

Proportion of work-related injuries and its predictors among the staffs of a government medical school in Malaysia

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Abstract: *The authors present the predictors and proportion of work-related injuries (WRI) among the staffs of a government medical school in Malaysia in this paper. The extent of WRI in a Malaysian public medical school has never been studied before. The main purpose of this study is to determine the proportion of WRI and its associated factors among the respondents. The cross-sectional study was conducted on 364 randomly selected Malaysian employees who worked for at least one year in the faculty. The self-administered questionnaire was used to collect information on socio-demographic, employment and individual characteristics, as well as data on work-related injuries, suffered in the past 12 months. The results of the study showed that out of 317 respondents who answered the questionnaire, seventeen of them (5.4%) had experienced WRI. Multivariate logistic analysis showed that the support staff is 35.7 times more likely to have WRIs (95% CI: 3.303-385.914), compared to the other group of respondents. In conclusion, the proportion of WRI among the respondents is high compared to those WRI that occurred among similar population in other countries. Predictors of WRI are very related to each other, but it is not impossible to reduce or remove it in order to lessen the rate of WRI. Based on the findings of this study, future research is needed to find out on why the employee in this institution need to do part-time work that will leave them feeling sleepy at work and eventually exposed them to higher risk of getting WRIs.*

Keywords: *Work-related injuries, universiti staff, risk factors, Malaysia*

I. Introduction

Today, work-related injuries still pose as serious problem in developing and developed countries and some employees are still unprotected from various hazards [1]. Health and Safety Executive (HSE) figures show that 6 million days were lost overall due to WRI during 2005/06 [2] and the International Labor Organization (ILO) estimated that, globally, about 270 million workers suffered from serious non-fatal injuries [3]. It is commonly accepted that the socio-demographic, occupational and individual factors are contributory factors to get WRIs. Accident at work affects the well-being of people in the workplace, both directly and indirectly, and therefore need to be prevented from occurring [4].

Currently Malaysia has 20 public universities and around 450 private higher learning institutions, including 25 universities, 22 college universities and 5 branch campuses [5]. Despite the fact that there are numerous institutes, colleges and universities in Malaysia, there is limited information published about the occurrence of WRI the academic setting, especially in the seemingly safe government-owned medical schools. Part of the reason why WRI in the higher education sector has not been studied probably due to the large variety of working groups in this setting [6].

There are huge numbers of people working in the education sector globally. For instance, in 2012, there were 15.88 million workers engaged in the education sector in the United European countries. Of these, 1.2 million were employed in Spain, 2.5 million in Germany and 3 million in the United Kingdom [7]. In the same year these workers had 4761 (0.40%) work accidents in Spain, 16,591 (0.66%) in Germany and 18,339 (0.61%) in the United Kingdom [7]. WRIs are an unexpected and unplanned injuries that occur in the workplace or that occur while commuting. The most usual body part involved are the upper limb, lower limb, head and neck, as well as the torso. Other than affecting the injured employee, work accidents also have other recognized implications such as the social impact, disruptions to the public education system and the good instance that should be set for students concerning the benefits of a great risk prevention strategy [8].

The Department of Occupational Safety and Health (DOSH) of Malaysia mandated that any occupational accident or dangerous occurrences be reported to them using the form Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease (NADOPOD) 2015 [9]. Various studies on WRI had been done in different sectors such as agriculture [10], mining [11], industry [12] and construction [13]. However literature on WRI among employees in public universities, especially in medical

schools in Malaysia is still lacking. Therefore, it is essential to look at the extent of WRI in the university setting, as well as to examine the factors that will contribute to it. The findings of the study can be used to plan for programs that will reduce the incidence of WRI and eventually to try to prevent it from occurring.

II. Material And Methods

2.1 Study Design and Study Population

A cross-sectional study design was used to determine the proportion of WRI and its associated factors. This study was conducted on 364 randomly selected Malaysian staff with a working experience of at least 1 year in the university. The study location is a medical school of a public university, situated about 10 km from Putrajaya, the administrative center of Malaysia.

2.2 Materials

The self-administered questionnaire, which was written in both English and Malay language was used to collect information, while anthropometric measurement was taken by the researcher to get data on the respondent's body weight and height. The questionnaire is divided into four sections; Section A, collects information on the socio-demographic background, such as gender, age, race, type of job, educational level, and monthly income and Section B is for the job position, length of employment, and working hours. Information on individual factors are collected in Section C, which include information on the sleep pattern, body mass index and fatigue feeling. The last section, Section D, contained details on the occurrence of WRI suffered in the past 12 months, and it includes the nature of injury, body part injured, mechanism and agent of injury.

2.3 Data collection

The questionnaire was distributed directly to the respondents. They were informed about the purpose of the study and those participating in did so on a voluntary basis. Besides, the respondents were made sure that their answers will be kept confidential and will only be used for research purposes. After the respondents have finished answering the questions, the questionnaires were collected immediately.

2.4 Data Analysis

The data was analyzed using the IBM Statistical Package of Social Sciences (SPSS) version 21. Initially the data was analysed descriptively using frequency, percentage, means and standard deviations, as well as median, and interquartile range. All numerical data were tested for normality before further analysed. Inferential analysis (Chi-square test) was used to determine the association between WRI and the independent variables (socio-demographic, occupational, and individual factors). Finally a multivariate analysis using multiple logistic regressions was performed to determine the factors associated with the occurrence of WRI. The results were considered statistically significant if $p < 0.05$.

This study had received ethical clearance from the Ethics Committee for Research Involving Human Subjects of UPM with the reference of UPM/TNCPI/RMC (JKEUPM) /1.4.18.1 /F2 dated 22nd April 2015 and permission to do the study was given by the authority of the study location.

III. Results

3.1 General Overview

Out of 364 questionnaires distributed, 317 respondents answered it, giving a respond's rate of 87%. The socio-demographic characteristics of the respondents are shown in Table 3.1. Majority of them are in the 30-39 year age group (45.4%). Their age ranged from 20 to 66 years, with the mean \pm sd of 38.2 ± 9.2 (year). Mostly were females (66.6%), Malay (87.7%), married (69.6%), have at least Degree qualification (69.8%), and 87 (27.4%) of them have a Doctoral Degree qualification. The monthly income of the respondents ranged from RM 1000 to 18,000 (USD 230 – 4,200), with the mean \pm sd of RM 6280 ± 4500 (USD 1460 – 1,050). Majority of them earn less than RM 3500 (USD 816) per month (82.6%) and mostly (58.0%) are in the range of income group of RM 1,000 – 6,000 (USD 230 – 1,400).

Table 3.1 Socio-demographic characteristics of the respondents (n=317)

Variables	Frequency	Percentage	Mean \pm sd
Age Group (year)			38.2 ± 9.2
20 – 29	53	16.7	
30 – 39	144	45.4	
40 – 49	76	24.0	
50 – 59	37	11.7	
> 59	7	2.2	
Gender			

Male	108	33.4	
Female	209	66.6	
Race			
Malay	278	87.7	
Chines	19	6.0	
Indian	15	4.7	
Others	5	1.6	
Marital Status			
Single	53	16.7	
Married	262	82.6	
Divorce	2	0.6	
Education Level			
Primary school	2	0.6	
Seconder school	55	17.4	
Diploma	44	13.9	
Bachelor's degree	61	19.2	
Master degree	68	21.5	
Doctorate degree	87	27.4	
Monthly Income (RM)*			6280 ± 4500
1000 – 6000	184	58.0	
6001.0 – 11000	77	24.3	
11001.0– 16000	50	15.8	
>16000	6	1.9	

* RM 1 ~ USD 0.23

For the occupational characteristics, out of 317 respondents, 82.6% of them are permanent staff, work as lecturer, 48.6% of them had been in service for less than 10 years (70.7%) and all of them work normal hours (8 am – 5 pm). Majority of the respondents (53.0%) work more than 40 hours, did not do overtime work (64.4%) and did not have part-time work (81.1%) (Table 3.2).

Table 3.2 Distribution of the respondent by occupational characteristics (n=317)

Variables	Frequency	Percentage	Mean ± sd
Employment status			
Permanent	262	82.6	
Temporary	17	5.4	
Contract	38	12.0	
Job Title			
Lecturer	154	48.6	
Support staff	100	31.5	
Administrative staff	40	12.6	
Tutor	16	5.0	
Driver	7	2.2	
Length of service (year)			9.2 ± 7.5
1 – 10	224	70.7	
11 – 20	72	22.7	
21 – 30	10	3.2	
31 – 40	10	3.2	
> 40	1	0.3	
Work in shifts			
Yes	0	00.0	
No	317	100.0	
Normal working hours (8am-5pm)			
Yes	317	100.0	
No	0	00.0	
Working hours per week (hour)			
40	149	47.0	
> 40	168	53.0	
Working overtime			
Yes	113	35.6	
No	204	64.4	
Part-time work			
Yes	60	18.9	
No	257	81.1	

Data on the individual characteristics shows that out of 317 respondents, majority (85.5%) of them sleep for about 6 – 8 hours a night, 56.5% did not feel sleepy during working time and 57.7% did not feel tired at work. Majority of the respondents (60.3%) have a normal BMI (Table 3.3).

Table 3.3 Distribution of the respondent according to individual characteristics (n=317)

Variables	Frequency	Percentage	Mean ± sd
Sleeping hours per night			6.4 ± 0.9
< 6	45	14.2	
6-8	272	85.8	
Feeling sleepy at work			
Yes	138	43.5	
No	179	56.5	
Feeling fatigue at work			
Yes	134	42.3	
No	183	57.7	
Body Mass Index			26.5 ± 8.0
Underweight	57	18.0	
Normal	191	60.3	
Overweight	62	19.6	
Obese	7	2.2	

3.2 Proportion of WRI among respondents

In this study the characteristics of WRI are categorized based on the International Labour Organisation (ILO) Classification of industrial accidents according to the nature of the injury, bodily location of the injury, and to the type of the accident. The type of industrial accident that occurred among respondents are classified according to the Classification of industrial accidents according to the type of accidents, and the agency involved. All classification for WRI used in this study is made based on the Sixteenth International Conference of Labour Statisticians (ICLS) [14].

Fig. 3.1 shows that 5.4% (17) of the respondents reported having sustained from WRI.

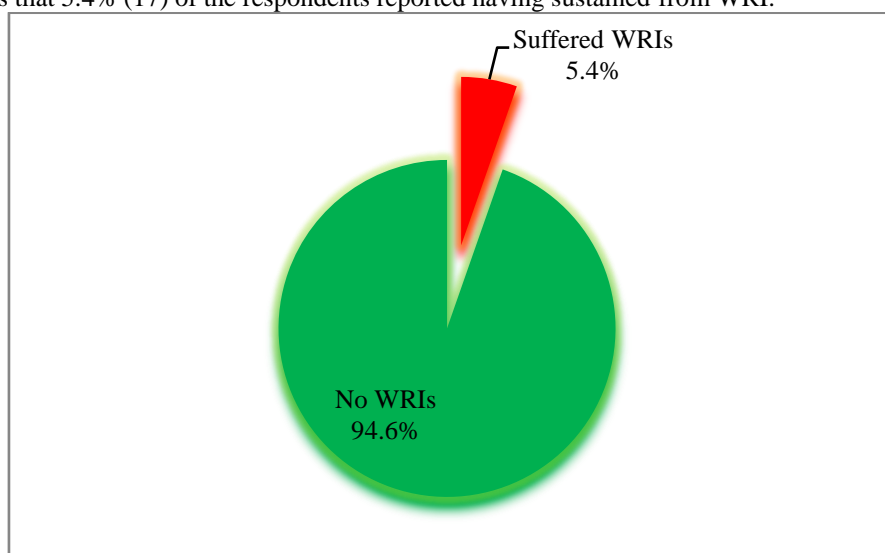


Figure 3.1 Proportion of WRI (n=317)

Table 3.4 shows that majority of WRI (38.6%) affected upper limbs and most of them (41.2%) sustained from sprain and strain injury. Regarding the mechanism of injury, in slightly more than half of them, 9 (53.3%) of the WRI happened due to 'fall or slip' and 5 (29.5%) of the injury agents were 'stairs, steps and ladders'.

Table 3.4 Characteristics of WRI

Information of WRI	Frequency (n)	Percentage (%)
Body parts affected #		
Head and neck	9	20.5
Upper limb	17	38.6
Lower limb	11	25.0
Torso	7	15.9
Types of injury		
Abrasions	6	35.3
Burns (heat/ chemical)	2	11.8
Sprain & strain	7	41.2
Fracture	1	5.9

Sharps injuries	1	5.9
Mechanism of injury		
Fall or slip	9	53.3
Contact with harmful substances /radiation	2	11.8
Struck by sliding or falling object	2	11.8
Needle stick/Needle prick	1	5.9
Car accident	3	17.6
Agent of injury		
Transport	1	5.9
Needles	1	5.9
Chemicals/Gases/ Lab instruments	3	17.6
Floors/Levels	4	23.5
Stairs/Steps/ Ladders	5	29.5
Accident	3	17.6

Some of the respondents were affected by WRI in more than two parts of their body

3.3 Distribution of WRI according to the outcomes (treatment and sick leave)

Table 3.5 shows that out of 17 respondents who had sustained WRI, majority of them 12 (70.6%) had just one episode of WRI. However majority of respondents who had WRI, 11(64.7%) needed to be treated, where 8 (72.7%) received treatment from the university clinic and 2 (18.2%) of them need to be warded. In terms of days away from work, majority of respondents had only one day sick leave due to WRI, 14 (87.5%). However, 2 (12.4%) of them had severe injury which caused them to be absent from work for more than one month.

Table 3.5 Distribution of WRI and their outcomes (treatment and sick leave) (n=17)

Variables	Frequency	Percentage
Frequency of injury		
Once	12	70.6
Twice	4	23.5
Three	1	5.9
Received treatment		
Yes	11	64.7
No	6	35.3
Where get treatment (n=11)		
Hospital	2	18.2
University clinic	8	72.7
In the workplace	1	9.10
Hospital admission (day)(n=2)		
2 days	1	50.0
7 days	1	50.0
Absent days from work (n=16)		
1 day	10	62.5
2 days	4	25.0
35 days	1	6.2
60 days	1	6.2

3.4 Association between WRI and socio-demographic, occupational as well as individual factors

Pearson's chi-square test is used to determine the association between the socio-demographic profiles (gender, age, race, marital status, education level and monthly income) and WRI. Table 3.6 below illustrates the result of Pearson's chi-square test analysis. It shows that there is no significant association between all socio-demographic characteristics and WRI.

Table 3.6 Association between socio-demographic profiles and WRI

Factors	WRIs		df	χ^2	P-value
	Yes (%)	No (%)			
Gender			1	2.848	0.487 ^a
Male	7 (41.2)	99 (33.0)			
Female	10 (58.8)	201 (67.0)			
Age Group (year)			2	3.146	0.207
20 – 29	4 (23.5)	49 (16.3)			
30 – 39	10 (58.8)	134 (44.7)			
> 39	3 (17.6)	75 (39.0)			
Race			1	1.822	0.705 ^a
Malay	16 (94.1)	262 (87.3)			
Non-Malay	1 (5.9)	38 (12.7)			
Marital Status			2	2.160	0.188 ^a
Single	5 (29.4)	48 (16.7)			

Married	12 (70.6)	250 (83.3)			
Educational Level			2	4.953	0.087
P and S School ¹	5 (29.4)	52 (17.3)			
D and B degree ²	10 (58.8)	95 (31.7)			
M and D Degree ³	2 (11.8)	153 (51.0)			
Monthly Income (RM)			1	3.723	0.065 ^a
1000 – 6000	15 (88.2)	169 (56.3)			
> 6000	2 (11.8)	76 (43.7)			

a. Fisher’s Exact Test, level of significance, $p < 0.05$, ¹ Primary and secondary school, ² Diploma and bachelor’s degree, ³ Master and doctoral degree

The association between employment characteristics and WRI was also analysed using Pearson’s chi square test. Table 3.7 below illustrates the result of the analysis. It shows that there are statistically significant association between WRI and job title, as well as with doing part time work, with $\chi^2 (3) = 14.732$, $df = 3$, $p = 0.002$ and $\chi^2 (1) = 9.264$, $df = 1$, $p = 0.006$ respectively.

Table 3.7 Association between employment characteristics and WRI

Independent Variables	WRIs		Df	χ^2	P-value
	Yes (%)	No (%)			
Employment status			1	0.001	1.000
Permanent	14 (82.4)	248 (82.7)			
Non-permanent	3 (17.6)	52 (17.3)			
Job Title			3	14.732	0.002*
Lecturer	3 (17.7)	167 (55.7)			
Support Staff	9 (52.9)	91 (30.3)			
Administrative Staff	3 (17.6)	37 (12.3)			
Driver	2 (11.8)	5 (1.7)			
Length of service (years)			1	1.184	0.276 ^a
1-10	14 (82.4)	210 (70.0)			
> 10	3 (17.6)	90 (3.0)			
Working hours per week			1	0.754	0.385 ^a
Normal (40 hours)	10 (58.8)	144 (48.0)			
Overtime (> 40 hours)	7 (41.2)	156 (52.0)			
Working overtime			1	0.990	0.975
Yes	6 (35.3)	107 (35.7)			
No	11 (64.7)	193 (64.3)			
Part-time Work			1	9.264	0.006**
Yes	8 (47.1)	52 (17.3)			
No	9 (52.9)	248 (82.7)			

a. Fisher’s Exact Test, level of significance, $p < 0.05$

Again, Pearson’s chi-square test was used to determine the association between individual factors and WRI. Table 3.8 below illustrates the result of the analysis. There is statistically significant association between feeling sleepy and feeling fatigue at work with WRI, $\chi^2 (1) = 11.012$, $df = 1$, $p = 0.001$ and , $\chi^2 (1) = 5.903$, $df = 1$, $p = 0.015$ respectively.

Table 3.8 Association between individual factors and WRI

Independent Variables	WRIs		df	χ^2	P-value
	Yes (%)	No (%)			
Sleeping hours per night			1	3.415	0.065 ^a
< 6 hours	5 (29.4)	40 (13.3)			
6 – 8 hours	12 (70.6)	260 (86.7)			
Feeling sleepy at work			1	11.012	0.001**
Yes	14 (82.4)	124 (41.3)			
No	3 (17.6)	176 (58.7)			
Feeling fatigue at work			1	5.903	0.015**
Yes	12 (70.6)	122 (40.7)			
No	5 (29.4)	178 (59.3)			
Body mass index			1	1.063	0.303
Normal	10 (58.8)	138 (46.0)			
Abnormal	7 (41.2)	162 (5.0)			

a. Fisher’s Exact Test, level of significance, $p < 0.05$

3.5 Logistic Regression of WRIs

Multivariate logistic regression test is used to determine how fit the effects of independent variables on WRI. Only independent variables with statistically significant association with WRI were included in the model. Table 3.9 reveals that Hosmer-Lemeshow (goodness of fit) is satisfactory ($X^2 = 35.916$, $df = 7$, $p = 0.001$). It shows that among the respondents, support staffs are 35.7 times more likely to have WRIs (OR=35.700, 95% CI: 3.303-385.914), compared to the lecturer, administrative staff, tutor, and drivers. Data analysis also showed that staffs who are working part-time are almost 8 times more likely to have WRIs (OR=7.947, 95% CI: 2.390-26.421) compared to staffs who are not doing part-time work. Staffs who feel sleepy at work are 4.401 times more likely to have WRIs (OR=4.401, 95% CI: 1.077-17.990) compared to other staffs who do not have a history of feeling sleepy at work.

$$\text{LogY} = -1.528 + 3.575 (X_1) + 2.073 (X_2) + 1.482 (X_3) + \varepsilon$$

Where:

Y= WRI,

X₁= Job title

X₂= Part-time work

X₃= Feeling sleepy at work, ε = Error

The Nagelkerke R² showed that the predictor variables recorded in the regression model explained about 23.4% of the variation of WRIs.

Table 3.9 Logistic Regression predicting likelihood of having WRI

Variables	B Coefficient	S.E.	Sig.	Adjusted OR	95% C.I. for OR	
					Lower	Upper
Job Title						
Lecturer**						
Support staff	3.575	1.215	0.003*	35.700	3.303	385.914
Administrative staff	1.486	1.014	0.143	4.421	0.606	32.263
Tutor	1.559	1.131	0.168	4.753	0.518	43.603
Driver	1.809	1.406	0.198	6.103	0.388	96.001
Part-time work						
Yes	2.073	0.613	0.001*	7.947	2.390	26.421
No**						
Feeling sleepy at work						
Yes	1.482	0.718	0.039*	4.401	1.077	17.990
No**						
Feeling fatigue at work						
Yes	0.450	0.628	0.474	1.568	0.458	5.366
No**						
Constant	-1.528	1.160	0.001	0.217		

**Reference category, * Significance level, $p < 0.05$; Cox and Snell R² = 0.080; Nagelkerke R² = 0.234, Note: B: Unstandardized Coefficient, S.E.: Standard Error, df: Degree of freedom.

IV. Discussion

Result from this study revealed that 5.4% of the respondents sustained WRI. This figure is very high compared with the results of study done in the United Europe [7]. For instance, in the said study, which was done in 2012 on WRI among university staffs, it was reported that in Spain, out of 4761 university employees, only 0.40% had WRI, 16,591 (0.66%) in Germany and 18,339 (0.61%) in the United Kingdom (UK) [7]. In addition, in another study which was carried out in the UK [15] found that only 2.5% out of 389 university staffs had WRI [15]. As comparison, the proportion of WRI that occurred among the respondents in the present study is very much higher compared to those in other countries; 13.5, 8.2, and 8.9 times higher than the proportion of WRI that occurred among university employees in Spain, Germany and the UK respectively [7]. The different figures in the occurrence of WRI may be related to the differences between the two countries in the level of infrastructure development, rules and regulations of occupational health and safety as well as services, difficulty of work responsibilities, status of the staff, and their settings. The other cause might be linked to the differences in the technique of data collection [16].

In this study none of the socio-demographic characteristics have a statistically significant association with WRI. However, in other places WRI was significantly associated with age (younger workers had the lowest rate of WRI), gender (female suffered more injuries than male), and the length of service (as employees' level of experience increased, the injury frequency decreased) [6], [7], [17], [18], [19]. The same studies by those researchers also showed significant associations between WRI and socio-demographic factors.

This study also found that there are significant association between WRI and job title, doing part-time work, feeling sleepy as well as feeling fatigue at work. These factors were found to be statistically significant predictors for WRI. Many previous research support this findings [6], [7], [20], [21]. A survey done among

employees of different organizations and companies in Netherland showed that feeling fatigue at work was also a significant predictor for occupational injuries [22]. Research had shown that fatigue affects mental and physical performance, which will lead to reduced energy [23]. This will be followed by reduced productivity and made workers feeling increasingly helpless and resentful.

The most common body parts injured among those with WRI in this study were upper limbs (38.6%), followed by the lower limbs (25.0%). However, these findings were in contrast to the findings of others, who found that the most frequent injuries were lower limb (37.5%), followed by the upper limbs (24.9%) among Andalusian (Spain) public universities [7].

With regards to WRI experienced by the respondents in the past 12 months, this study shows that most of the respondents (41.2%) suffered from strain and sprains. This finding is in agreement with the conclusions of the previous study among Andalusian (Spain) public universities, which reported that most of the injuries that occurred were strains and sprains (52.3%) [7].

Regarding the mechanism that caused injury to the respondents, this study shows that 53.3% are due to fall or slip (on the same level and to lower level). This finding is in agreement with the conclusions of the previous study, which reported that overexertion or falls accounted for more than half the accidents that occurred to employees in higher education sector in Andalusia [7]. The present study also shows that the most common agents causing WRI were stairs/steps/ladders (23.6%). However, this finding is not in agreement with the conclusions of the previous studies, which reported that the exposure to materials and substances was the agent, contributing to 12% of all reported cases among non-governmental employees in Malaysia[24]. This difference in the occurrence of WRI may be related to the different work scope between the two sectors (public versus private sectors).

In this study majority (64.7%) of the respondents who had WRI needed to be treated and majority of them (72.7%) were treated in the university clinic. Two workers who had WRI had to be warded for treatment and both of them had to be away from work (on sick leave) for at least one month. This shows the seriousness of the injuries. In Australia the WRI suffered among their respondents were not serious [25]. Majority of them (70%) only needed one day treatment in the hospital, and only 1.9% needed to be treated as in-patient for 15 days or more. Comparing the findings of the present study with those by Safe Work in Australia, it can be seen that WRI that occurred in this public university is far more severe [25].

V. Conclusion

The proportion of WRI among the respondents in this study is obviously much higher and the extent of WRI is far more serious compared to those WRI that occurred among university staffs in other countries. As the impact of WRI can be very costly, accident at work should be prevented. Three predictors of WRI were found from the study; job title, working part-time and feeling sleepy at work. These three predictors are very related to each other, however, it is not impossible to reduce or remove it. Based on the findings of this study, future research is needed to find out why the UPM employee need to do part-time work that will leave them feeling sleepy and fatigue at work and eventually exposed them to higher risk of getting WRI.

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