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## ORIGINAL ARTICLE

**THE RELATIONSHIP BETWEEN SITTING POSTURE AND OCCUPATIONAL RELATED NON SPECIFIC BACK PAIN AMONG WHITE COLLAR WORKERS**

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### ABSTRACT

**Background and objective:** Non specific occupational related back pain is a common disorder affecting workers. It has multifactorial contributing factors mainly those performing physically demanding task, adopting awkward posture and carry out task in static position for longer period of time. Globally such condition caused serious burden in operation cost and productivity. The aims of study is to evaluate the relationship of sitting posture and occupational related back pain among white collar workers.

**Methods:** This is a cross sectional descriptive types of study. Sitting posture is determined using self – administered close ended questionnaires. The questionnaires was distributed to workers experienced an occupational related back pain for the past 4 months. **Results:** A total of 140 respondents involve in this study and had an experience of non specific occupational related back pain. Majority of them is female (50.9%) and work as administration assistance (29.3%). Pain intensity is varies with 75.7% and 17.2% complain of moderate and severe pain respectively. There is no statistically difference ( $P > 0.05$ ) between sitting posture and occupational related non specific back pain among them.

**Conclusion:** The sitting posture was assessed through self – administer close ended questionnaires and didn't reveal their exact sitting posture at work. Relatively, occupational related non specific back pain is high among them. Preventive measures need to be considered in order to empower employees on safety at workplace.

**Keywords:** White collar workers, sitting posture, occupational related back pain

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## INTRODUCTION

In the 2010 Global Burden of Disease Study estimated that back pain is among the top ten injuries uppermost rate in the worldwide range. The incidence of low back pain are high at the workplace. This is due to the awkward and adopting prolong static posture at the workplace. More than half of the working population today is complaining of low back pain. Occupational related non specific low back pain is known a widespread health problem worldwide and a major cause of disability which affecting the performances at work and general well being. There are many risk factors that are associated with occupational related back pain including occupational posture, poor workstation design, depressive moods, obesity, sedentary lifestyles, and excessive body weight. The serious implication following such disorder is causing activity restriction, work absence and led to economic burden on industry<sup>1,2</sup>. The ergonomic application at workstation design is vital important in preventing occupational related injury and it is known to be a proactive methods for identifying ergonomics related injury risks<sup>3</sup>. The white collar workers was categorised as a non-manual workers which refer to professionals whose work is knowledge intensive, non-routine, unstructured task and required to perform in sitting position for most of the time. The purpose of this study is to evaluate the relationship of sitting posture and occupational related non specific back pain among white collar workers.

## METHODS

This is a cross sectional descriptive type of study design using self-administered structured questionnaire. The study population is a white collars workers working in the Nilai, Negeri Sembilan, Malaysia. The study samples size was calculated using Kish (1965) formula of  $n = (z_{1-\alpha})^2 (P(1-P)/D^2)$ . The alpha level is 95%, specificity of study 0.05 and prevalence of occupational related back pain is determine at

10% based on prevalence study conducted by Izhah & Jibi (2016)<sup>4</sup> and the total calculated samples size is 133. The participants need to fulfil inclusion criteria of performing office task in sitting position, using computer as office tools for more than 6 hours a day and had a history of an episode of occupational related back pain or discomfort within 4 months. Brief meeting with respective talent management department was carried out to obtain consent before distributing the questionnaires to the respective employees. To minimize the data collection bias, respondents need to kept the completed answer questionnaire forms in the given envelop and drop it into a collection box that has been placed at the talent management department. The questionnaire forms consists of 2 section, demographic information and question on sitting posture at work. The sitting posture consist of 12 closed – ended questions and the participants need to responses either 'yes' or 'no'. It was constructed based on the literature review. Cronbach alpha were calculated to determine the reliability of the questions and the score was  $r = 0.73$ .

Individual-informed consents was obtained from respondent prior data collection and confidentiality of respondents data were maintained throughout the study. All data were analysed using SPSS version 22. The descriptive analysis was used to describe demographic information of nonspecific back pain among respondents. T – Test and independent T – Test was used to determine any statistical differences between variables.

## RESULTS

Majority (50.7%) of respondents that having non specific occupational related back pain is female. Job categories of Administration Assistance (29.3%) is known to be the most job categories that suffering from such condition and only small numbers were managers (9.3%). The pain intensity was categorised according to slight, moderate and severe.

	N	%	Mean	Sd.
<b>Gender</b>				
Male	69	49.3%		
Female	71	50.7%		
<b>Job categories</b>				
Administration assistances	41	29.3%		
Administration executive	27	19.3%		
Auditor	21	15%		
Lecturers	20	14.3%		
Accountants	18	12.8%		
Managers	13	9.3%		
<b>Classification of BMI (kg/m<sup>2</sup>)</b>			24.1	±4.89
Underweight	14	10%		
Normal	71	50.7%		
Overweight	37	26.4%		
Obesity	18	12.9%		
<b>VAS</b>			5.4	±1.30
Slight pain	10	7.1%		
Moderate pain	106	75.7%		
Severe pain	24	17.2%		

**Table 1.** The prevalence of nonspecific back pain among white collar workers.

The pain intensity of 1 – 3 was categorised as slight, 4 - 6, 7 - 10 was moderate and severe pain respectively. The mean pain intensity is 5.4 ( $\pm 1.30$ ). Majority of respondents (75.7%) was categorised moderate pain and 17.2% (n = 24) were in severe pain category. Calculation of BMI were carried out according to body weight and height declared by participants.

The category of BMI is based on ASIAN population classification, 23 kg/m<sup>2</sup> is consider

normal BMI value. Majority (50.7%) of respondents were in normal BMI, 26.4% and 12.9% were categorised of overweight and obese respectively (Table 1).

T test was conducted to determine any differences between pain intensity, gender and BMI. It found that male workers experienced slight higher pain intensity compared to female counterpart. Interestingly, workers with underweight having less pain intensity compare with other BMI categories (Table 2).

		Mean	P - value
Gender			$P < 0.05$
	Male	5.6 $\pm$ 1.18	
	Female	5.2 $\pm$ 1.34	
BMI			$P < 0.05$
	Underweight	4.5 $\pm$ 1.40	
	Normal	5.3 $\pm$ 1.28	
	Overweight	5.7 $\pm$ 1.13	
	Obesity	5.7 $\pm$ 1.41	

Statistical test: t - test, significant p - value > 0.05

**Table 2.** Prevalence of VAS score between Gender and BMI categories.

There is no statistical differences between sitting posture and non specific back pain among them. Relatively, most of the workers performing lots of bending and twisting motion

in front of computer but statistically such motion didn't indicate any differences between pain intensity and sitting posture (Table 3).

Sitting Posture		N	VAS	
			Mean	P - value
Chair provided is comfortable.	Yes	125	5.26 $\pm$ 1.296	$P > 0.05$
	No	15	6.13 $\pm$ 1.125	
Bend and twist trunk many times per minutes?	Yes	87	5.44 $\pm$ 1.236	$P > 0.05$
	No	53	5.23 $\pm$ 1.409	
Often bend and twist the neck?	Yes	64	5.63 $\pm$ 1.106	$P > 0.05$
	No	76	5.13 $\pm$ 1.417	
Often bend and twisted posture?	Yes	79	5.41 $\pm$ 1.325	$P > 0.05$
	No	61	5.30 $\pm$ 1.283	
Often bend and twist trunk at work?	Yes	96	5.45 $\pm$ 1.204	$P > 0.05$
	No	44	5.16 $\pm$ 1.493	
Can view screen without turning head?	Yes	100	5.29 $\pm$ 1.358	$P > 0.05$
	No	40	5.53 $\pm$ 1.154	
Work desk allow for leg movement?	Yes	110	5.41 $\pm$ 1.383	$P > 0.05$
	No	30	5.17 $\pm$ 0.950	
Have sufficient body space at workstation.	Yes	127	5.41 $\pm$ 1.317	$P > 0.05$
	No	13	4.85 $\pm$ 1.068	

Forearms are horizontal when typing.	Yes	108	5.44 ± 1.410	P > 0.05
	No	32	5.06 ± 0.801	
Are eyes levels with the top of screen?	Yes	101	5.33 ± 1.386	P > 0.05
	No	39	5.44 ± 1.071	
Do you need a foot rest?	Yes	99	5.38 ± 1.307	P > 0.05
	No	41	5.29 ± 1.309	
Little wrist movement when typing?	Yes	114	5.42 ± 1.369	P > 0.05
	No	26	5.08 ± 0.935	

Statistical test: independent t - test, significant p - value > 0.05

**Table 3:** The differences of nonspecific back pain intensity and sitting posture at work.

## DISCUSSION

Total number of samples size achieved 100%, it minimised the possibility of type II error. The prevalence of non specific back pain is consistent with the most previous study <sup>5, 6, 7</sup>. However, a study has reported a lower incidence rate of back pain among white collar workers<sup>8</sup>. The differences may be due to differences in methodology and term used to define the back pain. It is difficult to standardize the definition of work related non specific back pain due to the many factors involved and the variability in the perception and effects of pain.

The obesity can be used as an important predictor of non specific occupational related back pain <sup>9</sup>. Obesity may cause back pain through metabolic syndrome, inflammatory mechanisms and aggravate the degeneration process <sup>10</sup>. Work related back pain among the white collar workers was associated with body weight, height, BMI, types of occupation, work organization, physical work, working postures and others. These were the risk factors could be regarded as the indicators of work related back pain, although the relationship was not

strong enough. However, in this study excessive body weight is determined using BMI calculation. Unable to determine the excessive body weight is due to fat or muscle composition.

This study didn't determine the type of medication used by the respondents to curb their pain. The possibilities of medication reducing pain intensity is high. The medication details need to be asked whether it is a contributing factors to reduce the pain. In order to minimised the recall bias, the duration of back pain experience of not exceeding 5 months is seems appropriate.

In this study there is no statistical difference between sitting posture and non specific back pain. Even though study by Angela et al (2007)<sup>11</sup> showed that sitting posture decreases the lumbar spine lordosis and increases back muscles activity, causing excessive pressure on disc and aggravating the regenerative and degenerative process over vertebrae regions. Therefore, to claims that back pain incidents are due to performing physically demanding activities is not accepted because of difference

in the body mechanical effects will aggravate such processes over vertebrae regions<sup>12, 13</sup>.

The limitation of this study is sitting posture was analysed using self – administer closed ended questionnaires and there is possibility of respondents answering based on their knowledge of good sitting posture and not according to actual sitting posture adopted by them at work. A proper visual observation of posture assessment need to be conducted to get the accurate picture of sitting posture. Workers with good ergonomic knowledge at workplace is not a criteria that can be used to ensure their safety. A study has reported no association between knowledge and attitude towards nonspecific back pain at work place<sup>14</sup>. The issue that need to address is workers attitude towards safety at work place. Training and awareness programme need to introduce in order to enhance better attitude towards self-safety at work place.

## CONCLUSION

Regardless of work nature, the possibilities of white collar workers suffering non specific occupational related back pain is relatively high. The serious implication following such disorder it causing activity restriction, work absence and incur additional operational cost. The preventive measures that need to be considered is equip workers with knowledge and instil positive attitudes towards safety at work place through training and awareness programme.

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