

The Association between Psychological Stress and Low Back Pain among District Hospital Employees in Gauteng, South Africa

ABSTRACT: *The presence of low back pain (LBP) can be influenced by psychosocial stress experienced at work. The aim of this study was to determine the point prevalence for LBP and the psychological stress experienced at work as a factor associated with the presence of LBP amongst staff employed at district hospital in Pretoria, Gauteng, South Africa. A self-administered questionnaire was completed by all participants. Results indicated that the point prevalence for LBP was 47.46%. Sixty five point five seven percent of employees who experienced stress at work all the time, suffered from LBP ($p=0.001$). Stress experienced at work all the time increased the risk of LBP (OR 3.47 CI 1.46; 8.23). A clinical recommendation resulting from this study is that healthcare providers need to include the provision of education, support and appropriate referral for patients who perceive themselves to have high levels of stress.*

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INTRODUCTION

Low back pain (LBP) is a widespread health problem, prevalent not only in South Africa, but all over the world. The LBP point prevalence rate among South African steel plant workers is 35,8% with the lifetime prevalence rate being 63,9% (Van Vuuren et al 2005). According to Louw et al (2007) the mean point prevalence rate of LBP in Africa among adults is 32% and the lifetime prevalence rate is 62%. Hospital workers are not overseen in these LBP statistics. The prevalence of LBP among employees in an Italian hospital was found to be 58,8% (Folletti et al 2005) and in Denmark, Warming et al (2009) found that 64% of nurses suffered from LBP. It is has been proven that physical factors influence the presence of LBP, but there is increasing evidence and growing consensus that psychosocial factors also play a role in the precipitation or worsening of LBP (Bernard 1997, Linton 2001).

Psychological stressors have been defined by Cotton (1990, p 29) as “those threats which are attributable to the individual’s internal reactivity—thoughts, feelings, and concerns about perceived

threats. Psychological stressors are subjective because the threat occurs because of the individual’s interpretation of an event, rather than as a result of the event itself”. She defined the stress response as “the integrated and non-specific reaction of the body to demands or stressors, which is comprised of cognitive, behavioural and physiological components.”

Work-related stressors were identified in various studies. In a South African study it was identified as unexpected events, dependence on others, negative perceptions of support, low job satisfaction, time pressure and deadlines. These work-related stressors were found to be associated with LBP (Van Vuuren et al 2007). On the other hand, taking unscheduled breaks was found to be preventative in the development of LBP. Psychological job demand was defined by Karasek et al (1998) as “the effort required carrying out work”. They defined decision latitude as “the individual’s potential control over the performance of the job” and job insecurity as “perceived threat or reality of job termination and layoff faced by workers”. Psychological

job demands and decision latitude were factors identified to play a role in the presence of LBP (Karasek et al 1998) while Hyeonkyeong et al (2007) found that high job insecurity was significantly associated with lower back work-related musculoskeletal disorders. Hyeonkyeong et al (2007) also found that flight attendants with LBP had higher perceived psychological demands than those without LBP.

In a study done in Brussels by Clays et al (2007) it was found that work-related psychosocial factors were associated with having LBP. They investigated the presence of psychosocial risk factors in a sample of 2556 middle-aged men and women. Participants were followed up after an average of 6.6 years while being employed at the same company. Psychosocial factors associated with

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the presence of LBP included low decision latitude, high job strain, low social support at work, low wage satisfaction and feeling stressed at work. The strength of this association was not reduced by controlling for physical factors. These findings were supported by Linton (2001) who did a systematic review on occupational psychological factors and LBP. He concluded that there is strong evidence that low job satisfaction, monotonous work, work relations, job demands, stress and perceived ability to work were related to future development of LBP.

LBP was the most common and serious complaint among employees studied by Chen et al (2005). Five hundred and sixty one employees at an offshore oil company in South China participated in their study. Physical environment (noise, vibration, heat), safety, interface between job and family/social life and ergonomics were found to be occupational stressors. According to Chen et al (2005) physical environment and ergonomics should not only be considered as physical factors but also as psychological stressors. Eating behaviour was identified as the most prevalent coping style and an important predictor of musculoskeletal pain (Chen et al 2005).

Gender differences in coping with psychosocial factors and its impact on LBP were also noted. Females were found to be at greater risk for LBP associated with psychosocial factors than males (Chen et al 2005, Tsuboi et al 2002, Yip et al 2001). Smedley et al (1997) did a longitudinal study on an all-female nursing population to establish predictors of LBP. They found that frequent low mood increased the chances of LBP leading to absence from work by 3.4 times. They argued that loss of time from work may be as a result of more severe LBP or a lack of ability to cope when the symptoms occurred. Among 141 nurses in Switzerland, Elfering et al (2002) found that a lack of control over stressful events at work, as well as lack of time control, may render an individual vulnerable to musculoskeletal pain. In a study done among flight attendants, also a female-dominated occupational group, it was shown that job insecurity

in particular was associated with increased LBP presence (Heyonkyeong et al 2007). Among females in administrative positions, feeling depressed was significantly associated with LBP (Clays et al 2007).

Psychosocial factors may cause increased muscle tension which may in turn lead to altered spinal loading. As a result of the latter, nutrition of the intervertebral discs, nerve roots and other spinal tissues is affected (Bergenudd and Johnell 1991, Bongers et al 1993). It was postulated that raised plasma cortisol levels may leave muscles vulnerable to injury due to mechanical loads and hence increased susceptibility to LBP (Theorell et al 1993). It is also believed that pain tolerance may be decreased due to stress among people living in poor psychosocial environments, and those affected may be inclined to take more sick leave due to LBP (Burton and Erg 1997, Nachemson 1992).

Self-reporting of LBP on a four-point scale in self-administered questionnaires has been found to have good reliability in test-retest analysis (Walsh and Coggon 1991). This method was also used by Warming et al (2009). They gained information from 148 nurses employed at a university hospital in Copenhagen, by completing daily logbooks on physical and psychosocial factors during three working days. High levels of stress were found to be strongly associated with LBP (OR 4.0, CI 1.04 ; 15.36) in their study.

In contrast to the findings of the above studies, Kwon et al (2006) found that the development of LBP was not dependent on the level of stress. In their study, they divided the respondents into groups of: no stress at all, slight stress, moderate stress and a great deal of stress. They argued that mental symptoms such as depression concurred with chronic diseases. For this reason they doubted that mental stress is a cause of LBP, but may be as a result of chronic suffering from LBP. Their study excluded people that showed the slightest sign or symptom of systemic disease, diagnosed or undiagnosed. This decreased the influence of chronic co-morbid diseases on the presence of LBP, and hence meant that a purer result could be obtained.

A vast number of different psychological stressors have been found to be associated with LBP by various researchers. These stressors cause physiological changes and reactions which may render an individual vulnerable to LBP. Although LBP may be experienced as a result of psychosocial factors or stress may be experienced as a result of chronic suffering from LBP, it is clear that perceived stress and LBP are associated. The aim of this article is to emphasise the presence of psychological stress at work, and its association with LBP in a population of hospital employees, in Pretoria, South Africa. By identifying the role playing factors associated with LBP, effective LBP prevention and management programmes can be put in place in the occupational environment.

Method

This cross-sectional study was conducted in 2007 using a self administered questionnaire. The population for the study comprised of all health care and support staff members employed permanently at a district hospital in Pretoria, Gauteng. Only staff members who were permanently employed were included. Hospital staff members who were not willing to participate, students and casual workers were excluded from the study. A self-administered questionnaire was developed for the data collection. Arrangements were made to conduct the study on a date and time when most staff members from each department were available to participate. The total number of participants was 354 which was 77.80% of the total number of permanently employed hospital employees. The reasons for non-participation in the study included not being available as a result of leave, absence from work and also refusal to participate.

Known risk indicators for LBP as described by Kwon et al (2006) was used as a foundation for the development of the self-administered questionnaire. The questionnaire contained questions under the following topics: demographics, recreation, occupation, perceived stress experienced at work, general health and the presence of LBP. The frequency of perceived stress at work was assessed

as part of the questionnaire by means of a four point scale (never, sometimes, often, all the time). The content of the questionnaire was validated by having it scrutinised by “physiotherapy experts” in the field of back care and management. The repeatability of the questionnaire was established using the test re-test method. Agreement on all the questions, that could not be changed from day to day, existed. Examples of questions on information that change from day to day are the number of exercise sessions per month, cigarettes smoked per day, hours spend sitting and standing, and number of units of alcohol consumed per week. The English questionnaire was translated into Tswana by three translators, and back translated into English again by two independent translators (Naude et al 2009).

Ethical clearance was granted (Number M070359) by the University of the Witwatersrand Human Research Ethics Committee prior to commencement of the study. Permission to conduct this study was obtained from the Superintendent of the hospital. Participants were told that refusal to take part in the study would not prejudice them in any way and were asked to voluntarily sign the consent form.

Statistical software (Stata Release 8.0) was used to analyse data. Categorical parameters were summarised using frequencies, percentages and cross-tabulations. Comparison between LBP categories (yes, no) with respect to categorical parameters employed Fisher’s exact and tests for trends in odds ratios employed Pearson’s chi-square test. Univariate analysis (independently) and odds ratios for potential risk factors for LBP were determined and tested for trend.

Results

The point prevalence of LBP was 47.46% (n=168). The majority of the population was between the ages of 26 and 40 years (n=216). Seventy two percent (n=255) of the participants were female.

The distribution of perceived stress at work and LBP is shown in Table 1. Few participants (12.15%) never experienced stress while 65.57% of the 61 participants who experienced stress all the time

had LBP. Perceived stress at work was found to be significantly associated with the presence of LBP (p=0.001). The risk of developing LBP was higher when a person had perceived stress at work all the time (OR 3.47, CI 1.46 ; 8.23) (Table 2).

Discussion

The point prevalence of LBP in this study (47.46%) is higher than what was found in two South African studies done by Uebel et al (2009) (13.1%) and Naidoo et al (2007) (44.33%). Uebel et al’s (2009) study only included nursing staff consulting for LBP at the staff clinic and injury-on-duty unit of the hospital where they were employed. Although Uebel et al (2009) states that the number

of nurses seeking outside medical attention is small, this may be a possible explanation for the low prevalence of LBP. Human resources and associated productivity at work will be negatively impacted by high point prevalence rates (Van Vuuren et al 2005). This issue is also relevant when looking at essential staff required in a hospital setting. This decrease in productivity will negatively impact on direct and in-direct patient care in a district hospital.

According to a number of studies, females are greatly at risk for LBP associated with psychological factors (Cole et al 2001, Tsuboi et al 2002, Yip et al 2001). The majority of the population in this study was female which may be a contributing factor to the high

Table 1: The distribution of perceived stress at work and low back pain (N=354)

Perceived work stress	Low Back Pain n (%)	No Low Back Pain n (%)	Total n (%)
Never	15 (4.24)	28 (7.91)	43 (12.15)
Sometimes	89 (25.14)	113 (31.92)	202 (57.06)
Often	24 (6.78)	24 (6.78)	48 (13.54)
All the time	40 (11.30)	21 (5.93)	61 (17.23)
Total n (%)	168 (47.46)	186 (52.54)	354 (100.00)

Table 2: The relationship between perceived stress at work and the presence of low back pain (n=168)

Lifestyle Factor	Category	Low Back Pain n (%)	Low Back Pain n (%)	(95% Confidence Interval)	p-value Test for Trend
Perceived stress at work	Never	15 (8.93)	1.00		0.001
	Sometimes	89 (52.98)	1.47	(0.74 ; 2.93)	
	Often	24 (14.29)	1.87	(0.79 ; 4.41)	
	All the time	40 (23.81)	3.47	(1.46 ; 8.23)	
	Total n (%)	168 (100.00)			

prevalence of LBP found in this study as well as the significant association of LBP and psychological stress.

This study established that 40 (65.57%) of the 61 participants who experienced stress all the time, had LBP. The risk to develop LBP for this group was also elevated (OR 3.47; CI 1.46 ; 8.23) and a positive association which was statistically significant ($p=0.001$) was found between stress at work and the presence of LBP in this study. A similar significant effect of work related stress on LBP was also found by various other researchers (Hartvigsen et al 2004, Karasek et al 1998, Van Vuuren et al 2007, Warming et al 2009).

This study did not establish various factors that can be identified as work related stressors, but research has shown that unexpected events, lack of control over stressful events, dependence on others, time pressures and lack of control over time are work-related stressors (Van Vuuren et al 2005, Elfering et al 2002). These stressors may also be present in the understaffed hospitals. Due to budget constraints, in November 2008 the department of health had 21 923 unfilled posts, including administration, support and management posts (Sibongakonke 2008). Unexpected and stressful events are also an integral part of daily patient care and the effect may be worsened by the lack of human resource. Van Vuuren et al (2007) established that unscheduled breaks are protective against LBP however hospital employees may not be able to have these breaks if there is understaffing.

Stressful situations may also be present in a staff member's personal life and may influence the stress experienced at work and in general. Clays et al (2007) found that nonwork-related factors like feeling depressed and low satisfaction with private life were associated with LBP. What could not be derived from this study is whether it was stress that was experienced at work which increased LBP, or if increased stress was experienced as a result of LBP.

From the literature it becomes clear that psychological stressors are *perceived* threats (Cotton 1990) and that these are subjective. In our study the frequency of perceived stress among hospital employ-

ees with LBP was very high (65.57%). All of the above mentioned work related psychological components may play a role in precipitating a non-specific stress reaction. This stress reaction can predispose an individual to LBP. As these stressors are being perceived differently by different individuals, the following questions may be asked: what causes one individual to be more immune to stress than another and which psychological characteristics are present in those with a high stress threshold? The answer to these questions can be transformed into an educational tool in order to increase the individual's threshold to work-related stressors and as a result reduce the chances of developing LBP.

In the present study, perceived stress was not measured by a standardised outcome measure. It was merely tested by a question aiming to gain information on the frequency of stress experienced by employees a hospital environment. It focuses the attention on the non-negligible issue of work stress and LBP, and this paper was used to identify relevant literature that confirms this finding. Further research is recommended in the association between psychological stress and LBP. Limitations of this study include self reporting of health and the presence of LBP may influence the accuracy of information given by participants. Health, LBP and perceived stress could have been underreported by staff for fear of negative repercussions from the employer with regards to job promotion and being prejudiced against.

Conclusion

The aim of this article is to emphasise the presence of psychological stress and its association with LBP among the staff members employed at a district hospital in Gauteng, South Africa. The point prevalence of LBP among employees at 47.46% is high. Psychological stress experienced at work is associated with the presence of LBP. Clinical recommendations include that healthcare providers need to incorporate the provision of education, support and appropriate referral for patients who perceive themselves to have high levels of stress. LBP prevention and management programmes should incorporate stress

management and relaxation techniques. Further research is needed to establish why certain psychological variables may be related to LBP as well as to establish the exact physiological mechanism behind this relationship.

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