revista de pesquisa ISSN 2175-5361

CUIDADO É FUNDAMENTAL

Escola de Enfermagem Alfredo Pinto – UNIRIO

INTEGRATIVE LITERATURE REVIEW *DOI:10.9789/2175-5361.rpcfo.v17.13910*

FACTORS ASSOCIATED WITH SUBJECTIVE MENTAL WORKLOAD: AN INTEGRATIVE REVIEW

Fatores associados à carga mental de trabalho subjetiva: revisão integrativa

Factores asociados a la carga mental del sujeto: revisión integradora

Matheus Silvelo Franco[I]
Valdecir Zavarese da Costa[2]
Thaynan Silveira Cabral[3]
Mariângela Herzog[4]
Talia Patatt Simonetti[5]
Marculina da Silva[6]
Rafaela Andolhe[7]

RESUMO

Objetivo: identificar os fatores associados à Carga Mental de Trabalho Subjetiva avaliada pela Escala Subjetiva da Carga Mental de Trabalho. **Método:** revisão integrativa realizada em julho de 2024, considerando o recorte temporal de 2009 a 2024. Constituíram-se locais de busca as bases de dados: *MEDLINE, Scopus, Web of Science, SciELO* e *PsycInfo*. As estratégias de busca foram fundamentadas a partir das palavras-chave "Carga Mental de Trabalho" e "Escala Subjetiva de Carga Mental de Trabalho", considerando os operadores booleanos "*AND*" e "*OR*". **Resultados:** Os fatores associados a Carga Mental de Trabalho Subjetiva foram: sexo, idade, escolaridade, lazer, categoria profissional, tempo de trabalho, carga horária de trabalho, satisfação no trabalho, qualidade de vida relacionada a saúde, níveis de estresse, transtornos mentais, neuroticismo, exigências psicológicas, apoio social e condições ambientais. **Considerações finais:** a Carga Mental de Trabalho Subjetiva é um fenômeno multidimensional que envolve fatores individuais, laborais e psicossociais.

DESCRITORES: Saúde mental; Carga de trabalho; Saúde ocupacional.

[I,2,3,4,5,6] Federal University of Santa Maria, Santa Maia, Rio Grande do Sul, Brazil.
[7] Federal University of Health Sciences of Porto Alegre, Porto Alegre, Rio Grande do Sul, Brazil.

Received: 2025/04/08. **Accepted:** 2025/05/28

CORRESPONDING AUTHOR: Matheus Silvelo Franco
Email: matheusfranco.profissional@gmail.com
How to cite this article: Franco MS, Costa VZ, Cabral TS, Herzog M, Simonetti TP, Silva M, Andolhe R. Factors associated with subjective mental workload: an integrative review. R Pesq Cuid Fundam (Online). [Internet]. 2025 [cited year month day];17:e13910. Available from: https://doi.org/10.9789/2175-5361.rpcfo.v17.13910.

ABSTRACT

Objective: to identify the factors associated with subjective mental workload as assessed by the Subjective Mental Workload Scale. **Method:** an integrative review was conducted in July 2024, considering the timeframe from 2009 to 2024. The following databases were searched: MEDLINE, Scopus, Web of Science, SciELO, and PsycInfo. Search strategies were based on the keywords "mental workload" and "subjective mental workload scale," utilizing the Boolean operators "and" and "or." **Results:** the factors associated with subjective mental workload included sex, age, education, leisure activities, professional category, working hours, job satisfaction, health-related quality of life, stress levels, mental health conditions, neuroticism, psychological demands, social support, and environmental conditions. **Final considerations:** subjective mental workload is a multidimensional phenomenon encompassing individual, work, and psychosocial factors.

DESCRIPTORS: Mental health; Workload; Worker health.

RESUMEN

Objetivo: identificar los factores asociados a la Carga Mental Subjetiva evaluada mediante la Escala de Carga Mental Subjetiva. **Método:** revisión integrativa realizada en julio de 2024, considerando el período de 2009 a 2024. Los lugares de búsqueda fueron las siguientes bases de datos: MEDLINE, Scopus, Web of Science, SciELO y PsycInfo. Las estrategias de búsqueda se basaron en las palabras clave "Carga Mental" y "Escala Subjetiva de Carga Mental", utilizando los operadores booleanos "AND" y "OR". **Resultados:** los factores asociados a la Carga Mental Subjetiva fueron: sexo, edad, educación, ocio, categoría profesional, tiempo de trabajo, jornada laboral, satisfacción laboral, calidad de vida relacionada con la salud, niveles de estrés, trastornos mentales, neuroticismo, demandas psicológicas, apoyo social y condiciones ambientales. **Consideraciones finales:** la Carga Mental Subjetiva es un fenómeno multidimensional que involucra factores individuales, laborales y psicosociales.

DESCRIPTORES: Salud mental; Carga de trabajo; Salud laboral.

INTRODUCTION

Workload is a key factor in determining the quality of workers' health and the services they provide. Workload refers to the ability to cope with work demands physically, cognitively, and emotionally, which involves a greater or lesser propensity to exhaustion. Historically, physical exertion was the main factor that aggravated workload, but scientific and technological development has changed this reality by demanding more mental capacity from workers.[1]

The subjective mental workload (SMWL) is a construct representing the mental capacity to withstand work-related stress. This process considers cognitive, labor, contextual, and subjective aspects. Cognition is an intrinsic component that uses mental functions to regulate the ability to perform tasks. Working conditions represent the degree to which tasks demand effort. Context involves environmental and psychosocial circumstances in which workers find themselves. Subjectivity considers the unique experiences of each worker.[2-3]

The main cognitive processes involved in SMWL are perception, attention, memory, and reasoning. These functions allow one to interpret, direct, store, evoke, and elaborate information. Tasks are also mediated by quantity, complexity, difficulty, execution time, and simultaneity, which determine their demand. The circumstances that influence changes in SMWL are denoted by social support, physical structure, conservation and availability of materials, climatic conditions, and interpersonal relationships in the contextual aspect. Finally, subjectivity considers the individual characteristics of workers, such as their skills, knowledge, feelings, motivation, satisfaction, engagement, and achievement.[2-3]

An imbalance in the intensity of the SMWL poses health risks to workers due to the excessive or insufficient use of mental resources, which are characterized as overload or underload, respectively. Mental overload occurs when the mental resources required to perform work are depleted due to excessive tasks or time constraints, resulting in mental fatigue. Conversely, mental underloading occurs when mental resources are minimally used, leading to a state of idleness. For these reasons, the mental load of workers is an important health concern, and therefore, some instruments aim to measure it.

The Subjective Mental Workload Scale (SMWLS) is one such instrument, designed to assess mental fatigue based on workers' perceptions of exhaustion and tiredness. Among its advantages, it is minimally invasive, has low application requirements, is well-accepted by participants, is low-cost, and has optimal characteristics for subjective techniques.[5]

This multidimensional scale was developed and validated in Spain. It contains dimensions based on cognitive, work, and health aspects. It considers twenty items related to cognitive demands and task complexity, task characteristics, temporal organization, work rhythm, and health consequences.[6]

That said, SMWL is a phenomenon that poses health risks and complications for workers due to the intensity of cognitive processes, work adversities, contextual conditions, and individual subjective characteristics. Additionally, imbalance compromises mental, physical, and social well-being. It significantly impacts the final product, leading to reduced performance and increased errors. Therefore, expanding knowledge about factors associated with SMWL is necessary, especially regarding instruments used to measure the relationship between mental capacity and work.

The objective of this review is to identify factors associated with subjective mental workload as assessed by the Subjective Workload Scale.

METHOD

This is an integrative review of scientific literature. The following procedures were adopted: 1) selection and definition of the theme, 2) logical organization of the work, 3) identification and location of sources providing relevant information on the subject, 4) compilation and reading of the material, and 5) systematization of the data. The guiding question emerged from the acronym PIO: in which the problem (P) is the SMWL, the indicator (I) is the SMWLS, and the outcome (O) is the associated factors. Thus, the question that guided the present review was: What evidence exists regarding the factors associated with subjective mental workload as assessed by the subjective workload scale?

The search took place in July 2024, and the chosen databases were: The National Library of Medicine (MEDLINE), Scopus, Web of Science, the Scientific Electronic Library Online (SciELO), and PsycInfo. The search strategy was based on the keywords "mental workload" and "subjective workload scale" because they denote the variables of interest for identifying associated factors. These terms were combined in Portuguese, English, and Spanish in both abbreviated and full forms (Chart 1). The time frame was adopted from 2009 to 2024 because it encompasses the existence of SMWLS.

Inclusion criteria comprise articles written in Portuguese, English, or Spanish that answered the review's question. Included were documents such as literature reviews, experience reports, reflection articles, opinion articles, thesis, dissertations, monographs, books, editorial comments, letters, reviews, and scientific abstracts. Duplicate articles were counted only once. Articles unavailable in the databases were identified through alternative access strategies, such as contacting the authors directly.

Chart 1 - Search strategies carried out in the databases. Santa Maria, RS, Brazil, 2024

Database	Search strategy
PsycInfo	Any Field: Subjective mental workload scale OR Any Field: subjective mental workload scale OR Any Field: SMWLS OR Any Field: SMWLS AND Year: 2009 To 2024
MEDLINE	(subjective mental workload[All Fields]) OR (SMWLS[All Fields])
Scopus	TITLE-ABS-KEY (subjective AND mental AND workload AND scale) OR TITLE-ABS-KEY (SMWLS) AND PUBYEAR > 2008 AND PUBYEAR < 2025
Web of Science	ALL=(Subjective mental workload scale)) OR TI=(Subjective mental workload scale)) OR AB=(Subjective mental workload scale)
SciELO	(carga mental del trabajo) OR (SMWLS) OR (carga mental de trabalho) OR (SMWLS)

Source: The Authors, 2024.

The study selection procedures are systematized in a flowchart created according to the PRISMA Statement 2020 to organize the number of identified, included, and excluded articles.[7]

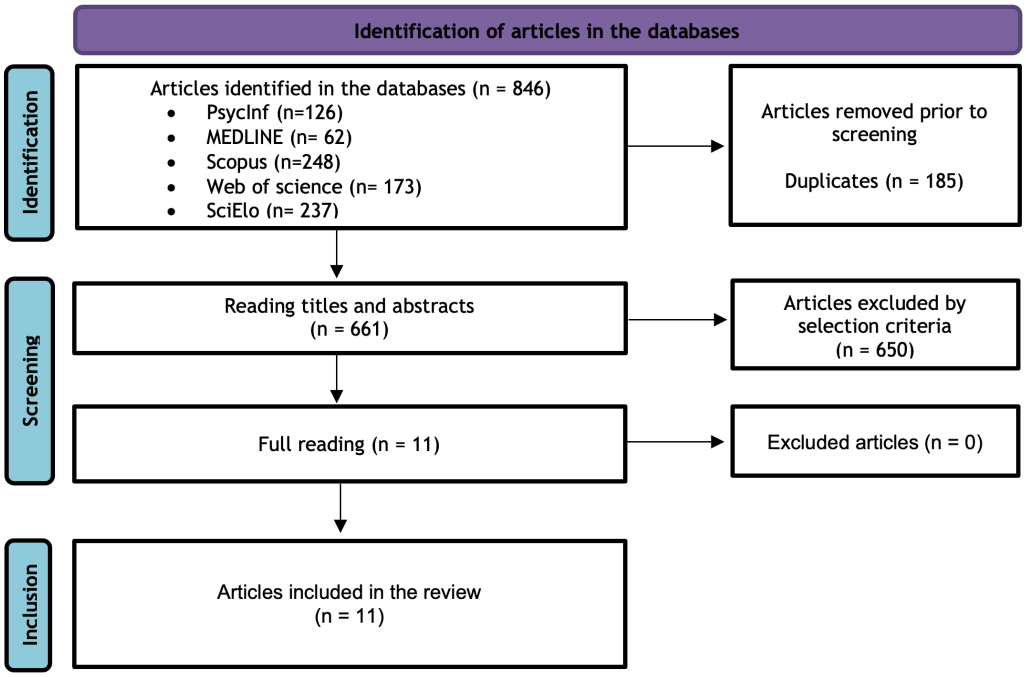
Two reviewers and the Ryan® software were used to operate the selection of articles. First, the reviewers conducted a double-blind review of the titles and abstracts and identified duplicates. Then, the articles were read in full and selected to compose the review corpus.

The articles that made up the review corpus were characterized, presented, critically analyzed, and described. Characterization considered the absolute (n) and relative (%) frequencies of the following: year of publication, country of origin, target audience, scenario, methodological approach, and levels of evidence[8]. The articles were presented based on their methodological designs and main results. Subsequently, they were critically analyzed based on their most relevant results and discussed according to semantic affinity.

RESULTS

The database search resulted in 846 studies. After excluding duplicates, 661 remained and were reviewed based on their titles and abstracts. At this stage, 650 articles were excluded because they did not meet the selection criteria. Then, 11 studies were read in full, and none were excluded, resulting in 11 eligible articles (Figure 1)

Figure 1 - Flowchart for the selection of studies in the databases. See Santa Maria, RS, Brazil, 2024



Source: The Authors, 2024; PRISMA, 2020.

The publications varied from 2010 to 2024. There was a predominance of Chilean articles (n = 8; 72.7%), a quantitative approach (n = 11; 100%), a target audience of health professionals (n = 7; 63.6%), hospital care settings (n = 6; 54.5%), and evidence level N4 (n = 11; 100%). The publications referred to descriptive studies with clinical questions directed toward meaning (Table 1).

Table 1 - Characterization of eligible articles. Santa Maria, RS, Brazil, 2024

Variables	n (%)
Publication year	
2024	1 (9,0)
2023	2 (18,1)
2022	2(18,1)
2021	1(9,0)
2020	1(9,0)
2016	1(9,0)
2015	1(9,0)
2014	1(9,0)
2010	1(9,0)
Country	
Chile	8(72,7)
Brazil	1(9,0)
Spain	2(18,1)
Target audience	
Health professionals	7(63,6)
Education professionals	2(18,1)
Other	3(27,2)
Scenario	
Hospital Care	6(54,5)
Primary Health Care	1(9,0)
Educational institution	2(18,1)
Other	2(18,1)
Methodological approach	
Quantitative	11(100)
Evidence levels	
N4	11(100)

Source: The Authors, 2024.

The synthesis of the eligible articles is presented through their methodological designs and main results. Cross-sectional studies predominate (n = 9, 81.8%), followed by methodological studies (n = 2, 18.1%) (Table 2).

Table 2 - Summary of eligible articles. Santa Maria, RS, Brazil, 2024

Methodological design and instruments used	Participants and main results
Cross-sectional. SMWLS and Job Stress Scale (JSS) – Demand-Control and Social Support Model	A study of 191 primary health care workers identified a negative and significant correlation between social support and SMWL.
Cross-sectional. SMWLS and Health-Related Quality of Life Questionnaire (HRQoL)	A study with 110 workers from an oncology unit found a negative, significant correlation between SMWL and perceived health-related quality of life.
Cross-sectional. SMWLS and sociodemographic, work, health, organizational conditions and psychological mediators questionnaire	A study with 411 healthcare workers found an association between high SMWL and being female, being ≤40 years old, being a nursing team member, having ≤10 years of work experience, having a 24-hour workload, and working at a closed health center. There was a positive and significant association between high SMWL and poor health and organizational conditions. Predictive factors of SMWL were being a member of the nursing team with less than six years of work experience in a closed health center with frequent stress symptoms, little satisfaction with rest, negative perception of access to personal protective equipment, and regular or poor social support.
Cross-sectional. SMWLS and the SUSESOISTAS questionnaire 21.	A study of 111 nurses identified a positive, significant correlation between SMWL and psychosocial risks.
Cross-sectional. SMWLS and environmental conditions questionnaire	Another study with 238 administrative workers identified an association between SMWL and an inadequate perception of lighting, noise, spatial distribution, and hygiene conditions.
Cross-sectional. SMWLS and Depression, Anxiety and Stress Scale (DASS 21)	Study with 311 educational institution workers identified a positive and significant correlation between SMWL and stress, depression, and anxiety.
Methodological. SMWLS and the SUSESOISTAS questionnaire 21	Study with 379 hospital workers identified a positive and significant correlation between SMWL and psychosocial risks. SMWLS demonstrated adequate validity and high reliability.
Methodological. SMWLS and the SUSESOISTAS questionnaire 21	A study of 54 educational institution workers identified a positive and significant correlation between SMWL and the psychological risk dimension of "psychological demands." SMWLS demonstrated adequate validity and high reliability.
Cross-sectional. SMWLS. Environmental Conditions Questionnaire and Brief Personality Questionnaire (BPQ)	Study with 201 emergency nurses found a negative and significant correlation between SMWL and environmental conditions at work, professional experience, time worked in emergencies, and the openness/intellect domain of personality. There was a positive and significant association between SMWL and age (older), female sex, a permanent contract, and the neuroticism personality domain. Predictors of SMWL included hygiene and lighting conditions at work, female gender, and the neuroticism personality domain.
Cross-sectional. SMWLS and biosociodemographic questionnaire	Study examined 47 administrative workers with an above-average level of SMWL. SMWL was predominant among those aged 21 to 30, female, without a partner, and with more than 25 years of service at the company.
Cross-sectional. SMWLS, Health-Related Quality of Life Questionnaire (HRQoL) and the SUSESOISTAS questionnaire 21	Study with 113 workers in an oncology unit identified a correlation between SMWL and health-related quality of life. The "health consequences" dimension of the SMWLS negatively correlated with the physical health components. All SMWLS dimensions had a negative correlation with mental health components.

SMWL = Subjective Mental Workload; SMWLS = Subjective Mental Workload Scale.
Source: The Authors, 2024.

DISCUSSION

Subjective mental workload (SMW) is defined as susceptibility to mental stress caused by the work process. This study compiles the most relevant evidence from research using the Subjective Mental Workload Scale (SMWL), a reliable instrument for the scientific investigation of this construct. The study identified associations with sociodemographic, work, and health factors, which are presented below.

Sociodemographic factors

Regarding the sociodemographic profile, the literature points to relevant results concerning gender, age, education, and leisure in various scenarios, some of which agree with each other and some of which do not.[4,9] [14]

Concerning gender, female workers have a higher prevalence of SMWL. Social stigma may justify this tendency, as women have historically been associated with household activities, and their involvement in these tasks remains prevalent. These arguments can justify the excessive mental load of workers, to the detriment of the double shift required.[4,11,12,16,17]

As for age, there are discrepancies regarding the age group most associated with imbalances in SMWL. There is a predominance in the 21-30 and 32-40 age groups. It is understood, however, that younger workers (those ≤40 years old) are more prone to imbalances in the SMWL. Such findings can be explained by the fact that, during this period, workers are new to the labor market, have fewer professional experiences, and consequently have greater difficulty coping.[11,12]

Among primary health care workers, a statistically significant association was identified between adequate SMWL and higher education. Higher education equips workers to perform their professional activities and strengthens their ability to cope with work pressures. Additionally, leisure time was found to have a statistically significant association with adequate SMWL, demonstrating its fundamental role in promoting physical, mental, and social well-being and enhancing work performance.[4]

Labor Factors

In terms of labor factors, the articles present relevant results regarding professional categories, working hours, workloads, and job satisfaction.[4,11,12]

In the context of the COVD-19 pandemic, nursing professionals represented the class with the highest percentage of SMWL (97.1%). Working in healthcare involves protecting human life and addressing the health-disease process. In certain situations, the scarcity of human and technological resources makes work difficult and exhausting. Nursing professionals, especially during the pandemic, worked amid the high demand for treating infections caused by the coronavirus. They were subject to the multiplicity, complexity, and prolonged duration of tasks.[11,16] These findings corroborate another study in which nurses and nursing technicians had higher scores in the task- and health-related dimensions, respectively.[17]

During this pandemic, teachers also had high rates of SMWL compared to other workers.[13] Among the circumstances consistent with this finding is the complexity of mediating the teaching-learning process, prolonged dedication to preparing classes, transmitting knowledge, fulfilling excessive demands due to a large number of students, and performing other administrative activities.[2] The pandemic also imposed emerging educational challenges, necessitating a readjustment of the educational model. This period was considered critical in this sector.[18]

Regarding length of service, an association was found between high SMWL and ≤5 years of service. Other studies show this accentuation in workers over 25 years of age. For reasons of adaptation, it is understood that workers with short or long service periods have greater difficulty coping.

Studies have shown a significant association between workload and job satisfaction and mental overload in relation to a 24-hour workday, as well as an increased feeling of dissatisfaction with one's activities.[4,11] This may occur due to psychological impairment resulting from extensive exposure to work activities.[19]

Health Factors

Some studies confirm the sickening nature of the SMWL phenomenon through variables such as health-related quality of life, stress, mental disorders, and neuroticism.[9-11, 13, 14, 17, 21, 22, 24]

Health-related quality of life is negatively correlated with SMWLS. Therefore, workers who perceive greater physical, mental, and social impairment have a higher degree of SMWL.[9] This corroborates other results in which workers identify an association between high SMWL and a "very poor" perception of health status.[11]

Physical health is negatively correlated with SMWL in two studies. In a hospital setting, components of workers' physical health correlated with the "health consequences" domain ($p = 0.000$).[10] In oncology workers, all components of physical health correlated with global SMWL ($p = -0.368$). Bodily pain was the most significant finding in the latter ($p = -0.316$) and was mainly related to temporal organization, work rhythm, and health consequences.[9] This relationship occurs in both dynamic and static activities due to the identification of

musculoskeletal problems. This indicates that the prolonged workload, fast pace, and excess activities are related factors.[20]

Psychosocial risks are factors that affect workers' interpersonal relationships and work environment.[17] An association between SMWL and psychosocial factors has been demonstrated. Findings indicate a positive and significant correlation between "psychological demands" and all SMWLS domains. Conversely, all psychosocial risk domains have been shown to predict the "health consequences" dimension.[21] In two SMWLS validations, these results are confirmed.[17,22] Thus, workers subjected to more psychosocial factors tend to experience more health consequences, and the higher the degree of psychological demand, the greater their SMWL.

Nevertheless, interpersonal relationships are indispensable to the work process. Social support involves cooperation, help, and encouragement among workers in an organization. One study demonstrates a negative and significant correlation between social support and SMWL[4]. High-demand work, which is harmful due to excessive psychological demands, work overload, and stress, is also mediated by social support. Workers in high-demand positions who face a high number of tasks have low social support.[23]

Cognitive and relational processes, as well as the work environment, are linked to SMWL. Lighting conditions, noise, spatial distribution, and hygiene are significantly associated with at least four dimensions of SMWLS and are factors associated with it.[24] It is well-known that occupational health is inseparable from work and the environment, although adequate conditions are not always met, which still infers occupational risk.

IMPLICATIONS OF THE STUDY

This study compiles scientific evidence about the factors associated with subjective mental workload in workers from various scenarios and contexts. Based on the factors identified in this review, strategies can be developed to reorganize work processes and improve their viability.

STUDY LIMITATIONS

This study is limited by the small number of articles using SMWLS, as it is a relatively new instrument in scientific research. It has not yet been widely disseminated, despite its well-validated and reliable psychometric properties. Furthermore, the totality of studies with quantitative, cross-sectional, and descriptive design limits this objective.

FINAL CONSIDERATIONS

Evidence reveals that subjective mental workload is associated with sociodemographic, work, and health factors, including gender, age, education, leisure, professional category, work hours, workload, job satisfaction, health-related quality of life, stress, mental disorders, and neuroticism. Additionally, an association with psychosocial factors is demonstrated, particularly regarding psychological demands, social support, and environmental conditions. Based on these findings, it is possible to define this construction as a multidimensional phenomenon involving individual, work, and psychosocial factors. Future studies using qualitative-quantitative or mixed methods can expand our knowledge. Additionally, experimental models that aim to measure biological parameters could confirm this evidence.

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