Methodological advances in the determination of the origin of stress-related occupational diseases: the Colombian experience

Gloria Helena Villalobos

ABSTRACT | Background: Inclusion of stress-related diseases into the Colombian legislation raised the need for tools that facilitate the assessment of cases in a standardized manner. Objective: To design a homogeneous and valid method for analysis, evaluation and establishment of causal relationship between psychosocial exposures at work and occurrence of diseases among the working population. Method: The protocol comprises seven consecutive steps from verification of diagnosis to assessment of psychosocial and non-psychosocial risk factors, which are scored on a valuation matrix that allows estimating the relative weight of each factor. Results: The protocol was validated with a set of cases of diseases possibly related with stress at work. General sensitivity and specificity indicators were calculated, as well as the ones specific for each disease included in the protocol. Conclusions: The Labor Ministry of Colombia established the protocol described here as mandatory reference for assessment teams at the various social security levels. Its relevance and applicability were assessed after ten years of use, and the process to update the supporting evidence was started.

Keywords | stress, physiological; psychology; community medicine; occupational health.

RESUMEN | Contexto: La inclusión de las enfermedades generadas por el estrés en el trabajo en la legislación colombiana planteó la necesidad de disponer de herramientas que faciliten la valoración de los casos de forma estandarizada. Alvo: Diseñar un método homogéneo y válido para el análisis, evaluación y establecimiento de relaciones causales entre exposiciones psicosociales en el trabajo y la presentación de enfermedades en la población trabajadora. Metodología: La metodología bajo la cual opera el protocolo está compuesta por siete etapas consecutivas que se extienden de la verificación del diagnóstico a la valoración de factores de riesgo tanto psicosociales como no psicosociales, los cuales se califican en una matriz de valoración que permite estimar el peso relativo de cada uno de ellos. Resultados: El protocolo se validó con un conjunto de casos de enfermedades presuntamente relacionadas con estrés en el trabajo. Se calcularon los indicadores de sensibilidad y especificidad generales, así como particulares para cada una de las enfermedades incluidas en el protocolo. Conclusiones: Esta herramienta fue asumida por el Ministerio de Trabajo de Colombia como de uso obligatorio por los equipos de calificadores de las diferentes instancias de la seguridad social. Luego de diez años de utilización, se analizó su pertinencia y funcionalidad, y se inició el proceso de actualización de la evidencia científica que la respalda.

Palavras-chave | estrés fisiológico; psicología; medicina comunitaria; salud laboral.
INTRODUCTION

Since 1994 the Colombian legislation for workers’ health includes diseases related with occupational stress, which are currently considered in the Decree no. 1,477 from 2014 and comprise cardiovascular, gastrointestinal, mental and sleep disorders. This legal development resulted in considerable technical development; as a result a set of tools validated with representative Colombian workers is currently available to measure exposure to psychosocial risk factors at and outside the workplace.

Data collected by the II National Survey of Safety and Health Conditions at Work within the Occupational Risk System of Colombia, conducted by the Ministry of Labor and the Ibero-American Social Security Organization (Organización Iberoamericana de Seguridad Social – OISS) in 2013 revealed 43% increase of mental and behavioral disorders among the working population in the period from 2009 to 2012, mainly corresponding to anxiety and depression.

This survey also investigated the workers’ perception of psychosocial factors at work and their relationship with the state of health. Some of the findings indicate that activities involving longer working hours were related to construction, health care, commerce, agriculture and transportation. About 36% of the respondents reported they needed to perform several tasks at the same time, and 47.47% that they needed to maintain a high level of attention. More than 60% of the sample stated that their work involved dealing with customers or clients, and 15% reported a high emotional load associated with the need to hide their own emotions. In regard to social support at work, 76% asserted they could receive help from colleagues, and 90% rated positive their relationships with others. About 11% reported workplace harassment from supervisors.

Establishing the (occupational or common) origin of diseases allegedly related to stress posed a challenge in the terms of development of validated methods enabling clearer determination of the impact of psychosocial exposures at and outside the workplace. In 2014 a protocol establishing technical criteria and methods for determination of stress-related diseases was designed and validated.

This protocol serves as guide for the interdisciplinary group charged of characterizing cases at the various levels defined in the Colombian social security norm (health care institutions, occupational risk management — ORM — and disability committees). The protocol contains homogeneous and standardized criteria and defines a series of steps for decision-making on the origin of diseases.

METHODS

The protocol was based on a review of the state on the art on cardiovascular, gastrointestinal musculoskeletal, endocrine and nervous system diseases related with reactions to stress.

Also legal aspects considered in other countries for determination of the origin of diseases, process of characterization and procedures for assessment of psychosocial risk factors were considered. The literature review allowed defining stress-related diseases as the ones in which, as a function of their persistence or intensity, reactions to stress trigger the respective pathophysiological mechanisms.

With the help of groups of clinical doctors from various specialties, risk factors for the targeted diseases were defined and hierarchized by means of the paired comparison method developed by Dean and Nishry. Four epidemiological criteria of causality were used for this purpose: precedence in time, strength of association, consistency of findings and biological plausibility (of risk factors relative to diseases) which were subjected to quantitative estimation.

Dean and Nishry’s (1965) method allows assessing the importance of factors critical for decision making by comparing them in pairs and attributing a weight to each as a function of their relative relevance.

Based on this hierarchical structure a valuation matrix was plotted for the (psychosocial and non-psychosocial) risk factors associated with each individual disease, which allows attributing to each a relative weight within the full set of risk factors.

The matrices were validated with a representative group of cases, which allowed plotting receiver operating characteristic (ROC) curves to estimate the sensitivity and specificity of the protocol, as well as the cutoff points to decide whether a given condition is occupational or common.

The following are the basic criteria that underlie the protocol design:
• diseases are multicausal. From this perspective, the effects of stress on health are not exclusively restricted to personal factors, but include the participation of environmental stimuli, working and living conditions that systemically interact as a part of the causal network of pathogenic processes;
• the epidemiological criteria used to establish causality derive from the Bradford Hill (1965) model for investigation of the causal relationship of non-infectious diseases;
• determination of the origin of diseases involves rigorous documentation of exposure to occupational and non-occupational risk factors;
• Presence of non-occupational risk factors (e.g., biological and individual conditions) by itself does not immediately rule out involvement of occupational risk factors;
• predominance of occupational or non-occupational risk factors in a given case can only be established by analyzing both in order to estimate the weight of each relative to the other;
• high quality of the information that documents the appraisal of all risk factors is indispensable to estimate their relevance during the process of determination of the origin of disease;
• the algorithm included in the protocol is only able to determine the origin of a disease when presence of an occupational risk factor was previously documented.

Psychosocial risk factors are work, environmental or individual conditions that interact in a dynamic manner and result in experiences able to influence the well-being of people. To assess these conditions there are criteria that document exposure in the terms of frequency of occurrence, length of exposure and magnitude of exposure. The latter is proximally measured as the ability of exposure to modify and individual’s functioning in the performance of work, his/her relationships with other people and his/her state of health.

RESULTS

The protocol describes the procedure to determine the origin of disease, which includes qualitative and quantitative criteria to assess psychosocial factors based on the estimation of their intensity, length of exposure and frequency of presentation, thus allowing for exact determination of the exposure of a worker to a given risk factor.

Validation of the protocol through application to a sample of cases allowed estimating its general sensitivity and specificity (83 and 71%, respectively) as well as specific for each of the targeted diseases.

The protocol includes an algorithm to establish whether response to stress is part of the causal network of a given disease. The process comprises seven consecutive steps described next, each one of which is documented in a specific format oriented by quality criteria that ensure homogeneity in the collection and assessment of information.

It should be observed that the possible participation of response to stress in the development of disease is usually determined by the assistant physician based on the information contained in medical records. When more than one disease are assessed for one and the same individual, the protocol is individually applied to each one of them.

STEP 1: VERIFY THE CLINICAL DIAGNOSIS
The professional group charged of assessing a case should verify whether diagnosis meets the following criteria:
• be issued by a general practitioner or a specialist;
• meets the diagnostic criteria established by internationally acknowledged scientific authorities relative to the targeted disease;
• be based on clinical and paraclinical evidences in agreement with the diagnostic criteria used as reference.

STEP 2: CONFIRM THAT THE INVESTIGATED CONDITION IS A STRESS-RELATED DISEASE
The assessing group must verify that the investigated condition(s) are included in the list of occupational diseases in vigor at the time of assessment; contrariwise, association must be documented based on scientific evidence.

STEP 3: ASSESS OCCUPATIONAL AND NON-OCCUPATIONAL RISK FACTORS
Documentation of psychosocial exposure must be oriented by the methodological triangulation criterion as strategy to control bias. Measurements must be performed using valid and reliable instruments to identify the worker’s
perceptions and obtain an "objective" evaluation of workers through expert psychosocial analysis of job positions.

STEP 4: WEIGH OCCUPATIONAL VERSUS NON-OCCUPATIONAL PSYCHOSOCIAL RISKS

Once occupational and non-occupational psychosocial factors were assessed in full detail, the corresponding averages are compared to estimate the predominance of ones over the others. The highest average is the criterion to start the process of determination of the origin of disease for a case, as follows:

- when non-occupational psychosocial factors predominate over occupational ones, the case is closed and the disease is defined as common;
- when occupational psychosocial factors are equal to or superior to the non-occupational ones, the investigation of the case continues to establish the origin (occupational or common) of disease.

STEP 5: ASSESS OTHER RISK FACTORS

Considering the multiple causality of disease, the protocol includes identification and assessment of other risk factors for each individual case to establish the relative weight of the identified psychosocial factor vis-à-vis hazards of different nature, based on a consensual definition established by groups of physicians from four specialties, to wit, cardiology, gastroenterology, neurology and psychiatry.

In this step, examiners should establish whether the worker involved in the case in point was exposed to common risk factors other than the identified occupational psychosocial one before the diagnosis of the disease under analysis.

In each and every case, identification of "common" risk factors is done through:

- review of medical records looking for information relevant to orient the identification of the risk factors under analysis;
- direct assessment of workers by clinical physicians, psychologists and psychiatrists, including the necessary psychodiagnostic tests.

STEP 6: USE DECISION-MAKING MATRICES

Decision-making matrices are used to establish the relative weight of each individual risk factor considered for a disease. These matrices were developed based on consensus among medical specialists relative to the consistency of findings, biological plausibility, precedence in time and latency period of such risk factors, including the occupational psychosocial ones.

STEP 7: COMPARE THE RELATIVE WEIGHT OF PSYCHOSOCIAL FACTORS TO THE CUTOFF POINT

Once the relative weight of common and occupational risk factors was calculated, the next step consists in making a decision on the origin of disease. The criterion used for this purpose is the relative weight of the identified psychosocial factor in the case. When the relative weight of the psychosocial risk factor is equal to or higher than the one indicated in the table of cutoff points for the disease under analysis, the conclusion will be that the latter is of occupational origin; when the relative weight is lower, the conclusion is that disease has a common origin.

DISCUSSION

The protocol developed to establish the origin (common or occupational) of stress-related diseases is based on the principle of the multiple causality of disease. For this reason, the method demands rigorous documentation of exposure to both occupational and non-occupational risk factors. The protocol is a mandatory reference for interdisciplinary staffs at Colombian social security institutions (Resolution no. 2,646, from 2008 — Ministry of Labor).

Practical application of the protocol and scientific advances in the understanding of the etiology of diseases led to a recent updating of the risk valuation matrices contained in the protocol, while the methods and algorithm remained unchanged.

The protocol allows assessment teams verify the clarity of diagnosis and use of the methodological triangulation criterion for identification and detailed description of the involved psychosocial factor, as well as to evaluate the latter based on objective criteria (length of exposure, frequency of presentation and intensity).

Estimation of the relative weight of occupational psychosocial risk factors vis-à-vis the non-occupational ones is one of the relevant reasons in decision making. This procedure involves the use of the valuation matrices for the various type of risk factors (psychosocial and others, such as previous
morbidity and presence of risk factors preceding psychosocial exposure). Clear documentation of the chronology of exposure to all possible risk factors for the analyzed disease is also crucial to make the right decision in each case.

Plotting risk valuation matrices based on criteria formulated by clinical experts, review of scientific evidence and estimation of the relative weigh of each risk factor based on causation criteria result in an objective tool that facilitates decision making by assessment staffs. It also allows dismissing estimations as to the origin of diseases exclusively based on technical expert criteria, whereby it represents an innovative technical tool for establishment of the origin of stress-related diseases.

For the tool to be continuously useful and relevant, it should be periodically updated in the light of scientific evidence, users should be trained, and application should be monitored to ensure its rigor and practicality.

**CONCLUSION**

The main advantages of the described protocol for users are: first, the possibility to assess both occupational and non-occupational aspects, as well as the worker’s clinical history in each case. Application is simple once the information on exposure to psychosocial risk factors and presence of other conditions affecting the health of workers was exhaustively documented. Finally, validation with different social actors and cases from practice allowed for adjustments and adaptations to ensure its practicality.

Following the development of the method, the next challenges are the training of the physicians and psychologists charged of the analysis of cases and the documentation of experiences of application of the protocol, which are crucial inputs to ensure its continuous improvement.

**REFERENCES**


Correspondence address: Gloria Helena Villalobos - Carrera 11, 78-22, ap. 403 - CEP: 110221 – Bogotá D. C. (Cundinamarca), Colombia – E-mail: gvillalo@javeriana.edu.co; villalobosfajard@javeriana.edu.co