

## The General Health Questionnaire (GHQ-12) in a Sample of Italian Workers: Mental Health at Individual and Organizational Level

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**Abstract:** The current study aims at measuring mental health in a sample of Italian workers as to evaluate the usability of the 12-item General Health Questionnaire (GHQ-12), both at individual and organizational levels. Indeed, working in unhealthy organizations appears to be particularly risky for workers. A database was built from data collected through a survey of workers in Italian industrial and public firms. The final sample comprised 2,707 employees from 55 Italian organizations. A confirmatory factor analysis (CFA) was conducted in which different competing models were tested. In addition, we measured the degrees of mental health both at individual and organizational levels by using a two-step cluster analysis. The findings of this study indicate that the GHQ has potential not only for measuring mental health at individual level but also at organizational level. In addition, demographic data was associated with mental health and appeared useful for epidemiological purposes. Finally, the use of a two-step cluster analysis illustrates the conceptualization of different degrees of mental health problems. These findings have some important theoretical implications for mental health promotion and also offer several opportunities for more in-depth research. Furthermore, these findings have the potential to help organizations prevent mental health problems at individual and organizational levels concurrently.

**Key words:** Healthy Organizations • Mental Health • Psychological Well-Being • General Health Questionnaire • Confirmatory Factor Analysis • Cluster Analysis • Work Stress

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### INTRODUCTION

**Mental Health:** Nowadays, a greater emphasis is being given to workplace mental health promotion and the implementation of measures to protect and improve well-being at work. Mental disorders strongly affect individuals and their employment [1, 2]; in turn, individuals with unsupported mental health needs may cause decreased productivity due to increased error rates, poor decision-making, lack of motivation, or high tension

and conflicts between colleagues [3]. Furthermore, these negative consequences might increase absenteeism and incidents at work, as well as foster a culture of early retirement [1, 3, 4]. Thus, it is important to address the existence and causes of poor mental health and well-being in order to deal with these problems at work and promote healthy employees in healthy working environments [5-7].

In that sense, the *General health questionnaire* (GHQ) [8] is commonly used instrument for assessing mental health and detecting various sources of distress

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for workers, such as depression, anxiety, somatic symptoms and social withdrawal. The GHQ is a self-report measure initially developed as a screening instrument to detect psychiatric disorders in non-clinical population [8]. There are also diverse versions available ranging from 12 to 60 items, in this study focussed on the shortest version (GHQ-12) because is the most frequent in the literature [9] and was validated in Italy by Fraccaroli *et al.* [10] in a sample of young unemployed participants. However, research on its psychometric properties among workers in Italy is still scarce for proper scientific comparisons with an actual normative sample. Consequently, the first aim of this study is to update the validation of the GHQ-12 in Italy in a sample of employed people.

The second aim is to explore the capacity of the GHQ-12 for evaluating mental health at an organizational level rather than at an individual level. Giorgi states that an individual's health might be aggregated into organizational health since in organizations there are unhealthy contagious cycles involving individual agents and groups [11]. In other words, in those organizations where there are many workers with mental health problems or who are particularly stressed, there might be a contagious effect, as individuals can affect their colleagues' mental health and mood [12]. Thus, in this paper we take a broader look at organizational health, going beyond the focus on individual health that is commonly found in the literature. We discuss methodological issues and theoretical approaches that allow us considering mental health at an organizational level and its implications for evaluating psychosocial risk factors and promoting mental health at work.

**Validation of the GHQ-12:** The validation of a GHQ-12 version in the organizational context may have important implications for occupational epidemiology and for monitoring employees' health and well-being. The GHQ-12 has shown a good internal consistency in a wide variety of studies from diverse cultural settings [13, 14], including a validation study in the Italian context in a sample of young unemployed people [10]. However, there is still an important controversy about its factorial composition [15-17] and a lack of evidence of its use in the Italian work-related context. In response, this study assesses the factor structure of the GHQ-12 in a sample of workers employed in different Italian organizations. We also explore the internal consistency of the GHQ-12 and its criterion validity by correlating scores on the GHQ-12 with socio-demographical variables and working conditions measures (Psychosocial factors at work).

Regarding socio-demographical variables, we expect to find different GHQ-12 scores depending on gender and job position/status. Particularly, we expect women would score higher than men since a meta-analysis of 19 epidemiological survey studies conducted in Europe revealed that women had higher prevalence rates of psychological distress than men according to their scores on the GHQ-12 [9]. In light of previous findings, we also expect that blue-collar employees in low-skilled jobs (E.g., transportation, construction or manufacturing) would score higher than both blue-collar employees in high-skilled jobs (E.g., sales, accounting or administration) and white-collar employees (E.g., managers). In this regard, Batinic *et al.* [18] argued that blue-collar employees in low-skilled jobs are committed to work that generally involves more physical exertion in less than optimal work environments, increasing the risk of psychological problems.

In addition, although antecedents of health and well-being at work are composite and multifaceted, researchers agree that there is a clear association between working conditions and employee mental health. For example, results from work-related studies conducted in United Kingdom suggest that poor working conditions, such as lack of social support, low decision authority, high job demands and role conflict predict psychological morbidity and distress -measured with the GHQ-12 in representative samples of civil servants and healthcare professionals [19]. Indeed, Rau *et al.* [20] found a positive association between working demands and depression. Similarly, recent meta-analyses of longitudinal studies indicated that being exposed to stressful working conditions has negative consequences on employee physical and mental health [21]. Thus, we expect a positive correlation between several job stressors (Such as role conflict, job demands and lack of job control and social support) and mental health.

**The GHQ-12 and Mental Health Promotion at Work:** In this section, we consider both traditional notions of workplace mental health focusing on the individual and recent comprehensive approaches that emphasize assessing the mental health of the organization itself [22]. Thus, using the GHQ-12 in organizational settings can be useful not only in monitoring the possible negative consequences of being exposed to poor working conditions (Individual level) or in estimating psychiatric morbidity in a specific population (Society level), but also in identifying specific unhealthy organizations,

workplaces, departments or units in which there is a high risk of deteriorate mental health (Group or organizational level).

Considering mental health at an organizational level needs to be approached both from a theoretical and a methodological point of view. In that sense, although aggregations of lower-level variables request caution and continue to remain a focal theme in multilevel organizational methods research [23, 24], one type of emergence of higher-level constructs is the *composition model*, which emphasizes the shared collective properties of an organization with the assumption of isomorphism between manifestations of constructs at different levels [25]. As Kozlowski and Klein describe “a phenomenon [As] emergent when it originates in the cognition, affect, behaviors, or other characteristics of individuals, is amplified by their interactions and manifests as a higher-level, collective phenomenon” [25]. According to these considerations and based on a multilevel comprehensive approach, organizational mental health can be defined as an organization-level construct that is created from the emergence of individuals’ mental health and psychological well-being at work and is amplified by the interactions of the individuals, as people tend to converge in their emotions to those around them, a process that Hatfield *et al.* [26] defined as emotion contagion, suggesting that moods and emotions spread among individuals much like viruses. Recent studies have shown that both positive emotions and common mental disorders (Depressive symptoms) can also ‘spread’ person-to-person [12, 27].

Consequently, the current research design tried to overcome previous limitations by using a cluster analysis technique in order to categorize persons with mental disorders (Or different degrees of mental health) instead of examining total scores. Using a cluster analysis technique might allow us to differentiate different gradations of mental health and not only establishing dichotomy categories (Healthy/non healthy or healthy/mental disorders). Such technique will be also applied at an organizational level, allowing us to differentiate between healthy and unhealthy organizations. Identifying gradations of mental health at both individual and organizational level is important from a managerial and occupational health preventive approach since it allows to establish specific measures depending on the situation (E.g., level of distress: healthy employees/organizations, employees/organizations at risk of experiencing mental problems and employees/organizations with mental problems).

## MATERIALS AND METHODS

**Procedure and Participants:** Data was collected between 2009 and 2012 from various companies that were asked to participate in a study investigating stress and mental health at work. The organizations were selected out of convenience. Specifically, 55 out approximately 100 organizations contacted agreed to voluntarily participate in this survey study. Companies were widespread around Italy, although the majority was established in the center of Italy. Furthermore, the sample comprised of only 5 public organizations, whereas 50 organizations belonged to the private sector. Depending on the organization size, in some companies all employees were involved whereas a stratified sampling technique was followed in others. Overall, the rationale was to achieve a representative sample of the various organizational functions and hierarchies of all organizations.

Participants were tested in their workplace by psychologists and doctors during working hours in rooms provided by the organizations. No payment was provided to participants. They were informed that their responses were anonymous and that completing the questionnaires would take about 30 minutes, although no time limit was imposed.

The questionnaire packages consisted of (a) demographic questions, (b) GHQ12 (c) the Stress questionnaire. A subgroup of the total sample was used for criterion validity testing. Thus, the entire sample completed the GHQ-12, whereas employees belonging to a reduced number of private companies (N = 20) also completed the stress questionnaire, SQ. The organizations belonging to the sub-sample were selected out of convenience.

Response rate was high, ranging from 65% to 96% across companies. The latter may be attributed to regulation introduced in 2008 that obliges organizations to assess psychosocial risk factors and their impact on workers’ mental health, resulting in a more favorable attitude of companies towards organizational diagnostic activities. Despite the latter privacy and confidentiality have to be taken into account by researchers since results might have strong managerial implications. For that reason, only few demographics (Gender and job position) were collected in order to ensure confidentiality.

The final sample of this study was comprised of 2,707 employees from 55 different Italian organizations. Gender was balanced since 55.2% of the participants were men and 44.8% women. Regarding job position, 70.1% of the participants were blue-collar employees in high-skilled

jobs, 25.4% were blue-collar employees in low-skilled jobs and 4.5% of participants were white-collar employees. Finally, regarding professional activity, 43.5% were employed in sales and service areas, 34.5% in technical jobs and 22% in administration.

The sub-sample was comprised of 1550 employees.

**Instruments:** After limited demographic questions (I.e., gender and job position), participants completed the following questionnaires in their Italian version:

- *The Italian version of the GHQ-12* [10]. Participants have to report whether they have experienced a particular symptom of mental distress recently according to a four-point scale (Typically: 'less than usual', 'no more than usual', 'rather more than usual' and 'much more than usual'). The customary scoring methods follow either a bimodal scale (0-0-1-1 with the two least symptomatic answers scoring 0 and the two most symptomatic answers scoring 1), or a 4-point Likert-type scale (0-1-2-3 according to the above mentioned four possible responses). However, there is evidence that suggests that the latter allows better discrimination between competing models in confirmatory factor analysis since "produces a more acceptable distribution of scores for parametric analysis" [28]. Thus, after recoding negative items (Six of the items are positively worded; the other six are negatively worded), this second scoring method was used in this study. Hence, the questionnaire gives a total score ranging from 0 to 36 points, in which a higher score indicates a 'worse degree' of mental well-being.
- *The Stress Questionnaire (SQ)* [29-31]. This questionnaire was completed only by a subgroup of the sample (Subsample, n = 1,550) for criterion validity testing. It is composed by 25-item assessing five job stressors or psychosocial factors at work in a 5 point Likert scale (From 1 = "strongly agree" to 5 = "strongly disagree"): (a) *role conflict* (5 item; e.g., "I have a clear idea about what is expected of me at work"), or lack of awareness regarding your roles and responsibilities at work ( $\alpha = .76$ ); (b) *colleague support* (5 item; e.g., "I get support I need from colleagues"), which assess the extent to which employees perceive collaboration and support from their colleagues ( $\alpha = .76$ ); (c) *supervisors' support* (4 item; e.g., "My supervisor energizes me at work"), which measures the extent to which employees experience support and understanding from their

supervisors or leaders ( $\alpha = .80$ ); (d) *job demands* (6 item; e.g., "I have unrealistic deadlines"), which measures the perception of quantitative demanding aspects of the job ( $\alpha = .75$ ) and (e) *job control* (5 item; e.g., "I can plan my work"), which assess the autonomy and decision-making capabilities that employees have to perform their tasks ( $\alpha = .75$ ). The factorial structure of this questionnaire has been supported in previous studies [32].

**Statistical Analysis:** First, we explored the factorial structure and internal consistency (Cronbach's alpha) of the GHQ-12. According to the solutions found in previous studies [15, 16, 33], this study tests different competing models through Confirmatory Factor Analysis (CFA) to determine the factorial structure of the GHQ-12 among Italian workers: one-dimension model or mental well-being; two-factor model based on how items are presented in the questionnaire (i.e., positive and negative worded); and the three factor model identified by Graetz [28] that differentiates between anxiety/depression, social dysfunction and loss of confidence.

We then addressed the criterion validity of the GHQ-12 by calculating the correlation coefficients between scores in the GHQ-12 and its dimensions and the scores in the dimensions of the stress questionnaire (SQ). In addition, one-way ANOVAs and t-tests were conducted to explore differences in mental health among target variables (e.g., demographics). Target variables were introduced as factors and both the total score of the GHQ-12 and the score in each dimension were introduced as dependent variables.

Finally, a two-step cluster analysis procedure was used in order to reveal natural groups (Or clusters) within the data set, without having pre-arranged clusters. Cluster analysis encompasses a number of different algorithms and methods for grouping participants of similar kinds into respective categories (Clusters). This method was preferred to using existing cut off points, as the latter can create bias in the definition of categories of people based on whether or not they suffer from mental health problems [10, 34]. In sum, a two-step cluster analysis was performed to measure the prevalence of mental health issues and obtain scores to differentiate healthy from unhealthy employees and organizations. In that sense, it is necessary to notice that the Intraclass Correlation Coefficients (ICC) were calculated to test the validity of aggregating mental health to the organizational level. Significant *F* statistics from a one-way analysis of variance as parameter for ICC (1) and ICC(2) values of more than 0.60 were used as a standard [23].

Table 1: Confirmatory factor analysis for the GHQ-12 (n = 2,707)

	$\chi^2$	df	GFI	CFI	RMSEA	RMR	IFI
One-Factor	1954	54	.88	.81	.118	.038	.81
Two-Factors	1344	53	.91	.87	.092	.031	.87
Three-Factors	813	51	.95	.92	.074	.026	.92

Table 2: Descriptive statistics (n = 2,707) and correlations between the GHQ-12 and the SQ (n = 1,550)

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. GHQ12-Total	10.43	5.42	(.85)	.91**	.89**	.69**	.38**	.34**	.35**	.40**	.35**
2. GHQ12-AD	4.12	3.63		(.81)	.96**	.72**	.47**	.34**	.35**	.42**	.34*
3. GHQ12-SD	3.51	2.92			(.78)	.50**	.31**	.29**	.35**	.44**	.33**
4. GHQ12-LC	.60	1.11				(.73)	.29**	.20**	.22**	.21**	.23**
5. SQ-RC	2.00	.68					(.76)	.45**	.39**	.36**	.50**
6. SQ-SS	2.51	.90						(.80)	.42**	.37**	.40**
7. SQ-CS	2.53	.74							(.76)	.37**	.39**
8. SQ-JD	2.74	.73								(.75)	.34**
9. SQ-JC	2.52	.72									(.75)

Note: GHQ12-Total = Total score on the General Health Questionnaire (GHQ-12); GHQ12-AD = Dimension “Anxiety and Depression”; GHQ12-SD = “Social Dysfunction”; GHQ12-LC = “Loss of confidence”; SQ-RC = Score on the dimension “Role Conflict” of the Stress Questionnaire (SQ); SQ-SS = “Supervisor Support”; SQ-CS = “Colleague Support”; SQ-JD = “Job Demands”; SQ-JC = “Job Control”; \*\* $p < .01$  (2-tailed); \* $p < .05$  (2-tailed). Cronbach’s alpha is reported in the diagonal between parentheses.

## RESULTS

**The GHQ-12 Factorial Structure and Internal Consistency:** Three different models were tested by using maximum likelihood estimations to determine the factorial structural of the GHQ-12 in our sample. Results revealed that a three-factor model, where the dimensions were allowed to correlate between them (Anxiety and depression, social dysfunction and loss of confidence), achieved the best fit to the data (Table 1); whereas both the one-factor model (in which all items were predicted to load onto a single factor, reflecting a general mental health factor) and the two-factor model (Positive and negative worded items where factors were allowed to intercorrelate) presented poor fit indices and both the RMR and RMSEA values were within the accepted range [35, 36].

According to these results, the GHQ-12 internal consistency was assessed. Cronbach’s alpha for the GHQ-12 total scale was .85 and for each dimension/factor ranged from .73 to .82, suggesting the good reliability of the instrument (Table 2).

**The GHQ-12 Criterion Validity:** As it was expected, women ( $M = 11.1$ ;  $SD = 5.7$ ) scored significantly higher than men ( $M = 9.8$ ;  $SD = 4.9$ ) on the GHQ-12 total scale ( $T(2576) = 6.3$ ;  $p < .001$ ). Identical results were found when scores on the subscales anxiety and depression, social dysfunction and loss of confidence, were considered instead of the total score. Regarding the job position, blue-collar employees in low-skilled jobs

( $M = 9.5$ ;  $SD = 4.8$ ) reported fewer mental health problems ( $F(2, 2509) = 11.9$ ;  $p < .001$ ) than those in high-skilled jobs ( $M = 10.7$ ;  $SD = 5.6$ ) or white-collar employees ( $M = 10.2$ ;  $SD = 4.3$ ). Again, identical significant differences were found on the subscales anxiety and depression and social dysfunction; however, the difference for loss of confidence was not significant.

Furthermore, the GHQ-12 total scale and each of its dimensions were significantly associated with several job stressors, with Pearson’s correlations ranging from .20 to .47 (Table 2), which supports the criterion validity of the questionnaire.

**Mental Health at Individual and Organizational Levels:** A cluster analysis was performed in order to find further evidence of the GHQ-12 sensitivity in light of the different degrees of mental health problems at individual and organizational levels. Scores in the GHQ-12 total scale were considered as a variable in the cluster analysis. At an individual level, results suggested four clusters (See Figure 1): the first comprised 44.6% of the cases or employees that participated in our study ( $M = 6.1$ ;  $SD = 1.5$ ); the second cluster made up 28.7% of the cases ( $M = 10.3$ ;  $SD = 1.1$ ); the third cluster comprised 21% of the cases ( $M = 15.5$ ;  $SD = 2.2$ ); and the fourth cluster 5.7% of the cases ( $M = 25.1$ ;  $SD = 3.8$ ).

At an organizational level, we first conducted analysis to test if aggregation into an organizational level was feasible or not. Results from one-way ANOVAs tests revealed differences in mental health among target companies when scores in both the total

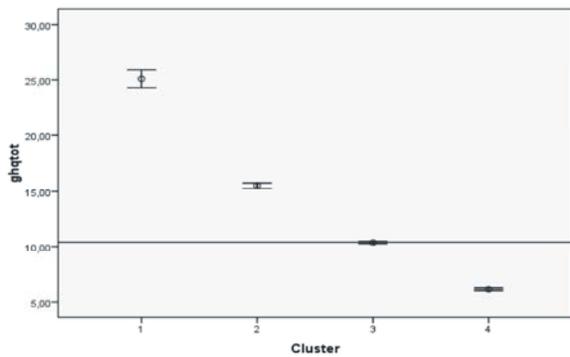


Fig. 1: The two-step cluster analysis for assessing employees' mental health

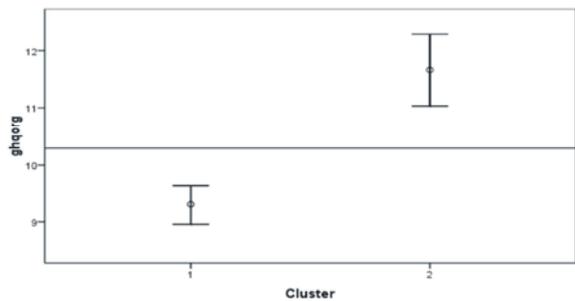


Fig. 2: The two-step cluster analysis for assessing organizational health

scale ( $F(54, 2652) = 3.25; p < .001$ ) and in each dimension were considered: social dysfunction ( $F(54, 2652) = 2.74; p < .001$ ), anxiety and depression ( $F(54, 2652) = 3.1; p < .001$ ) and loss of confidence ( $F(54, 2652) = 2; p < .001$ ). The statistic ICC(2) was thereafter calculated, showing values of 0.60 for the mental health total score and for the dimensions, with the exception of loss of confidence (.48). These results reflect sufficient within-organization consistency and support aggregation at an organizational level. Thus, scores in the GHQ-12 total scale for each company were considered as variables in the cluster analysis. Results revealed two clusters (Figure 2); the first comprised 14.5% of the cases or organizations involved in our study ( $M = 42.68; SD = 10.51$ ) and the second cluster included the remaining 85.5% of the organizations ( $M = 22.93; SD = 10.51$ ).

## DISCUSSION

A comprehensive approach to workplace health management needs to consider the mental health of the employees as well as should explore possibilities for assessing health-related constructs at higher levels.

Our results suggest that the structure of the GHQ-12 in the current sample fits with three factors: anxiety/depression, social dysfunction and loss of confidence. This result is in line with the original purpose of the GHQ of covering diverse common mental health problems or psychiatric disorders, suggesting that the GHQ-12 can be considered a multidimensional instrument. However, as the three proposed factors exhibit high correlations between them, it is also possible to argue that the questionnaire is a screening tool that provides a total score or general measure of mental well-being. In that sense, future studies should explore whether a second-order factor (I.e., psychological well-being) can be obtained from the correlations of these factors (I.e., first-order factors: anxiety/depression, social dysfunction and loss of confidence).

Regarding demographic variables, our results indicate that demographics might play an important role in mental health. The fact that women seem to be more affected by psychological distress than men is congruent with previous findings on psychological well-being [9, 34, 37], particularly considering that women exceed men in internalizing disorders such as depression and anxiety [38], which are core dimensions of the GHQ-12. On the other hand, contrary to our expectations, blue-collar employees in low-skilled jobs reported better psychological well-being than their colleagues in high-skilled jobs and white-collar employees [39, 40].

The GHQ-12 also shows a high internal consistency and criterion validity since it was associated to different job stressors that have been identified as precursors of mental problems [20, 21]. In addition, mental health is a complex phenomenon that might be conceptualized on gradations. Our results suggest that it is possible to construct gradations or degrees for mental health problems by exploring the intensity of mental health with a cluster analysis rather than by using a cut-off point (Which may be of interest in clinical settings). The current study provides statistical evidence that 44.6% of the sample did not report mental health problems while 28.7% of our sample indicated low levels of mental health that, whilst it may cause problems over time, are common and potentially superficial. Indeed experiencing some negative feelings or anxiety now and then appears to be normal at workplace. However, 21% of participants pointed out a potential mental problem that might require professional treatment or intervention. The remaining 5.4% of participants reported important potential problems relating

to mental health that could result in permanent problems such as psychological disorders, increased risk of heart disease, and even suicide [10, 33, 41, 42].

Finally, our results also suggest that the GHQ-12 can be used at an organizational level to discriminate healthy organizations from unhealthy ones, suggesting its practical use in organizational diagnosis. 14.5% of organizations might be defined unhealthy because they comprise several workers with mental health problems or/and some serious cases. Mentally unhealthy organizations might be hazardous for workers since some psychological problems might not be properly treated and employees with mental disorders can be stigmatized [43, 44, 45]. This might stimulate the conceptualization of mental health problems as “taboo subjects” in the organizations [46], which, in turn, can trigger that employees who suffer stress or of some kind of mental health problem might not cope with their health status constructively, experiencing a higher risk of developing more serious psychological problems as well as of spreading negativities to the other employees.

We believe that in these organizations negative emotional cycles might be present and mental health problems may spread to multiple people (Through contagion effects) [26, 47, 48]. It may also be that different types of emotion cycles emerge in mentally unhealthy or healthy organizations. For example, people working in unhealthy organizations are likely to pick up on others’ negative emotions and tend to focus on negative aspects of their working lives and organizational surroundings [12, 49]. In contrast, individuals working in healthy organizations are more self-confident and tend to focus on positive aspects of their social surroundings [32, 50]. Thus, considering that both positive emotions (Happiness) [27, 51] and common mental disorders can also spread person-to-person (Depressive symptoms) [12, 27], different reinforcing emotional contagion cycles may occur in unhealthy and healthy organizations.

Moreover, as Cooper *et al.* [52] pointed out, employment provides psychological experiences that promote mental well-being through time structure (An absence of time structure can be a major psychological burden), social contact (employment offers a social context outside the family) and social identity (Employment is an important element in self-definition). Thus, interventions should aim at both preventing mental disorders (I.e., activities aimed at avoiding illness) and

promoting mental health by supporting employees in changing their lifestyle to move toward a state of optimal health (I.e., activities aimed at mental health flourishing and happiness). In this case, the GHQ-12 can be used together with other measures (E.g., psychological strengths) to assess what mental health needs of the employees are and, in turn, setting priorities before implementation of mental health promotion activities. In other words, the GHQ-12 can be included in the current health risk assessments (HRA), which usually underestimates mental health and focuses more on lifestyle (E.g., exercise, alcohol intake and diet) and physiological data (E.g., weight, height and blood pressure).

Also at individual level, it’s worthwhile to note that the GHQ-12 can be used to identify specific employees with mental problems that may need immediate counseling and psychological treatment [38, 43].

Last, regarding the use of the GHQ-12 at organizational level, from the above findings, it also seems that the GHQ-12 can be used together with other aggregated indicators recorded by HR managers or occupational health professionals (E.g., absenteeism, turnover rates, sick leaves) as part of the psychosocial risk management cycle either to identify departments or units with high risk of mental health problems (E.g., before taking action as part of the psychosocial factors and health surveillance in the company) or to establish the effectiveness of health promotion programs and personnel policies that incorporate health targets (E.g., by comparing mental health levels before and after introducing interventions).

There are also limitations to generalize the results of this study. First, although the study has a significant number of participants from 55 organizations, our sample was convenient and is not representative of the working population in Italy. Second, our measures were assessed via self-report; therefore, the significant relationships found in this study are not immune to inflation due to common method bias. Thus, the GHQ-12 should be used in longitudinal studies in order to provide scientific information about mental health problems in representative samples from the working population in Italy. Moreover, data from epidemiological research at work and from occupational health physicians’ daily activities needs to be added to self-report measures in order to confront these findings on mental health problems with related physiological mechanisms.

There are, despite the limitations inherent in the study design, various contributions in our study: (a) the validity and the reliability of the GHQ-12 in our Italian sample of workers; (b) that gender and job position may potentially contribute to mental health at work; (c) that different degrees of mental health exist both across organizations and individuals and (d) that the GHQ-12 is capable of providing a valuable indicator of unhealthy organizations. Consequently, we can conclude that antecedents of mental health problems might be found within the context and structure of the organization, rather than solely in the mind of the individual. This highlights the importance of conducting interventions to promote healthy organizations through the measurement of health also at organizational level [22]. Thus, measuring mental health at an organizational level appears useful and necessary for promoting healthy organizations and planning a complete intervention on well-being at work.

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All the authors contributed equally to this work.

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