

# WORK-RELATED DEPRESSION AND ASSOCIATED FACTORS IN A SHOE MANUFACTURING FACTORY IN HAIPHONG CITY, VIETNAM

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## Abstract

**Objectives:** To determine the prevalence and associated factors of work-related depression among the employees of a shoe manufacturing factory in Haiphong City, Vietnam. **Material and Methods:** We carried out this cross-sectional study among 420 workers in 2012 in Le Lai II Shoe Manufacturing Factory in Haiphong City, Vietnam using Karasek's Job Content Questionnaire (JCQ) and the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM IV) tool for measuring depression. **Results:** The study results show that a relatively high proportion of workers (20.7%) belongs to the high-strain group based on Karasek's model. The prevalence of work-related depression among workers was relatively high (18.8%). The factors associated with depression at work were high psychological demand (adjusted OR = 3.0, 95% CI: 1.1–8.3), low social support (adjusted OR = 4.7, 95% CI: 1.2–12.8), inadequate work protection materials (OR = 4.1, 95% CI: 2.2–10.1) and work absenteeism (OR = 6.2, 95% CI: 2.5–18.9). **Conclusions:** Strengthening the social support network (involving supervisors and co-workers), reducing psychological job demand and assuring work protection materials at the workplace may highly facilitate reducing work-related depression.

## Key words:

Work-related depression, Shoe manufacturing factory, Karasek's Job Content Questionnaire, Job Strain Model, Vietnam

## INTRODUCTION

Job strain is defined by a series of reactions that occur when workers are faced with a disparity between demands at work and their knowledge, skills and aptitudes [1], while work-related depression is a clinical illness which is characterized by a combination of symptoms that interfere with a person's ability to work, sleep, study, eat, and enjoy once-pleasurable activities [2]. However, job strain can lead to various mental and physical disorders, such as depression, metabolic disorders, hypertension, angina pectoris and musculoskeletal disorders [1].

Depressed and stressed individuals have by 70% and 46% higher risk of developing illnesses and generating health expenditures, respectively [3]. These conditions also have an impact on enterprises due to the diminution in performance by stressed workers, absenteeism and increased staff turnover, with even additional costs resulting from a greater risk of accidents at work [1,4]. It is estimated that 50–70% of workers in developing countries (compared with 30% in industrialized countries) are forced to work in poor, in terms of ergonomics, working conditions. Most at risk are miners, farmers, fishermen, loggers, workers in the clothing manufacturing industry and

Received: March 24, 2014. Accepted: July 18, 2014.

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health sector employees [3,4]. Low labor costs, easy supply of leather and a tradition of shoe making allowed shoe manufacturing industries to move to developing countries. Vietnam is becoming the largest footwear exporter after China [5]. Shoe manufacturing is one of the industrial sectors in the country that have shown sustained growth and recruited at least 2.5 millions of workers yearly, of which 80% are females. However, insufficient attention has been given to job factors such as job insecurity, physical exertion, chemical exposure and organizational hazards [6,7]. Studies all over the world have shown that depression, anxiety, and stress are a significant problem among blue collar workers [8–11]. More and more studies explore the relationship between psychosocial job factors and depression and stress [12–14]. Among the psychosocial job factors, 3 dimensions of the Job Demand-Control-Support [15] model of job stress – psychological job demand, job control and social support – are being widely used to explore this relationship. In Vietnam, no study has documented the prevalence of mental issues such as depression or stress and their relationships with psychosocial job factors in shoe manufacturing workers. This is a very serious omission. Therefore, the aim of this study is to determine the prevalence of work-related depression and associated factors among workers in a large shoe manufacturing factory in Haiphong City.

## MATERIAL AND METHODS

### Study design

A cross-sectional study was designed to determine the prevalence of job strain and work-related depression and associated factors among workers in Le Lai II shoe factory in Haiphong.

### Sample size

Sample size calculation was based on the 13% prevalence of work-related depression among employees in another study [16]. The power of the study was established

at 80% with an  $\alpha$  value of 0.05. The calculated sample size was 385 workers needed to be included in the study. To prevent non-responded subjects, we planned to ask 430 workers for consent in order to achieve interviewing at least 385 workers in the study.

### Recruitment of study subjects

We developed specific inclusion and exclusion criteria for our study subjects. The inclusion criteria were as follows:

- age between 18 and 55 years,
- working in the factory for at least 1 year,
- consent obtained to participate into the study.

The reason for choosing the 1-year threshold is that we expected to measure the impact of working conditions and factory organization on the mental patterns of the workers. The exclusion criterion was a diagnosis of any psychiatric illness. Le Lai II shoe factory has in total 1700 workers. Among them, 1500 are directly dealing with manufacturing shoes and 1200 of them met the inclusion criteria. We used a simple random table to draw 430 workers to be included in the study.

### Research instruments and data collection

Data were collected through 4 questionnaires administered to the participants:

- a socio-demographic questionnaire,
- an instrument that measures job strain (JCQ-V),
- a questionnaire on absenteeism and workers' feelings about work conditions,
- the depression component of DSM IV.

The instrument measuring job strain (named JCQ-V) is the Karasek's Job Content Questionnaire (JCQ-K) that had been translated and validated from the English version into Vietnamese in an earlier study by Hoang Thi Giang et al. [17].

JCQ-K is a questionnaire-based instrument designed to measure the content of a work task. It contains 5 scales: psychological demand (job demand), decision latitude

(job control), social support, physical demand, and job insecurity. Job demand can be described as a psychological stressor in the work environment, such as having to complete much work and working under time pressure. Job control consists of 2 components, namely “decision authority” (opportunity to make decisions concerning the job) and “skill discretion” (amount of skills used in the job). Social support also consists of two components – co-workers’ and supervisors’ support. Physical demand is measured by the physical effort necessary to accomplish the task, while job insecurity is measured by job steadiness, job security, and future layoff. Four job conditions might result from different combinations of job demand and job control – active, passive, low strain, and high strain – according to Karasek’s job strain model [15,18].

The questionnaire on absenteeism contained 6 items whose construction was inspired by the book “Absenteeism: tools and methods for action” of the French National Agency for the Improvement of Working Conditions [19]. Five items assess absenteeism over the last 1 month (30 days): number of absences, total number of days of absence, causes of absences, absenteeism forecasts due to working conditions and the desire to change the job or workstation.

The DSM-IV depression component is a diagnostic tool developed by the American Psychiatry Association that is widely used in Vietnam [20,21]. This depression component contains 9 criteria for diagnosing depression (e.g., problems with sleeping, appetite), which are evaluated (presence or absence) over a 2-week period. According to the guidelines related to this tool, participants should be considered at risk for a depression diagnosis if they answered positively for 5 criteria out of 9 depressive symptoms. In this study, the addition of participants’ answers for each clinical symptom was calculated (0 – absence, 1 – presence) and expressed as an equivalent score of depressive symptoms (minimum: 0, maximum: 9).

Workers were also asked about their perceived work conditions and work protection using a questionnaire build

and validated by the Department of Occupational Health at Haiphong University of Medicine and Pharmacy, which was used in several Vietnamese occupational health studies [22,23]. This questionnaire contained 7 questions asking the workers to rate their level of satisfaction of their work conditions (4 questions) and protection (3 questions) on 3 levels (0 – bad/inadequate, 1 – acceptable, 2 – good/adequate). The general perceived work condition was good when the sum score was  $> 4$  and the general perceived work protection was adequate when the sum score was  $> 3$ .

### Statistical analysis

Data entry and analysis were done using the Statistical Program for Social Science (SPSS) Version 15.0. Means  $\pm$  standard deviations ( $M \pm SD$ ) for continuous variables and frequencies and percentages for categorical variables were calculated for socio-demographic characteristics and occupational characteristics. Depression was treated as a dichotomous binary outcome – those above the median were considered as depressed and those below the median as non-depressed. The associations between depression and socio-demographic characteristics and psychosocial job factors were examined by multiple logistic regressions. The level of significance was set at the p value of less than 0.05. Multiple logistic regressions were checked for fitness using Hosmer-Lemeshow’s goodness-of-fit test. All analyses were carried out in the Faculty of Public Health, Haiphong University of Medicine and Pharmacy, Haiphong, Vietnam.

The research protocol had been evaluated and approved by Haiphong University of Medicine and Pharmacy Institutional Review Board.

## RESULTS

We successfully interviewed 420 workers in the factory. Table 1 shows that female workers represented a proportion 4 times higher than male workers (77.9% vs. 22.1%); most of them were young (nearly 75%

**Table 1.** Socio-demographic characteristics of the study group

Variable	Respondents (N = 420)	
	n	%
Sex		
female	327	77.9
male	93	22.1
Age (years) (M±SD = 34.36±8.1)		
< 20	60	14.3
20–29	138	32.9
30–39	114	27.1
40–49	98	23.3
≥ 50	10	2.4
Marital status		
married	289	68.8
single/divorced	131	31.2
Education level		
primary school	1	0.2
secondary school	92	21.9
high school	327	77.9

under 40 years old), nearly 80% had high school education level.

Table 2 shows that the average time of work per week was 55.5 h; 68.3% subjects had worked for this factory for less than 5 years; 13.1% worked in shifts; 72.6% often or always used automated machines; 50% were absent at least 1 day during the last month. Most of them were absent 1–2 times during the last month and usually 1 day each time.

The prevalence of job strain is shown in Table 3. A relatively high proportion of workers (87/420) (20.7%) belongs to the high-strain group. More than half of workers felt that they had a low-strain job (with low job demand and high decision latitude) and 33 (7.9%) felt that they had a passive job (low job demand and low decision latitude).

**Table 2.** Occupational characteristics of the study group

Variable	Respondents (N = 420)	
	M±SD	n (%)
Work per week (h)	55.5±14.0	
Total duration of employment (years)	5.7±4.8	
Duration of employment (years)		
1–4		287 (68.3)
5–9		50 (11.9)
≥ 10		83 (19.8)
Shift work		
yes		55 (13.1)
no		365 (86.9)
Absenteeism (during last month)		
no		211 (50.2)
1–2 days		134 (31.9)
> 2 days		75 (17.9)
Using automated machines		
not at all		40 (9.5)
occasionally		75 (17.9)
often		215 (51.2)
always		90 (21.4)

M – mean; SD – standard deviation.

Table 4 shows the prevalence of depression in 420 workers at the level of 18.8% (79/420). A higher proportion (23/87) (26.4%) of workers in the high-strain group experienced depression compared to those who are not in the high-strain group (56/333) (16.8%). The difference is statistically significant ( $p < 0.05$ ).

Table 5 shows the results of the multiple logistic regression analysis of depression in 420 shoe manufacturing workers. The factors associated with work-related depression among shoe manufacturing workers in univariate analysis were high psychological

**Table 3.** Prevalence of job strain following Karasek's Model

Job demand	Job decision latitude [n (%)]		
	low	high	total
High	high strain 87 (20.7)	active 54 (12.9)	141 (33.6)
Low	passive 33 (7.9)	low strain 246 (58.6)	279 (66.4)
Total	120 (28.6)	300 (71.4)	420 (100.0)

**Table 4.** Prevalence of depression (DSM IV) and its association with job strain

Depression	High strain (stress at work) [n (%)]			p
	yes	no	total	
Yes	23 (26.4)	56 (16.8)	79 (18.8)	0.041
No	64 (73.6)	277 (83.2)	341 (81.2)	
Total	87 (20.7)	333 (79.3)	420 (100.0)	

demand (OR = 1.9, 95% CI: 1.5–6.1), low and moderate social support (OR = 2.6, 95% CI: 1.4–18.2; OR = 1.4, 95% CI: 1.3–15.1, respectively), marital status (OR = 2.6, 95% CI: 1.2–6.5 for those who were married compared to those who were single or divorced), educational level (OR = 3.2, 95% CI: 1.1–6.2 for those with a primary school level or lower compared to those who had a higher level of education), feeling of having inadequate work protection materials (OR = 2.6, 95% CI: 1.0–5.3), absenteeism during the last month (OR = 4.4, 95% CI: 2.1–9.3). However, when we performed multiple logistic regression, the factors that remained significantly associated with work-related depression were high psychological demand (adjusted OR = 3.0, 95% CI: 1.1–8.3), low social support (adjusted OR = 4.7, 95% CI: 1.2–12.8), feeling of inadequate work protection materials (OR = 4.1, 95% CI: 2.2–10.1) and work absenteeism (OR = 6.2, 95% CI: 2.5–18.9).

**Table 5.** Associated factors of depression among shoe manufacturing workers

Factor	Crude OR <sup>a</sup> OR (95% CI)	Adjusted OR <sup>b</sup> OR (95% CI)	p <sup>c</sup>
Psychological demand			
low	1	–	0.047
high	1.9 (1.5–6.1)	3.0 (1.1–8.3)	
Social support			
high	1	–	
moderate	1.4 (1.3–15.1)	3.6 (0.8–6.9)	0.051
low	2.6 (1.4–18.2)	4.7 (1.2–12.8)	0.032
Sex			
male	1	–	0.111
female	1.5 (0.8–3.3)	2.1 (0.7–5.2)	
Marital status			
single/divorced	1	–	0.088
married	2.6 (1.2–6.5)	3.1 (0.8–6.5)	
Age (years)			
< 40	1	–	0.191
≥ 40	1.5 (0.7–3.2)	1.3 (0.5–2.9)	
Education level			
secondary school and above	1	–	0.082
primary school and lower	3.2 (1.1–6.2)	4 (0.8–6.5)	
Duration of employment (years)			
1–9	1	–	0.144
≥ 10	2.6 (0.4–3.5)	1.7 (0.2–8.8)	
Perceived work conditions			
good	1	–	0.191
bad	1.5 (0.5–4.4)	2 (0.6–4.5)	
Perceived work protection materials			
adequate	1	–	< 0.01
inadequate	2.6 (1.0–5.3)	4.1 (2.2–10.1)	
Work absenteeism			
no	1	–	< 0.01
yes	4.4 (2.1–9.3)	6.2 (2.5–18.9)	

<sup>a</sup> Univariate analysis; <sup>b</sup> multiple logistic regression; <sup>c</sup> likelihood-ratio test.

OR – odds ratio; CI – confidence interval.  
 $\alpha < 0.05$ .

## DISCUSSION

Karasek et al. [15,18] found that stressful work conditions were associated with impaired health. According to their research, the most stressful set of work conditions combines a low level of decision latitude (job control) – for example, having little control over the pacing of tasks or the allocation of resources – and having a highly psychologically demanding task, such as those that involve time pressure, deadlines, large workloads, and conflicting or heavy emotional demands. This “high-strain” combination is related to elevated risk for such negative health outcomes as coronary heart disease and depression. Presumably, the high level of demand creates arousal, and the inability to exert control leads to frustration. Mausner-Dorsch and Eaton [24] also found that high job strain was associated with greater prevalence of all forms of depression. They were able to evaluate the relation between occupational strain and depression with population-based data instead of with data from clinical or other selected populations.

We carried out this cross-sectional study among 420 shoe manufacturing workers in Le Lai II factory in Haiphong using DSM IV and JCQ-V tools that are validated in Vietnamese [17]. Among them, female workers represent a 4 times bigger proportion than male workers (77.9% vs. 22.1%), most of them are young (nearly 75% under 40 years old), and nearly 80% have high school education level. Table 3 presents that the prevalence of job strain was relatively high: 87/420 workers (20.7%) belong to the high-strain group. Table 4 shows the prevalence of depression in 420 workers at the level of 18.8% (79/420). A higher proportion (23/87) (26.4%) of workers in the high-strain group experienced depression compared to those who are not in the high-strain group (56/333) (16.8%). The difference is statistically significant ( $p < 0.05$ ). The results also confirm the importance of the demand-control model for depression by providing a theoretical framework to explain the relation between the psychosocial characteristics of the work environment and depression as a health outcome.

Table 2 shows that the average time of work per week is 55.5 h; most subjects (68.3%) had worked for this factory for less than 5 years; 13.1% work in shifts; 72.6% often or always use automated machines; and nearly 50% had been absent at least 1 day during the last month. In studying the relationship between an individual and work, special attention is usually given to work conditions – job characteristics, work surroundings – and organization of work, that are often hard to change. This is because it is technically, economically, and politically difficult, in practice, to influence the organization of work and to alter work conditions. The term ‘work conditions’ embraces physical work conditions (e.g., noise, temperature, lighting), chemical conditions (e.g., vapor, dust), and biological conditions (e.g., bacteria, viruses). The term ‘organization of work’ means the division of labor, mode of operation and work pace, and the way in which each worker is assigned a place and function.

The organization of work conflicts with the psychological functioning of an individual at every point, and it can be understood that depressive states may arise from the mode of organization of work. Clinical investigations have effectively demonstrated that assembly-line workers did not experience the same type of depression as office workers [25]. Furthermore, Hammen [26] has proposed that certain individuals may be vulnerable to some stressors more than others.

Based on Karasek’s job strain model [9,15], high-strain workers would invariably experience adverse physical and psychological events such as, respectively, ischemic heart diseases and depression. In the present study, we found that the odds of having work-related depression were 3 times higher for high psychological demand (adjusted OR = 3, 95% CI: 1.1–8.3) than low psychological demand, and for low social support they were 4.7 times higher (adjusted OR = 4.7, 95% CI: 1.2–12.8) than for high social support. Depression among workers was associated also with the feeling of inadequate materials of work protection

(adjusted OR = 4.1, 95% CI: 2.2–10.1) and work absenteeism (adjusted OR = 6.2, 95% CI: 2.5–18.9).

Lack of social support contributes to the development of job strain because opportunities to benefit from the positive (healthy) social contacts are reduced. Particularly with regard to ‘people’s work’, which often implies intensive emotional experiences, social support from colleagues and superiors may help workers to cope effectively with these experiences. A meta-analytic study by Janssen et al. [27] provides evidence for the relationship existing between demands (workload) and lack of resources (limited social support) on the one hand, and emotional distress on the other. Social support from colleagues and supervisors can be very helpful in reducing and preventing emotional distress. Investigators have also found that depressed people have fewer supportive relationships and that depression-affected persons perceive less support from the relationships that they do have [26]. As Blazer et al. [28] have speculated, depressed individuals may alienate those close to them because of their excessive demands for support – a process that elicits rejection that in turn serves to intensify or maintain depression.

Another risk factor of depression among the workers was high psychological demand. The odds of having depression for high psychological demand were 3 times higher compared to low psychological demand (adjusted OR = 3.0, 95% CI: 1.0–8.8). However, there is some debate about whether the job demand dimension predicts health. In the Whitehall II (prospective cohort) study, a cohort of 6895 male and 3414 female London-based civil servants aged 35–55 years at baseline also showed that poor health was associated with lower job control, but not with high job demands [29].

In our study, the finding that the feeling of being provided with inadequate work protection materials was related to depression is difficult to be interpreted, but we think that the fact that the workers perform their tasks with the feeling of not being secured and safe at their workplace

is a source of stressing perception, that affects the workers along with their time of work and may indirectly interact with their depression status. Another interesting factor that is associated with work-related depression is work absenteeism. The odds of having depression among workers who had been absent were 6.2 times higher compared to those who had not been absent during the last month. We think this pattern may rather be a consequence of work strain and depression leading to workers absenteeism.

A study conducted by Saini et al. [4] also proved that work-related depression was a product of stress and job dissatisfaction. Lack of social support and resources, little control and autonomy on the job, and unfair and overly demanding workloads and expectations could breed depression. Because of the strong association between the development of depression and the psychosocial work environment, businesses that contribute to negative employee affect may incur significant decreases in productivity, quality, and profit due to increases in absenteeism and turnover. This is consistent with the findings reported by Revicki et al. [16] that anger, depression, work stress, and job satisfaction were highly related. They also found a direct relationship between stress and depression and they concluded that employee emotions were closely linked to perceptions of social support and resource availability at the workplace.

## CONCLUSIONS

The prevalence of work-related depression among shoe manufacturing workers was relatively high (18.8%). A relatively high proportion of workers (20.7%) belongs to the high-strain group based on the Karasek’s Model. The factors associated with depression at work were high psychological demand (adjusted OR = 3.0, 95% CI: 1.1–8.3), low social support (adjusted OR = 4.7, 95% CI: 1.2–12.8), inadequate work protection materials (adjusted OR = 4.1, 95% CI: 2.2–10.1) and work

absenteeism (adjusted OR = 6.2, 95% CI: 2.5–18.9). Strengthening the social support network (involving supervisors and coworkers), reducing psychological job demand and assuring work protection materials at the workplace may facilitate reducing work-related depression.

#### ACKNOWLEDGMENTS

The corresponding author would like to thank Dr Nguyen Thi Thuy Linh and the Haiphong Medical University study team who have participated in data collection for this study; he would also like to dedicate special thanks to Le Lai II Factory Human Resources officers who have facilitated the access to the factory data and interviewing the workers.

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