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*Research Article*

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# Relationship Between Work Related Stress Risk, Memory and Anxiety

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**ABSTRACT**

Several studies, with cross-sectional perspectives, attempt to understand which are the elements that favor the onset of occupational stress and although it is known that stress is associated with negative effects on physical and mental health, research remains problematic. This investigation seeks to highlight the relationship between self-perception of work-related stress risk, memory and anxiety. A psychodiagnostic protocol composed of: Questionnaire for the in-depth assessment of the risk of work-related stress, Healthcare Personnel Version, INAIL 2022, HAM-A: Hamilton Anxiety Rating Scale and Digit Span was administered to a sample of 50 healthcare workers. The results highlighted a medium-low level of work-related stress risk for the entire sample, but subjects with moderate to severe anxiety reported borderline memory levels. Investigating occupational stress in the workplace periodically through questionnaires, scales, tests is important and fundamental for managing organizational health and the psychophysical well-being of workers.

**Keywords:** Distress, Memory, Anxiety, Health Psychology, Psychological Distress

## Introduction

Stress is currently identified with everything that does not work and wears. The National Institute for Occupational Safety and Health (NIOSH) defines occupational stress as a set of harmful physical and emotional reactions that occur when job demands exceed the worker's capabilities and resources [1]. Several studies attempt to understand what are the elements that favor the onset of stress in the workplace and various studies, with cross-sectional perspectives, attempt to understand what are the elements that favor the onset of occupational stress and although it is known that stress is associated with negative effects on physical and mental health, research on stress remains problematic.

Some studies state that personality traits such as excessive tolerance, ambiguity, anxiety and neuroticism favor the development of work-related stress as a pathological outcome of a stress-inducing process that affects psychologically predisposed workers and that results in some components, including the deterioration of commitment to work, memory deficits, instability and anxiety [2].

Certainly, occupational stress is a determining factor in cognitive deterioration and limits daily work performance, increasing the risk of errors and accidents. A common thread that links these consequences seems to be associated with emotionality with alterations in executive functions [3,4]. Scientific literature indicates the prefrontal cortex (PFC) as the region of the brain that responds to stress with maximum sensitivity and rapid changes in cognitive functions that depend on it have been observed, thanks to new neuroimaging techniques [5,6].

A recent review analyzes the impairments determined by stress on brain areas and functions, elaborating the centrality of cognitive functions in work processes and in the regulation of emotions, affirming the need to evaluate the factors that modify the emotionality and neuropsychological responses of subjects to stress that can determine accidents, injuries and adverse events in the workplace [7].

Modern man has mistakenly thought that the use of new technologies and the application of a rational push to production and organizational processes would have allowed the reduction or disappearance of the most onerous part of work activity. On the contrary, it is easy to see that increasingly Western man

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continues to commit more and more time in terms of working days and hours and a significant part of his mental and physical energy to work activity. The wear and tear that commitment and work produce is manifested every time work is experienced as a duty, an essential obligation indispensable for survival, even if not rewarding, not in tune with the individual vital sphere [1].

A systematic review of stress as a risk factor in the workplace assessed with self-perception questionnaires aims to identify the risk factors of work environments that cause daily stress. The search strategies were applied in seven databases, of which 41 studies were included in a qualitative synthesis. The most commonly measured work environment risk factor was work intensity, while stress was more frequently framed as an emotional response. The measures of these two dimensions were also more frequently correlated with each other and most of the correlation coefficients were statistically significant, making work intensity an important risk factor for stress in the workplace, highlighting the impact of self-perceived stress on physiological effects, albeit with different methodological approaches in data collection and analysis [8].

A Chinese study with 1,988 participants aimed to identify the characteristics of occupational stress risk and job suitability in healthcare workers by administering the Depression, Anxiety and Stress (DASS-21) and the Worker-Occupation Inventory (WOFI). The identification of risk characteristics was achieved by building a multiple logistic regression on risk models that included poor work-occupation adjustment, experience of a traumatic event and lack of regular exercise habit. The study concluded that healthcare workers presenting these characteristics had a 90.2% probability of work-related stress risk [9]. Workers seeking medical care for mental health problems related to occupational stress report cognitive deficits, in fact a 2012 study, using a battery of cognitive tests, compared the cognitive functions of subjects with burnout related to occupational stress with healthy controls and the most pronounced difference between exposed and controls was observed in the Digit Span test. The study clearly shows that cognitive impairment should be taken into account when evaluating subjects seeking care for occupational stress [10].

A study evaluating the cognitive performance of 54 subjects after recovery from work stress and return to active work concludes that workers with previous work-related burnout show persistent attention deficits upon return to work despite significant general recovery [11].

**Objective.**

This survey conducted on healthcare personnel seeks to evaluate the relationship between anxiety, working memory and self-perception of work-related stress risk.

**Materials and Methods**

Between October to December 2024, a sample of 50 healthcare technicians from a Sicilian hospital at the beginning of the morning shift in a maximum time of 40 minutes, after signing the informed consent and carefully explaining, checking the inclusion and exclusion factors, was administered in the same space-time conditions, a psychodiagnostic protocol with validated and standardized scales composed of:

A). **Questionnaire for the in-Depth Assessment of the risk of Work-Related Stress,** Healthcare Personnel Version, Inail 2022 methodology, self-administered, composed of 65 items, with answers referring to the last six months, on a 5-point Likert scale, asking to indicate to what extent you agree with a statement, starting from the maximum level (5) to the minimum (1), with intermediate options. The raw scores are subsequently standardized into weighted scores on three levels: Low, Medium, High [12].

B). **Ham-A: Hamilton Anxiety Rating Scale**, a rating scale developed to measure the severity of anxiety symptoms used in both clinical and research settings. The scale is composed of 14 items, which indicate both psychic anxiety (mental agitation and psychological stress) and somatic anxiety (physical disorders related to anxiety). Each item has a score from 0 (not present) to 4 (severe), with a total score range of 0-56, where <17 indicates mild severity, 18-24 mild to moderate and 25-30 moderate to severe [13].

C). Digit Span, traditional assessment of short-term memory; a series of numbers, each time of increasing length, is repeated forwards and in reverse order. The test is based on correct answers and indicates the capacity of the retention memory (number of digits) that a subject can immediately recall. The norm is, seven plus or minus two items remembered (7 ± 2.) [14].

| Population under study: n.50 subject | |
|---|---|
| Middle Age | 48 |
| Sex | men n.31<br>women n.19 |
| Educational level (years) | 16 |
| Marital status | yes |
| Children | yes |
| Working Seniority middle (years) | 14 |
| Smoking | no |
| Alcohol | no |
| Drugs | no |

**Ethical Considerations**

Participants were informed about the objective of the study and signed an informed consent form. The ethical principles enshrined in the Declaration of Helsinki were observed at all times. The confidentiality of the data and the anonymity of the subjects were preserved in compliance with on Personal Data Protection GDPR 679/2016.

**Results**

The sample under examination, composed of 50 health technicians; 31 male subjects and 19 female subjects, with an average seniority of 14 years, 16 years of education, an average age of 48 years, all with day and night shifts, with a permanent employment contract, reports the following results to the psychodiagnostic protocol:

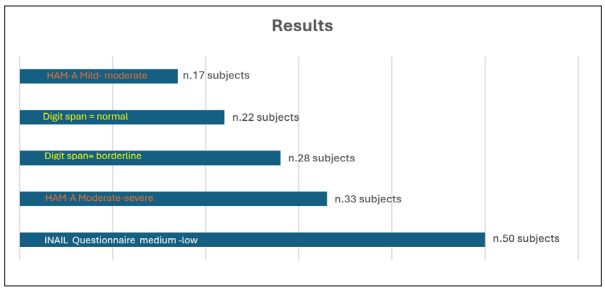
- INAIL questionnaire, a total score on the assessment of work-related stress risk that demonstrates a medium-low level of stress for the entire sample under examination.
- Hamilton Anxiety Rating Scale, 17 subjects reported scores

in the range of 18-24 indicative of mild to moderate anxiety, while 33 subjects reported scores in the range of 25 to 30 indicative of moderate to severe anxiety.

- Digit Span, (average between Digits Forward and Digits Backward) 28 subjects with moderate to severe anxiety reported span 4 considered borderline for working memory, the other 22 subjects reported span between 5 and 7 within normal limits.

No significant differences emerge with respect to gender.

| Results | | | |
|---|---|---|---|
| **Psychodiagnostic Protocol** | **Sample n.50 subjects** | **Range** | **Level** |
| INAIL Questionnaire 2022 | n.50 subjects | 16-32 | Medium-low |
| HAM-A: Hamilton Anxiety Rating Scale | n.17 subjects | 18-24 | Mild-moderate |
| HAM-A: Hamilton Anxiety Rating Scale | n.33 subjects | 25-30 | Moderate-severe |
| Digit Span | n.28 subjects | span 4 | Borderline |
| Digit Span | n.22 subjects | span 5-7 | Normal |




## Discussion

In recent years, work-related stress has grown exponentially and the negative impact that this condition has on people's health is considerable. The effects of work-related stress can be divided into those that affect workers (depression and anxiety) and those that affect the company (absenteeism and productivity) [15]. All healthcare workers are at risk of work-related stress disorders and risk assessment and early signs of occupational stress-related disorders can be an effective preventive measure for health, although prevention of work-related stress disorders in healthcare settings has not been studied and evaluated in depth and generational differences in nurses' emotionality and work attitudes have not been considered to improve organizational well-being [16,17].

A recent cross-sectional study was conducted in an emergency department of a public metropolitan hospital in Australia; emergency department nurses and physicians were invited to participate in an electronic survey containing 13 survey measures and one qualitative question assessing occupational stress and coping. Descriptive statistics were used to report stressors, and responses to open-ended questions were analyzed thematically. Thematic analysis identified high workloads and limited leadership support as contributing factors to stress. Coping mechanisms, such as building personal resilience, were reported more frequently, concluding that organizational stressors negatively impact the well-being of emergency department nurses and physicians [18].

Health care workers experience morally stressful situations during care delivery that can disturb their conscience. Emerging literature in the context of global pandemics has suggested a frequency of morally stressful situations in health care and a link to negative outcomes such as dropout and burnout [19].
Several studies indicate a clear impairment of working memory after exposure to a stressor, consistent with the idea that stress affects abilities that require conscious and continuous processing of information for cognitive efficiency [20].

We highlight findings that support and extend the complexity of acute stress-induced effects and reinforce the importance of delineating the type of memory under study when addressing stress-memory interactions, as stress is a strong modulator of memory. However, memory is not a unitary process, and stress appears to exert different effects depending on the type of memory. Some findings support evidence indicating complex effects of stress on different types of memory, and a pronounced working memory deficit has been associated with stress exposure. These findings reinforce the idea that acute stress can be highly disruptive to working memory processing [21,3].

The term working memory actually refers to a group of cognitive functions that allow humans to actively access, store, update, and manipulate information [22]. The capacity of working memory is limited both in the amount of information it can hold and how long that information can be retained [23,24]. As such, working memory is often considered selective in human information processing [25].

Findings regarding the effects of acute stress on working memory have been very heterogeneous, while several investigations have indeed reported negative effects of stress on working memory just as many, report none; and some have even reported positive effects of stress on working memory [26-28].

Anxiety is often associated with WM deficits and a longitudinal study examines the role of perceived stress and sleep disturbances in the longitudinal development of cognitive deficits in a group of patients with work-related stress over a 12-month period, arguing that the improvement in cognitive deficits is partly mediated by decreased levels of perceived stress and, to a lesser extent, decreased sleep disturbances [29].

In China in 2022, depression and anxiety were found in 58.82% and 62.08% of shift nurses, respectively, and these percentages were affected by fatigue during shift work with excessive workload during night shifts [30].

Male day workers and both male and female shift workers showed the association between long weekly working hours more than 52 hours and both depressive and anxious symptoms, compared to those who worked less than 40 hours, demonstrating a significant association between long weekly working hours and depressive and anxious symptoms, regardless of gender and shift work hours [31].

**Conclusions**

The scientific literature suggests investigating occupational stress in work environments periodically through questionnaires, scales, tests since professional stress and the identification of the characteristics that place people at high risk of occupational stress are the basis for managing organizational health and mental well-being of workers. Our analysis highlighted in the sample under study a medium-low level in the self-perception of work-related stress risk but there is a relationship between anxiety and short-term memory in subjects with moderate to severe anxiety.

It should not be overlooked that subjects on sick leave due to work-related stress often present cognitive deficits, sleep disturbances and anxiety and even if the most common mental health diagnosis is anxiety disorder it remains largely undertreated.

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