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Work-related stress risk assessment in Italy: the validation study of Health Safety and Executive Indicator Tool

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ABSTRACT. *Introduction. In compliance with the Italian occupational health and safety regulatory framework, as provided by the Lgs. Decree 81/2008, the “work-related stress” risk assessment should follow the same principles as other risk assessments, in accordance with the European Agreement of 8 October 2004; therefore, validated and scientifically proven methodological tools are needed to conduct an adequate work-related stress risk assessment. The UK’s Health Safety and Executive (HSE) Indicator Tool (IT) is used for assessing the risk of work-related stress. The aim of this study is to test the factor structure of IT as a measure of work-related stress in a sample of Italian workers. Methods. Data collected from 65 Italian organizations (6378 workers) was used for a Confirmatory Factor Analysis (CFA) on the 35-item seven-factor model. Results. The results showed acceptable fit to the data (CFI .90; TLI .89, RMSEA .045). A second CFA was done to test a 35-item six-factor model (CFI .89, TLI .87, RMSEA .047). Both models were tested after removing six items (factor loadings less than .50.), resulting in a 29-item model. Here again, there was an acceptable fit to the data (29-item seven-factor model: CFI .93, TLI .91, RMSEA .044; 29-item six-factor model: CFI .92, TLI .90, RMSEA .046). Discussions. These findings show that the HSE model satisfactorily adapts to use in a sample of Italian workers. One of the most important innovations introduced in the assessment of work-related stress with the HSE IT is the global approach for identifying work-related stress risk factors, aimed at establishing the best strategy from the viewpoints of prevention officers and also of workers.*

Key words: *work-related stress, validation study, factor analysis, psychometrics, psychosocial risk factors.*

RIASSUNTO. *Introduzione.* Il quadro normativo italiano di tutela della salute e sicurezza sui luoghi di lavoro, costituito dal D.Lgs 81/2008, ha stabilito che il rischio da “stress lavoro-correlato” deve essere valutato al pari di tutti gli altri rischi presenti sui luoghi di lavoro, secondo i contenuti dell’Accordo Europeo dell’8 ottobre 2004. Pertanto, per effettuare un’adeguata valutazione di questa tipologia di rischio, risulta indispensabile l’utilizzo di strumenti metodologici validati e basati su ampie sperimentazioni scientifiche. L’Indicator Tool (IT), sviluppato nel Regno Unito dall’Health and Safety Executive (HSE), è uno strumento utilizzato per la valutazione del rischio da stress lavoro-correlato. Il presente studio si prefigge di verificare la struttura fattoriale dell’IT per la misurazione dello stress lavoro-correlato su un campione di lavoratori italiani. *Metodi.* I dati raccolti in 65 diverse aziende italiane (su un totale di 6378 lavoratori) sono stati utilizzati per effettuare l’analisi fattoriale confermativa (CFA) del modello a sette fattori con 35 item. *Risultati.* I risultati mostrano un adattamento accettabile del modello ai dati

Introduction

Work-related stress is “a state which is accompanied by physical, psychological or social complaints or dysfunctions and which results from individuals feeling unable to bridge a gap with the requirements or expectations placed on them” (1). Continuing changes in the world of work are placing increasing demands on workers. Outsourcing, down-sizing, the greater need for flexibility in terms of both function and skills, increasing use of temporary contracts, increased job insecurity, higher workloads and more pressure, and poor work/life balance are all factors contributing to work-related stress. Stress is the second most frequently reported work-related health problem. In 2005, an average of 22% of working Europeans suffered stress. Its prevalence in the new European Union (EU) Member States (EU10)¹ is markedly higher (30%) than in the older ones (EU15)² (20%) (2, 3). According to the 2009 Scoreboard of the EU Strategy on Health and Safety at Work, national surveys (where they exist) indicate that over the last ten years, work-related stress levels have risen in six EU nations (Denmark, Germany, Latvia, Austria, Slovakia, Finland), remained stable in two (Netherlands, UK) and fallen in one (Sweden). In the last three years, they have risen in nine (the six above plus Bulgaria, Estonia, Ireland), remained stable in three (also Belgium), and only fallen in Sweden (4).

Health and safety at work is not only essential for workers’ well-being but is also very important economically to companies and society. Studies suggest that between 50% and 60% of all lost working days have some link with work-related stress (5). This amounts to a huge cost in terms of both human distress and impaired economic performance. The annual social cost of work-related stress in the EU15 was estimated at 20 billion Euros in 1999, based on a conservative estimate that at least 10%

¹ The ten countries that joined the European Union in May 2004: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia;

² The EU15 comprised the following 15 countries prior to the accession of ten countries on 1 May 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

(CFI .90; TLI .89, RMSEA .045). Una seconda CFA è stata eseguita su un modello con 35 item a sei fattori (CFI .89, TLI .87, RMSEA .047). Inoltre, entrambi i modelli sono stati testati dopo l'eliminazione di sei item (con peso fattoriale inferiore a .50), passando da 35 a 29 item. Anche in questo caso, è stata osservata un'accettabile bontà di adattamento ai dati (modello a sette fattori con 29 item: CFI .93, TLI .91, RMSEA .044; modello a sei fattori con 29 item: CFI .92, TLI .90, RMSEA .046). *Discussioni.* I risultati indicano che il modello HSE si adatta in maniera soddisfacente al contesto italiano. Una delle principali innovazioni introdotte dalla valutazione dello stress lavoro-correlato attraverso l'impiego dell'IT riguarda l'approccio globale adottato per identificare i fattori di rischio dello stress lavoro-correlato, volto a definire la migliore strategia di intervento sia dal punto di vista delle figure della prevenzione che dei lavoratori.

Parole chiave: stress lavoro-correlato, studio di validazione, analisi fattoriale, psicomètria, fattori di rischio psicosociale.

of all work-related illness costs are work-stress-related (6). In France, a 2007 study estimated that the cost of stress at work amounted to a minimum of 2 to 3 billion Euros per year (7). In the UK, it was estimated that 10 million working days were lost as a result of anxiety, depression, and stress, which employees linked directly to work and working conditions (8). Increasing awareness and the growing need for employers, workers and their representatives to identify the signals indicating work-related stress problems have led to the development of integrated theoretical models for monitoring occupational psychosocial risk factors. The European Framework Agreement on Work-Related Stress of 8 October 2004 (1), aimed at giving workers and their employers a guide for managing work-related stress, like other occupational risks (physical, chemical, etc.), was incorporated in Italy into Legislative Decree 81/08, under which it is obligatory to make a valid and reliable evaluation of work-related stress, based on minimal indications, as part of the employer's responsibility for risk assessment.

We closely analyzed the benchmarking for studies concerning the management of work-related stress in several EU countries, from the perspective of the European Framework (9-12) and decided to test the approach launched in 2004 by the UK Health and Safety Executive (HSE) for the evaluation and management of work-related stress in the Italian setting. The core of the HSE approach for dealing with work-related stress is the Management Standards (MS) approach. This is a set of conditions which, if present, reflect a high level of health, well-being and organizational performance. These conditions cover seven areas of work design which, if not properly managed, are associated with negative outcomes, such as poor health and well-being, lower productivity and increased sickness absence: demands, control, managerial support, peer support, relationships, role, and change (13, 14). As part of the MS approach, the HSE produced a 35-item self-report survey scale called the Indicator Tool (IT), validated in the United Kingdom and Ireland on more than 26,000 workers (15). This was designed to help employers

identify risks by assessing the psychosocial working conditions detected with the MS as leading to work-related stress. The first draft of the IT was based on the demand-control-support model drawn up by Karasek in 1979 (16), in which work-related stress is considered the result of a combination of high work demands and low job control, mitigated by social support. This model was subsequently adapted by Marmot et al. (17) for the Whitehall II studies of stress and health outcomes. A pool of 100 questions broadly representing all aspects of the MS was constructed with the intention of developing an IT that was comprehensive in coverage and statistically reliable and valid. After Exploratory Factor Analysis (EFA) to extract the factors best representing the MS areas, the IT consisted of 35 items and seven subscales. The factor structure of the Tool was checked by first-order Confirmatory Factor Analysis (CFA) to test the factor structure of the 35-item IT and by second-order CFA to establish whether the HSE scale can be explained by seven first-order factors (demands, control, managerial support, peer support, relationships, role, and change) and one second-order factor (general work-related stress) (18). As noted by Edwards et al. (18), one of the most important limitations of the HSE study was that data came from 39 different organizations, mainly in the public sector. For each of the seven areas, HSE indicates optimal levels of performance to reduce the risk of stress, that can be used as targets for interventions to improve psychosocial working conditions. However, the IT is not designed to measure the actual effects of work-related stress on workers but only to estimate the risks and identify points for potential intervention. Only few studies have investigated the relationships between MS and stress-related work outcomes (19-21). Main et al. (19) found a weak association between the MS and job satisfaction, sickness absence, job performance, and psychological distress. Kerr et al. (20) showed a positive association between the MS and job satisfaction and a negative one between the MS and job-related anxiety, job-related depression and witnessed errors. Guidi et al. (21) studied the relationships between the measures of psychosocial risk provided by the HSE IT and psychological distress as measured by the General Health Questionnaire (GHQ), which is generally thought to be the best tool to estimate the effects of stress on psychological health. Guidi et al. found the HSE indicator subscales were negatively associated with psychological distress and positively associated with work ability. They also reported a strong association between psychological distress and work ability. These findings show that work-related stress is harmful for workers' health and that the HSE IT may help employers manage psychological risks.

Adapting the HSE model to the Italian context, to identify and compare the reference levels, we found that the methodological part adapted easily to the requirements of Italian Decree 81/2008 and its subsequent modifications and additions, and the IT was easily administered in different work settings. The model's strong point is the active participation of workers and prevention officers, which makes for cooperation in obtaining information on the organizational context and identifying corrective strategies (10).

The primary aim of this study was to test the factor structure of the MS IT, using CFA to check how the HSE model fitted a large sample of Italian workers throughout the country, representative of both the public and private sectors, different macro-sectors of economic activities and organizations of different sizes. This validation could contribute to a global approach for identifying risk factors for work-related stress. The global approach, involving the active participation not only of prevention officers in each organization but also of workers, enables us to consider different points of view and to identify the best strategy for each situation.

Methods

Instruments

The HSE MS IT consists of a 35-item scale tested by Cousin et al. (13) as a multidimensional measure of work-related stress. The IT was translated into Italian with a blind back-translation procedure and then some work-related stress experts checked that the translation was correct. The IT consists of seven subscales: demands (8 items) measures issues like workload, and work patterns; control (6 items) reflects how much say the person has in the way they do the work; managerial support (5 items) measures encouragement and sponsorship provided by the employer; peer support (4 items) measures colleagues' encouragement and support; relationships (4 items) covers promoting a positive working atmosphere to avoid conflict; role (5 items) asks employees whether they understand their job and whether their employers ensure they do not have conflicting roles; and change (3 items) measures how organizational change is managed and communicated at work. The IT uses two alternative response formats: a frequency format (1=*Never*, 5=*Always*) and an agree format (1=*Strongly Disagree*, 5=*Strongly Agree*). The questions for 'demands' and 'relationships' are negatively phrased, and in order to simplify comparisons across the other factors we reversed the scores so a higher rating indicated less risk of stress at work (18). We tested the preliminary version of the questionnaire and assessed the internal consistency of the IT on a pilot sample of 389 workers from Italian organizations. In this first version we asked workers to indicate suggestions and comments to make the questions easier to understand and improve the questionnaire. The pilot sample consisted of 238 men and 138 women, plus 13 not specified from seven organizations. Cronbach's α coefficients of reliability for the seven subscales were adequate, with demands .75, control .82 managerial support .80, peer support .78, relationships .65, role .77, change .73, overall .89, considering .70 as an acceptable level (22). On the basis of the pilot study, we made minor additional revisions to some items in order to improve translation of the final version of the questionnaire.

Participants

Data were collected for the validation study in March-September 2010. The respondents were recruited with the collaboration of occupational safety and health key con-

tact experts in regional occupational health services. The experts distributed and subsequently collected the completed self-administered questionnaires in different organizations. The sample consisted of 6378 workers (3200 men, 2172 women, 1006 not specified) from 65 organizations. Organizations with fewer than ten respondents, with the same characteristics, were merged in a single group. Organizations involved in the study were a heterogeneous sample both for geographical distribution (North West 50.8%, North East 24.6%, Center and South and Islands 24.6%), and for type (27.7% public sector and 72.3% private sector), and for the size of the organization (10-50 employees 27.1%, 51-100 employees 22.0%, 101-250 employees 16.9%, more than 251 employees 33.9%). The workers' age breakdown was 18-30 years (11.5%), 31-40 (31.2%), 41-50 (33.5%), 51 and more (23.9%); 987 did not report age. Just over a third of the sample (36.0%) were public sector workers, and 64.0% private.

On the basis of the Italian Classification of Economic Activity (ATECO) (23), the macro-sectors most widely represented were Section C (Manufacturing, 23.5%), I (Accommodation and food service activities) and Q (Human Health and Social Work Activities) both with 15.1%. The other sections accounted for smaller proportions. More than half the sample (51.7%) worked in organizations that had more than 251 employees, 10.1% had 51-100, 8.4% had 101-250 and 6.0% had 10-50; 23.8% of the sample did not provide this information. The total response rate was 74.8%.

Statistical analysis

Mean scores, standard deviations (SD) and percentiles (20th, 50th and 80th) for each of the seven subscales were calculated after reverse-coding negatively worded items, so higher scores reflected better working conditions. The percentiles enable organizations to place themselves in categories based on their own mean scores. If an organization were to score at the 50th percentile, this would mean its score was as good as or better than the scores reached by half the organizations in the sample (18). Each percentile rank requires a follow-up action: "urgent action" (the organization score is below the 20th percentile); "improvement needed" (the organization score is below the 50th percentile but at or above 20th); "good performance but potential for improvement" (the score is above the 50th percentile but below the 80th); "doing very well - need to maintain performance" (the score is at or above the 80th percentile). Internal consistency for the total scores and the subscales of the MS IT has been reported as satisfactory, considering the suggested threshold of .70 (22). We ran a CFA on a sample of workers in Italy to test the factor structure of the HSE IT. As the data were obtained from 65 different organizations, in order to avoid multilevel problems caused by merging these observations we standardized the data set by converting responses to Z-scores for each question within each organization. This enabled us to remove between-organization differences in means and standard deviations (18, 24). This was confirmed by the Intraclass Correlation Coefficients (ICC) which were not significantly different from 0 ($p > .05$). In

order to reach multivariate normality, we excluded 362 cases because of univariate outliers (130) and multivariate outliers (232) (25), as indicated by the Mahalanobis distance ($\chi^2 = 67.98, p < .001$) for CFA (Mardia's coefficient 1245.23; critical value 1295.00) (26). The pattern of missing data appeared to be random, so we adopted full information maximum likelihood (FIML) estimation in AMOS (27). After closer inspection of the CFA results (standardized factor loadings and correlations between factors), it appeared that some items produced factor loadings lower than .50 (28) and two factors had high correlation coefficients (.85), so we tried to delete these and unify them to see how the model fit changed.

We used the following goodness-of-fit indices for all the models: the χ^2 goodness of fit test (29), the Comparative Fit Index (CFI) (30), Tucker Lewis Index (TLI) (31), Root Mean Square Error of Approximation (RMSEA) and its 90% confidence interval (CI) (32). RMSEA values of .05 or less are considered indicative of a close fit but cut-offs close to .06 are generally taken to indicate a reasonable fit (33, 34). For CFI and TLI values higher than .90 or .95 are typically taken to reflect respectively acceptable and excellent data fits (33-35). Models with same number of items but with different number of factors were nested models (Model 1 and Model 2; Model 1a and Model 2a) whereas models with same number of factors and different numbers of items were non-nested (Model 1 and Model 1a; Model 2 and Model 2a). To compare nested models we used the chi square difference statistic ($\Delta\chi^2$) whereas to compare non-nested models we calculate Akaike's information criteria (AIC) (36). The model with the lowest AIC is considered to have the best fit. All analysis was done with either SPSS or AMOS (versions 18.0 for Windows) statistical packages.

Results

Descriptive statistics

Descriptive statistics, such as mean scores, SD and percentiles (20th, 50th and 80th) for the seven MS IT subscales are shown in table I. Higher mean scores reflect better working conditions. The mean scores (SD) for the seven subscales range from 3.32 (0.87) for change to 4.36 (0.58) for role.

Factor analysis

We tested different models to examine the factor structure of the HSE MS IT. Model 1 referred to the seven-factor CFA proposed by Edwards et al. (18) which has seven subscales: demands, control, managerial support, peer support, relationships, role and change. Cronbach's α coefficients of reliability for the seven subscales were adequate, varying from demands .77; control .79; managerial support .80; peer support .82, relationships .82; role .77; change .70; overall .90, considering .70 as an acceptable level (22). Figure 1 shows the standardized factor loadings for Model 1 and correlations between factors. The loadings varied within each subscale from low (.36) to high (.81), indicating different levels of association between the latent factors and the respective items. The correlations between factors ranged from low (.21) to high (.85). The indices for Model 1 (CFI .90; TLI .89; RMSEA .045) indicated an acceptable fit (table II). Model 1a refers to the seven-factor CFA from which all items with standardized factor loadings less than .50 (items 2, 4, 9, 16, 30, and 34) had been removed. Removing these raised the α coefficients for demands .80, control .81, and relationships .83. The standardized factor loadings and the between-factor

Table I. Descriptive statistics and percentiles for the seven-factor 35-item HSE Management Standards Indicator Tool

	Demands ^a	Control	Management Support	Peer Support	Relationships ^a	Role	Change	Total
Mean	3.40	3.46	3.58	3.73	3.72	4.36	3.32	3.64
SD	0.69	0.81	0.84	0.79	0.98	0.58	0.87	0.51
Percentiles								
20	2.88	2.83	3.00	3.00	3.00	4.00	2.67	3.20
50	3.50	3.50	3.80	3.75	4.00	4.40	3.33	3.69
80	4.00	4.17	4.40	4.25	4.50	5.00	4.00	4.09

^a The questions for this factor are negatively phrased, but to simplify comparison across the other factors in this table the scores have been reversed so that a higher value indicates less risk of stress at work, like for the other factors.

Table II. Fit indices for the MS Indicator Tool based on confirmatory factor analysis

	χ^2	df	CFI	TLI	RMSEA (90% CI)	AIC
Model 1	7190.09*	539	.90	.89	.045 (.044-.046)	7442.09
Model 1a	4496.89*	356	.93	.91	.044 (.043-.045)	4712.89
Model 2	7755.47*	545	.89	.87	.047 (.046-.048)	7995.47
Model 2a	5069.62*	362	.92	.90	.046 (.045-.048)	5273.62

CFI, Comparative Fit Index; TLI, Tucker Lewis Index; RMSEA, Root Mean Square Error of Approximation; CI, Confidence Interval, AIC, Akaike's Information Criteria
 * $p < .05$

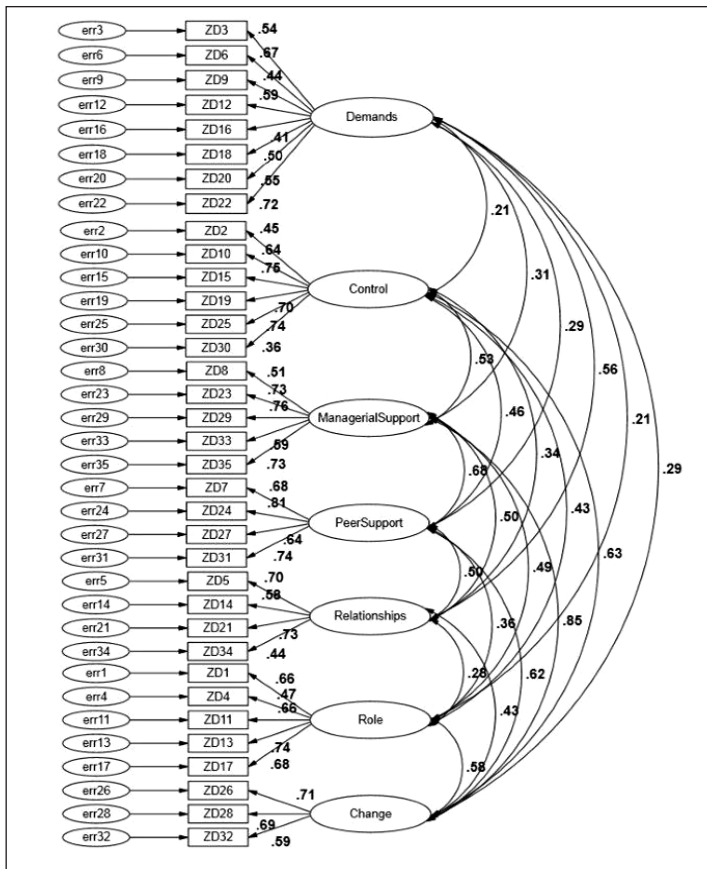


Figure 1. Model 1: seven-factor Confirmatory Factor Analysis, standardized factor loadings and correlations

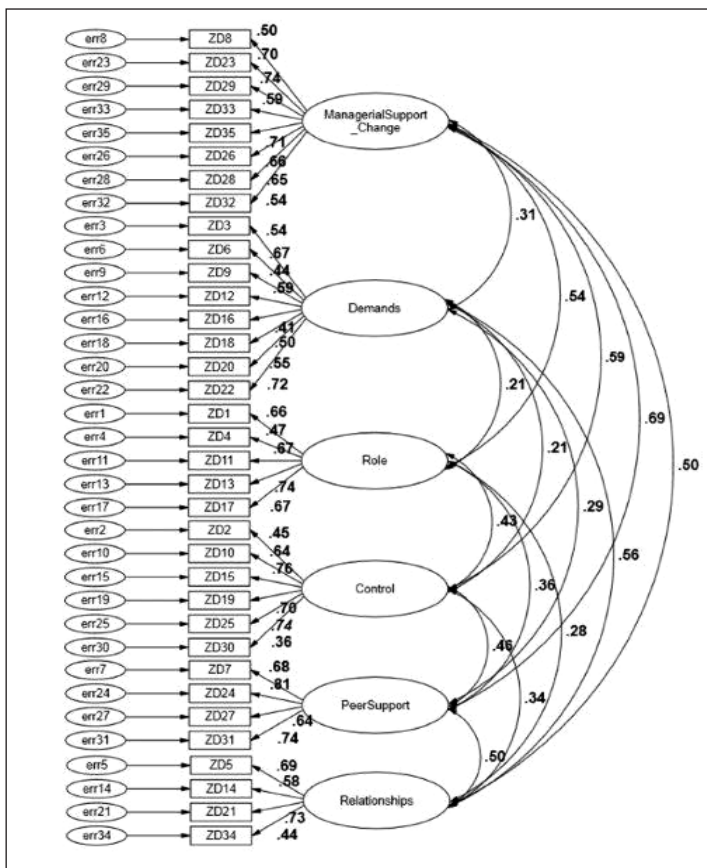


Figure 2. Model 2: six-factor Confirmatory Factor Analysis, standardized factor loadings and correlations

correlation coefficients were similar to Model 1, and again fit indices were acceptable (CFI .93; TLI .91; RMSEA .044) (table II). Non-nested models were examined using AIC and the model with the lowest AIC is considered to have the best fit. Figure 1 shows a high correlation coefficient between the factors managerial support and change, casting doubt on their discriminant capacity. We then tested the six-factor structure on our sample using CFA, forming Model 2 (figure 2). The standardized factor loadings varied within each subscale from low (.36) to high (.81). Correlations between factors ranged from 0.21 to 0.69. Fit indices were acceptable (CFI .89; TLI .87; RMSEA .047). Model 2a was constructed by leaving out of Model 2 all the items with standardized factor loadings less than .50 (Items 2, 4, 9, 16, 30, 34). This gave satisfactory results, with loadings between .50 and .81. Fit indices for Model 2a (CFI .92; TLI .90; RMSEA .046) indicated an acceptable level of fit. The nested model comparison between Model 1 and Model 2 ($\Delta\chi_{(6)}^2 = 565.38$) and between Model 1a and Model 2a ($\Delta\chi_{(6)}^2 = 572.73$) showed a statistically significant worsening when the number of factors decrease from 7 to 6. Furthermore, analyzing the non-nested models through AIC, we noted that the models with the better fit were models with fewer number of items (Model 1a and Model 2a). According to this analysis, we could affirm that model with seven factors and 29 items better fit to the data.

Discussions

The Italian Workers' Compensation Authority (INAIL) – formerly the Italian National Institute for Occupational Safety and Prevention (ISPESL) – has thoroughly examined the Italian and European regulations and made a careful benchmarking analysis of the main models used in the different countries for assessing and managing work-related stress. The methods selected are based on the British MS developed by the HSE, adapted to the Italian situation through a multi-stage process aimed at tracing out a systematic route – the result of lengthy studies – to enable an employer and an organization's prevention officers to manage this risk like other occupational risks covered by the regulations.

We set out to validate the IT questionnaire used by the HSE, adapted to the Italian work context through a blind back-translation procedure. This validation study was conducted on a fairly large sample of Italian workers (about 6400), representative of different situations throughout the country, with different demographic features (sex, age, etc.), employed in different settings (public or private companies, different sectors, etc.). Cronbach's α gave good internal consistency, as the

values for the seven subscales and the total were all .70 or more (22). Factorial analysis for validation of the IT started from a confirmatory approach based on the model resulting from the UK HSE validation (18). Model 1 adapted well to the Italian sample, and its goodness-of-fit indices were acceptable (table II); this confirms that the 35-item seven-factor measure is a psychometrically robust instrument in Italy too. The use of this tool to assess and manage work-related stress is one step in a process moving through the stages of current regulation, with a view to simplicity and synthesis, and concluding by giving priority to all the figures involved in prevention in an organization.

Comparison with the HSE results (18) brought to light similarities in the various questionnaire items: though slightly lower, the standardized factor loadings for the Italian model (figure 1) mirror the British results for each subscale. For the factor demands the most important item in the British and Italian models regards unrealistic deadlines. For the factor control, two items have the heaviest loadings in both studies; these are freedom to decide how to do the job, and having a say in how to do it. For peer support factor loading for the item stating that colleagues provide encouragement and support when needed is very high. For change the two items with greatest loading concern the chance to ask superiors about changes in work. Under the headings of managerial support, relationships and role, the items with highest loadings are not exactly the same in the two studies. In Italy the most important items are: "I can talk to my line manager about something that has upset or annoyed me about work" (managerial support), "I am subject to bullying at work" (relationships), and "I'm clear about the goals and objectives for my department" (role). In the HSE study, however, the heaviest loadings under managerial support centered on encouragement from the boss about the work being done. Relationships gave two items with high factor loadings: "There is friction or anger between colleagues" and "Relationships at work are strained". Finally, for role the item with the heaviest loading was "I am clear what my duties and responsibilities are". The two studies gave similar results for the items with low loading scores except on one item. Items 9 ("I have to work very intensively"), 16 ("I am unable to take sufficient breaks"), 2 ("I can decide when to take a break"), 30 ("My working time can be flexible"), and 4 ("I know how to go about getting my job done") had low factor loadings in both models. In the Italian study, item 34 too ("Relationships at work are strained") had a low loading factor.

Although the goodness-of-fit indices were acceptable for the Italian sample, we nevertheless made a critical analysis of the results of the model tested using the factor loadings and the between-factor correlations. As indicated by Comrey & Lee (28) we took factor loadings higher than .55 as good. Then, as in the British study, we eliminated the items with lower loadings and re-tested the model (Model 1a); this resulted in an overall improvement in the goodness-of-fit indices, as shown by AIC which is lower than in Model 1 (table II). In both studies there were high correlations between the factors managerial support and change, suggesting these two may lack discriminant power. To look

into this point further we did a CFA with six factors. As expected, this produced a new model, Model 2, in which the two factors with high correlations are combined in one, while the others remain the same as in Model 1. This is easy enough to understand considering the items of each factor: managerial support (8. "I am given supportive feedback on the work I do"; 23. "I can rely on my line manager to help me out with a work problem"; 29. "I can talk to my line manager about something that has upset or annoyed me about work"; 33. "I am supported through emotionally demanding work"; 35. "My line manager encourages me at work"); and change (26. "I have sufficient opportunities to question managers about change at work"; 28. "Staff are always consulted about change at work"; 32. "When changes are made at work, I am clear how they will work out in practice"). On the organizational level this pairing is not unreasonable as changes are decided at managerial level, so workers tend to group all aspects inherent to change under the heading of managerial support. Comparing nested and non-nested models, we could highlight that decreasing number of factors from seven to six caused a worsening of overall fit, whereas decreasing the number of items from 35 to 29, caused an improvement of fit to the data (table II). In conclusion, therefore, the HSE model adapts satisfactorily to Italian workers. To improve and implement procedures for assessing work-related risk on a large scale, the six items with low factorial loadings might be eliminated, and this – like the British study states – would considerably improve the goodness of fit. Slight modifications might also be made to the questions under the headings managerial support and change in order to make a clearer distinction between these two areas. Although our sample was smaller than the UK one and was a convenience sample, the large size ensured good representativeness of the whole Italian worker population, the geographical distribution, the economic sector, the size of the organizations, and type of organization (public or private). This limit might subsequently be overcome because we have now developed a web-based structure (<http://85.18.194.67/focusstresslaborocorrelato/>) in which Italian companies will be able to complete the IT directly on line, continuously enlarging the data set. The larger sample could then be used for a new factor analysis to confirm the present findings. However, it is important to bear in mind that the IT must be administered to "homogeneous groups" (organizational units) created by employers within their own organizations. These are groups of workers identified, for instance, on the basis of their sex, age, nationality, type of contract, or any other criteria which identify a specific and common risk factor for workers, such as workshift, special jobs, etc. In addition, the IT, as the HSE pointed out, has problems in ensuring anonymity in firms with fewer than ten employees. In such cases semi-structured interviews and *ad hoc* customized focus groups might be used in place of the IT. The most important innovation in Italy as regards work-related stress assessment is not just the use of scientifically validated tools but also the active participation of the people involved in stress management, which includes not only prevention officers in the organization but also workers.

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Appendix

INDICATOR TOOL

Demands (8 items)

Scored on a 5-point LIKERT scale 'never', 'seldom', 'sometimes', 'often', 'always'

Item 3: Different groups at work demand things from me that are hard to combine

Item 6: I have unachievable deadlines

Item 9: I have to work very intensively

Item 12: I have to neglect some tasks because I have too much to do

Item 16: I am unable to take sufficient breaks

Item 18: I am pressured to work long hours

Item 20: I have to work very fast

Item 22: I have unrealistic time pressures

Control (6 items)

Scored on a 5-point scale 'never' to 'always'

Item 2: I can decide when to take a break

Item 10: I have a say in my own work speed

Item 15: I have a choice in deciding how I do my work

Item 19: I have a choice in deciding what I do at work

Scored on a 5-point scale 'strongly agree', 'agree', 'neutral', 'disagree', 'strongly disagree'

Item 25: I have some say over the way I work

Item 30: My working time can be flexible

Managerial support (5 items)

Scored on a 5-point scale 'never' to 'always'

Item 8: I am given supportive feedback on the work I do

Item 23: I can rely on my line manager to help me out with a work problem

Scored on a 5-point scale 'Strongly agree' to 'strongly disagree'

Item 29: I can talk to my line manager about something that has upset or annoyed me about work

Item 33: I am supported through emotionally demanding work

Item 35: My line manager encourages me at work

Peer support (4 items)

Scored on a 5-point scale 'never' to 'always'

Item 7: If work gets difficult, my colleagues will help me

Scored on a 5-point scale 'Strongly agree' to 'strongly disagree'

Item 24: I get help and support I need from colleagues

Item 27: I receive the respect I deserve from my colleagues at work

Item 31: My colleagues are willing to listen to my work-related problems

Relationships (4 items)

Scored on a 5-point scale 'never' to 'always'

Item 5: I am subject to personal harassment in the form of unkind words or behaviour

Item 14: There is friction or anger between colleagues

Item 21: I am subject to bullying at work

Scored on a 5-point scale 'Strongly agree' to 'strongly disagree'

Item 34: Relationships at work are strained

Role (5 items)

Scored on a 5-point scale 'never' to 'always'

Item 1: I am clear what is expected of me at work

Item 4: I know how to go about getting my job done

Item 11: I am clear what my duties and responsibilities are

Item 13: I am clear about the goals and objectives for my department

Item 17: I understand how my work fits into the overall aim of the organization

Change (3 items)

Scored on a 5-point scale 'Strongly agree' to 'strongly disagree'

Item 26: I have sufficient opportunities to question managers about change at work

Item 28: Staff are always consulted about change at work

Item 32: When changes are made at work, I am clear how they will work out in practice