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## Original Article

## How Much Does My Work Affect My Health? The Relationships between Working Conditions and Health in an Italian Survey



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## ABSTRACT

**Background:** Working condition surveys are widely recognized as useful tools for monitoring the quality of working life and the improvements introduced by health and safety policy frameworks at the European and national level. The Italian Workers' Compensation Authority carried out a national survey (Insula) to investigate the employer's perceptions related to working conditions and their impact on health.

**Methods:** The present study is based on the data collected from the Italian survey on health and safety at work (INSULA) conducted on a representative sample of the Italian workforce ( $n = 8,000$ ). This focuses on the relationship between psychosocial risk factors and self-reported health using a set of logistic and linear regression models.

**Results:** Working conditions such as managerial support, job satisfaction, and role act as protective factors on mental and physical health. On the contrary, workers' risk perceptions related to personal exposure to occupational safety and health risks, concern about health conditions, and work-related stress risk exposure determine a poorer state of health.

**Conclusions:** This study highlights the link between working conditions and self-report health, and this aims to provide a contribution in the field of health at work. Findings show that working conditions must be object of specific preventive measures to improve the workers' health and well-being.

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## 1. Introduction

Working conditions have changed radically in the last few decades. Globalization, new technologies, and demographic and socioeconomic changes [1,2] have resulted in an increase of more demanding cognitive and emotional jobs. In such scenarios, work environments still play a decisive role in influencing the psychological and physical health of workers [3]. The scale and speed of such changes have led to the emergence of new risks alongside the traditional risk factors for workers' health and safety, requiring the redefinition of research priorities over time, to offer adequate solutions and interventions for mitigating the negative impacts of working conditions on workers' health [4,5].

Over the years, new approaches on monitoring working conditions have been consolidated in occupational safety and health (OSH) alongside the traditional standardised indicators, as accidents and occupational diseases. The large supranational surveys

on working conditions conducted by the main European research institutes [6–8] have long been one of the richest and most comprehensive sources of information. Such surveys allow the comparison of the quality of work across countries, including both socioeconomic and organizational aspects as emerging risks for OSH.

Thanks to the analysis of multiple variables on wide samples of the working population, the added value is the monitoring on the link between work and health through three main categories of data [9]. The first examines the effects of the physical aspects of the working environment (e.g. ergonomic design, exposure to workplace hazards, and so on) on the prevalence of occupational diseases and injuries at work. Through the second category, the role of the objective and social aspects of work (e.g. working hours, social prestige and so on) is examined in relation to the quality of work. The last category—distinctive of occupational health psychology—examines how the psychosocial risk factors

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(e.g. decision-making latitude, job demands, role, relationships, and so on) improve or undermine the workers' health [10]. This third category is currently an established pillar in working conditions surveys [8] given the huge evidence of the potential impact of work organization on the quality of work and its direct effect on workers' health [11,12].

Psychosocial risk factors concern the way in which the work is designed, organized, and managed, as well as the relative social context in which work takes place [13], and can have serious effects on workers' health for their link with work-related stress (WRS). Psychosocial risk factors can lead to the deterioration of mental health and also contribute to the incidence of cardiovascular disease and musculoskeletal disorders [14–16]. Therefore, psychosocial risk factors are included in recent years in working condition surveys alongside environmental aspects and work attitudes [17–21].

Among the national surveys on working conditions, INSULA [22], conducted by the Italian Workers' Compensation Authority, represents the main monitoring system on quality of work and health and safety in the workplaces in Italy. INSULA provides useful data for the identification of prevention strategies tailored on the needs of the Italian OSH system, according to the national regulatory framework (Legislative Decree No. 81/2008) and the main changes of world of work.

In line with previous research studies [23–26], this study aimed to examine the link between working conditions and worker's health through secondary analyses of the data collected in the first wave of INSULA survey to determine which aspects of the work can have a detrimental effect on workers' health, both in terms of physical and mental diseases.

## 2. Materials and methods

INSULA survey was conducted between July and December 2013 by Italian Workers' Compensation Authority on a sample of 8,000 Italian workers.<sup>1</sup> Data were collected by expert interviewers through computer-assisted telephone interviews. Participation in the survey was voluntary and completely anonymous; each participant was informed about the contents, methods, and objectives of the INSULA survey, and they endorsed an informed consent form read by the interviewer before they were surveyed. The questionnaire focuses on aspects related to health and safety at workplace in Italy, including working conditions, health status, role of OSH figures in prevention, and compliance to the OSH national regulatory framework. The sample was stratified from a universe of 17,000 workers using the 2012 national Labour Force Survey. Main criteria of selection were Italian workers whose employment is regulated by the OSH national legal framework. The sample was stratified based on sociodemographic and occupational variables, namely region of residence, gender, age, type of contract, and statistical classification of economic activities of the organizations. The specific measures about working conditions, risk perception, and self-reported health used in this study are presented in the following (Appendix A).

Different self-report health measures were included in this study. First, we used a list of thirteen specific health disorders which respondents have or have not suffered in the twelve months preceding the survey. Moreover, we included a validated measure of the "General health" [6]. We also examined a measure of work

**Table 1**  
Sociodemographic of study's sample (n = 8,000) by gender

	Male (n = 4,314, 54%)		Female (n = 3,686, 46%)	
	n	%	n	%
<b>Age</b>				
16–24	243	4.9%	182	4.5%
25–34	897	20.0%	752	18.5%
35–44	1,328	31.8%	1,163	32.4%
45–54	1,256	29.6%	1,105	30.8%
55–64	581	13.7%	493	13.8%
Missing	0	0.0%	0	0.0%
<b>Job seniority</b>				
Less than one year	288	6.5%	249	6.5%
1–5 years	882	20.4%	827	21.9%
6–10 years	871	20.6%	717	19.1%
11–15 years	670	15.7%	604	16.7%
Over 15 years	1,594	36.9%	1,297	35.7%
Missing	0	0.0%	1	0.0%
<b>Firm size</b>				
1–9 employees	614	14.3%	637	17.2%
10–49 employees	868	20.2%	698	18.9%
50–249 employees	898	20.9%	816	22.1%
Over 250 employees	1,779	41.3%	1,358	36.8%
Missing	146	3.4%	186	5.0%

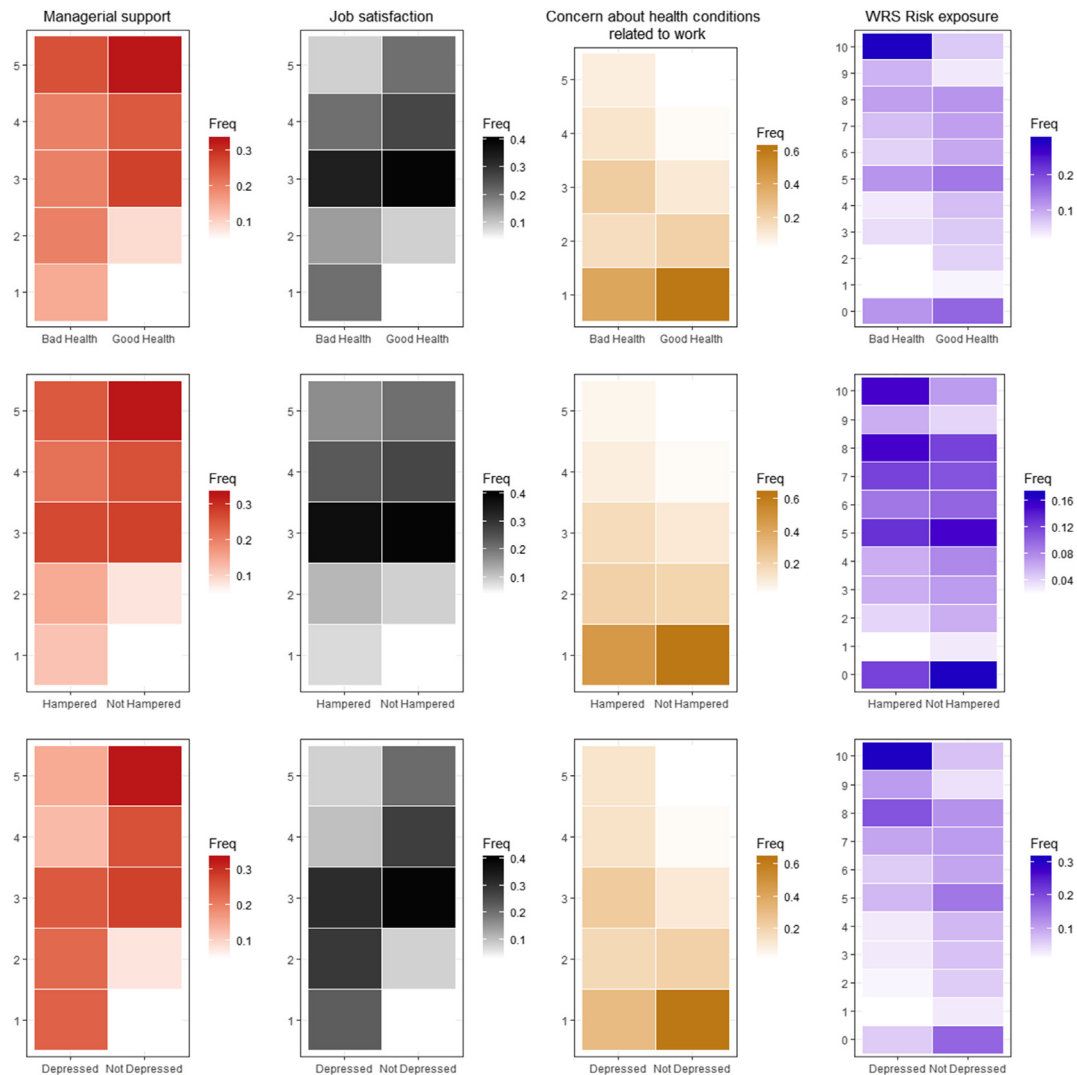
impediments due to the state of health [7], named "Limitations in the work activity caused by illness". As a measure of mental health, we included "Depressive symptoms" through the Patient Health Questionnaire-2 [27,28] including two statements: "Little interest or pleasure in doing things" and "Feeling down or sad or desperate" with the following answer options: "never", "some days", "more than half the time", "almost every day". Based on previous studies [29], the univocal evaluation is based on the two numerical values (0 is "never", 3 is "almost every day") assigned to the answers. The value 3 is considered as the cutoff value of depressive symptoms [27,28].

The independent variables considered are related to the employees' perceptions of working conditions and OSH risks, concerns about health at work, and perceptions of the WRS risk exposure. The last one was included since it was found to be the risk to which workers feel most exposed [22]. As a measure of "Working conditions", we included seven items from the Italian version of the Management Standards Indicator Tool [41]. Such items concern the work content and context factors that are attributable to psychosocial risks in the workplaces [13], in

**Table 2**  
Self-report health disorders in the last 12 months

	Not suffered	Suffered	Suffered (%)
Back pain	3,875	4,123	51.6%
Shoulder, neck, and upper limb pain	4,262	3,732	46.7%
General fatigue	4,526	3,472	43.4%
Headache, visual impairment	4,619	3,378	42.2%
Muscle pain in the lower limbs	5,655	2,344	29.3%
Insomnia	5,984	2,012	25.2%
Stomach ache	6,018	1,972	24.7%
Skin disorders	7,084	915	11.4%
Respiratory difficulties	7,385	611	7.6%
Hearing loss	7,402	595	7.4%
Cardiovascular disorders	7,421	571	7.1%
Wounds	7,514	482	6.0%

<sup>1</sup> The survey was conducted in collaboration with TNS Italia, which performed the interviews, and with the Italian National Institute of Statistics (ISTAT), which helped calculate the quotas useful for defining a representative sample of the workforce in Italy.



**Fig. 1.** Frequencies of Managerial support, Job satisfaction, Concern about health conditions related to work, WRS risk exposure by General health, Limitations in the work activity caused by illness, and Depressive symptoms. More intense colors correspond to higher frequencies according to the legend reported on the right side of each graphic. (WRS, work-related stress.)

particular the following: demands (workload), control (worker decision latitude), support (peer and managerial support) relationships, (bullying at work), role (clear organizational goals and objectives), and change (communication about organizational changes) [31–35]. We also included single items for “Job satisfaction” and “Organizational commitment” as measures of workers’ attitudes toward their job which showed having a good reliability in previous studies [36,37]. To assess workers’ risk perception, two indicators were included according to the literature [38,39]: one investigating the perceptions of “Personal exposure to OSH risks” and the second one measuring the “Concern about health conditions related to work”. Finally, we considered the perceptions of “Exposure to WRS risk” (“Please indicate the extent to which you feel exposed to the risk of work-related stress, scored from 0 to 10, where 0 means not at all and 10 completely exposed”). The control variables included in the study’s models are gender, age, firm size, and job seniority (Table 1).

Because we have analyzed variables with discrete responses (some variables used a 5-step Likert scale and others a 10-point response scale), the use of non-parametric tests was considered most reliable, given that it is impossible to formulate hypotheses on data distribution [40,41]. In this regard, the Kruskal–Wallis test confirms the existence of significant differences between the sample groups by health conditions, health-related work impediments, and depressive symptoms ( $p < 0.001$ ).

All analyses were conducted using SPSS, v. 25.0 software (SPSS, Chicago, IL, USA).

### 3. Results

#### 3.1. Descriptive statistics

Table 1 describes the sociodemographic and occupational characteristics of the 8,000 workers by gender. Table 2 summarises the responses on health disorders reported by interviewees. More than 40% suffer from at least one disorder, in particular about 50%

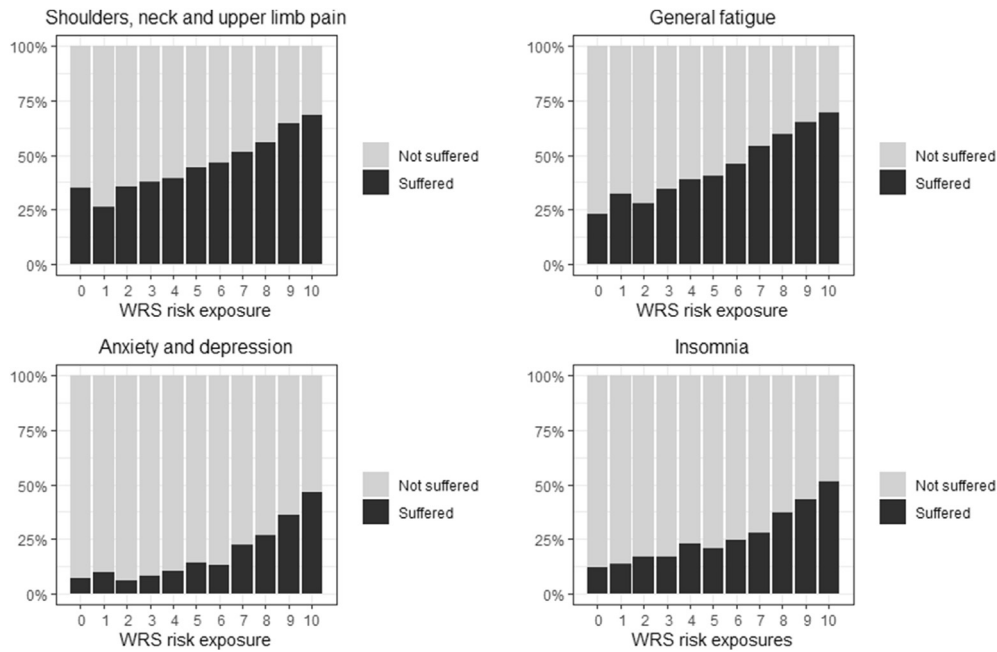


Fig. 2. Self-report health disorders and WRS risk exposure. WRS, work-related stress.

suffer from back pain, the most common disorder reported. Fig. 1 shows the frequencies of four independent variables (Managerial support, Job satisfaction, Concern about health conditions related to work, WRS risk exposure), differentiated according to the three measures of “Self-report health”, namely “General health”, “Limitations in the work activity caused by illness”, and “Depressive symptoms”. As regard to “Managerial support”, having a good general health, none limitations, and the absence of depressive symptoms are associated to a good managerial support. Similar findings were found for “Job satisfaction” in particular for workers with depressive symptoms. The variable “Concern about health conditions related to work” also offers a particularly critical scenario for those who declare to suffer depressive symptoms: 63% of workers without depressive symptoms declared they had no fear of getting ill because of their job, while only 31% of those suffering depressive symptoms selected this answer. Finally, for “WRS risk exposure”, there is a clear association with all the self-report health measure, in particular 31% of workers with depressive symptoms and only 7% without symptoms declare to be exposed to the WRS risk. Fig. 2 also shows the response rates for some health disorders in relation to the level of “WRS risk exposure”. As the perceived “WRS risk exposure” increases, the percentage of workers with one of the disorders considered increases too.

3.2. Correlation and logistic models

Table 3 shows the bivariate correlations between the independent variables relating to “Working conditions”, “Risk perception”, and “WRS risk exposure”. This last variable is inversely and moderately correlated with various aspects relating to “Working conditions”. Feeling exposed to WRS risk is associated with the persistence of critical issues in “Change” and “Managerial support”. Furthermore, a direct association emerges between “WRS risk exposure”, “Personal exposure to OSH risks”, and “Concern about health conditions related to work”. “Personal exposure to OSH risks” shows only moderate association with “Relationships”, while “Concern about health conditions related to work” reports moderate associations in particular with “Relationships”, “Change”, “Organizational commitment”, and “Job satisfaction”.

Table 3 Correlations between Working conditions, Risk perception, and WRS risk exposure

	Personal exposure to OSH risks	Concern about health conditions related to work	WRS risk exposure
Demands	-0.121**	-0.156**	-0.173**
Control	-0.159**	-0.204**	-0.217**
Peer support	-0.110**	-0.166**	-0.210**
Managerial support	-0.141**	-0.213**	-0.239**
Role	-0.145**	-0.199**	-0.175**
Relationships	-0.222**	-0.233**	-0.220**
Change	-0.180**	-0.229**	-0.257**
Organizational commitment	-0.177**	-0.246**	-0.246**
Job satisfaction	-0.135**	-0.236**	-0.275**
WRS risk exposure	0.244**	0.361**	1

\*\*Statistically significant at the 0.01 level. WRS, work-related stress.

Table 4 shows the three logistic models. Most of the “Working conditions” show an odds ratio (Exp(β)) less than one, meaning that having better working conditions is a protective factor for the three variables considered health outcome. On the other hand, “Personal exposure to OSH risks” and “to WRS risk” are significantly greater than one that means they increase the probability of negative perceptions of personal health conditions.

Referring to the first model with “General health” as a dependent variable, “Peer support”, “Job satisfaction”, and “Concern about health conditions related to work” are significant. A greater support from colleagues and a higher “Job satisfaction” would seem to act as a protective factor on “General health”. On the contrary, a higher “Risk perception” is more likely to determine a poorer state of health, in particular “Concern about health conditions related to work” shows that an increase in the covariate of one unit causes a 1.3 increase in the probability of suffering poor health. Among the control variables, gender is particularly significant: women have poorer health than men, and the perceptions of health worsen with age. The second logistic model with “Limitations in the work

**Table 4**  
Logit estimates of Working conditions, Risk perception, and WRS risk exposure (Self-report health as dependent variables)

	Model 1 General health			Model 2 Limitations in the work activity caused by illness			Model 3 Depressive symptoms		
	Exp( $\hat{\beta}$ )	95% Confidence interval per Exp( $\hat{\beta}$ )		Exp( $\hat{\beta}$ )	95% Confidence interval per Exp( $\hat{\beta}$ )		Exp( $\hat{\beta}$ )	95% Confidence interval per Exp( $\hat{\beta}$ )	
		Lower	Higher		Lower	Higher		Lower	Higher
Demands	0.983	0.850	1.136	1.027	0.952	1.108	0.938	0.846	1.034
Control	0.983	0.839	1.152	0.919*	0.848	0.996	0.963	0.856	1.071
Peer support	0.823*	0.699	0.969	0.950	0.873	1.035	0.952	0.814	1.024
Management support	1.084	0.921	1.275	0.866**	0.796	0.942	0.859**	0.772	0.969
Relationships	0.950	0.807	1.118	0.926	0.848	1.011	0.859*	0.752	0.945
Role	0.856	0.705	1.040	0.795**	0.711	0.889	0.867*	0.718	0.943
Change	0.932	0.780	1.114	0.971	0.887	1.062	0.998	0.851	1.098
Organizational commitment	0.899	0.745	1.084	1.082	0.984	1.191	0.816**	0.716	0.932
Job satisfaction	0.695**	0.576	0.839	1.062	0.965	1.169	0.711**	0.597	0.778
Personal exposure to OSH risks at workplace	1.158	0.990	1.355	1.116**	1.031	1.208	0.855**	0.773	0.973
Concern about health conditions related to work	1.304**	1.110	1.533	1.18**	1.084	1.285	1.419**	1.378	1.718
Work-related stress	1.011	0.950	1.077	1.033*	1.002	1.065	1.088**	1.092	1.203
N. of self-report health problems	–	–	–	–	–	–	1.262**	1.201	1.325
Age (higher score = higher age)	1.245**	1.045	1.483	1.039	0.953	1.132	0.954	.881	1.124
Firm size (higher score = biggest size)	0.943	0.804	1.107	1.059	0.979	1.147	0.788**	.708	0.881
Gender (1 = male; 2 = female)	1.678**	1.200	2.345	1.052	0.892	1.241	1.160	1.110	1.774
Job seniority (higher score = higher seniority)	1.021	0.882	1.181	1.030	0.957	1.108	0.999	0.926	1.137
Costante	0.044			0.189			0.640	0.000	0.000
Average Variance inflation factors (VIF)	1.406								

activity caused by illness” as a dependent variable (Table 4) suggests that an improvement in “Control”, “Managerial support”, and “Role” reduces the work limitations due to illness. “Personal exposure to OSH risks” and “Concern about health conditions related to work” are significant; thus, the greater the perceived risk, the greater work limitations are. The third model (Table 4) shows that “Working conditions” constitute a protective factor against “Depressive symptoms”: in particular a greater support from the manager (“Managerial Support”), the absence of bullying and harassment in the workplace (“Relationships”), a clear understanding of the role held within the organization (“Role”), “Job satisfaction”, and “Organizational commitment”. An increase of one unit in “Concern about health conditions related to work” determines a 1.5 increase in the probability of suffering “Depressive symptoms”. Furthermore, “Exposure to WRS risk” and the number of “Self-report health disorders”<sup>2</sup> are positively associated with “Depressive symptoms”. Finally, gender is particularly significant in this model too, with a preponderance of depressive symptoms among women as compared with men, while it seems that depressive symptoms increase in larger companies.

#### 4. Discussion

This study analyzed the associations between the risk perceptions related to working conditions and self-related health in a large representative sample of the Italian workforce. All independent variables contemplated in the analysis models showed significant correlations (Table 3), in particular the strongest associations emerged between concern about health conditions

related to work, exposure to WRS risk, job satisfaction, and the seven items measuring psychosocial risk factors at work. In particular, most of the items allowing to assess psychosocial risks [31,42] are moderately correlated with the WRS risk exposure, with the exception of those relating to the “Demands” and “Relationships” factors, which showed a weak correlation. This could be due to the fact that, in our study, the workers’ perceptions of the psychosocial risk factors are measured through a single item for each dimension. This can introduce biases, specifically the risk of underrepresenting their constructs [43] and moderately altering the levels of reliability and validity within the relative scales [44]. Thus, we decided to use the seven items with the highest factor loadings [30] to introduce a synthetic and informative measure of workers’ perceptions related to the work content and context factors in the INSULA survey, according to the major working conditions surveys [6,8]. Furthermore, as shown in Table 4, there are associations between most of working conditions and the self-related health variables investigated. These results are in line with previous studies where the dimensions investigated by the MS indicator tool resulted associated with WRS outcomes, including job satisfaction and mental health measures, such as anxiety and depression [45,46]. Furthermore, as regard to job satisfaction, our results confirmed that this can moderate workers’ diseases and reduce the negative impacts on psychophysical health [47], as a protective factor against exposure to WRS risk, bad health, and depressive symptoms. As regard to the variables of risk perceptions and personal exposure to OSH risks, including exposure to WRS risk, clear associations with self-related health emerged. In line with previous studies and surveys on working conditions, it emerged that workers who perceive their work environment as unsafe and stressful are more likely to have negative perceptions of their health [19,9]. This has been highlighted in the regression models, in which workers declaring to be concerned about their own health are more likely to have negative perceptions of all the self-related health variables; and this particularly

<sup>2</sup> The number of self-report health disorders suffered in the twelve months preceding the survey was included in the model with depressive symptoms as dependent variables (from 0 to 12 self-reported health disorders) due to the moderate and significant correlation with the PHQ-2 (Spearman’s rho = 0.412,  $p < 0.01$ ).



emerged in the relationship between exposure to WRS risk and depressive symptoms. Such results highlighted the role of psychosocial risk factors as determinants of workers' mental health, especially in the case of depressive symptoms [48,49].

#### 4.1. Limitations and future directions

Although the present study adds a valuable contribution, some limitations must be highlighted. The first is related to the use of cross-sectional data not allowing us to determine causal relationships between variables but only associations. Another limitation is the necessary use of synthetic measures for certain variables rather than using validated scales in their extended form. Wider measures of working conditions would allow more reliable assessment of the variables investigated, but at the same time, they could jeopardize the sustainability of the data collection performing with computer-assisted telephone interview methodology. However, this aspect will certainly be addressed in the future in the development of the second round of the INSULA survey.

## 5. Conclusions

This study highlights the role of working conditions for self-related health in a large representative sample of workers. Findings highlighted the need for specific preventive measures on working conditions to improve the workers' health. Some aspects of the work affect the employees' perceptions of their health conditions, and this moderately differs according to age, gender, and the firm size. Our findings contribute in developing further measures of working conditions for the next round of INSULA as new areas of investigation (e.g. technology innovations, new work arrangements, and so on). This allows us to monitor adequately changes of the world of work and the potential impacts of emerging and traditional risks on the workers' health.

## Conflicts of interest

All authors have no conflicts of interest to declare.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.shaw.2021.04.002>.

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