

OCCUPATIONAL PSYCHOLOGY AND MEDICINE FOR WORK-RELATED STRESS PREVENTION: A PROTOCOL ADMINISTERED IN TIMES OF COVID-19 TO MONITOR PSYCHO-PHYSICAL SYMPTOMS

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Preventing stress is a primary goal for organizations. To achieve this goal in an effective way, integration between the three levels of intervention — primary, secondary, and tertiary — and between different professional figures is fundamental. A protocol (named OPhy-WRS protocol) has been implemented to allow occupational physicians (OPhys) and occupational psychologists (OPsys) to cooperate for secondary and tertiary prevention. The protocol aims to measure anxiety, emotional, and somatic symptoms, and sleep disorders, as well as behavioral responses that can be traced back to work-related stress. The protocol consists in a worksheet compiled by the OPhy as a result of a structured interview to be conducted during healthcare surveillance. Prior to the administration of the protocol, in the perspective of multidisciplinary cooperation, OPhys received training by OPsys. The physicians administered the protocol to 804 employees in a big Italian company. Five hundred eighty-six employees were interviewed before the pandemic outburst, the remaining 218 after March 2020: This condition created two subgroups (pre-pandemic and pandemic) that could be compared. The data obtained are useful to isolate clusters and workers that need further investigation and closer monitoring by occupational physicians. The comparison between the two groups shows a worsened scenario in terms of stress symptoms.

Keywords: Occupational physician; Occupational psychologist; Secondary prevention; Tertiary prevention; Symptoms of stress.

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Preventing stress has been a primary goal for organizations in recent years. The increased stress risk — related to faster work rhythms and more pressing requests — is turning prevention into a necessity, not a commodity. In Europe, about 22% of workers experience stress, which is the cause of 60% of lost working days (Milczarek et al., 2009). In Italy alone, the costs of organizational disruption are estimated at over five billion euros. The term “costs” relates to different categories: There are costs for the individual, in terms of physical, psychological, social, and relational health; costs for the organization, in terms of absences,

presenteeism, turnover, accidents, and injuries; hidden costs, connected to the impact on public relations and organizational reputation, possible disputes with employees, replacement personnel and deterioration of the organizational climate; distant costs, such as sickness or disability benefits.

While it is not easy to quantify the costs, they are estimated in the range of hundreds of billions of euros only in the western countries (Hassard et al., 2018) in terms of expenses needed to intervene on disease, manage situations of conflict and violence, and replace workers as well as lost income due to low productivity and time loss (Hassard et al., 2014).

Among the costs, hampered performance is particularly relevant because it decreases the overall organizational effectiveness. Stress is noted to have a negative effect on the physiological, psychological, and behavioral status of individuals (Gershon et al., 2009; Golparvar et al., 2012, Kivimäki et al., 2012; Madsen et al., 2017). Stress harms the motivation, morale, and perceived security of employees in the workplace (Darvishmotevali & Ali, 2020). Moreover, it has a negative relationship with job satisfaction that interferes with one's energy to work and results in lower performance levels (Musyoka et al., 2012).

Sentinel events and aspects of work content and context are among the most important factors for assessing work-related stress risk. Therefore, events such as absences and injuries, rhythms and loads of work commitment, conflicts, and turnover are indicators of high risk of work-related stress in an organization. The constant monitoring of sentinel events, as well as content and context factors, has the main objective of preventing negative consequences, including psycho-physical and behavioral strain, burnout, and various psychic pathologies of different magnitude and severity.

The necessity of preventing stress and intervening in existing disease situations has become even more pressing in time of the Covid-19 pandemic, which made stress risk even higher (Giorgi et al., 2020) and, contextually, hampered workers' performance (Saleem et al., 2021). The uncertainty and fear related to the pandemic and contagion on one side, and the complexity of remote working on the other have created a high-stress condition for managers and workers alike (De Carlo et al., 2022; Galanti et al., 2021; Prasad et al., 2020).

While the whole picture in terms of implications and strategies to adopt in the near future is not yet completely clear (Kniffin et al., 2021) and the organizational culture — possibly more important now than ever — is rapidly evolving (Daum & Maraist, 2021), the outcomes of the pandemic on health are already visible and tangible.

Anxiety, mental confusion, depression, and social deprivation are just some examples of the mental and psychological issues related to a negative working environment that have been enhanced by the pandemic (Brooks et al., 2020; Preti et al., 2020; Yıldırım & Arslan, 2020). Even burnout and post-traumatic stress disorder symptoms have increased in the pandemic years (Raudenská et al., 2020).

The pandemic has increased the impact of the working environment on people's health, where the alignment between people's values and those of the company is an element that strongly correlates with psychological well-being, and also with performance (Garavan & McGuire, 2010), where the positive management of people has a key role to building a safe and healthy environment (Berry, 2007), where the discrepancy between the stated actions and truly adopted values affects workers' perceptions and health levels (Wagner et al., 2009).

Among the activities that show the organization's values, are those related to employees' health, namely evaluation, monitoring, research, and intervention. Mental health is particularly relevant: The adoption of tools that allow to protect it, such as psychological help desks — including online ones — and the presence of different health professionals in the company represents a critical factor in the

well-being and social responsibility of business for the people inside but also for the population (Macassa et al., 2017).

Within this framework, this study presents a protocol that measures anxiety, emotional and somatic symptoms, and sleep disorders, as well as behavioral responses that can be traced back to work-related stress. The instrument was administered in a big Italian company before and during the Covid-19 pandemic.

PREVENTING STRESS: THE JURIDICAL FRAMEWORK IN EUROPE AND ITALY

Assessing and monitoring stress is not just desirable for organizations because it is a means of reducing costs and improving individual and collective performance, it is also an obligation. Health and safety actions geared toward work-related stress are widespread in most countries, especially in Europe (Jain et al., 2022).

While some countries chose a more specific and normative approach — see Sweden with the “Organisational and Social Work Environment” provisions which came into effect on March 31, 2016, which precisely norm requirements, goals, working hours, and victimization (European Commission, 2019) — others, such as the UK with the Management Standards for work-related stress introduced by the Health and Safety Executive, opted for a soft law approach, based on voluntary employer engagement and on producing guidelines and offering support in managing psychosocial risks (MacKay et al., 2004).

The relevance of normation in this area has probably never been so high: The Covid-19 pandemic has raised awareness of the impact of psychosocial risks on health and the stakeholders know it is a topic worthy of close attention (International Labour Organization, 2020) and a priority in many international agendas (European Agency for Safety and Health at Work, 2018; International Labour Organization, 2019; Schulte et al., 2020). Managing, monitoring, as well as legislating in relation to psychosocial risks is also becoming more complex as a consequence of technological developments and trends of remote work, the evolution of employment contracts, and increasing workforce diversity — conditions that pose challenges in terms of agile policy-making (Leka, 2021).

In Italy, the legislation on work-related stress dates back to 2008 (Legislative Decree 81/2008). There, work-related stress evaluation is to be divided into two steps, a preliminary one based on objective parameters and a further, in-depth, one based on subjective data. The subjective intervention is not mandatory unless the results of the preliminary assessment are negative and the situation does not change following an organizational intervention. Nevertheless, the Italian institutional stakeholders expressed clearly that assessing individual perceptions and monitoring them is highly desirable and organizations should do it (Inail, 2017).

In this framework, it is necessary for the employer — who can make use of the participation and collaboration of the actors indicated in the legislation, including the OPhy — to adopt the appropriate measures to prevent, eliminate, and reduce the sources of stress (European Agreement, October 8, 2004). An important mode of action relating to the prevention of work-related stress is the constant monitoring of work situations.

While the OPhy does not have a specific obligation of sanitary surveillance concerning work-related stress, because the legislation aims to reduce its possible causes instead of monitoring its symptoms, this professional figure can be involved in stress prevention and management activities identified by the national stakeholders (Inail, 2017) in many different ways:

- participating in the evaluation team for the identification of homogeneous groups to be observed as clusters for assessing and monitoring stress;
- providing the data of competence in relation to sentinel events;

- participating in the evaluation team for the compilation of observational checklists;
- applying any in-depth risk assessment tools (e.g., questionnaires) if in possession of adequate training;
- contributing to the identification of corrective measures, in particular for stressful organizational factors that are more related to biological aspects;
- participating in the management of individual cases that may emerge both as visits on request and in other ways, according to the procedures established by the company;
- participating in corporate health promotion initiatives with regard to stress-related diseases, with particular attention to gender and age differences, with a view to corporate social responsibility.

These are the same areas in which an OPsy can give a contribution, bringing different expertise and point of view. The Inail (2017) manual identifies the areas in which the psychologist can contribute to the prevention of and intervention on work-related stress: directly in assessing work-related stress risk, in collaboration with the figures designated for the assessment itself, in training evaluators, in planning and managing corrective actions following the results of the mandatory “preliminary assessment,” in the “in-depth” assessment — which is mandatory if the results of the preliminary one are not satisfactory. This last activity is the one in which psychologists are mostly in charge, given that assessing individual perceptions is a specific activity of the psychological profession.

One more possible activity for the psychologist in the field of work-related stress, this time with a precise reference to specific skills in the diagnostic field, is the evaluation of the cases of individual workers who, in the context of health surveillance, make a specific request to the OPhy for work-related stress risk assessment, pursuant to Article 41 of Legislative Decree 81/2008 and subsequent amendments. Finally, the psychologist can usefully contribute to the training and information activities for workers on the subject of work-related stress provided by Articles 36 and 37 of Legislative Decree 81/2008.

Overall, the juridical framework can seem fragmented because the doctrinal approaches can be, as shown above, different. Nevertheless, the relevance of preventing and managing stress emerges as ubiquitous, and OPhys and OPsys are recognized actors.

PREVENTING STRESS: THE INTEGRATION OF INTERVENTION LEVELS, PROFESSIONS, AND METHODS

The current context makes it necessary to use every available tool, in particular integrating different types of interventions, different professionalism as well as different methods. Research, data collection, prevention, and intervention must be constantly integrated and carried on with the perspective of overcoming barriers (Edwards, 2008).

Particularly important for effectiveness in preventing stress and promoting mental health is the integration between the three levels of intervention. Actions aimed to fight psychosocial risks are divided into primary, secondary, and tertiary (Kisling & Das, 2019).

From a medical perspective, the primary prevention approach focuses on preventing disease before it develops, secondary prevention aims to detect diseases early and intervene (during healthcare surveillance), and tertiary prevention is directed at managing established disease. Clinical monitoring, in this perspective, falls under secondary prevention (Jensen et al, 2010).

From a psychological perspective, primary interventions mainly involve interventions on the organizational structure, which can be constantly optimized by promoting ethics, authenticity, and positive management, hand in hand with the constant adaptation and better optimization of working procedures (Donaldson-Feilder et al., 2011). Secondary interventions correspond to training and development interventions, aimed to improve technical skills and coping strategies and therefore enhance the ability of workers to

manage work. Among tertiary interventions — which, compared to the other two can be defined as “therapeutic,” given that they focus on tackling existing symptoms of disease — are the interventions of the OPhy, “following a request for a medical examination by the worker” (Inail, 2017, p. 55), as well as in cases emerging in the context of periodic visits. Other examples of tertiary interventions are the various forms of professional support provided to help alleviate the symptoms of people in stressful conditions (De Carlo et al., 2020). Traditionally, organizations assigned secondary and tertiary interventions to medical doctors while primary interventions to different consultants, many of whom psychologists.

Today’s complex context makes it necessary to reach a deeper level of comprehension of the interdependent nature of the three levels of prevention in order to maximize the possible positive effect of each as well as enable different professions to contribute effectively and broadly in the organizations (Calvet et al., 2021). The optimization of tertiary prevention activities can be particularly effective in the behavioral field, to prevent situations and actions that are potentially harmful to individual health, in terms of psychological strain and exhaustion (Dijkstra et al., 2009), and to favor the pursuit of organizational well-being in every workplace.

With regard to the working methodology that can help organizations in defining primary, secondary, and tertiary interventions and implementing them, action-research is a strong candidate because it allows to integrate different knowledge bases, perspectives, and areas of intervention. Action-research is a transformative methodology used in the organizational field as a knowledge and improvement/change technique to promote and strengthen the critical success factors which characterize organizational and individual work, implementing and enhancing the positive ones and correcting and limiting the potentially negative ones (Lewin, 1946; Kaneklin et al., 2010).

It is an essentially transformative activity, conducted to listen to, understand, and involve organizational actors in promoting organizational well-being. Its distinctive character, as well as its great strength, is the maximum identification of the participants in the research itself, of which they become co-builders. The phases of knowledge and change follow each other circularly, influencing each other: Theoretical knowledge and that relating to action are oriented toward change and are integrated into the elaboration of information, strategies, and actions aimed to modify and resolve possible critical issues.

Managing work-related stress, therefore, means tapping into consultancy, training, diagnosis, clinical intervention, medicine, psychology, law, action-research, data management. This perspective — which can be a guide to professionals, namely OPhys and OPsys but also others such as consultants and lawyers, and which has to be internalized and carried on daily by middle and top managers — can be the framework for building a protective, productive, and health-generating working environment (Donaldson-Feilder et al., 2011).

THE OCCUPATIONAL PHYSICIAN AND THE OCCUPATIONAL PSYCHOLOGIST

Occupational Physician

Over the last decade, occupational medicine has undergone several profound changes that have brought to light some relevant questions, including the relationship with other occupational health and safety figures in the workplace.

The perspective in which occupational physicians are asked to work is very integrated (Zismer, 2011), in coordination with organizational figures such as managers, other health professionals such as occupational psychologists, and other professionals such as lawyers, consultants, or coaches.

In relation to the Italian context, in which the protocol was first introduced, the Legislative Decree 81/2008 has played a key role in the collocation of the OPhy who, up to the '90s, was essentially concerned with verifying the suitability of workers for the performance of the organizational task, but is now actively involved in assessing risk, planning (individual and collective) protection measures, and carrying out health promotion/training/information programs for workers (Calicchia et al., 2019).

The Legislative Decree 81/2008 tackled different risks, some of them “traditionally” domain of occupational medicine such as physical, chemical, and biological hazards, some relatively new such as stress. In this perspective, the very nature of the medical profession in organizations had to evolve and become oriented toward a more widespread concept of health instead of a very specific set of activities to carry out to be compliant with the norms (Facci, 2021; Franco, 2006; Frimat, 2017). In this perspective, the OPhy assumes a key role in corporate social responsibility (Sugita & Miyakawa, 2016), which is particularly relevant in a period characterized by uncertainty, such as in times of Covid-19, in spreading the perception of care and company effort among workers (Papaleo & De Rosa, 2022). In this perspective, the OPhy can be a “global consultant” for organizations in all matters of health (Apostoli & Pugliese, 2010).

However, in many organizations, the role of the OPhy is still too often not sufficiently involved in the definition of company policies on prevention and is, instead, confined to simply carrying out health checks (Mosconi, Santini, et al., 2014), potentially referring workers to mental health specialists and, eventually, to express a judgment on the worker's suitability to a specific task, with possible prescriptions or limitations. The centrality of the OPhy in safeguarding workers' health has, instead, become apparent with the Covid-19 emergency and will have to be considered by organizations in the future (Spagnolo et al., 2021). At the same time, work conditions safeguarding doctors' health are to be guaranteed, so that they may best operate (Eisch et al., 2022).

To date, many work activities expose workers to risks of various kinds (psychological, social, and linked to work discomfort). The different facets of health and safety issues, therefore, require multidisciplinary skills in all phases of risk assessment. This involves the integration between the role of the OPhy and other professional figures, such as the OPsy (Mosconi, Bartolucci, et al., 2014; Santantonio et al., 2008).

As shown above, the Legislative Decree 81/2008 and, more recently, the Legislative Decree 106/2009, have brought the risk of work-related stress to the attention of the OPhy. The two decrees refer to the European Agreement on Stress of 2004, which defined stress as a process that takes place when organizational demands exceed the management capacity and resources of the worker. However, the ability to meet the demands depends on the assessment of the worker, whose individuality must always be taken into consideration (Buselli & Cristaudo, 2009). In this perspective, the OPhy is, also according to the norms, a pivotal figure for general health, prevention, information, and mental health (Isolani, 2011). The role of the OPhy, therefore, is becoming more and more central, especially within high-reliability organizations (HRO), that is, those realities that have developed methods of action that make it possible to manage the unexpected.

Occupational Psychologist

Following the most recent evolutions of the law in relation to health and safety in organizations, as well as the great increase in interest for mental health that has characterized the pandemic period (Moreno et al., 2020), the role of the occupational psychologist is becoming more and more relevant for organizations (Kärkkäinen et al., 2019). The present condition is one in the face of which psychologists must be ready, especially considering the relevance of their knowledge in protecting workers' health and safety during this period (Graupner, 2021).

In this perspective, the figure of the OPsy assumes great importance in supporting the activity of the OPhy, intervening in the prevention of psychosocial risks related to the work activity of an individual. The psychologist's work concerns the identification of the strengths and weaknesses of an organizational system, the dissemination of knowledge of these elements to individual workers, and a general improvement of organizational processes in terms of efficiency and effectiveness. In addition, the activities of the OPsy also include constructing detection tools, training and professional updating staff, designing and evaluating safety interventions in organizational contexts (Barbieri et al., 2012).

In relation to the OPhy, the OPsy can play two roles. The first one is direct — assessing, monitoring, and treating mental health issues in organizations. The second is in support of the physician, through training in mental health detection and intervention and through the creation of instruments that the physician can use in addition to the ones used to assess other types of risks and diseases (Rothermund et al., 2018). This type of integration follows the general trend in mental disease prevention and intervention (Sy et al., 2019) and brings it into the organizational context.

With regard to the Italian context, psychologists are a chartered profession, recognized in 1989 with the Legislative Decree 56/1989. The profession was born as a humanistic one and became fully recognized as a healthcare one in 2018 with the Legislative Decree 3/2018. The concept of OPsy is not legally recognized, given that the only specialization available for psychologists, following the integrations of the Legislative Decree 56/1989 introduced in 1992, is psychotherapy. Nevertheless, training in occupational psychology is common and, among the nearly 110,000 psychologists operating in Italy, many thousands find their primary source of revenue in occupational psychology (ENPAP, 2020).

The role of the OPsy today is complex and relevant: managing first-hand interventions and support activities with other professionals, among whom the OPhy, in a rapidly evolving legal context and a field, that of mental health, which is in the limelight, is not an easy task. In this perspective, structured and semi-structured instruments can help them both in their interventions and in supporting others.

THE OPHY-WRS PROTOCOL

Instrument

Integration between levels of intervention and professions is fundamental. In this perspective, obtaining and managing data by making the best use of different areas of expertise can be an effective starting point.

In order to facilitate the occupational physician's task of collecting symptoms of disease related to stress to allow secondary and tertiary interventions to be programmed and carried out in organizations, as well as to help the collaboration between OPhy and OPsy, a protocol was designed by a multidisciplinary team of Italian occupational psychologists and physicians. The protocol design phase involved some meetings generating a constructive dialog among different professionals. As a result, the protocol was perfected through rephrasing or selecting particularly meaningful items. The results of the first survey were shared and discussed collectively, in the action-research perspective. The final protocol was named OPhy-WRS. It was based on an anamnestic tool for OPhys who, during their routine consultations with workers, may assess elements related to stress and possible emerging symptoms.

The protocol was adapted for the administration by the OPhy (hetero-evaluation) — according to specific organizational needs and the principles of high-reliability companies — from Form 4 of the V.I.S. method (Sarto et al., 2009, validated by Falco, Girardi, Marcuzzo, et al., 2013; see also Falco, Girardi,

Parmiani, et al., 2013), from a briefer scale already adapted for hetero-evaluation (Falco et al., 2012), and from the self-report scales present in the Q_u-Bo Test (De Carlo et al., 2008).

The OPhy-WRS protocol consists of: instructions for the occupational physician; a socio-anagraphic form (gender, age, homogeneous group identified when assessing work-related stress risk); a list of 50 items to evaluate anxiety, emotional, and somatic symptoms, and sleep disorders; 12 items to evaluate behavioral responses; instructions for data evaluation; informed consent form.

Anxiety, emotional, and somatic symptoms, and sleep disorders are evaluated through 50 items on the basis of the frequency of occurrence in the previous six months, on a scale from 1 = *never* to 6 = *daily*. Anxiety symptoms, aimed to assess those effects related to anxious states, are measured through 14 items such as: “Do you feel dry in the mouth?” “Do you perceive palpitations and tachycardia, inexplicably?” “Do you feel restless, worried, agitated?.” Sleep disorders are assessed through six items such as: “Do you need a long time to fall asleep?” “Do you wake up feeling already exhausted?.” Emotional symptoms are assessed through 15 items such as: “Do you think of your work as useless?” “Do you feel sluggish, weakened?” “Do you feel you do not have the strength to go to work?.” Somatic symptoms are assessed through 15 items such as “Do you experience a sense of vomiting?” “Do you experience a burning sensation in the stomach?” “Do you experience a lack of appetite?.” Behavioral responses are assessed through 12 items, with dichotomous or multiple-choice response scales. Sample items are: “Have you ever thought about harming yourself?” “Do you feel significantly isolated from family/friends?.”

The protocol is administered by the OPhy, who lists the possible symptoms and clues that may be associated with any discomfort/malaise, marking the answer that, according to his/her evaluation, is most relevant, based on the subjective opinion of the worker. If he/she deems it appropriate, the OPhy can provide some further explanation or insight, without, however, compromising the standardized nature of the instrument.

An average score equal to or greater than 4 allows to identify workers who need closer monitoring by the OPhy. Moreover, the protocol involves the possibility of isolating critical situations when a respondent gives a score of 3 (*some times in a month*) or more in at least four “critical items” simultaneously. The critical items are in the areas of anxiety and emotional symptoms and behavioral responses. Samples of critical items are: “Do you fear dying or losing your mind?” (anxiety symptoms), “Do you feel you don’t have the strength to go to work?” (emotional symptoms), “Do you happen to drink a lot?” (behavioral responses). These items represent the most severe reactions to stress, therefore they are a useful indicator of critical situations. This feature of the protocol allows to identify conditions of particular risk that should be monitored carefully by the OPhy. To better safeguard employees, the protocol allows to identify participants with an average score equal to or greater than 1.5, which is the score identified by the team of OPhys, on the basis of the evidence obtained from their professional experience and from the comparison at the scheduled meetings, as the limit of the “safe” area, following the requests of the target organization and the need of maximum cautiousness due to the legal implication of health monitoring. In this article, only the data equal to or above 1.5 are commented (which naturally also include those equal to or above 4), since below this value the frequency of experiencing symptoms/disorders is zero or very rare.

Participants and Procedure

The OPhy-WRS protocol was administered by occupational physicians to 804 employees in a big Italian HRO. The employees worked in different areas of Italy, from north to south, because the organization is active across the country. The majority of the sample is male (93.4%), 6.6% female. Twenty-three percent is below 35 years old, 49.4% between 35 and 50, 27.7% over 50.

Timewise, 586 workers were administered the protocol before the outburst of the Covid-19 pandemic, the remaining 218 respondents were administered it after the first lockdown in Italy (March 8, 2020). This condition created two sub-groups in very different situations: pre-pandemic (Group 1) and pandemic (Group 2). Group 1 consists of 93.8% men and 6.2% women with 22.1% below 35 years old, 52.5% between 35 and 50, and 25.4% over 50. Group 2 consists of 92.6% men and 7.4% women with 25.2% below 35 years old, 41.1% between 35 and 50, and 33.7% over 50. While the variables monitored through the protocol by the OPhys were the same, their meaning for the workers could be different due to the radical change in lifestyle and job demands. The existence of these two distinct groups, albeit not formally recognized, has been acknowledged by occupational physicians and by the company and comparisons have been made between them.

Because the administration of the protocol is oral, and the OPhy is in charge of transferring the answers obtained into a grid, training is extremely important to obtain correct scores and to homogenize the performance of the different OPhys. Therefore, an intensive training session carried out by OPsys took place before starting the program, creating a concrete moment of cooperation between occupational physicians and psychologists.

The protocol took into consideration the following dimensions:

- the percentage of workers who, on average, answer with a value of 4 or above;
- the percentage of workers who, on average, answer with a value of 1.5 or above;
- the distribution in frequency and percentage, and the average scores;
- the analysis of the critical situations, considering the scores of the critical items of 3 or above, in at least four items identified as simultaneously critical and identified with (^).

The occupational physicians administered the protocol within a wider set of activities aimed to prevent stress, also from a corporate social responsibility perspective. Consequently, the administration of the protocol was simultaneous to an information campaign.

The protocol, which focused on secondary and tertiary prevention and intervention, was, therefore, a part of a broader program that integrated primary, secondary, and tertiary interventions as well as different professions. This way the organization managed to carry out an innovative and complex intervention, aimed to protect workers' health and safety.

RESULTS

In the present study, to analyze the factor structure of the OPhy-WRS protocol, we used a confirmatory approach. In particular, we carried out a confirmatory factor analysis (CFA). The model was fitted in LISREL 8.80 (Jöreskog & Sörbom, 2006) using robust unweighted least squares (ULS) estimation for ordinal variables. To evaluate the goodness-of-fit of the model, several indices were taken into consideration (Schermetleh-Engel et al., 2003). The χ^2 statistic shows a good fit to the data if it is non-significant. However, it is sensitive to sample size, therefore we considered additional fit indices: the comparative fit index (CFI) and the nonnormed fit index (NNFI), both associated with good fit if the values are $\geq .97$; the root-mean-square error of approximation (RMSEA), whose value $\leq .05$ can be considered as a good fit; and the standardized root-mean-square residual (SRMR), whose value $\leq .10$ can be considered acceptable. Afterward, to evaluate construct reliability and convergent validity, we calculated the composite reliability (ρ) and the average variance extracted (AVE) indices, whose values

$\geq .70$ and $\geq .50$, respectively, are considered satisfactory (Fornell & Larcker, 1981; see also Bagozzi & Yi, 2012; Kline, 2016).

The model was tested using items as indicators and four factors were modeled: anxiety, emotional, and somatic symptoms, and sleep disorders. Fit indices suggest a good fit to the data, $\chi^2(1121) = 14278.16$, $p \cong .0$; CFI = .99; NNFI = .99; RMSEA = .041; SRMR = .065. Regarding construct reliability and convergent validity evaluation, the indices considered show satisfactory values (Table 1).

TABLE 1
 N items, alpha coefficients, ρ , and AVE for all the scales used

	N items	α	ρ	AVE
Anxiety symptoms	14	.90	.94	.54
Sleep disorders	6	.86	.89	.58
Emotional symptoms	15	.92	.95	.57
Somatic symptoms	15	.82	.93	.48

Note. ρ = composite reliability; AVE = average variance extracted.

It should be noted that 100% of the OPhys used the protocol. Occupational physicians introduced the administration of the OPhy-WRS protocol in their visits during healthcare surveillance and workers answered with regard to work-related stress symptoms. This result is relevant considering the wide sample taken into consideration, recruited during the one-year-long application of the protocol.

Taking into consideration the whole sample, with no distinction between pre-pandemic and pandemic administration, less than 1.5% of workers was above the threshold value that limits the safe area (values of 4 or above) with regard to anxiety symptoms (1.4%) and emotional symptoms (1%); considering a threshold value above or equal to 1.5, the percentage is 39.5 for anxiety symptoms and 22.6 for emotional symptoms. Concerning sleep disorders, 8% of the workers were above the attention level (values of 4 or above); considering a threshold value above or equal to 1.5, the percentage is 53.1. Concerning somatic symptoms, the percentage of workers above the limit of the safe area (values of 4 or above) was 0.9%; considering a threshold value above or equal to 1.5, the percentage was 26.3 (Figure 1).

With regard to behavioral responses, 23% of workers informed the OPhy of some organic pathologies, 1% of workers declared that they considered self-harming behaviors, and 2.5% of workers declared some form of social isolation. The clusterization of workers that scored values higher than 3 in at least four critical items led to the identification of 53 workers who needed further investigation and a higher level of monitoring by the OPhy. In the comparison between the two groups — pre-pandemic and pandemic — χ^2 test shows some statistically significant differences. Specifically, in the pandemic group (Group 2) the percentage of workers that scored 1.5 or above in the areas of anxiety symptoms ($\chi^2 = 4.920$, $df = 1$, $p = .027$) and sleep disorders ($\chi^2 = 8.201$, $df = 1$, $p = .004$) is significantly higher (Table 2). In general, the trend in the pandemic group is toward worse values.

A comparison between the two groups (pre-pandemic and pandemic) was made also by splitting the sample on the basis of gender and age. With regard to gender, men of Group 2 (pandemic) show significantly higher values of anxiety ($\chi^2 = 5.593$, $df = 1$, $p = .018$) and emotional ($\chi^2 = 4.698$, $df = 1$, $p = .030$) symptoms, as well as sleep disorders ($\chi^2 = 10.261$, $df = 1$, $p = .001$).

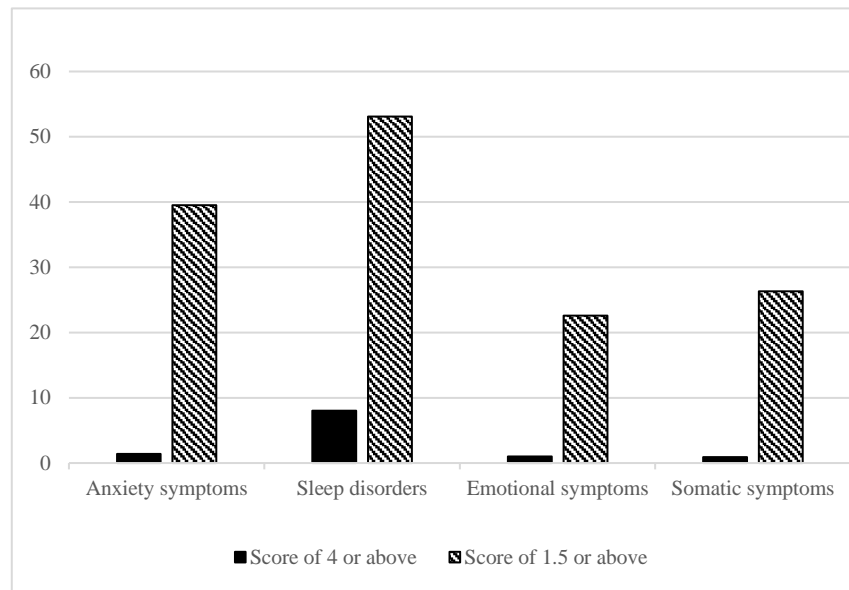


FIGURE 1
Percentage of workers in relation to the two threshold values

TABLE 2
Difference between pre-pandemic (Group 1) and pandemic (Group 2)

Average scores	Group 1 <i>M</i> and distribution	Group 2 <i>M</i> and distribution	χ^2
Anxiety symptoms	1.5	1.6	
≥ 1.5	37.2%	45.8%	4.920*
Sleep disorders	1.8	2.0	
≥ 1.5	50.0%	61.4%	8.201**
Emotional symptoms	1.3	1.4	
≥ 1.5	21.2%	26.1%	2.213
Somatic symptoms	1.4	1.4	
≥ 1.5	25.3%	28.9%	1.032

Note. *M* = average of the four symptoms/disorders per group; distribution = percentage of workers who, on average, answered with a value ≥ 1.5.

* $p < .05$, ** $p < .01$.

With regard to the age of participants, only in that between 35 and 50 years are there significantly higher distributions in Group 2 in the dimensions of anxiety ($\chi^2 = 8.628$, $df = 1$, $p = .003$) and somatic ($\chi^2 = 4.540$, $df = 1$, $p = .033$) symptoms as well as sleep disorders ($\chi^2 = 9.744$, $df = 1$, $p = .002$) (Table 3).

TABLE 3
Differences between Group 1 (pre-pandemic) and Group 2 (pandemic)
in relation to gender (men) and age (35-50)

Ave- rage scores		Anxiety symptoms			Sleep disorders			Emotional symptoms			Somatic symptoms		
		Group 1	Group 2	χ^2	Group 1	Group 2	χ^2	Group 1	Group 2	χ^2	Group 1	Group 2	χ^2
Men	≥ 1.5	34.9%	44.4%	5.593*	48.6%	61.9%	10.261***	18.3%	25.5%	4.698*	22.9%	27.0%	1.309
Age 35-50	≥ 1.5	29.8%	46.6%	8.628**	42.5%	61.4%	9.744**	16.3%	25.0%	3.404	23.8%	35.2%	4.540*

* $p < .05$, ** $p < .01$, *** $p < .001$.

DISCUSSION

The OPhy-WRS protocol proved to be a useful tool for integrating psychological dimensions in the occupational physician's work. The fact that it was successfully administered in a big company and to a wide number of employees indicates that its characteristics of simplicity and agility make it usable in real-life contexts. The results of the administration have a high organizational value because they can be used in compliance with the national laws, as well as to identify areas and workers that need specific attention and to plan actions for improving working conditions.

With regard to the data obtained through the protocol, secondary and tertiary information is extremely relevant in terms of monitoring work-related stress risk and intervening in it, but it is rarely shared between physicians, psychologists, and the organization. The reason for that is inherent in the nature of physician visits, which are confidential and cover a wide range of health issues. Physicians might see symptoms of disease that could be traced back to work-related stress, but these symptoms could be camouflaged among others and the physician may not have the training or the experience to recognize them and their potential cause. So, the protocol is a useful instrument because it focuses the physician's attention on work-related stress for a certain amount of time during the visit and the information obtained is shared in a multi-professional context. Furthermore, the protocol requires training, which is a fundamental element of cooperation: psychologists and physicians share knowledge and information long before the administration of the protocol to workers.

The data show a generally good organizational condition and allow to identify clusters of employees and individual employees to be further investigated. They also show a worsened condition in some symptomatic areas after the pandemic outburst. These data are in line with the literature.

This study has some limitations. There is no comparison between the data and other validated scales, nor validated cut-off values, and the comparison between groups was not planned at the beginning of the protocol administration. Furthermore, the worsened conditions in the pandemic group could be due to the modification of the working environment and condition, but also to some individual psycho-social or physical effects due to the pandemic itself.

Nevertheless, the relevance of the study is not to be found mainly in the results, but in the practice of collaboration between OPhys and OPsys, which proved to be possible and effective in training, data collection, data sharing, and data interpretation, while complying with anonymity.

Based on the results obtained and the critical issues encountered and shared among competent doctors, psychologists, and the organization, the creation of a corporate platform accessible to all OPhys was identified as a possible future development. This platform will allow the administration of the questionnaire

in a more standardized form and active communication between the different OPhys, currently only possible during specific meetings. The digitization of the protocol will make data analysis easier, allowing for the drafting of quarterly reports for the organization. In case of workers needing special attention, a communication will be sent directly to the OPhy indicating the homogeneous group to which the worker who needs special attention belongs (respecting anonymity). OPhys will have the opportunity to comment on reports or communications, giving rise to constructive discussions. In addition, the use of the protocol over time by OPhys will allow the definition of stable cut-off indices. Tertiary intervention, furthermore, is not commonly taken into account by occupational psychology, because it is considered a field in which physicians operate alone. This study and the OPhy-WRS protocol, therefore, can be a starting point for professional and scientific integration between psychology and medicine in tertiary prevention and intervention.

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