Evaluation of psychological occupational health constraints according to the Karasek model among female sewing machine operators in Tunisia

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ABSTRACT – REZUMAT

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Stress has become a major concern of modern times as it can cause harm to employee's health and performance. Mental health is a fundamental constituent of occupational health. Scientific studies on psychological occupational health in the textile industry are relatively rare in Tunisia. This study seeks to estimate the rate of occupational stress, reveal associated factors and design strategies and ways to improve the work situations in a clothing company in the Monastir region. We performed a transversal study among female sewing machine operators. For the evaluation of professional stress, we used the Karesek questionnaire, a validated self-administered questionnaire. To carry out the descriptive analyses, we estimated frequencies and odds ratios (ORs). To explore associations linking organizational and socio-demographic variables and stress, we calculated adjusted ORs using a logistic regression model. As a result, the present study pointed out a strong degree of stress among operators: 30% of study participants reported that they were suffering from stress according to the Karasek stress scale. Our study revealed a statistically relevant correlation between stress and age, work experience, perceived non-adaptation of the task, and a poor perception of the organization. Stress is related to multiple socio-professional determinants. Most operators needed ergonomic interventions and prevention and risk management recommendations. Evaluation of the width of psychosocial risk factors at the workplace enables preventive strategies to preserve operators' mental health.

Keywords: *occupational health, stress, Karasek, textile industry, Tunisia*

Evaluarea constrângerilor psihologice de sănătate ocupaţională conform modelului Karasek în rândul operatorilor de mașini de cusut de sex feminin din Tunisia

Stresul a devenit o preocupare majoră a timpurilor moderne, deoarece poate dăuna sănătății și performanței angajaților. Sănătatea mintală este o componentă fundamentală a sănătății ocupaţionale. Studiile științifice privind sănătatea psihologică ocupaţională în industria textilă sunt relativ rare în Tunisia. Acest studiu urmărește să estimeze rata stresului profesional, să dezvăluie factorii asociați și să conceapă strategii și modalități de îmbunătățire a situațiilor de muncă într-o companie de îmbrăcăminte din regiunea Monastir. A fost efectuat un studiu transversal în rândul operatorilor de mașini de cusut de sex feminin. Pentru evaluarea stresului profesional a fost utilizat chestionarul Karesek, un chestionar autoadministrat validat. Pentru a efectua analizele descriptive, au fost estimate frecvențele și rapoartele probabilităţilor (OR). Pentru a explora asocierile care leagă variabilele organizaționale și socio-demografice și stresul, au fost calculate OR ajustate prin intermediul unui model de regresie logistică. Drept urmare, studiul de față a evidențiat un grad puternic de stres în rândul operatorilor: 30% dintre participanții la studiu au raportat că suferă de stres conform scalei de stres Karasek. Studiul nostru a relevat o corelație relevantă din punct de vedere statistic între stres și vârstă, experiența de muncă, neadaptarea percepută la sarcină și o percepție slabă a organizației. Stresul este legat de multipli determinanți socio-profesionali. Majoritatea operatorilor aveau nevoie de intervenții ergonomice și recomandări de prevenire și management al riscurilor. Evaluarea amplorii factorilor de risc psihosocial la locul de muncă permite conducerea strategiilor preventive și păstrarea sănătății mintale a operatorilor.

Cuvinte-cheie*: sănătate ocupaţională, stres, Karasek, industria textilă, Tunisia*

INTRODUCTION

In clothing companies, time is a key success factor. Time constraints added to productivity objectives as well as quality and efficiency expectations will cause the operator to be under considerable stress and pressure and can lead to stress-related health problems [1]. A series of challenges are faced, like new strategies adopted to be adapted to the external environment's requests and new technologies implemented [2]. Work-related stress is considered the harmful physical and emotional response consequence of an imbalance between job demands and the capabilities of the worker [3, 4]. Furthermore, compensatory behaviours like smoking, alcoholism, eating disorders, health illnesses [5], and work-related stress could potentially have a negative influence on companies, including a decrease in productivity, worker turnover, absenteeism, and rising healthcare costs [6, 7].

Lately, as a consequence of globalization and the global financial crisis that is affecting all countries, professions and all categories of workers, professional stress is considerably increasing [3]. In industrialized countries, the prevalence of occupational stress has been assessed through several studies however scientific research on this topic is rare when it comes to developing countries. To implement a prevention policy in workplaces, stakeholders need valid and accurate information which is in most situations scarce [8]. Tunisia workers, as in other developing countries, are facing various constraints such as non-ergonomic workstation design, poor work management and dangerous working conditions. These mentioned constraints and others can cause occupational stress and make the physical and mental state of employees vulnerable. This study aims to assess the prevalence of occupational stress, to identify associated factors among the operators of a textile company based in Tunisia and to design strategies and ways to improve the work conditions.

Work-related stress evaluation was conducted via a scientifically validated tool: Karasek's Job Content Questionnaire (JCQ) [9, 10]. Several research underlined the predictive validity of Karasek's model for mental illness [11]. The relevance of the Karasek model is its plainness; moreover, it's an empirically studied model in several epidemiological and psychophysiological research conducted in numerous countries. These different research had as purpose of investigating the impact of the working system on workers' mental health [12].

METHODOLOGY DESCRIPTION

Study framework

This transversal study was performed in a Tunisian textile company based in the region of Monastir which was employing 110 agents. The study's target population consisted of all people working in the factory, except those assigned to administrative service (25 agents). The population included all workers assigned to production service (85 agents).

Study protocol

The study objectives were communicated to the participants as well as the confidentiality of the data and all of their questions were answered by the interviewer. Questionnaires were administered in semi-structured interviews. Socio-professional data concerned: age, work experience, and marital status. The questionnaire encompasses three questions about the worker's perception of work and their coping with it.

The questionnaire includes three dimensions: Job Demands (JD), Decision Latitude (DL) and Social Support (SS). We can distinguish two classes for each dimension. The first class is for low scores (L) which includes any score below the median score of the whole sample for the corresponding dimension. The second class is for the high score (H) which includes any score above the median score of the whole sample for the corresponding dimension. By the chosen methodology, operators' scores were segmented into four categories: Active, corresponding to high job demand [HJD] and high decision latitude [HDL], Job strain, corresponding to high job demand [HJD] and low decision latitude [LDL]), Passive (LJD and LDL) and Relaxed (LJD and HDL). Another category is presented in the model; the «Iso-strain» category, blending a high job demand, low decision latitude and low social support. In figure 1, the job strain model is outlined [13].

JCQ scale means, standard deviations, reliabilities, and correlations were compared and validated, in a study that dealt with the cross-national validity of the JCQ scale in six broadly different populations from four industrial societies [14]. At the Tunisian level a study that aims to assess the prevalence of psycho-organizational constraints among Tunisian workers in different companies was conducted via descriptive cross-sectional investigation of employees of eight sectors of activity (fourteen companies) was carried out. The project was based on the Karasek questionnaire and they obtained valid results [15].

Data analysis

Data was analysed using the SPSSTM software. The analysis process aims to pinpoint factors related to the socio-professional aspect of the work eventually causing the prevalence of professional stress among workers. First, we proceeded to a descriptive approach to the data collected, then to an analytical

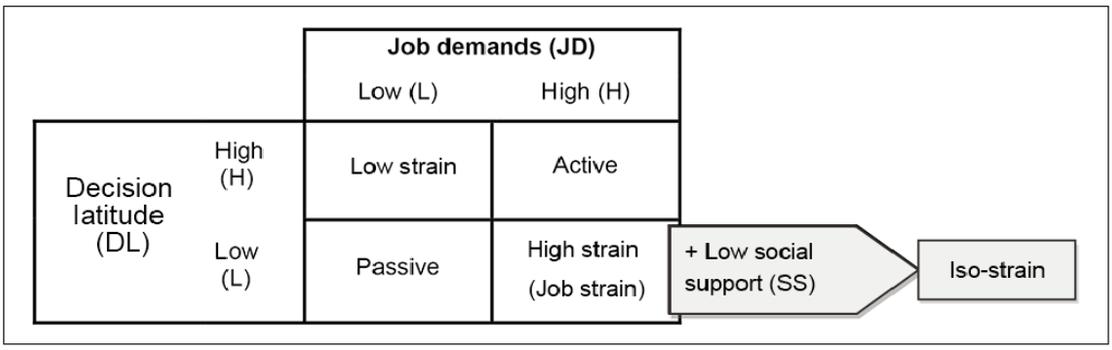

Fig. 1. Categories of the job based on the Karasek model

approach aiming at identifying the eventual correlation between each of the dependent variables and the independent variables. Crossings were performed and the estimation of the unadjusted odds ratio (OR) was measured to identify associations in a univariate analysis. The trends observed after performing the univariate analysis were confirmed via proccing to the multivariate analysis consisted of evaluating the association between these variables. Under 0.05 P-value was considered statistically significant.

RESULTS

In table 1 the description of the variables studied are summarized. The questionnaire was answered by all participants. They were all female, 90% of them were married and mostly aged between 20 and 29 years old (76%) and 80% had a < 9-year work experience. The "job strain" category assembled 30% of participants. The dimension of social support was considered separately, and low social support concerned 70% of operators. When considering that dimension in Karasek's model, 18% of workers move to the "Iso-strain" category.

In table 2 the number of workers perceiving stress, by Karasek's questionnaire in functions of socio-demographic and organizational variables are illustrated.

We can also notice through the second table that «job strain» is significantly related to ≤ 29-year-old age group, ≤ 9-year work experience, non-adaptation to work, and being single.

Table 3 summarizes the main results of the multivariate analysis that was performed to highlight associations between the different variables studied and perceived stress in the population of the study.

According to Karasek's methodology, stress is significantly associated with work experience (≤ 9 years), age (≤29 years old), non-adaptation to work and the perception of a poor work organization as shown in table 3.

Table 1

VARIABLES STUDIED DESCRIPTION

Variables	Categories	N	%
Age	20–29 years	65	76
	≥ 30 years	20	24
Marital status	Single	8	10
	Married	77	90
Work experience	1–9 years	68	80
	≥ 10 years	17	20
Work organization	Good	44	52
	Poor	41	48
Adaptation to work	Yes	64	75.0
	No	21	25.0
Stress according to Karasek's model	Yes	26	30
	No	59	70
Iso-strain	Yes	15	18.0
	No	70	72.0

Table 2

JOB STRAIN ACCORDING TO KARASEK'S MODEL AND DISTRIBUTION OF SOCIO-DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES

Variables	No job strain N (%)	Job strain N (%)	p-value
Age			
20–29 years	39 (60)	26 (40)	0.59
≥ 30 years	8 (40)	12 (60)	
Marital status			
Single	6 (75)	2 (25)	0.36
Married	7 (10)	70 (90)	
Work experience			
1–9 years	48 (71)	20 (29)	0.03
≥ 10 years	6 (36)	11 (64)	
Work organization			
Good	30 (68)	14 (32)	0.10
Poor	17 (40)	24 (60)	
Adaptation to work			
Yes	46 (72)	18 (28)	< 0.01
No	2 (11)	19 (89)	

Table 3

ASSOCIATIONS BETWEEN JOB STRAIN AND INDIVIDUAL AND ORGANIZATIONAL CHARACTERISTICS ACCORDING TO KARASEK'S MODEI

Variables	Unadjusted OR (95% CI)	p-value	Multiv. OR* (95% CI)	p-value
Age	1.3 (0.60–2.22)	0.52	5.5 (1.69–16.55)	< 0.01
Work experience	2.8 (1.19–6.65)	0.01	13.1 (3.66–46.55)	< 0.01
Marital status	1.4 (0.68–3.68)	0.40		NS
Work organization	1.6 (0.99–3.56)	0.13	5.5 (1.89–12.56)	< 0.01
Adaptation to work conditions	3.9 (1.93–8.41)	< 0.01	6.8 (3.85–16.86)	< 0.01

DISCUSSIONS

Studies on stress at work are very uncommon in North Africa [16]. The present study develops a methodology for assessing the prevalence of work-related stress in a Tunisian textile business, diagnosing possibly related determinants and designing strategies and ways to improve the work situations.

According to Karasek's approach, the textile company's evaluation of employee stress levels revealed that 30% of employees experienced stress. The percentages found in that firm are comparable to those found in previous studies conducted in both industrialized and developing nations. Edimansyah et al. [17] found a 31% job strain in an automobile assembly company in Malaysia. Moreover, a foundry firm in India's workforce saw a 25% rate of job strain, according to research conducted by Mohan and colleagues. The garment industry often faces a major issue of very high lead times [18].

According to Karasek's model, the multivariate analysis of the current study revealed a strong correlation between stress and age (≤ 29 years old), work experience (≤ 9 years), the perceived lack of job adaptability, and the negative perception of work organization. These findings support those made by Tsutsumi et al. in Japan [19] and Lotfizadeh et al. in Iran [20]. They do not, however, agree with research done in Belgium by Clays et al. [11], who found higher levels of stress among workers. These differences in outcomes can be explained by the properties of the population studied. The worker population studied was 35–59 years aged and included 70% of men and 30% of women.

The associated factors to stress were also the age and work experience. Younger operators and those with an experience under 5 years were more likely to experience stress. A study led by Bourbonnais et al. [21], claimed that young, less experienced operators were more vulnerable to stress due to less theoretical and theoretical expertise in dealing with demanding or challenging situations. According to these studies, with experience, workers gain confidence, assertiveness, self-esteem and the ability to make decisions [12, 22].

In the present case study, stress also depended on the perception of a non-adaptation to work and a poor work organization. This was also reported by other studies [9, 11, 23, 24]. The factors associated with stress depended on the model we employed. In our study, we applied Karasek's model which granted linking occupational risk and work experience.

After diagnosing the stress risk factors, the strategies to adopt to face stress for work improvement focused on: Adjusting the demands of work, guaranteeing that workers develop or already have the adequate skills and knowledge to perform their tasks effectively. Finally, it's important to increase the amount and quality of social support they receive. Based on the results questionnaire, the managers decided to work on reducing the risk factors by addressing three levels of action: At the organizational level focusing on the questions: how does the way of organizing work induce these situations? And how can we organize work differently? At the cognitive and collective level by becoming aware of the impact of these situations. At the individual level making employees feel valued is important, helping to build a strong workplace culture. The constraints and tensions in work weigh heavily on feelings and affect motivation. Offering places and times for employees to express and share the reality of work helps to identify solutions. Finally, we have initiated ways of reduction and prevention of stress at the workplace. Training and informing strategies are required to reduce stress factors at work and related pathologies.

CONCLUSIONS

Stress is not always dangerous, but being stressed beyond one's capacities is dangerous and affects mental and physiological health by creating many illnesses. In the present study, a methodology is developed to estimate occupational stress among operators working in a textile company in Tunisia. The measurement of stress level reached out to 30% of workers according to Karasek's model. A statistically significant association was observed between stress and age, work experience, perceived non-adaptation to work and the poor perception of organization. Priorities for action point to the need for monitoring psychosocial hazards and work-related stress and the need to develop an occupational health and safety culture. So governments and social organizations must be conscious to reduce the stress in the textile sector.

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