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**Author**

Vecchio, Nerina, Scuffham, Paul A., Hilton, Michael, Whiteford, Harvey A.

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# **Work-related injury among the nursing profession: An investigation of modifiable factors**

Nerina Vecchio\*

Department of Accounting, Finance and Economics, Griffith University

Paul A. Scuffham

School of Medicine, Griffith University

Michael Hilton

QLD Centre for Mental Health Research, University of Queensland

Harvey A. Whiteford

QLD Centre for Mental Health Research, University of Queensland

## **ABSTRACT**

Nurses are at high risk for work-related injury. This paper examines key determinants of such injury among a sample of nurses in Queensland, Australia. Data were based on the Work Outcomes Research Cost-Benefit Survey conducted in Australia during 2005 and 2006. The study sample of 5724 represented ~14% of nurses in Queensland at the time. Logistic regression was used to determine the magnitude of association of psychological distress, the number of health conditions and various socio-economic factors with work place injury. High psychological distress was associated with a 5% probability of injury. As the number of health conditions increased, the probability of injury increased. Compared to the total sample, nurses that reported high levels of psychological distress demonstrated greater sensitivity to the number of health conditions. Little difference was found in the likelihood of injury when the total sample was compared to nurses with less than 5 years of work experience.

*Keywords:* Work-related injury, nurses, psychological distress, health conditions, socio-economic factors.

*JEL classifications:* I12, J24, J28

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### **\* Corresponding author:**

Dr Nerina Vecchio

Griffith Business School

Griffith University Gold Coast Campus

PMB 50 Gold Coast Mail Center Queensland 9726 Australia

Tele: +61 7 5552 8284

Fax: +61 7 5552 8068

[n.vecchio@griffith.edu.au](mailto:n.vecchio@griffith.edu.au)

# **Work-related injury among the nursing profession: An investigation of modifiable factors**

## **INTRODUCTION**

Globally, health workers<sup>1</sup> number 39.47 million and comprise 67% of the total health workforce (World Health Organization 2006). In richer countries the health workforce can account up to 13% of the total workforce (World Health Organization 2006). Nurses are at high risk for work-related injury due to the physically demanding nature of their work and the environment in which it is conducted. Work-related injuries often impact on the health and economic well-being of nurses. Absenteeism and presenteeism associated with injuries at work also impose considerable costs to employers in terms of lower productivity, escalating workplace insurance and financial compensation.

There are reports in the literature of a link between the physical demands of clinical care and work-related injury among nurses and nursing assistants. Most relate to back and neck/shoulder pain (e.g. Smedley et al. 1997, Retsas and Pinikahna 2000). In the US, nurses and other health care workers are among the highest risk professions for back injury, ranking health care workers in the six of the top ten occupations at highest risk (Bureau of Labor Statistics 2001). Sharps and needlestick injuries are also commonly reported (Smith and Leggat 2005, Mustafa et al. 2006). Research from Turkey revealed that 79.7% of nurses experienced such injuries during their professional life (Mustafa et al. 2006). Sharp or needlestick injuries are particularly hazardous as they increase the risk of contracting infectious disease.

Langford (1997) conducted the first Australian study on the extent of occupational illness and injury sustained by nurses in the health industry. The report based on a survey of injured and ill

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<sup>1</sup> Includes professionals (e.g. doctor, nurse), associates (e.g. laboratory technician), other community (e.g. traditional practitioner).

nurses became the basis for the 1998 ANF (Australian Nursing Federation) Victorian Branch's 'no lifting policy'. Further research commissioned by the Australian Safety and Compensation Council (2008) revealed that Australian nurses were exposed to a wide range of occupational hazards. Just over half of the 955 nurses surveyed had sustained, at some stage of their career, at least one work-related injury or disease that required time off work. The most common injuries or diseases were reported as musculoskeletal (70.6%), stress (19.8%), bullying (15.1%) and infection (12.1%).

Given the high risk of injury among nurses, an important question then becomes: *what factors can be modified to reduce work-related injury among the nursing profession?*

## **Background**

Previous injuries have been shown to be associated with missed work and future injury among nurses (Videman et al. 2005). Other research has included workplace psychosocial factors as a risk factor of work-related injury (see Gillen et al. 2007 for a comprehensive review). Studnek and Crawford's (2007) investigation of 579 emergency medical technicians in the US identified satisfaction with current assignment and self reported physical fitness as strongly associated with self reported back problems. A similar study involving 1862 cases using multivariate logistic regression determined that increasing call volume, community size, certification level and a history of back problems were associated with reporting job related illness or injury (Studnek et al. 2007). The analysis of 1600 Turkish hospital employees showed that age, female gender, smoking, occupation, perceived work stress and heavy lifting were significant risk factors in the prevalence of low back pain (Karahan et al. 2009). Smith and Leggat's (2005) investigations of work related injuries among Australian nursing students found that being a third year student was the only statistically significant risk factor for needlestick injury.

Extending these investigations, other studies have explored the theoretical models of psychosocial stress factors as predictors of injury in hospital workers. These models included

measures of Demand–Control (DC) and Effort-Reward Imbalance (ERI) (Karasek et al. 1998, Bosma et al. 1998, Gillen et al. 2007). The DC measure postulates that the combination of high psychological demands and low decision latitude can cause health disrupting stress reactions leading to “job strain”. The ERI measure proposes that stress reactions are caused by a combination of high effort and low rewards in terms of compensation, respect, advancement prospects and job security. Various studies have tested these and similar models on nursing staff (see Salminen et al. 2003, Eriksen et al. 2004, Jhun et al. 2004, Cheung et al. 2006, Gillen et al. 2007). Gillen’s (2007) study of two hospital sites in the US supports the consensus that work-related injury is strongly influenced by psychosocial and physical job-related exposures.

Australian studies of the nursing profession have focused on issues of work conditions, work-related stress, recruitment and retention (Moyle et al. 2003, Hegney et al. 2006, Eley et al. 2007a, Eley et al. 2007b). This is also the case overseas (see Andrews and Dziegielewski (2005) for a review of the literature, Shields and Ward 2001, Hart 2001, Tourangeau and Cranley 2006). However, research on the factors associated with work-related injury tends to be dominated by overseas investigations. Such findings cannot be easily translated into the Australian context. Factors associated with injury rates may vary in importance from one country to another based on differences in institutional, social and demographic settings relating to union membership, workplace laws, wage rates, health and safety regulations, level of qualifications, health expenditure per capita and management systems to name a few.

The purpose of the study reported here is to determine which characteristics are associated with work-related injury and to discern what factors, if any, can be modified to reduce the risk of injury. If modifiable factors significantly impact on work-related injuries, a case is made to develop strategically effective occupational health and safety workplace programs that proactively improve the health capital of nursing professionals. The evidence also provides a basis for future research that relates to improvements in retention rates and productivity levels within the profession. An

understanding of the risk factors associated with work-related injury is important to the nursing profession, planners of occupational health and safety, employers and clients of health care services.

This study extends the work of previous research in several ways. First, this research benefits from the use of a large cross-sectional database (<http://www.qcmhr.uq.edu.au/worc>) that contains 5724 observations on Queensland nurses – making this the largest Australian study of this nature. Confining the analysis to nurses working in the State of Queensland captured the award agreements of that State and reduced the complexities associated with heterogeneous institutional factors and labour market forces experienced among various Australian States. Information relating to health includes both mental and physical conditions.

### **Health production model**

There is the widespread view that injuries within the nursing profession can be best prevented by engineering controls and new products that are touted as safer devices (Hanrahan and Reutter 1997) e.g. disposal containers and lifting devices. Research relating to potential influential factors has been given less attention by policy makers. Hanrahan and Reutter's (1997) critical review of the literature on sharps noted that interventions such as disposal containers were shown to alter the type, but not necessarily the overall number of sharps injuries. In the pursuit of reducing work related injuries, workforce policies need to consider a range of factors including issues relating to the individual.

The health production model assumes that the individual inherits an initial stock of health that depreciates over time. The individual can positively influence the stock of health capital (Grossman 1972). The greater the health stock the greater the number of healthy days. This in turn provides a greater number of days available for work to create income. Similar to machinery or capital stock, an individual's health can depreciate over time owing to excessive factors such as smoking, ageing or exposure to stressful environments. This can be offset by investments in health

capital through a combination of an individual's own time and market goods such as regular exercise, diet, medical care, rest and education.

This study focuses on the health capital of nurses. Here work-related injury is used as a measure of health outcome that depends on certain characteristics and bundles of goods and services - some that add to injury and others that detract from injury.

## **THE STUDY**

**Aim:** The aim of this study was to examine the relations between work-related injuries and modifiable risk factors among nursing professionals after controlling for socioeconomic factors.

**Design:** This cross sectional study was based on questionnaires sent to Australian employees in 2005/06.

**Participants:** The study utilised a large sample that represented 14 percent (5724 out of 41,373 nurses (AIHW 2008)) of the employed registered and enrolled Queensland nurses. The analysis was confined to nursing professionals aged 18 to 65 years. Those aged over 65 were excluded from the analysis because the minimum Age Pension for males is 65 years in Australia. This excluded 0.26 percent of the respondents captured in the survey sample.

### **Data collection**

The information in this paper was collected from the Health and Performance at Work Questionnaire (HPQ) developed by the World Health Organisation (WHO). The data were compiled as a component of the Work Outcomes Research Cost-benefit (WORC) Project ([www.qcmhr.uq.edu.au/worc](http://www.qcmhr.uq.edu.au/worc)). The WORC Project was designed to investigate the return on



investment, from an employer's perspective, from early detection of depression and facilitating help-seeking behaviours by employees.

Detailed information on the engagement of companies and HPQ survey distribution has been previously published (Hilton et al. 2008). Data were collected through 58 large (>1000 employees) companies (representing over 350,000 employees) across Australia. Employers agreed to distribute the surveys to their employees via paper or the internet between October 2005 and October 2006. Overall 78,726 employees responded to the HPQ survey.

*Questionnaire:* The HPQ is a health risk assessment survey developed for the purpose of estimating the impact of health problems on the workplace (Kessler et al. 2003). It consists of 24 questions about chronic physical health conditions, four questions regarding chronic mental health conditions, in addition to work performance and demographic questions. Further information about the HPQ can be accessed at [www.hcp.med.harvard.edu/hpq/](http://www.hcp.med.harvard.edu/hpq/).

**Ethical consideration:** The Human Research Ethics Committee of a major University approved the study protocol. Employees over the age of 18 years were invited to respond to the HPQ. Participation in the survey was voluntary and confidential.

### **Data analysis**

Data were analysed using the statistical package Stata version 10.1 (StataCorp, Texas, USA). A binary logistic regression is run to estimate the relationship between a work-related injury and risk factors.

$$\text{logit}(E(\text{Injury}_i)) = \alpha + \beta_1 \text{K6score}_i + \beta_2 \text{lnHourlyWage}_i + \beta_3 \text{HlthCond}_i + \beta_4 \text{Z}_i + \beta_5 \text{X}_i + \varepsilon_i \quad (1)$$

where  $Injury_i$  is a dichotomous dependent variable: 1 is the  $i^{th}$  individual with a work-related injury. 0 is otherwise. The variable is based on the survey question that asked respondents, “*In the past 12 months, did you have a work-related accident, injury or poisoning that required medical attention?*”

Based on the availability of the data and the theoretical model, the variables in the model also consist of the following:

1. *K6score*. Previous research highlights the importance of considering mental health issues in examining work-related injury. Major causes of sickness presenteeism are related to mental health (Marlowe 2002). Research by Wang et al. (2004) showed depression as the only condition associated with a decrease in an employee’s ability to stay focused on tasks. To capture the state of mental health, the K6 score was included as a measure of psychological distress (discussed below). This variable also becomes a proxy for the Demand–Control measure for job strain used by Gillen and colleagues (2007).
2. *lnHourlywage*. The hourly wage rate is a proxy for the Effort-Reward Imbalance that measures high effort and low reward. Previous research used an effort-reward score (Gillen et al. 2007) in the model for work-related injury.
3. *HlthCond*. This variable captures the number of pre-existing health conditions. As the number of health conditions experienced by an individual increases one would expect a greater strain on the individual. The number of health conditions is treated as exogenous.
4. *Z*. The vector *Z* represents employment characteristics such as work experience and employment status. Injury may reduce hours worked and hours worked are expected to positively correlate with the likelihood of injury. To overcome this issue of endogeneity the model uses employment status, either part-time or full-time employment, to represent hours worked. This categorical variable is less endogenous with injury. In the short run, if an

individual possesses an injury they are likely to reduce hours worked rather than change from full-time to part-time employment.

5.  $X$ . Personal demographics is represented by  $X$ , a vector of control variables relating to the respondent's personal characteristics such as marital status, gender, education and the number of children. Applying these characteristics allow the control for as much as possible of the unobserved individual fixed effects.

After fitting the model with logistic regression, the statistical package Stata10.1 allowed the computation of the marginal effects (Baum 2006). Initially the option computed the marginal effects at the multivariate point of means. That is, the marginal effects for an average nurse.

Previous studies have identified low nursing experience as a significant factor in work-related injury (Smith and Leggat 2005, Mustafa et al. 2006). The marginal effects analysis also evaluated the estimated function when nursing had less than 5 years of work experience. The output allowed a comparison between relatively inexperienced nurses (less than 5 years experience) with the mean of the total sample.

Lastly, an additional computation of the marginal effects set the psychological distress (K6score) to equal high. A sample of nurses with a high level of psychological distress was compared with the mean of the total sample.

### *Data*

In the model, the number of health conditions is included as a categorical variable. The ability to isolate those with only one health condition takes into consideration the possibility that one health condition may relate to injury. 'No health condition' is the reference category.

To construct hourly wage several steps were taken. First, the variable hours worked per week, was derived from the hours employees were expected to work by their employer over the last

28 days divided by 4 weeks. This captured the shift work component within the nursing profession. Second, the midpoint of each range of annual income before tax was used to obtain the income variable. Permanent income such as annual income has a stronger effect on health than transitory variations in income. The hourly wage was constructed by dividing the annual income by the hours employees were expected to work in a typical seven day period, divided by 52 weeks. The variable was then converted to its logarithm. This produced a level of skewness and kurtosis within the acceptable range of a normal distribution.

The data did not include information on actual labor market experience. In the absence of such information, the traditional approach is to use the Mincer proxy for potential labor market experience calculated as age minus number of years of education minus six (in Queensland children generally start school at 6 years of age). The derivation of this variable required a number of intermediate steps. In order to calculate the number of years of full-time equivalent education, it was assumed that each post-secondary qualification lasted a specific length of time (Kidd and Shannon 1996). Similar to other studies, Mincer and Mincer Squared were included in the model (Kidd and Shannon 1996, Langford 1995). Mincer Squared captured the effect of labour market experience. The analysis added a children status variable to capture the effect of child-rearing on women's labour force experience.

Embedded in the HPQ survey is the K6 score, a six-item scale of psychological distress with high internal consistency and reliability. The K6 strongly discriminates between community mental health cases and non-cases (Kessler et al. 2002, Furukawa et al. 2003, Kessler et al. 2003, Cairney et al. 2007). Detailed information on the K6 including scoring has been published (Furukawa et al. 2003, Kessler et al. 2003). In this study we employ published methods where a K6 score of 0 to 7 reflects low psychological distress, a score of 8-12 indicates moderate psychological distress and a score of 13 to 24 represents high psychological distress (e.g. a high likelihood of a mental health disorder).

The remaining variables are used as covariates in the model.

## **RESULTS**

### **Descriptive statistics**

Table 1 presents the definitions and proportions or mean values for the variables included in the models. The analysis is presented for the pooled sample and also stratified into injury and no injury categories. Of the pooled sample, 10 percent of nurses reported a work-related accident, injury or poisoning in the last 12 months that required medical attention. Males, those who are unmarried, work full-time, have four or more health conditions and a medium to high K6 score appear more vulnerable to injury compared to their counterparts.

### **Representativeness of the data**

The nurses in the WORC sample are predominantly female (91 percent, Table 1). The participants' mean age of 43 years reflects the ageing of the nursing workforce. Also 50 percent of nursing professionals in the sample are employed part-time. These figures resemble the 2005 Australian Bureau of Statistics Queensland data, that reported 94 percent of nurses being female, nurses with an average age of 47 years and 50 percent of nurses employed part-time (AIHW 2008 p29).

INSERT TABLE 1 HERE

### **Regression analysis**

The results of the binary logistic regression are presented in Table 2. Males and unmarried individuals have more work-related injury compared to their counterparts. The probability of injury increases by a multiplicative factor of 1.37 and 1.68, respectively, as the K6 score moves from low

to medium and low to high levels of psychological distress. The odds ratio and significance level shows little significant change in the likelihood of injury on the basis of a change in the years of work experience (Mincer and Mincer Squared). Compared to individuals with no health conditions those with three or more conditions have greater odds of work-related injury.

INSERT TABLE 2 HERE

### **Marginal effects: total sample versus nurses with less than 5 years of work experience**

Also of interest is the probability of injury for the average nurse who possesses over 20 years of work experience compared with nurses who possess fewer years of work experience. The marginal effects of the total sample *and the sample of nurses with less than 5 years of work experience* are presented in Table 3. The mean values of the average nurse are also reported.

Referring to the total nursing sample, the average nurse has a mean work experience value of 23 years. The marginal effects of the total sample indicate that males and the unmarried have a 2% higher probability of injury. Those with high psychological distress have a 5% probability of injury. As the number of health conditions increase, the probability of an individual receiving a work-related injury rises from 5% for 3 health conditions to 15% for 6 or more health conditions.

INSERT TABLE 3 HERE

A comparison of the marginal effects of the total sample with nurses of less than five years of work experience show that, with the exception of 5 and 6 or more health conditions, the significant coefficients are only between 0.2% and 0.8% higher for the less experienced nurses. There appears to be little difference in the likelihood of injury on the basis of work experience.

### **Marginal effects: total sample versus nurses with high levels of psychological distress**

Table 4 presents the output of the analysis relating to the marginal effects of the total sample and the nurses that reported high levels of psychological distress. The significant marginal effects (sex, married, three or more health conditions) are exaggerated for the sample of high distressed nurses compared to the total sample. For instance, the effect of 3 or more health conditions on work-related injury are 2% (0.066 versus 0.047) to 5% (0.204 versus 0.149) higher for nurses experiencing high levels of psychological distress compared to the total sample.

INSERT TABLE 4 HERE

## **DISCUSSION**

### **Study limitations**

The study relied on a large sample of self-reported data. As such, factors including previous health conditions, work performance, and injuries were not validated. The sample was obtained from 14 percent of the nursing population and therefore may suffer from responder bias. Nevertheless, the demographic characteristics of the responders closely resembled the National and State profiles of nurses.

The Mincer variable is not an ideal measure of the labour market experience. The mean labour market experience of 23 years reported in this study may be overestimated. Given that 91 percent of the sample respondents were women, it is expected that a high proportion would have experienced breaks in the workforce to perform carer and child rearing duties. This labour market experience figure is further exaggerated by 50 per cent of respondents that reported working part-time. Including the number of children variable in the model, to some extent, controlled for the

breaks in the workforce. Eley and colleague's (2007b) investigation of 1369 Queensland nurses identified a break from the nursing profession of 5.1 mean years for the aged care sector, 2.6 for the public sector and 2.9 for the private sector (Eley et al. 2007b).

## **Discussion of results**

This study investigated the depreciation of the health capital of nurses as measured by work-related injury. The identification of certain variables that detract from health capital is important in developing policies that can improve the injury rates within the nursing profession.

Little research exists on the factors associated with work-related injury among the Australian nursing profession. Although studies from abroad do provide some insight into the modifiable risk factors, this study adds to the literature by investigating nurses in the Australian context that captures institutional, social and demographic settings.

Approximately 10 percent of the sample of nursing professionals reported a work-related accident, injury or poisoning that required medical attention. This rate resembled the 9.4 percent estimated by Studnek et al. (2007) for the prevalence of work-related illness or injury with time away from work.

The analysis of the data identified males as more vulnerable to work-related injury. This possibly reflects their greater exposure to physically demanding tasks. There may be a tendency for female nurses to call on male nurses to assist them when they are confronted with difficult patients. Also nurse managers may allocate male nurses to more physically demanding duties.

Our findings of a significant association between psychological distress and work-related injury are consistent with previous investigations (Hegney et al. 2006, Eley et al. 2007a, ASCC 2008, Karahan et al. 2009). This association is concerning; that is, most unintentional injuries can be avoided and psychological distress can be reduced through appropriate prevention and early intervention strategies. Nurse managers, employers and other nurses need to be aware of the signs



and symptoms of prolonged psychological distress and encourage nurses with psychological symptoms to seek professional help. Moreover, psychological distress in healthcare workers carries risks for patient care. For example, pediatricians with depression are 6.2 times more likely to make medication errors than non-depressed colleagues (Fahrenkopf et al. 2008) and it is possible that similar risks exist for patients being treated by nurses with mental health problems

Studies have demonstrated a link between work-related injury and several characteristics such as previous injuries (Videman et al. 2005, Studnek et al. 2007) and physical fitness (Studnek and MacCrawford 2007). We found that the number of existing health conditions increased the likelihood of work-related injury. Effective occupational health and safety workplace programs should focus on providing adequate support to allow nurses greater opportunity to fully recover from physical and mental illness. Moreover, professional treatment should be facilitated, by encouraging referrals to appropriate services such as medical specialists, physiotherapists and/or psychologists, to improve management of chronic diseases, musculo-skeletal limitations, and psychological distress.

The analysis also involved the computation of the marginal effects of three groups - the total sample, nurses with less than 5 years work experience and nurses with high levels of psychological distress. Compared to the total sample, the likelihood of injury on the coefficients for the remaining two groups of nurses was exaggerated. The distress level more so than work experience mattered in the association with injury rates.

## **CONCLUSION**

The findings imply that any workplace program directed towards the reduction of injury should include prevention and early intervention strategies that reduce psychological distress. Further,

occupational and safety workplace programs need to focus on providing adequate support to allow nurses greater opportunity to fully recover from physical and mental health conditions.

Possessing several health conditions was associated with work-related injury. The possession of either one or two health conditions was not significant. This finding highlights the importance of co-morbidity when investigating injury at work. Future studies need to dispel the commonly held notion that the possession of one health condition has a similar impact on injury to that caused by several health conditions.

Similar to other countries, Australia is experiencing a shortage of nurses (Buchan and Calman 2004). The state of Queensland possesses the lowest nursing rate of all the Australian states (AIHW 2008 p21). Given the current difficulties of attracting and retaining nursing professionals, the ability to provide additional resources, including adequate recovery time will be a challenge for policy makers.

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**Table 1** Definition of variables. Queensland Nursing Professionals, 18 – 65 years

		<b>Pooled %/Mn (S.D)</b>	<b>Injury %/Mn (S.D)</b>	<b>No injury %/Mn (S.D)</b>
<b>Variable Name</b>	<b>Definition of Variable</b>	n=5724	n=580	n=5144
Injury	Work-related accident/injury/poisoning requiring medical attention during last 12 months (percent)		10.13	89.87
Sex	1 = male (percent)	9.43	11.90	9.16
	2 = female (percent)	90.57	88.10	90.84
Marital status	0 = not married (percent)	29.11	34.83	28.46
	1 = married (percent)	70.89	65.17	71.54
Number of Children	Continuous variable (mean)	0.30 (0.84)	0.29 (0.85)	0.30 (0.84)
Educational level	Year 11 or under – referent (percent)	11.39	11.03	11.43
	Year 12 (percent)	9.80	8.79	9.91
	Tertiary education ( percent)	23.45	24.31	23.35
	Degree graduate ( percent)	32.39	33.45	32.27
	Post graduate ( percent)	22.97	22.41	23.04
Hourly wage	Hourly wage. Continuous variable (mean)	24.57 (13.73)	24.17 (12.98)	24.61 (13.82)
Employment	1 = Full-time (percent)	50.49	55.34	49.94
	0 = Part-time (percent)	49.51	44.66	50.06
Mincer	Labour market experience proxy. Continuous variable (mean)	23.26 (11.20)	23.29 (11.39)	23.27 (11.18)
MincerSq	Labour market experience proxy squared. Continuous variable (mean)	666.50 (534.24)	671.03 (526.95)	666.55 (534.95)
Number of health conditions – categorical variable	0 – referent (percent)	11.98	6.21	12.64
	1	14.73	8.62	15.42
	2	15.95	10.69	16.54
	3	14.74	11.90	15.07
	4	11.97	12.76	11.88
	5	8.44	10.69	8.18
K6score	6 and over	22.19	39.14	20.28
	Low – referent (percent)	72.83	60.34	74.24
	Medium (percent)	22.66	32.41	21.56
	High (percent)	4.51	7.24	4.20

Source: WORC Survey 2005/6



**Table 2** Work-related injury among Queensland nurses: logistic regression

	<b>Odds Ratio</b>	<b>P-value</b>	<b>95% Conf. Interval</b>	
Sex (Female)	0.745	0.040	0.563	0.987
Marital status (married)	0.810	0.030	0.670	0.980
Number of children	0.957	0.434	0.858	1.068
Educational level <sup>a</sup> =Year12	0.998	0.994	0.658	1.512
=Tertiary	1.135	0.472	0.803	1.605
=Degree	1.129	0.521	0.779	1.636
=Postgraduate	1.021	0.916	0.693	1.503
Log of hourly wage	0.812	0.439	0.480	1.375
Employment (full-time)	1.112	0.262	0.924	1.339
Work exp (Mincer)	0.986	0.354	0.956	1.017
Work exp squared (MincerSq)	1.000	0.656	1.000	1.001
K6score <sup>b</sup> =medium	1.373	0.002	1.124	1.677
=high	1.680	0.004	1.175	2.403
No. of health conditions <sup>c</sup> =1	1.134	0.577	0.729	1.765
=2	1.320	0.201	0.863	2.020
=3	1.628	0.023	1.070	2.476
=4	2.207	<0.001	1.453	3.353
=5	2.651	<0.001	1.715	4.097
=6&over	3.740	<0.001	2.561	5.462

Source: WORC Survey 2005/6

<sup>a</sup> Referent is year 11 and below

<sup>b</sup> Referent is low K6score

<sup>c</sup> Referent is no physical health conditions

**Table 3** Work-related injury among Queensland nurses: Work Experience – marginal effects

Variable	Mean	Total sample of nurses with a mean of 23 years of work experience				Sample of nurses with less than 5 years of work experience			
		Marginal Effects	95% CI		P-value	Marginal Effects	95% CI		P-value
Sex (female)	1.906	-0.024	-0.047	-0.001	0.040	-0.027	-0.054	0.000	0.051
Marital status (married)*	0.709	-0.018	-0.035	-0.001	0.036	-0.020	-0.039	-0.001	0.035
Number of children	0.302	-0.004	-0.013	0.005	0.434	-0.004	-0.014	0.006	0.398
Educational level <sup>a</sup>									
=Year12*	0.098	-0.000	-0.034	0.034	0.994	-0.003	-0.039	0.034	0.893
=Tertiary*	0.234	0.011	-0.019	0.041	0.484	0.010	-0.023	0.042	0.56
=Degree*	0.324	0.010	-0.021	0.042	0.529	0.011	-0.024	0.045	0.555
=Postgraduate*	0.230	0.002	-0.030	0.034	0.916	0.001	-0.034	0.036	0.964
Log of hourly wage	1.358	-0.017	-0.060	0.026	0.439	-0.019	-0.067	0.029	0.442
Employment (full-time)*	0.505	0.009	-0.007	0.024	0.261	0.010	-0.007	0.026	0.267
<b>Work experience (Mincer)</b>		<b>-0.001</b>	<b>-0.004</b>	<b>0.001</b>	<b>0.353</b>	<b>-0.012</b>	<b>-0.047</b>	<b>0.024</b>	<b>0.52</b>
Work exp squared (MincerSq)	665.979	0.000	-0.000	0.000	0.656	-0.000	-0.000	0.000	0.238
K6score <sup>b</sup>									
=medium*	0.227	0.028	0.009	0.047	0.004	0.031	0.008	0.053	0.007
=high*	0.045	0.052	0.009	0.094	0.017	0.057	0.008	0.106	0.023
No. of health conditions <sup>c</sup>									
=1*	0.147	0.011	-0.028	0.050	0.590	0.012	-0.031	0.055	0.588
=2*	0.160	0.025	-0.016	0.065	0.234	0.027	-0.018	0.073	0.243
=3*	0.147	0.046	0.001	0.091	0.045	0.051	-0.001	0.103	0.056
=4*	0.120	0.083	0.029	0.138	0.003	0.091	0.027	0.155	0.005
=5*	0.084	0.111	0.047	0.176	0.001	0.121	0.044	0.198	0.002
=6&over*	0.222	0.148	0.094	0.202	0.000	0.161	0.089	0.233	0

Source: WORC Survey 2005/6

(\*) marginal effect is for discrete change of dummy variable from 0 to 1

<sup>a</sup> Referent is year 11 and below

<sup>b</sup> Referent is low K6score

<sup>c</sup> Referent is no physical health conditions

**Table 4** Work-related injury among Queensland nurses: Psychological distress - marginal effects

Variable	Mean	Total sample				Nurses with high psychological distress			
		Marginal Effects	95% CI		P-value	Marginal Effects	95% CI		P-value
Sex (female)	1.906	-0.024	-0.047	-0.001	0.039	-0.035	-0.069	-0.001	0.042
Marital status (married)*	0.709	-0.018	-0.035	-0.001	0.036	-0.026	-0.050	-0.002	0.036
Number of children	0.302	-0.004	-0.013	0.005	0.435	-0.005	-0.018	0.008	0.439
Educational level <sup>a</sup>									
=Year12*	0.098	-0.000	-0.034	0.034	0.989	-0.000	-0.050	0.049	0.992
=Tertiary*	0.234	0.011	-0.019	0.041	0.492	0.015	-0.028	0.058	0.489
=Degree*	0.324	0.010	-0.022	0.042	0.532	0.015	-0.031	0.060	0.532
=Postgraduate*	0.230	0.001	-0.031	0.033	0.932	0.002	-0.044	0.048	0.929
Log of hourly wage	1.358	-0.017	-0.060	0.026	0.442	-0.025	-0.087	0.038	0.443
Employment (full-time)*	0.505	0.009	-0.006	0.024	0.257	0.013	-0.009	0.035	0.260
Work experience (Mincer)	23.249	-0.001	-0.004	0.001	0.360	-0.002	-0.005	0.002	0.351
Work exp squared (MincerSq)	665.979	0.000	-0.000	0.000	0.674	0.000	-0.000	0.000	0.660
<b>K6score<sup>b</sup></b>		<b>0.023</b>	<b>0.011</b>	<b>0.035</b>	<b>0.000</b>	<b>0.034</b>	<b>0.011</b>	<b>0.057</b>	<b>0.004</b>
No. of health conditions <sup>c</sup>									
=1*	0.147	0.011	-0.028	0.050	0.588	0.016	-0.041	0.072	0.587
=2*	0.160	0.025	-0.016	0.066	0.231	0.036	-0.022	0.094	0.227
=3*	0.147	0.047	0.001	0.092	0.043	0.066	0.003	0.130	0.040
=4*	0.120	0.084	0.030	0.138	0.002	0.117	0.043	0.190	0.002
=5*	0.084	0.112	0.048	0.177	0.001	0.154	0.069	0.238	0.000
=6&over*	0.222	0.149	0.096	0.203	0.000	0.204	0.134	0.274	0.000

Source: WORC Survey 2005/6

(\*) marginal effect is for discrete change of dummy variable from 0 to 1

<sup>a</sup> Referent is year 11 and below

<sup>b</sup> K6score is a continuous variable.

<sup>c</sup> Referent is no physical health conditions