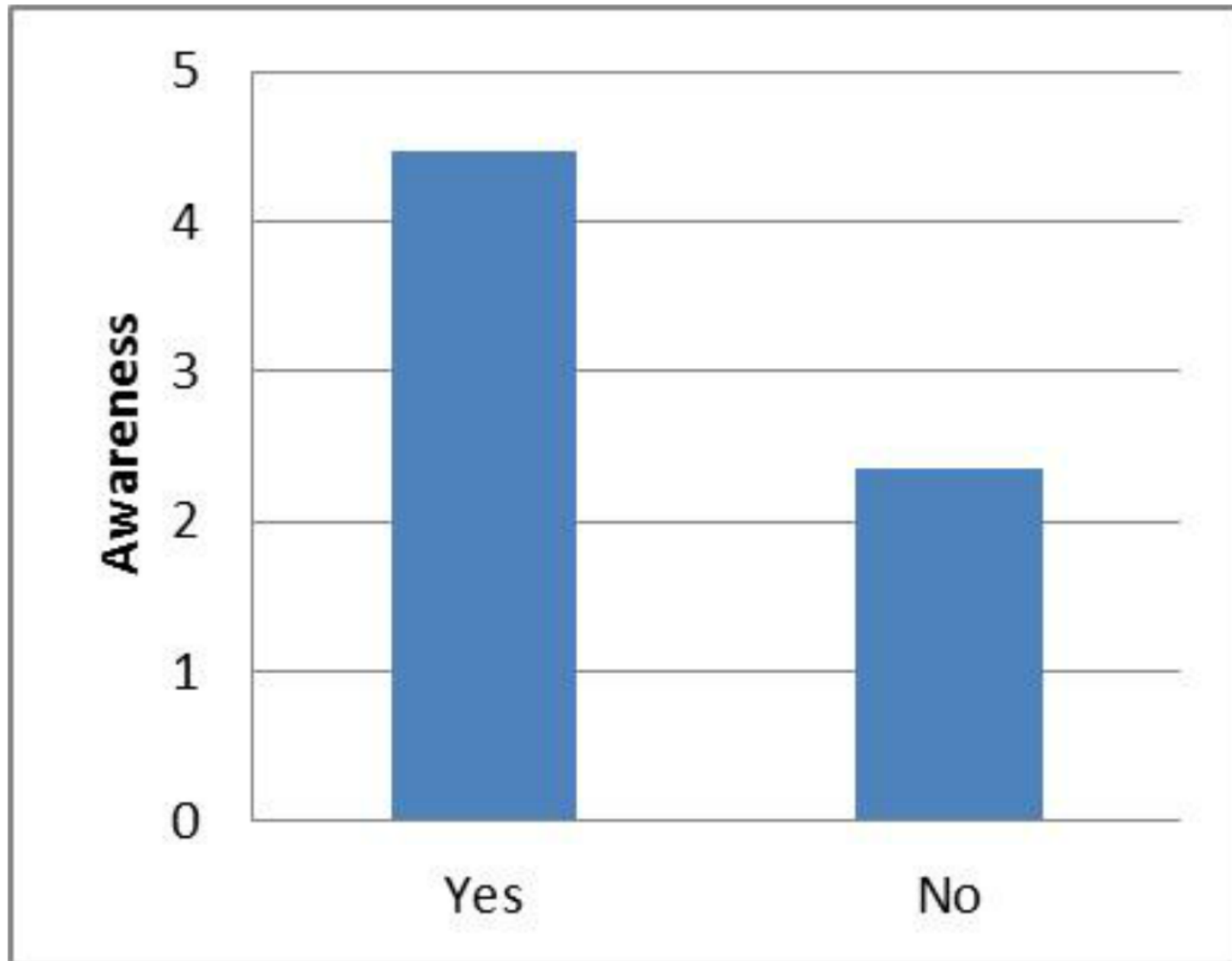


CTD prevalence vs. footrests

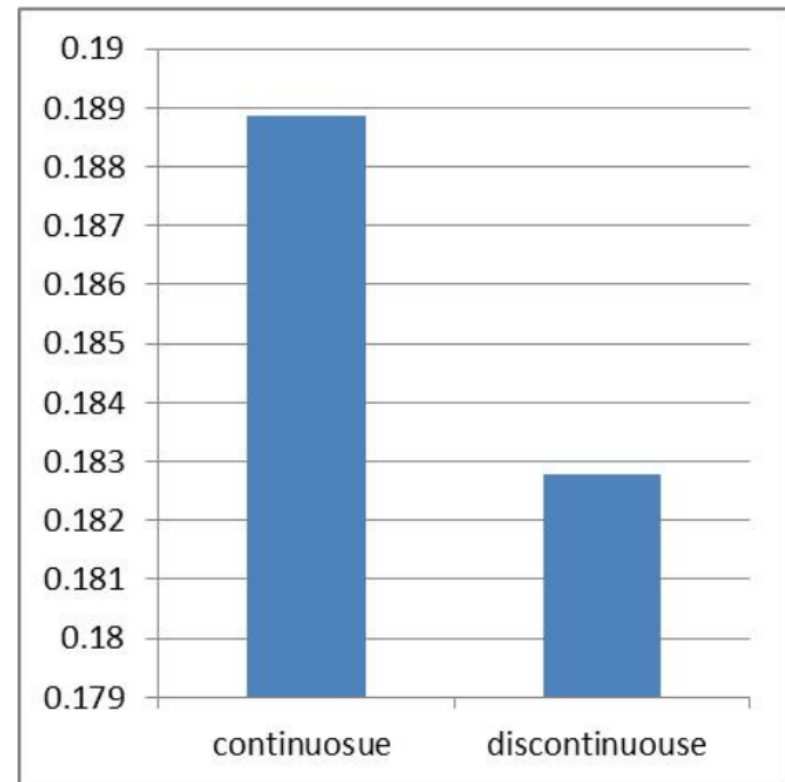
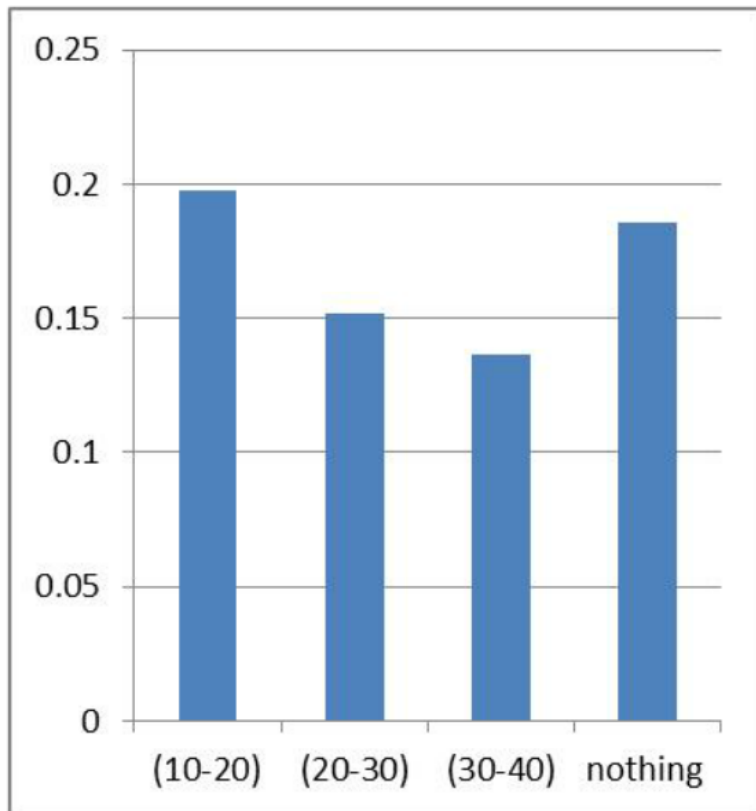


CTD prevalence vs. mouse supports

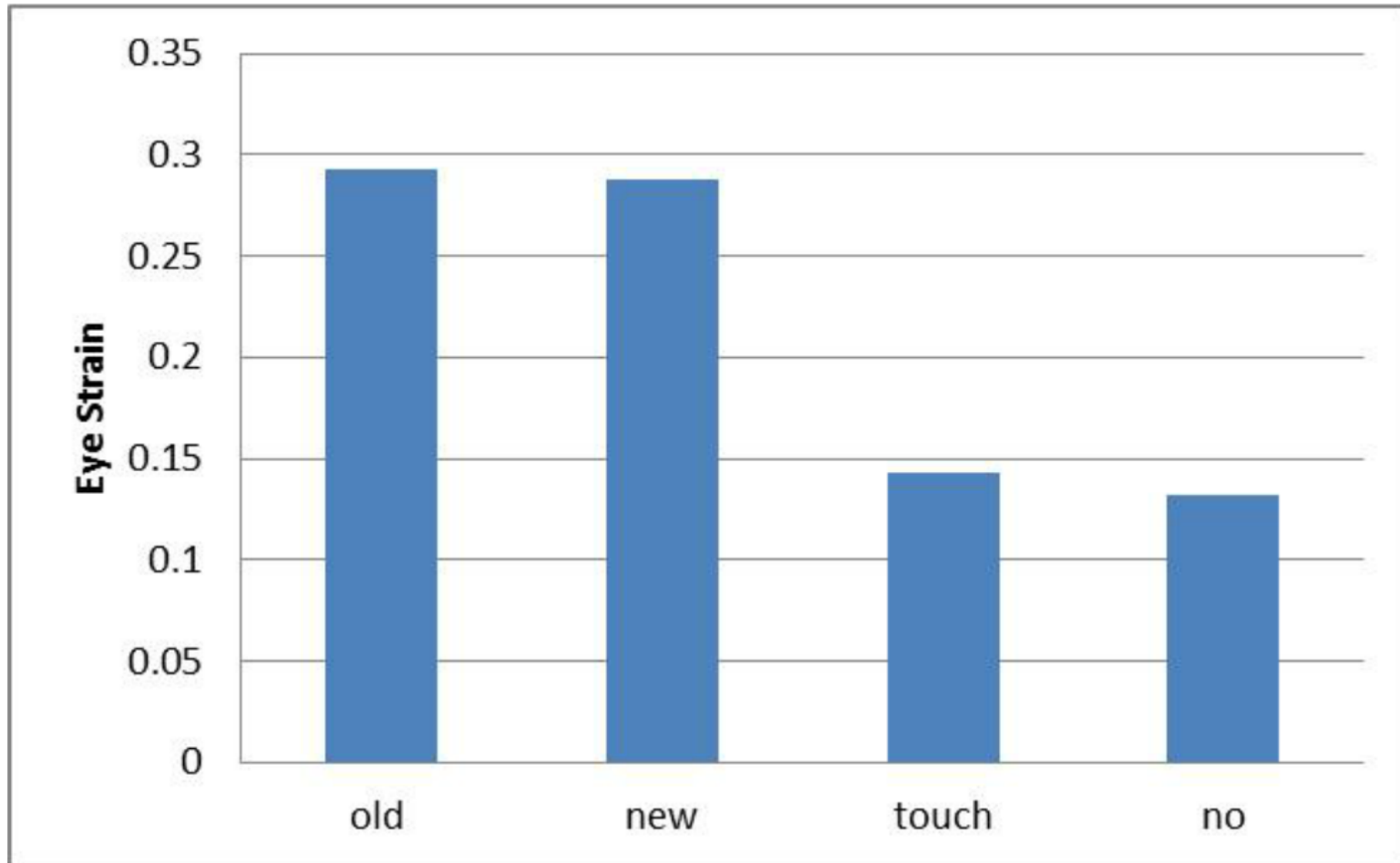
Employee awareness



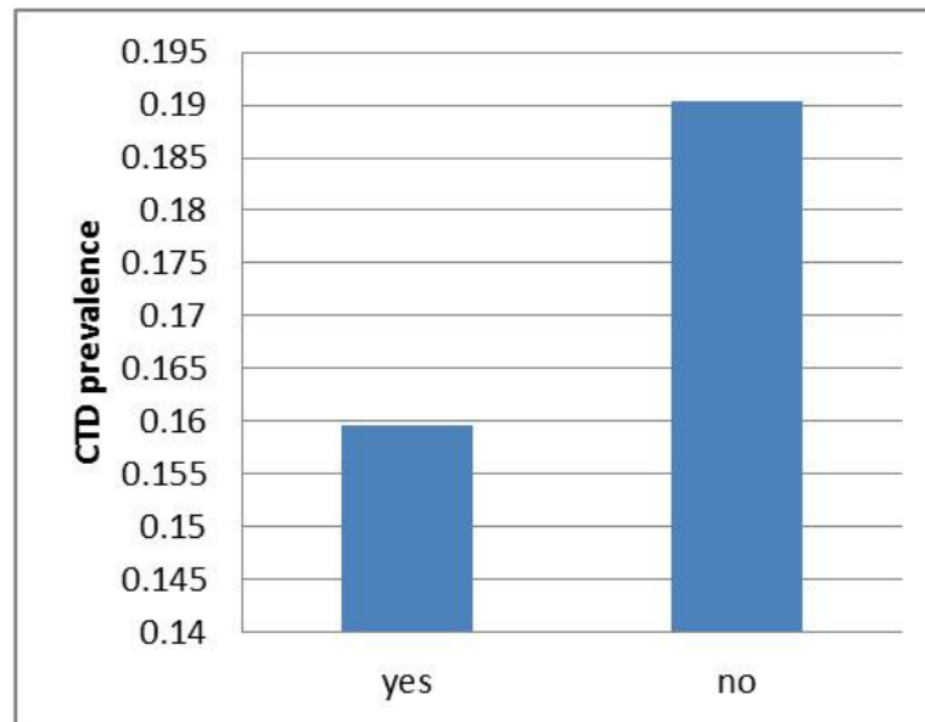
Breaks Time



Computer Screens



Training programs



Regression Analysis

The regression model was obtained , for both as a linear model and an interaction model, and they were significant with a percentage of the response variable variation (R-Squared) of 83.62%

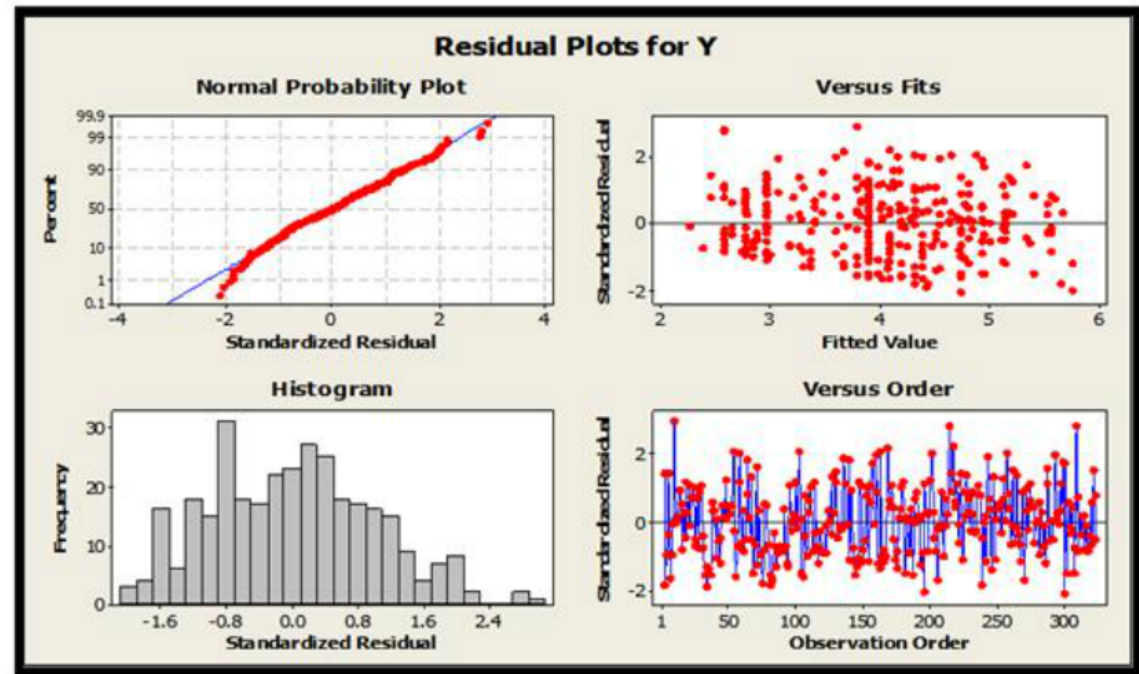
Results for the linear regression shows that only three factors; Gender, Age and Weight, are considered as a significant one, according to the P-values

$$Y = 1.52931 \text{ Gender} + 0.414699 \text{ Age} + 0.193045 \text{ Weight} + 0.347769 \text{ Sector} - 0.114952 \text{ Work Years}$$

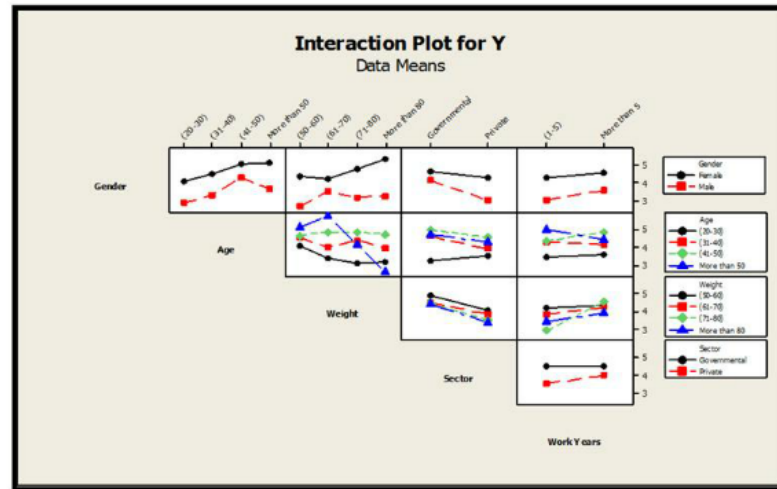
Term	Coef	SE Coef	T	P
Gender	1.52931	0.169871	9.00277	0.000
Age	0.41470	0.127756	3.24603	0.001
Weight	0.19305	0.081770	2.36084	0.019
Sector	0.34777	0.246559	1.41049	0.159
Work Years	-0.11495	0.241853	-0.47530	0.635

The model according to our assumptions is

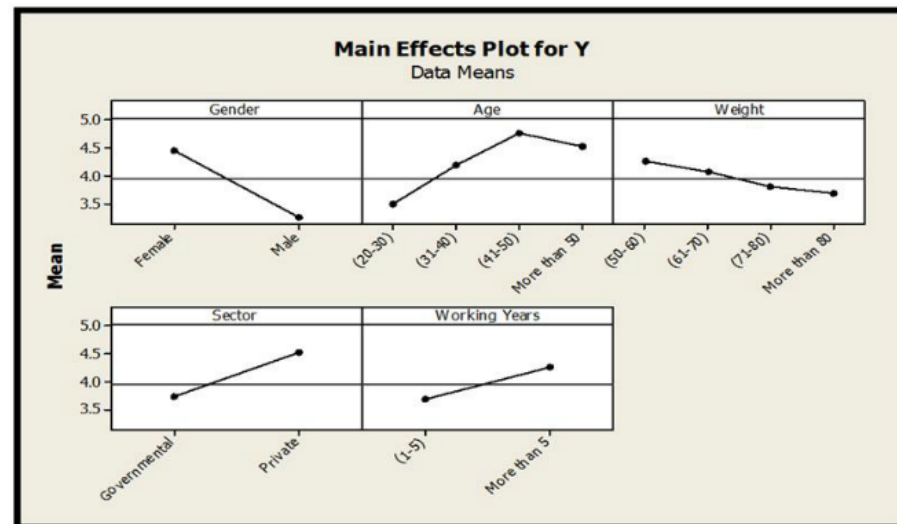
- Normal
- Linear
- Random
- Independent.



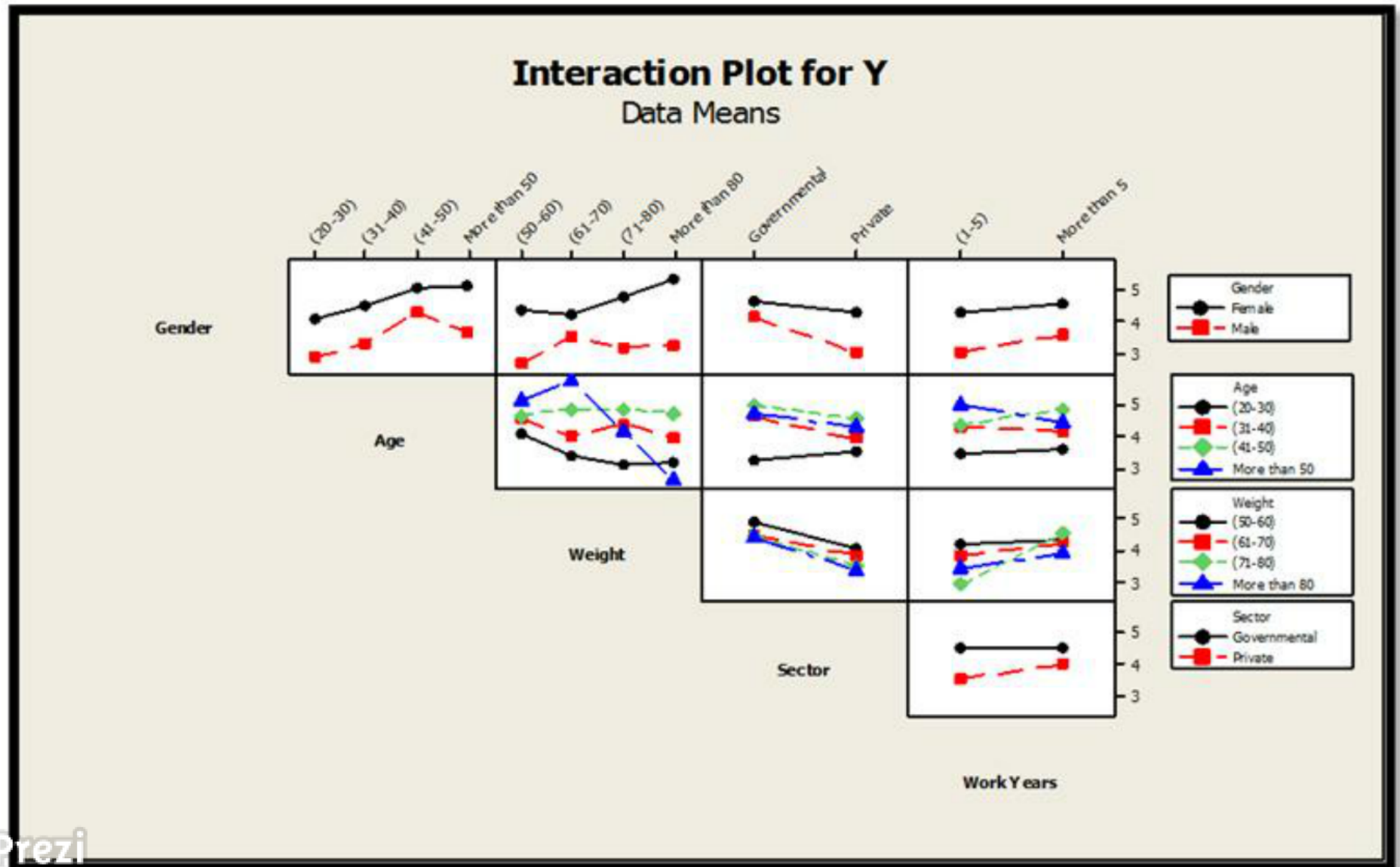
Interaction Plot



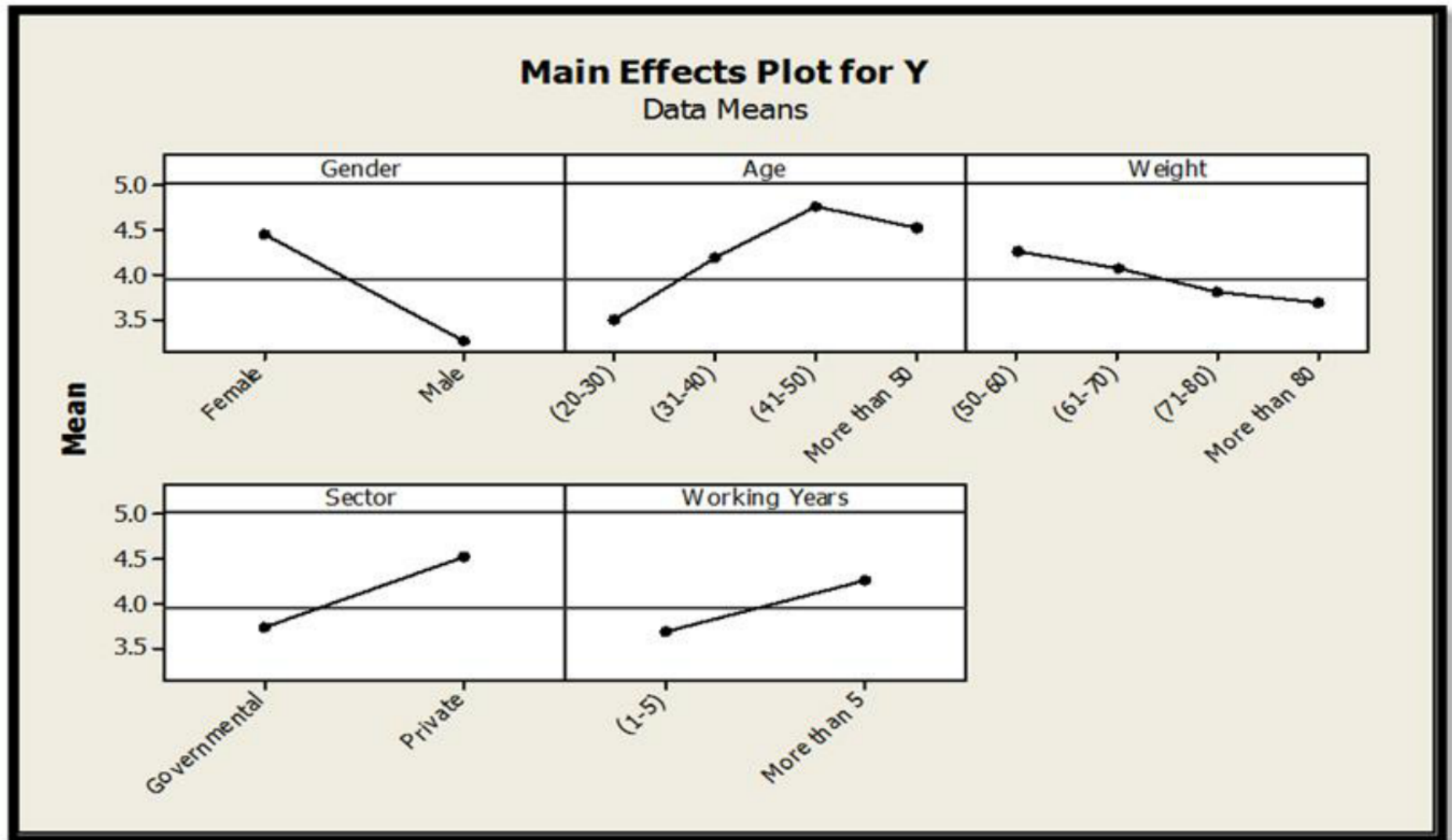
Main effects Plot for CTD prevalence



Interaction Plot



Main effects Plot for CTD prevalence



Recommendations

From Three Perspectives:

- Engineering
- Administrative
- Personal employee

- Designing the work place
- Improving work environment

Recommendations

From Three Perspectives:

- Engineering
- Administrative
- Personal employee

- Training
- Activities
- Care

Recommendations

From Three Perspectives:

- Engineering
- Administrative
- Personal employee

- Tools
- Sport, health, food

Conclusion

- The prevalence percentage of CTD is 64% among office workers, which indicates the serious impact of workers health
- In addition, the negative effects that an organization may exposed to, in terms of productivity, quality and time.