

# The risk management of occupational stress

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**Abstract** *In Europe, occupational stress is considered as a risk-assessable disease. Recent high-profile litigation cases have raised awareness of the risk posed by workplace stress. Whilst legislation provides guidelines for the risk assessment of physical hazards, there remains little guidance for employers concerning occupational stress. This article proposes a risk management methodology that might be used to identify hazards and assess the level of risk associated with those hazards, using well-validated stress audit instruments, for example the Occupational Stress Indicator. It is suggested that a risk management approach is both informative and cost-effective. High risks, which may require more expensive organisational development solutions, can be differentiated and prioritised from lower risks, which may be effectively controlled through stress management or Employee Assistance Programmes.*

**Key words:** stress risk assessment, occupational stress indicator, risk methodology

## Introduction

The negative effects of occupational stress on the health and psychological well-being of individual employees and the businesses of their employing organisations are well-documented. For example, the results of a large-scale household survey indicated that 19.5 million working days were lost in the UK during 1995 due to work-related illness, with by far the largest category of illness being 'musculoskeletal, stress, anxiety and depression' (Jones *et al.*, 1998). Organisations suffer business loss through lost working days (due to work-related illness or accidents), absenteeism, staff turnover, lowered performance, and the associated, often hidden, costs of training replacement staff and the added burden placed on the colleagues of absent or under-performing staff. Recently, an additional source of business costs to employers has been the increase in personal injury claims against them, brought by employees who have suffered from the adverse effects of workplace stress (Earnshaw and Cooper, 1996). In the case of *Walker vs. Northumberland County Council*,<sup>1</sup> an employee brought a claim against his employer because he had suffered a nervous breakdown as a result of stress from an excessive workload. Whilst this case was settled out-of-court, most recently, in *Lancaster vs. Birmingham City Council*, the employer admitted liability for the stress-related

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1. [1995] *Industrial Relations Law Reports*, 35.

illness suffered by an employee and she was awarded damages.<sup>2</sup> In response to such developments, the UK Health and Safety Executive (HSE) has issued a discussion document prompting debate on the management of stress at work (Health and Safety Executive, 1999).

Recent years have seen a proliferation in legislation requiring employers to conduct risk assessments of their operations; in the UK, this includes the Control of Substances Hazardous to Health (COSHH) Regulations 1988/1994 and the Management of Health and Safety at Work Regulations (MHSWR) 1992. Whilst the current legislation focuses on physical hazards, such as chemicals, asbestos, use of display screen equipment, and so on, the emphasis has recently shifted to the risk associated with occupational stress (HSE, 1999). Employers are becoming increasingly aware that they must assess the risk posed by workplace stress and take adequate measures to control that risk—both to avoid business loss (including compensation claims) and to ensure a healthy work-force. There is good evidence linking the experience of occupational stress with serious psychiatric harm and physical disease, such as coronary heart disease (Cooper, 1996). There is also growing evidence concerning the effectiveness of organisational stress interventions, such as Employee Assistance Programmes (EAPs), in mitigating the experience of stress (Berridge *et al.*, 1997); for example, Cooper and Sadri (1991) found that an in-house stress counselling programme in a large organisation reduced absenteeism by 60% in one year. This was later substantially confirmed in a study of a number of external Employee Assistance Programmes (Highley-Marchington and Cooper, 1998).

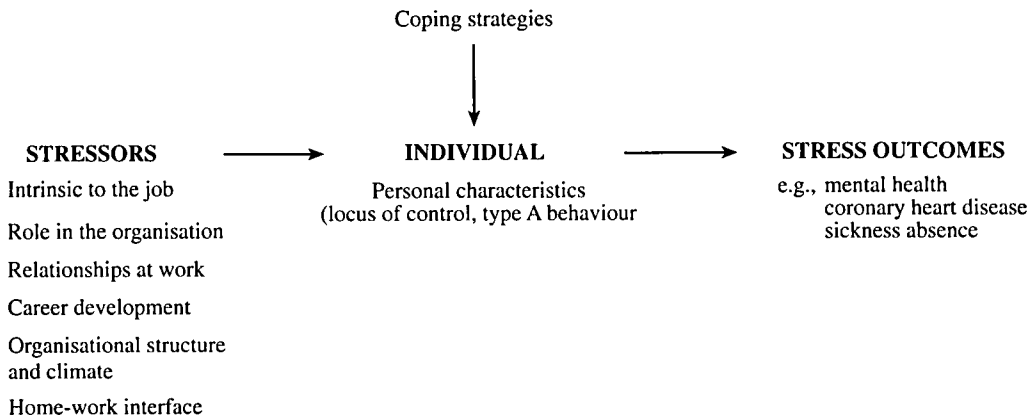
Whilst employers could not claim ignorance of the hazard posed by occupational stress, or that there are ways that they as employers can mitigate the associated harm, what is lacking is a risk management methodology, akin to those specified in legislation relating to physical hazards, to assess and evaluate the risk involved. A risk management methodology is needed to allow companies to assess the risk posed by workplace stress in their organisation (compared to industry standards), to prioritise those risks and devise appropriate risk control measures for the type of hazard and level of risk identified. This article aims to outline the form that such a risk management methodology might take.

### **The nature and effects of occupational stress**

Sources of occupational stress (or 'stressors') have been categorised by Cooper and Marshall (1976) as: intrinsic to the job; role in the organisation; relationships at work; career development; organisational structure and climate; home-work interface (see Figure 1). Those that are 'intrinsic to the job' will include physical aspects of the working environment, such as noise and lighting, and psychosocial aspects, such as workload, and will vary in importance depending on the job; for example, health-care professionals experience high workload, the need to work long hours, time pressures and inadequate free time (Wolfgang, 1988; Sutherland and Cooper, 1990); whilst money-handling and the threat of violence at work are stressors for bus drivers (Duffy and McGoldrick, 1990). Sources of pressure are derived not only from factors inherent in the job itself, but also from the organisational context, such as the structure and climate of the organisation (such as the management style, level of consultation, communication and politics). Research shows that organisational stressors can have more impact, even in seemingly 'stressful' jobs, than factors intrinsic to the job, for example, the police (Hart *et al.*, 1995) and teaching occupations (Hart, 1994). Hart *et al.* (1995) found that 'hassles' associated with police organisations (such as communication and administration) were the main predictor of psychological distress amongst police officers.

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2. *The Times* (6 July 1999).



**Figure 1.** *The occupational stress model.*

Occupational stress has been defined by many researchers (for example, Cox, 1978; Cummings and Cooper, 1979; Quick and Quick, 1984) as a negatively perceived quality which, as a result of inadequate coping with sources of stress at work, has negative mental and physical health consequences. There are two key dimensions of this definition: in order for an individual to experience stress symptoms, firstly, the source of stress must be negatively perceived and secondly, the individual must display inadequate coping. The experience of stress symptoms is therefore both subjective and dependent on individual differences. If a source of stress is positively perceived, for example, as a challenge to be overcome, then the individual will not experience negative outcomes. However, some individuals are predisposed to perceive themselves in a negative light, that is, they are high in 'negative affectivity' (Watson and Clark, 1984), and are, therefore, more likely to perceive job situations as stressful. Research studies have found that individuals high in negative affectivity are more likely to report stress symptoms (Spector and O'Connell, 1994; Moyle, 1995; Cassar and Tattersall, 1998). Parkes (1990) suggests that negative affectivity has a moderating influence on the stress-strain relationship, making high negative affectivity individuals more vulnerable to perceived stress, a hypothesis that has found empirical support (Moyle, 1995; Cassar and Tattersall, 1998). Research has suggested that workers with particular personality traits are more vulnerable to stress: a more 'external' locus of control (Spector, 1986; Newton and Keenan, 1990; Rees and Cooper, 1992) and Type A behaviour pattern (Ganster, 1987; Newton and Keenan, 1990). Other personal characteristics, such as age and sex, may also affect vulnerability to stress (Jenkins, 1991).

Stressors do not act on a passive individual; he/she is likely to take action to cope with sources of pressure. It is when these coping strategies fail that an individual will experience negative stress outcomes, such as physical or mental ill-health. Proactive, task-focused coping styles, which deal with the problem itself (for example, improving time management skills to cope with a heavy workload) are likely to be more effective than reactive, emotion-focused coping styles, which aim to mitigate the side-effects (for example, smoking or drinking alcohol to reduce feelings of anxiety or depression). Koeske *et al.* (1993) differentiate between two types of coping: control coping (for example, 'took things a day at a time, one step at a time'; 'considered several alternatives for handling the problem'; 'tried to find out more about the problem') and avoidance coping (for example, 'avoided being with people in general'; 'kept feelings to myself'; 'drinking more'). In a longitudinal study looking at newly appointed case managers (dealing with challenging patients), they found that control coping had a

significant buffering effect over time against the negative consequences of stress; the exclusive use of avoidance coping strategies, in the place of control coping, had detrimental effects. The coping strategies that individuals adopt will depend on a variety of factors including, personality, experience, training and the environment, such as the degree of control the individual has over the situation. For example, Koeske *et al.* (1993) found that avoidant copers tended to demonstrate a more external locus of control. Hurrell and Murphy (1991) argue that individuals with an internal locus of control suffer from fewer stress symptoms as they are more likely to define stressors as controllable and take proactive steps to cope with them; however, in work settings where some stressors, such as workload or work pace, are beyond the control of the individual worker, extreme internals may fare no better than moderate or extreme externals. In the latter case, emotion-focused coping strategies may be most effective in reducing distress. Thus, there will be differential effects for some moderators, such as personality and coping mechanisms, depending on the work environment. Control in the workplace is of particular importance, if individuals are expected to cope successfully with challenging work environments (Karasek and Theorell, 1990). For example, Cooper *et al.* (1999) found that anaesthetists felt a lack of control and autonomy at work that had significant negative effects on their well-being. Although individuals can be taught to use proactive coping strategies, the work environment must allow workers a degree of autonomy and decision latitude in order to make use of such coping mechanisms.

Finally, there will be differences in the type of symptoms experienced by an individual in response to exposure to different stressors (Cooper *et al.*, 1989). For example, a heavy workload might cause psychological effects in one person, making them anxious, whilst another might experience headaches.

Any risk management methodology aimed at assessing and controlling the risk posed by occupational stress must take into account the nature and effects of stress. The previous section has highlighted the differences between occupational stress and physical hazards, such as chemicals, which are currently assessed by law. Firstly, stress is subjective—research has identified sources of pressure, but these only lead to negative outcomes if they are negatively perceived; secondly, the experience of stress is affected by a variety of individual factors, including age, sex, personality and ways of coping; finally, different stressors are more salient in different environments, and different stressors lead to different negative outcomes.

### **Risk assessment and risk management**

A Royal Society Study Group (1992) aimed to produce a multi-science approach to risk management, highlighted instead the conflicting perspectives and the lack of a common understanding of risk. Many definitions of risk and alternative approaches to risk management exist (Singleton and Hovden, 1987; Rowe, 1990). Whilst there is no universally accepted definition of risk, Warner, in the Introduction to the Royal Society report, argues that the term refers to “a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence” (Warner, 1992: p. 4). A hazard might be understood as ‘the potential to cause harm’, whilst a risk is ‘the likelihood of that potential being realised’ in a given period of time (HSC, 1991: p. 41). Reflecting this understanding, a risk can be conceptualised as having two basic elements, one relating to the probability that an event, decision or activity will have undesirable negative outcomes, and the other relating to the severity of those outcomes. These elements are commonly represented as an equation (Glendon and McKenna, 1995: p. 320):

$$\text{Risk} = \text{probability of occurrence of an event} \times \text{consequences, for a given time period}$$

Approaches to risk management are also divided—with social scientists emphasising the social experiences of those who are exposed to risk (for example Wynne, 1989) and rejecting the methods of quantifying risks favoured by natural scientists. Hood and Jones (1996: p. 7) describe a broad understanding of the risk management process as “a range of related activities for coping with risk, including how risks are identified and assessed and how social interventions to deal with risk are monitored and evaluated”. The basic steps in this process are: identifying hazards; evaluating risk; determining appropriate controls; implementing controls; evaluating the effectiveness of the controls (Hood and Jones, 1996; Glendon and McKenna, 1995).

In the UK, companies have a legal obligation to undertake risk assessments of their operations under Management of Health and Safety at Work Regulations (1992) and other legislation. Risk assessment involves both hazard identification and risk evaluation and has been defined as a “process of estimating the probability and size of possible outcomes, and then evaluating the alternative courses of action” (Wharton, 1992: p. 7). The primary purpose of risk assessment is to determine the extent to which existing, or planned, control measures are satisfactory, or need to be improved (Booth, 1993).

Methods of risk assessment derive an estimate of the level of risk, or a risk rating, for a hazard. This is commonly achieved by estimating the probability of an event, the severity of the consequences and the frequency of exposure—these figures (which may be based on subjective judgement) are multiplied together to give the risk level (see, for example, Steel, 1990; Kazer, 1992; Waring, 1996). Events with severe consequences must be very rare, and very frequent events must have low consequences for the resultant level of risk to be acceptable. Frequent events with severe consequences represent an unacceptable risk. In an example cited by Waring (1996), a manufacturing plant identified the use of ethoxol as a hazard (this is a respiratory irritant and narcotic); the frequency of exposure was high as it is airborne and levels varied between areas of the plant, the consequences were also high as the UK Health and Safety Executive has set maximum exposure limits which were exceeded in some areas. Using this simple formula, the risk would be assessed as unacceptably high and, if ethoxol could not be eliminated from the manufacturing process, risk control measures would have to be implemented to reduce exposure, for example, changes in handling procedures or a ‘no smoking/no eating’ ban introduced in high exposure areas.

The above example illustrates how a fairly simple estimate of risk can be obtained for physical hazards. However, it must be appreciated that an over-reliance on ‘objective’ risk estimates can be unwarranted. For example, this equation might be applied to estimating the risk of a fire hazard in underground train stations: an identified hazard (people throwing down lighted matches or cigarettes and starting a fire) can be assessed as: [exposure (often)]  $\times$  [consequences (minor)]  $\times$  [probability of an accident (very unlikely)], that is, an acceptable risk. A more sophisticated approach might make use of technical information, for example incorporating equipment reliability data, such as the probability of water fog equipment failing. However, Toft (1993) argues that even for the assessment of major hazards, quantified risk assessments, which fail to take ‘soft’ factors into account, may be unsuitable. The validity of this argument is illustrated by re-evaluating the previous assessment in the light of a subsequent accident, such as the King’s Cross Underground Fire in 1987, a disaster involving a serious fire in one of London’s major underground train stations, which cost the lives of 31 people. The consequences might have been assessed as ‘minor’ as previous incidents had resulted in fires, but these were small-scale and had resulted in few injuries and no loss of life; however, this demonstrates a misunderstanding of the available data—no serious injuries/fatalities to date does not imply potential low consequences. In terms of the probability of an accident, dropping a lighted match actually had a much higher

chance of starting a serious fire owing to the built-up debris under wooden escalators, which was not taken into account by technical estimates of their flammability. Thus, although risk assessments may draw on objective and quantitative data, subjective judgement is often necessary in order to account for the human element in a system.

Cox and Cox (1993) differentiate between acute exposure (hazardous events) and chronic exposure (hazardous situations). In the latter case, the probability of a specific event (the accident) is less obvious as hazardous situations lead to 'slow accidents', that is, the adverse effects of a hazard are delayed and are not immediately obvious. Yet it may be argued that many major disasters are 'slow accidents' as they have resulted from the accumulation of small failures over time (Turner, 1978). In the above scenario, the fire hazard (dropping lighted matches) would best be understood as a trigger of a set of latent failures (built-up debris under the escalators, lax fire procedures, and so on) within the system (Reason, 1990). Although exposure to stress can be acute (for example, experience of an isolated incident of sexual harassment), many stressors will lead to chronic exposure over time. The risk posed by occupational stress might be evaluated as akin to the 'slow accident', that is, as a mental or physical breakdown resulting from an accumulation of stress responses over time.

### **Risk assessment of occupational stressors**

Workplace stressors can be viewed as representing a hazard, although not a physical one, and many will lead to chronic, rather than acute, exposure. The effects of many occupational stressors might be compared to the 'slow accident', whereby constant exposure leads to negative outcomes over time. The risk posed by workplace stressors can be understood in relation to the exposure (*E*) to stress (perceived level of the stressor) and the consequences (*C*), in terms of negative outcomes.

#### *Exposure*

It may be less relevant to measure the duration and frequency of a stressor than a physical hazard, for example a low-level radiation leak may occur infrequently (every 4–12 weeks) for a short period of time (less than 10 minutes), but a stressor, such as working to tight deadlines, might best be described as a constant source of pressure. It is possible to gain an objective measure of exposure to radiation by calculating the number and duration of radiation leaks within a given period. However, exposure to stress is subjective, that is, the extent to which the individual perceives a particular work characteristic, such as working to deadlines, as a source of pressure. Exposure can be operationalised as the level of perceived pressure from a given stressor. This is a quantifiable, but subjective, measure of exposure. Whilst it may be possible to obtain 'objective' measures of stressors, for example, the number of hours worked per week might be taken as measure of workload, this fails to account for the dispositional differences between individuals. The same number of work hours can have a more negative effect on one individual owing to his/her negative disposition (high in NA) than another who perceives the work situation more positively. Thus, it is important that it is the *perceived* level of stress that is measured.

#### *Consequences*

From the earlier example, exposing a person to a respiratory irritant (ethoxol) over time has known and specific effects—in the short term, breathing difficulties, and in the long term, lung disease. The consequences of exposure to stress are more varied and affected by

numerous factors; possible consequences include physiological (for example high blood pressure, chest pains), psychological (such as depression, anxiety, irritability) and behavioural (such as excessive drinking, smoking) symptoms. In the long term, these symptoms may result in physical (such as coronary heart disease) and/or psychological (such as mental breakdown) ill-health.

Attempting to assess the risk associated with a specific stressor (for example meeting tight deadlines) resulting in a specific negative outcome (for example mental breakdown) for a particular individual is probably unworkable, given the number of factors that must be known, for example, genetic predisposition, family history, individual coping styles, support available from spouse, and so on. However, it may be possible to gain an understanding of the risk involved for a particular work-force with an identifiable negative outcome at an organisational level, for example sickness absence. Rather than focusing on assessing the risk for each employee, aggregating across individuals will give an estimate of the likelihood of negative consequences for a work-group, or the organisation as a whole.

The consequences of occupational stress might be represented, for a particular work-force, as the sample correlation between a stressor and a stress outcome, for example if a correlation of  $r = 0.50$  is found between 'working to deadlines' and the number of lost work days each year, this may be interpreted as shared variance between the two variables of 25% ( $r^2 = 0.25$ ). Whilst  $r$  and  $r^2$  give equivalent information,  $r^2$  is more easily interpreted, being measured on an interval rather than an ordinal scale.

One disadvantage of using sample correlations is that the  $r$  statistic does not represent non-linear relationships. Whilst it may be a valid assumption that an increasing experience of stress will lead to an increase in the negative outcome (such as more lost working days) for most stressors, some will deviate from this simple linear relationship. For example, workload has a U-shaped relationship with symptoms, for example within a certain tolerance limit (the bottom of the U) workload will generate few stress symptoms; as workload falls into the range of underload, this will be experienced as increasingly stressful (first arm of the U); and as workload falls into the range of overload, this will also be experienced as increasingly stressful (second arm of the U). This might be tackled by looking at overload and underload as two separate variables.

Another disadvantage is that particularly high or low mean stressor levels across a sample would result in little variation, and so, affect the value of  $r$ . Thus, in a sample where a very high workload was experienced by the entire workforce, the correlation between workload and absenteeism, for example, would be close to zero. Such a situation emphasises the need for triangulation—the correlation estimate obtained from the particular sample could be compared to correlations obtained from other sources. Nevertheless, the sample correlation could be interpreted, given that care had been taken to ensure that the sample was representative of the population under study.

#### *Calculation of a risk factor*

It is proposed that the level of risk (or risk factor) associated with the likely negative effects of a given stressor may, therefore, be calculated by weighting the sample mean (perceived level of a stressor) by the sample correlation (between the stressor and a stress outcome):

$$\text{Risk factor} = \text{exposure} \times \text{consequences} = E \times C$$

where  $E$  is the perceived level of the stressor (exposure) and  $C$  is the correlation between stressor and stress outcome (consequences).

A stress audit instrument, such as the Occupational Stress Indicator (OSI) (Cooper *et al.*, 1988) or Pressure Management Indicator (PMI) (Williams and Cooper, 1996), which measures the level of perceived stress, can be used to obtain  $E$  for a particular sample. Undertaking a stress audit to establish the perceived levels of stress is equivalent to the first stage of the risk assessment process—hazard identification.

Values of  $C$  (consequences) are obtained by calculating the correlation between the stressors and stress outcomes, and converting  $r$  into  $r^2$ . Both the Occupational Stress Indicator and the Pressure Management Indicator include measures of some outcome variables (mental and physical well-being, job satisfaction) allowing the calculation of correlations between the stressor and some stress outcomes; however, the use of the same instrument to gain subjective measures of both stressors and stress outcomes has the possible disadvantage of common method variance, leading to inflated correlations. Therefore, additional information on further stress outcomes, such as absenteeism, could be collected separately: objective data, such as sickness absence, work days lost through accident involvement, and so on, might be obtained from employee records. The weighting of the stress level ( $E$ ) by its correlation with a stress outcome ( $C$ ) gives an estimate of the risk associated with exposure to that stressor. This is equivalent to the second stage in the risk assessment process—risk evaluation.

#### *Worked example*

McFarlane (1997) conducted a stress audit within a leading UK retail organisation. A sample of blue-collar workers ( $N=66$ ) completed the Pressure Management Indicator and the General Health Questionnaire (GHQ). The GHQ is a well-validated instrument that measures symptoms of mental ill-health (Goldberg, 1978).

Table 1 shows the mean perceived levels of stress associated with the Pressure Management Indicator stressors and the correlations with GHQ scores. Positive correlations with GHQ indicate that a stressor is associated with an increased level of negative health symptoms:

Risk factor (RF) = level of stressor  $\times$  correlation between stressor and stress outcome, for a particular sample

or,

$$RF = E_{(s)} \times C_{(s)}$$

for example, for workload, the mean PMI score is 9.85,  $E_{(s)}$  is 9.85, the correlation between workload and mental health,  $r$ , is 0.09, and  $r^2$  is 0.0081, while  $C_{(s)}$  is 0.81 (expressed as a percentage). Thus:

$$\text{Risk factor (sample)} = 9.85 \times 0.81 = 7.98 [= 8 \text{ (to nearest whole number)}]$$

This procedure yields risk factors for this particular sample of retail workers, indicating the risk of developing negative health symptoms as a result of working for the organisation for eight different stressors. Whilst these figures provide little information *per se*, they can be used for comparisons between stressors. Table 1 shows that daily hassles poses a very low risk, whilst the highest risk is posed by home-work balance. Although the perceived level of the stressor, daily hassles ( $E=11.42$ ), is comparable to the perceived stress associated with personal responsibility ( $E=11.08$ ), the latter poses a far greater risk in terms of mental

**Table 1.** Sample risk factors for the PMI stressors (means for blue-collar retail workers, N = 66)

Stressors	Mean	<i>r</i> (with GHQ)	$r^2 \times 100$	Risk factor
Workload	9.85 <sup>a</sup>	0.090	0.81	8
Relationships	13.49 <sup>a</sup>	-0.080	0.64	9
Recognition	11.29	-0.098	0.96	11
Organisational climate	12.05	-0.057	0.32	4
Personal responsibility	11.08	0.162	2.62	29
Managerial role	8.06	0.167	2.79	22
Home-work balance	8.91 <sup>a</sup>	0.155	2.40	21
Daily hassles	11.42	-0.006	0.004	0

<sup>a</sup> Job stressors measured on different response scales need to be standardised before entry into the risk equation.

ill-health. This arises as *C* (personal responsibility) is 2.62 compared to *C* (daily hassles) at 0.004, resulting in a much higher risk factor (RF) for personal responsibility (RF = 29) compared to daily hassles (RF = 0). This result might indicate that this particular sample of workers is successful in coping with daily hassles, but less successful in coping with personal responsibility. Note that the stressor with the highest value of *E* (relationships, *E* = 13.49) does not have the highest risk factor, again this is because the value for *C* is low.

#### *Risk acceptability*

The worked example yielded a risk factor of 8 for workload. Whilst this figure has some meaning by comparison to other stressors within the sample, it is difficult to evaluate the relative level of the risk for an organisation (that is, is it a 'low' risk?) without reference to normative values. Thus, it is proposed that the acceptability of a risk factor be determined by comparison to industry norms. This allows the level of the risk to be compared to that obtained from similar organisations with similar operations. The decision as to the acceptability of a risk is determined by considering the cost of lowering the risk level, against the benefits from a reduction in risk.

#### *Worked example (illustrative data)*

For illustrative purposes, Table 2 shows the normative values of the Pressure Management Indicator for the general working population (*N* = 14,455) and hypothetical values of *r* for the correlations of this normative population between the stressors and GHQ (actual data not available).

Normative risk factors for an industry can be calculated, where the norm for exposure,  $E_{(norm)}$ , and for consequences,  $C_{(norm)}$ , are known:

$$\text{Risk factor (norm)} = E_{(norm)} \times C_{(norm)}$$

for example, for workload, the norm PMI score is 12.46,  $E_{(norm)}$  is 12.46, the correlation between workload and GHQ, *r*, is 0.05, and  $C_{(norm)}$  is 0.25. Therefore:

$$\text{Risk factor (norm)} = 12.46 \times 0.25 = 3.12 [= 3 \text{ (to nearest whole number)}]$$

Comparing the risk factor (sample) to the risk factor (norm) gives a company an indication of the extent of the risk in its own organisation: a low risk might be the industry average or

**Table 2.** Normative risk factors for the PMI stressors (means for general working population, N = 14,455)

Stressors	Mean	r (with GHQ)	r <sup>2</sup> × 100	Risk factor
Workload	12.46 <sup>a</sup>	0.05	0.25	3
Relationships	13.44 <sup>a</sup>	0.20	4.00	54
Recognition	13.13	0.10	1.00	13
Organisational climate	13.65	0.25	6.25	85
Personal responsibility	12.73	0.30	9.00	115
Managerial role	9.94	0.23	5.29	53
Home-work balance	9.87 <sup>a</sup>	0.24	5.76	57
Daily hassles	11.71	0.10	1.00	12

<sup>a</sup> Job stressors measured on different response scales need to be standardised before entry into the risk equation.

below; moderate risk might be up to 1 standard deviation above the average (in the worst 34%) and a high risk might be 1 standard deviation or more above the average (in the worst 16%). This would assume that companies form a normal distribution of risk factor scores for the industry. These scores could be converted to standard scores (*z* scores) for ease of interpretation: for a low risk, *z* is zero (the score is the same as the industry standard) or negative (a risk lower than the industry standard); for a moderate risk, *z* is between 0 and 1, and for a high risk, *z* is above 1 (see Table 3).

Whilst exposure norms already exist for a number of industries and occupations, a review of the available data would be needed to determine the normative values of *C*, for a range of negative outcomes. One such method might involve a meta-analysis of the relationships between stressors and outcome measures found across studies.

Whilst comparison to industry or occupation norms would allow an organisation to measure its risk levels against standards within its own industry or occupation, a below-average level of risk in relation to an industry norm which is dangerously high, would not indicate a low risk of negative outcomes. Norms based on data collected across a wide range of industries and occupations would give an additional external standard by which organisations could understand their risk levels. The Occupational Stress Indicator has developed this wider range. Some indicative figures can be illustrated from large-scale studies, such as Jones *et al.* (1997); this study compared self-reported working conditions and lost working days due to illness reported in a UK household survey. It was found that the increased likelihood of time lost through illness, was 6.5 times for 'lack of help and support from people in charge' and 4.5 times for both 'working to deadlines' and 'too much work'.

**Table 3.** Definition of high, moderate and low risks by comparison to industry norms

Risk category	<i>z</i> score	%
LOW	Below-1	Best 16%
	Between 0 and-1	Best 34%
	Zero	Average
MODERATE	Between 0 and + 1	Worst 34%
HIGH	Over + 1	Worst 16%

### Risk control measures

Once risk factors for stressors resulting in particular negative outcomes have been determined, and prioritised in terms of external norms, risk control measures can be devised to reduce the risk associated with a stressor. In the worked example, only workload emerges as a stressor with a risk factor above the industry average. The likelihood of negative outcomes (symptoms of mental ill-health) in the sample work-force, resulting from workload, is higher than that found in the general working population on average. Thus, examining the workload of employees would be the first step in devising an appropriate risk control measure. It must be noted that this risk management methodology is based on a generic stress audit instrument, such as the Pressure Management Indicator or the Occupational Stress Indicator, which uses broad categories of stressors, facilitating comparisons between organisations. However, designing remedial measures would require a detailed analysis of the workload of the specific workers under study. Risk control measures might involve improving time management skills, so that employees can better manage their existing workloads, or reorganising schedules so that workload is reduced.

### *Stress interventions*

Interventions to deal with occupational stress usually fall into three categories (Table 4): tertiary (lifestyle changes), secondary (stress management) or primary (organisational level) (Cooper and Cartwright, 1994). The secondary and tertiary levels of intervention by organisations are most common. These focus on the individual, either through programmes that encourage more healthy lifestyles, for example, keep-fit centres on site, dietary advice, relaxation and exercise classes, or provide education on how to develop more effective stress management skills. Tertiary interventions act to mitigate the symptoms of stress on an individual, for example, helping individuals to cope with their anxiety through relaxation and biofeedback. The positive effects of an improved lifestyle can feed back into the stress process by boosting individuals' resistance to stress. Secondary interventions operate by improving the coping strategies of individuals and/or by replacing maladaptive coping styles with more successful ones, that is making the work-force less vulnerable to stress. Such stress interventions will lower the risk factor, by reducing the value of  $C$  (a more stress-resistant work-force will have a reduced likelihood of experiencing stress symptoms), rather than by affecting the value of  $E$ , the exposure to stressors. Primary interventions focus on stressor reduction. For example, where the nature of the job is leading to stress, the task or the work environment might be subject to redesign; where the organisation's structure or climate is the source of stress, a more participative management style might be encouraged. These interventions reduce exposure to stressors, lowering the value of  $E$ , and therefore reducing the risk factor.

A more detailed follow-up can help to determine exactly what type of risk control measures are required, depending on the type of stressor. Moderate risks might be reduced to low risks by providing training or organisational support (reducing  $C$ ), whilst a high risk might need to be tackled at an organisational level (reducing  $E$ ). If  $E$  is very high, reducing the value of  $C$  may not be sufficient to reduce the overall value of the risk factor to an acceptable level. Thus, organisational interventions must be aimed at reducing exposure. However, whilst some solutions may be relatively inexpensive, for example providing protective screens to shield bus drivers from the threat of physical violence, those aimed at changing the organisation's culture or structure may involve considerable effort and expense. Using a risk management strategy as advocated in this article, allows companies to evaluate the relative level of risk involved, before embarking on expensive organisational development pro-

Table 4. *Examples of stress interventions*

Tertiary stress interventions (individual focus)	Secondary stress interventions (focus on organisation-individual interface)	Primary stress interventions (organisation focus)
Relaxation techniques	Stress management training	Changing organisational structures
Biofeedback	Cognitive coping strategies	Selection and placement
Meditation		Training
		Redesign task or work environment
Exercise	Time management	Employee consultation
		Management style, e.g. more participative
Employee Assistance Programmes (EAPs)		Focus on team-building

grammes. Not every case of high risk for the organisation will require a primary level intervention—for example, violence at work may originate in non-work factors and be best tackled at an individual level—but a risk management approach can aid an organisation in making decisions about the most appropriate type of intervention.

#### *Monitoring and feedback*

The final stage of the risk management process involves monitoring the effects of risk control measures, and evaluating their effectiveness. A further stress audit can be used to monitor the levels of exposure and the effects on outcome measures. For example, if an intervention focused on increasing the level of job control for workers, a successful intervention would be suggested by a subsequent reduction in the risk factor—including an increase in perceived job control, reduced symptoms of mental ill-health and evidence of a link between the change in job control and the change in mental health symptoms.

#### **Conclusions**

To date, employers have lacked a risk management methodology to assess and evaluate the risk associated with workplace stress. An understanding of the nature and effects of occupational stress suggests that it poses a significant hazard to employee health and also acts as a source of business costs. Occupational stressors must be negatively perceived and subject to inadequate coping to result in negative stress outcomes; the experience of stress is also moderated by a number of individual difference variables. Taking these factors into account, it is argued that the risk posed by workplace stressors for a particular stress outcome, at a group or organisational level, can be assessed and evaluated using a simple risk assessment formula, whereby

$$\text{risk} = \text{exposure (perceived level of stressor)} \times \text{consequences (related to a negative stress outcome)}$$

Risks can be evaluated as low, moderate or high by comparison to industry/occupation norms. The level of risk can be reduced through stress interventions, either by reducing exposure (through organisation-level, primary interventions) or by affecting outcomes (mak-

ing the work-force more stress resistant, using secondary and tertiary interventions). This risk management methodology is cost-effective in that it allows a company to identify those high risks which require the most expensive organisational development solutions (primary interventions) as opposed to lower risks which may be controlled through secondary and tertiary interventions, such as stress management and Employee Assistance Programmes.

### *Limitations*

The risk management methodology proposed here is based on a relatively simple model and is aimed at use by organisations themselves. The technique for deriving the risk factors associated with sources of pressure in an organisation is based on sample means and correlations. The use of these statistics has a number of disadvantages—the sample correlation will be affected by particularly high or low mean levels where there is little variation; values of  $r$  do not reflect non-linear relationships, nor more complex combination effects (for example, interactions between stressors, or additive effects). Nevertheless, the sample mean of a stressor weighted by the sample correlation between the stressor and a stress outcome gives a simple risk estimate for workplace stressors in organisations. Another feature of this methodology is the use of a generic stress audit—this is principally because such a measure allows comparison between work-sites, departments and organisations, and also against external norms. However, generic categories of stress will have the disadvantage of not being sensitive to the specific stressors associated with a particular work-group or occupation. It is recommended that this methodology is used in conjunction with stress scales which are designed to measure more specific stressors, particularly when designing stress interventions to control risk. The risk management approach to occupational stress and the specific technique for risk assessment outlined, are floated in order to provoke discussion and promote further research, rather than to present a fully tested risk assessment tool. Further research is required in this area, particularly field studies in organisations, to produce a validated and thoroughly tested risk assessment tool for evaluating the risks associated with occupational stress.

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