

# Occupational Physicians' Management of Workers with Multiple Sclerosis in Italy: Results from a Survey

BRUNA MARIA RONDINONE<sup>1#</sup>, GIULIANA BURESTI<sup>1#</sup>, SERGIO IAVICOLI<sup>2</sup>, PAOLO DURANDO<sup>3,4</sup>, MARIO ALBERTO BATTAGLIA<sup>5,6</sup>, GUGLIELMO DINI<sup>3,4</sup>, ALFREDO MONTECUCCO<sup>3,4</sup>, ALBORZ RAHMANI<sup>3</sup>, NICOLETTA DEBARBIERI<sup>4</sup>, PAOLO BANDIERA<sup>7</sup>, MICHELA PONZIO<sup>5</sup>, TOMMASO MANACORDA<sup>7</sup>, ELENA PIGNATTELLI<sup>5</sup>, MATILDE INGLESE<sup>8,9</sup>, BENEDETTA PERSECHINO<sup>1,\*</sup>

<sup>1</sup>Department of Occupational and Environmental Medicine, Epidemiology and Hygiene, Italian Workers' Compensation Authority (INAIL), Monte Porzio Catone, Rome, Italy

<sup>2</sup>Directorate-General for Communication & European & International Relations, Ministry of Health, Rome, Italy

<sup>3</sup>Department of Health Sciences, University of Genoa, Genoa, Italy

<sup>4</sup>Ospedale Policlinico San Martino di Genova IRCCS, Genoa, Italy

<sup>5</sup>Scientific Research Area, Italian Multiple Sclerosis Foundation, Genoa, Italy

<sup>6</sup>Department of Life Science, University of Siena, Siena, Italy

<sup>7</sup>Italian Multiple Sclerosis Society (AISM), Genoa, Italy

<sup>8</sup>Department of Neurosciences, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health (DiNOGMI), University of Genoa, Genoa, Italy

<sup>9</sup>Neurology Unit, Ospedale Policlinico San Martino di Genova IRCCS, Genoa, Italy

#Contributed equally

**KEYWORDS:** Multiple Sclerosis; Occupational Physicians; Occupational Health Practice

## ABSTRACT

**Background:** *This study, conducted on a sample of Italian occupational physicians (OPs), aimed to gather data regarding professional activity and their needs in managing workers with multiple sclerosis (MS).* **Methods:** *A convenience sample of OPs recruited by e-mail invitation to the list of Italian Society of Occupational Medicine members was considered. A total of 220 OPs participated between July and October 2022. An ad hoc questionnaire was developed based on previous survey experiences. It investigated, among others, the characteristics of OP respondents, the evaluation of fitness for work issues, and the OP training and updating needs on MS and work.* **Results:** *Ninety-one percent of OPs had to assess the fitness for work of workers with MS during their activity. Sixty-four percent experienced particular difficulties in issuing a fitness for work judgment. Regarding the level of knowledge on MS, 54% judged it sufficient. The "Assessment of fitness for work for the specific task" and the "Role of the OPs in identifying reasonable accommodations" were the most interesting training topics regarding MS management in work contexts chosen by the respondents.* **Conclusions:** *The interest in the work inclusion and job retention of people with disability, particularly the aspects linked to the Identification and implementation of reasonable accommodations, will require integration with the occupational safety and health protection system and will undoubtedly impact the OP's activities.*

## 1. INTRODUCTION

Multiple sclerosis (MS) is an inflammatory demyelinating chronic disease of the central nervous system. It is one of the most frequent causes of neurological disability in young adulthood, generally diagnosed between the ages of 20 and 40; it affects females more than men in a ratio equal to 2:1. The majority (approximately 85%) of the patients affected by MS are diagnosed with relapsing-remitting form (RRMS) that is characterized by episodes of significant worsening of symptoms (relapses), followed by complete or partial recovery, and then periods of remission. RRMS is more common among women and young adults (average age 30) [1-3]. Around 15% of patients are diagnosed with primary progressive form (PPMS), in which disability continuously progresses and relapses may or may not be present. PPMS is usually diagnosed in older patients than RRMS (average age 40) and with no differences based on gender [2, 4]. In many cases, individuals with RRMS develop after years of a secondary-progressive MS form (SPMS).

In 2023, 2.9 million people lived with MS worldwide [5], 1,200,000 in Europe [6]. MS prevalence has increased in every world region since 2013. Indeed, in 2020, the prevalence worldwide was 43.95 per 100,000 population (a 50% increase compared with 2013). In Europe, the prevalence was 142.81 per 100,000 population, with a rise of 32% compared to 2013. Although MS is found in all parts of the world, its prevalence varies greatly, being highest in the Americas (111 people with MS per 100,000) and Europe (137 people with MS per 100,000) and lowest in Africa and Western Pacific region (5 people with MS per 100,000) according to most recent statistics [5]. The pooled incidence rate across 75 reporting countries is 2.1 per 100,000 persons/year, and the mean age of diagnosis is 32 years. Females are twice as likely to live with MS as males [5].

In Italy, Italian Multiple Sclerosis Society (AISM) estimates the existence of approximately 137,000 people with MS in 2023, with an incidence of over 3,600 new cases each year (6 per 100,000 people, 12 in Sardinia region) and a prevalence of 221 per 100,000 people [6].

In 2015, the Italian Multiple Sclerosis Registry (RISM) was created to build an organized multi-center structure to collect data on all MS patients followed in the various Italian MS centers for better defining the disease epidemiology, improving quality of care, and promoting research projects [7]; in September 2023 there were over 85,000 cases in the register, corresponding to about 60% of the MS population estimated in Italy according to the 2023 MS barometer [8].

MS represents a significant psychological, physical, financial, and social burden for patients; in fact, the most common symptoms of the disease are related to depression and cognitive dysfunction, problems with walking, deadness, difficulties in balance and coordination, dysarthria, bladder and bowel disturbance, visual impairment, reduced heat tolerance, pain, and fatigue [4, 9].

Battaglia et al. [10] showed that patients with MS are affected by several burdensome and disabling symptoms, above all the overwhelming presence of fatigue. Moreover, they showed a great impact of the disease on daily and work activities, referring in particular to life plans, difficulties in travelling, attention and presence at work, salary, and early exit from the job market or retirement.

In 2019, the overall cost of the disease in Italy was €4.8 billion. The National Healthcare System sustained most of the costs (80%), most notably direct healthcare costs, while patients paid almost all non-healthcare expenses [10].

A study on seven European cost-of-illness analyses showed that the societal economic burden varies between MS types; in particular, costs for SPMS were higher than those for RRMS [11, 12]. For example, it was estimated that in Europe, the total economic costs of MS amount to 14.6 million €/year, with the highest costs per subject (26,974 €/year) among the main brain disorders [13]. This significant economic burden is mainly related to the young age of MS onset (symptoms first appear between ages 20 and 50) and to its unemployment rates [13, 14]. In this regard, the consequence of MS is a decrease in employability due to a reduced ability to perform occupational functions and tasks. People with Multiple Sclerosis (PwMS) are at an increased risk of unemployment during the

disease. In recent years, progress has been made in improving the time until patients have to leave the workforce permanently [15]. Loss of employment is still one of the most troubling consequences of MS and contributes to the economic burden of the disease on the societal and personal level. In this context, several studies examined the impact of MS on employment status: unemployment rates among PwMS can reach 80% [16].

Within the “PRISMA project – Risk Prevention, Collaborative Networks, Work Inclusion in Multiple Sclerosis: From Knowledge of the Working Reality of People with MS in Italy to the Development of Innovative Models and Programs for Work Inclusion”, funded by Italian Workers' Compensation Authority (INAIL) aimed at identifying tools and strategies to contribute to overcoming the difficulties in the protection of occupational health and safety of workers with MS (WwMS), exciting results have arisen.

Regarding the occupational outcomes of PwMS, Vitturi et al. [17] show that even for patients who remain employed, more than a quarter show some deterioration in employment status, and 56% observe a work performance loss in the short term after the diagnosis. Furthermore, once unemployed, it is difficult for WwMS to return to the workforce. Workers are exposed to different typologies of barriers during their jobs. These barriers refer to job characteristics, work environment (e.g., access to the workplace, presence of steps, etc.), social relationships at work (e.g., interaction with supervisors, employer's attitude, etc.), adverse work events and lack of information [18, 19]. It comes to light that a multidisciplinary approach can help manage the interaction between the impairments caused by MS, the physical environment, and the job demands [19]. A literature review also shows that in the last years, even though still prevalent in WwMS, unemployment and early retirement have slightly decreased [20].

Therefore, it is easy to understand the pivotal role of the occupational physician (OP) [21] – a key figure in the company prevention system according to Italian occupational health and safety (OSH) regulations – in defining fitness for work judgment and identifying specific prevention and protection

measures, including reasonable accommodations. This intervention will contribute to job retention for WwMS, favoring anti-discriminatory processes and real work inclusion as much as possible, using a shared and integrated approach among the different professionals of the company prevention system. In this context, among the specific objectives of the PRISMA project, a survey of Italian OPs was conducted through a self-administered questionnaire to gather data regarding the professional activity and their needs in the management of WwMS. In particular, the survey aimed to explore some issues related to the fitness for work in the presence of WwMS, the training needs on “MS and work”, and the OP's perception of including the disabled worker.

## 2. METHODS

### 2.1. Participants

A convenience sampling approach was used, contacting OPs recruited by e-mail invitation to the list of members of the Italian Society of Occupational Medicine (SIML). A total of 220 OPs living and working in Italy participated in this study between July and October 2022.

Under current privacy legislation (Legislative Decree 196/2003), all the participants were informed in written form about the survey's aims and told that the data obtained would be used only for research purposes, collected and processed anonymously and aggregately. After this disclosure, the participants were asked to answer a questionnaire voluntarily.

Ethical review and approval were waived for this study due to the anonymity of the data collected, the observational design, and the absence of patient clinical data.

### 2.2. Questionnaire

To pursue the study's aims, a structured ad hoc questionnaire was developed. The items and questions included in the questionnaire were prepared and contextualized based on tools already

administered in previous survey experiences and on the analysis of scientific literature [21, 22].

A pilot test was conducted on a small sample of subjects (n=10) to determine each item's length, content, clarity, and comprehensibility. The questionnaire was adapted according to suggestions and observations gathered during the pilot test phase.

The questionnaire consisted of close-ended questions organized into the following sections:

- I. the OP demographic and professional characteristics: gender, age, region of residence, specialization in Occupational Medicine or other disciplines, medical activity in other fields besides Occupational Medicine, number of workers examined as OP, number and types of companies seen as OP and risks present;
- II. the evaluation of fitness for work of WwMS: potential experience in WwMS management, type of company and risks, frequency, and areas of difficulty in managing the fitness assessment linked to occupational risk or aspects of the disease, need and usefulness of specialist medical certifications, need and usefulness of discussion with other health-care professionals;
- III. the OP training and updating needs on issues related to disability and work and in particular MS and work: disability and work with a focus on MS and work – specific training insights, degree of usefulness of the topics, particular areas of interest in participating in training events on the subjects, the effectiveness of different teaching methodologies;
- IV. knowledge and consultation of “Fitness for Work and Multiple Sclerosis. Guide for Occupational Physicians” published in 2013 by AISM in collaboration with SIML [23]: reasons for the consultation and the degree of interest in the different sections of the Guide.

Different 1-5 scales were used, where 1=minimum level and 5=maximum level, to investigate the utility, complexity, or interest level in some issues. The questionnaire was administered via the web on

the Survey Monkey platform via an e-mail invitation to the list of SIML members.

### 2.3. Statistical Analysis

Statistical analysis was performed with SPSS software version 25. Descriptive analysis was performed: percentages and frequencies were calculated on the total sample and, at a greater level of detail, contingency tables were employed to display the frequency distribution of the variables in the subsets generated by sociodemographic variables and highlight any peculiarities. Five-point scales were re-coded in three classes: “not at all” was aggregated with “slightly” and “very” was aggregated with “extremely”.

## 3. RESULTS

### 3.1. Sociodemographic and Professional Information

The convenience sample consisted of 220 OP respondents (equal to approximately 16% of the active members of SIML). Most respondents were male (52,7%), aged 45-64 years (55.9%), lived in the North-West of Italy (35.9%), and specialized in Occupational Medicine (80.7%). Over half of the sample (52.3%) began their activity as OPs between 1991 and 2007, and 31.8% subsequently; 52.4% worked as self-employed, and 36.4% worked in other fields besides Occupational Medicine. Most of the sample (43.2%) worked in less than ten companies, 50.0% examined more than 1,500 workers overall, and 36.4% of OPs worked for large companies (more than 250 employees). The most frequent risk factors present in the visited companies were manual handling of loads (11.8%) and video display units (11.4%). Sociodemographic information is reported in Table 1.

### 3.2. The Assessment of Fitness for Work in Workers with Multiple Sclerosis

Most of the participants (90.9%) had to assess the fitness for work of WwMS during their OPs activity, mainly 1-4 times overall (47.7%). Mostly, WwMS for

**Table 1.** Description of the sample: sociodemographic and professional information.

	N	%
<b>Gender</b>		
Male	116	52.7
Female	104	47.3
<b>Class of age</b>		
<35 yr	15	6.8
35-44 yr	35	15.9
45-54 yr	61	27.7
55-64 yr	62	28.2
≥65 yr	47	21.4
<b>Geographical area of residence</b>		
North-West Italy	79	35.9
North-East Italy	62	28.2
Middle Italy	42	19.1
South and Islands	37	16.8
<b>Legal requirements to perform OP profession<sup>1</sup></b>		
Specialty in Occupational Medicine	192	80.7
Specialty in Hygiene and Preventive Medicine	14	5.9
Authorization pursuant to article 55 of Decree Law no. 277/1991	12	5.0
Teaching Occupational Medicine or Preventive Medicine for Workers and Psychotechnique or Industrial Toxicology or Industrial Hygiene or Physiology and Occupational Hygiene	10	4.2
Specialty in Legal Medicine	8	3.4
University master for specialists in Hygiene and Preventive Medicine or Legal Medicine	2	0.8
<b>Total number of workers examined as OP in a year</b>		
≤100	14	6.4
101-500	25	11.4
501-1000	35	15.9
1001-1500	36	16.4
>1500	110	50.0
<b>How many employees do the companies in which you have most assignments as OP have?</b>		
<10 employees (micro)	38	17.3
11-49 employees (small)	57	25.9
50-249 employees (medium)	45	20.5
≥250 employees (large)	80	36.4
<b>What is(are) the risk(s) in the companies where you carry out activities as OP?<sup>1</sup></b>		
Manual handling of loads	209	11.8
Visual display units	202	11.4
Chemical substances	183	10.4
Biomechanical overload of the upper limbs	178	10.1
Night work	174	9.8

*Table 1 continues*

**Table 1.** Description of the sample: sociodemographic and professional information. (continued)

	N	%
Biological agents	172	9.7
Noise	148	8.4
Vibrations	115	6.5
Carcinogenic substances	110	6.2
Artificial optical radiation	108	6.1
Electromagnetic fields	99	5.6
Other	69	3.9

<sup>1</sup>Multiple choice question, percentages of responses.

whose fitness for work was assessed by the OPs interviewed belong to the health and social care sector (22.6% of the answers provided), followed by other services activity (12.4%), public administration (7.6%) and manufacturing activities (6.9%). About the occupational risks to which WwMS were exposed, video display units were mainly represented (21.5%), followed by manual handling of loads (19.7%).

Most respondents (64.0%) experienced (sometimes, often, and always) specific difficulties in issuing a fitness for work judgment. Among the aspects that are mainly attributable to the problems encountered in assessing fitness for work, the working posture appears to be the leading cause (18.9% of the answers provided), followed by job rotation (15.9%) and, with almost the same percentages (about 14%), working hours, type of risk and working environment. The main findings related to the management of WwMS by Italian OPs are reported in Table 2.

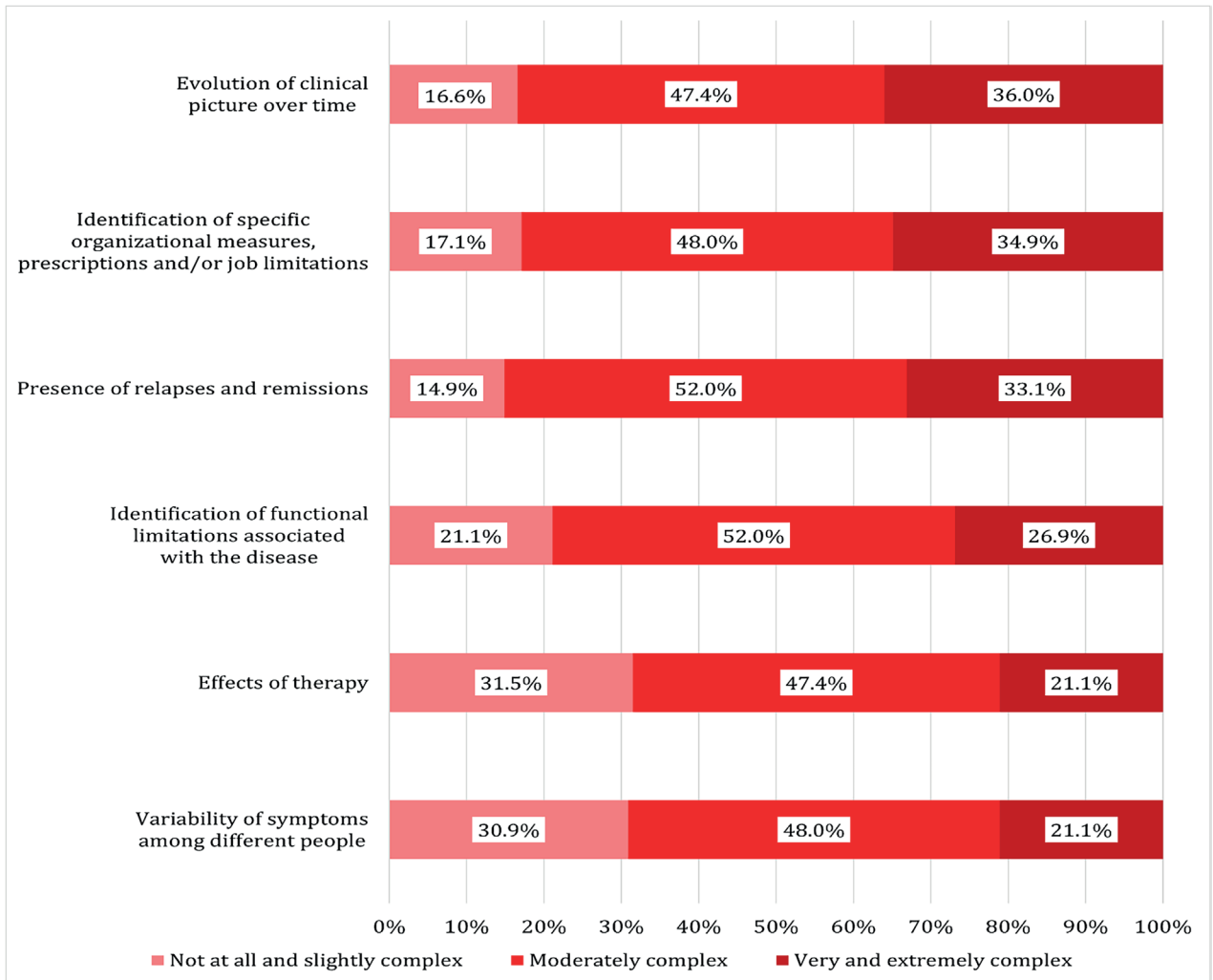
Regarding MS-related aspects that can make the assessment of fitness for work challenging, the “Evolution of clinical picture over time” was the topic which reached highest percentage of subjects that considered it very and extremely complex (36.0%), followed by the “Identification of specific organizational measures, prescriptions and job limitations” topic (34.9%) and the “Presence of relapses and remissions” (33.1%) (Figure 1).

For the assessment of fitness for work, 40.0% of respondents declared the medical documentation submitted by WwMS to be exhaustive, while 56.6% considered necessary to acquire the medical certifications or reports issued by the WwMS’s specialist clinical center of reference; only 3.4% of respondents

**Table 2.** The management of WwMS.

	N	%
<b>Health risks to which WwMS whose fitness for work you assessed were exposed to<sup>1</sup></b>		
Visual display units	138	21.5
Manual handling of loads	126	19.7
Biological agents	99	15.4
Night work	78	12.2
Biomechanical overload of the upper limbs	71	11.1
Chemical substances	51	8.0
Noise	25	3.9
Vibrations	15	2.3
Other	38	5.9
<b>How often has the fitness for work judgment presented difficulties in the WwMS assessment?</b>		
Never	18	9.1
Rarely	53	26.9
Sometimes	101	51.3
Often	22	11.2
Always	3	1.5
<b>The difficulties you experienced in issuing a fitness for work judgment were mainly due to...<sup>1</sup></b>		
Working posture	77	18.9
Job rotation	65	15.9
Working hours	59	14.5
Typology of risk factors	58	14.2
Work environments overall	57	14.0
Magnitude of occupational risk factors	38	9.3
Equipment and working machinery	34	8.3
Other	20	4.9

<sup>1</sup>Multiple choice question, percentages of responses.



**Figure 1.** Degree of perceived complexity of different aspects for the assessment of fitness for work of WwMS. The scale ranged from not at all complex to extremely complex.

considered necessary to have the WwMS undergo a specialist examination by a neurologist chosen by the employer.

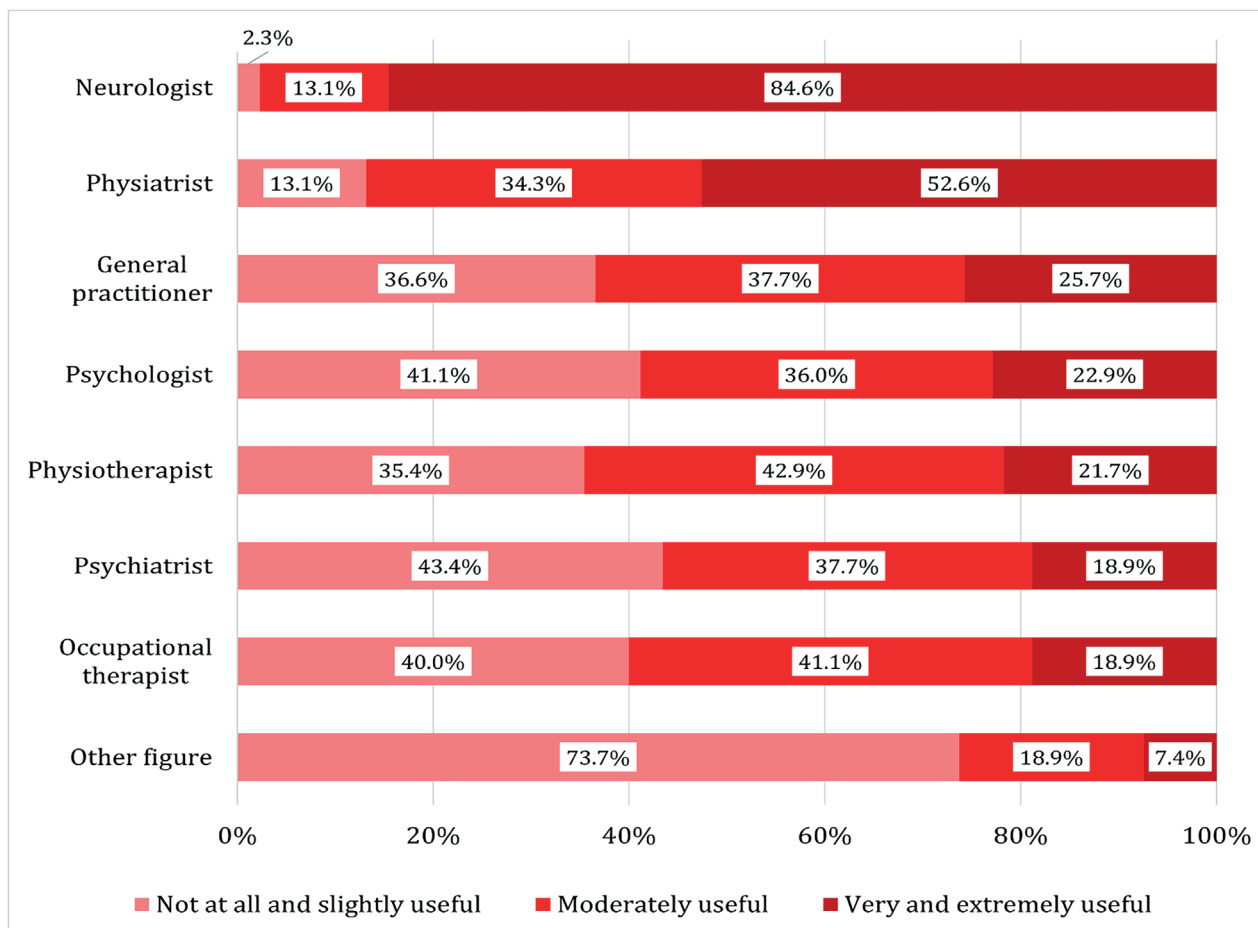
Most respondents (85.1%) considered the availability of neurological certification during the fitness assessment for WwMS work to be very and completely useful. At the same time, 45.0% of the respondents had to ask the neurologist for advice during this process.

In broader terms, the OPs interviewed, called to respond regarding the usefulness of the interaction with different professionals during the fitness for work assessment of WwMS, considered

the collaboration with the neurologist (84.6%) and psychiatrist (52.6%) as very and extremely useful, in a scale from not at all useful to extremely useful, again aggregating the two extremes of both sides (Figure 2).

### 3.3. Training and Updating Needs

Investigating specifically the level of knowledge of MS, 53.6% of the sample interviewed judged it sufficient, 28.4% good and excellent, and 18.0% poor and mediocre. A high percentage (76.5%) of respondents is interested (very and completely) in



**Figure 2.** Degree of usefulness of the interaction with the different professionals for assessment of fitness for work of WwMS. The scale ranged from not at all useful to extremely useful.

participating in a Continuing Medical Education (CME) course on topics related to MS management in work contexts.

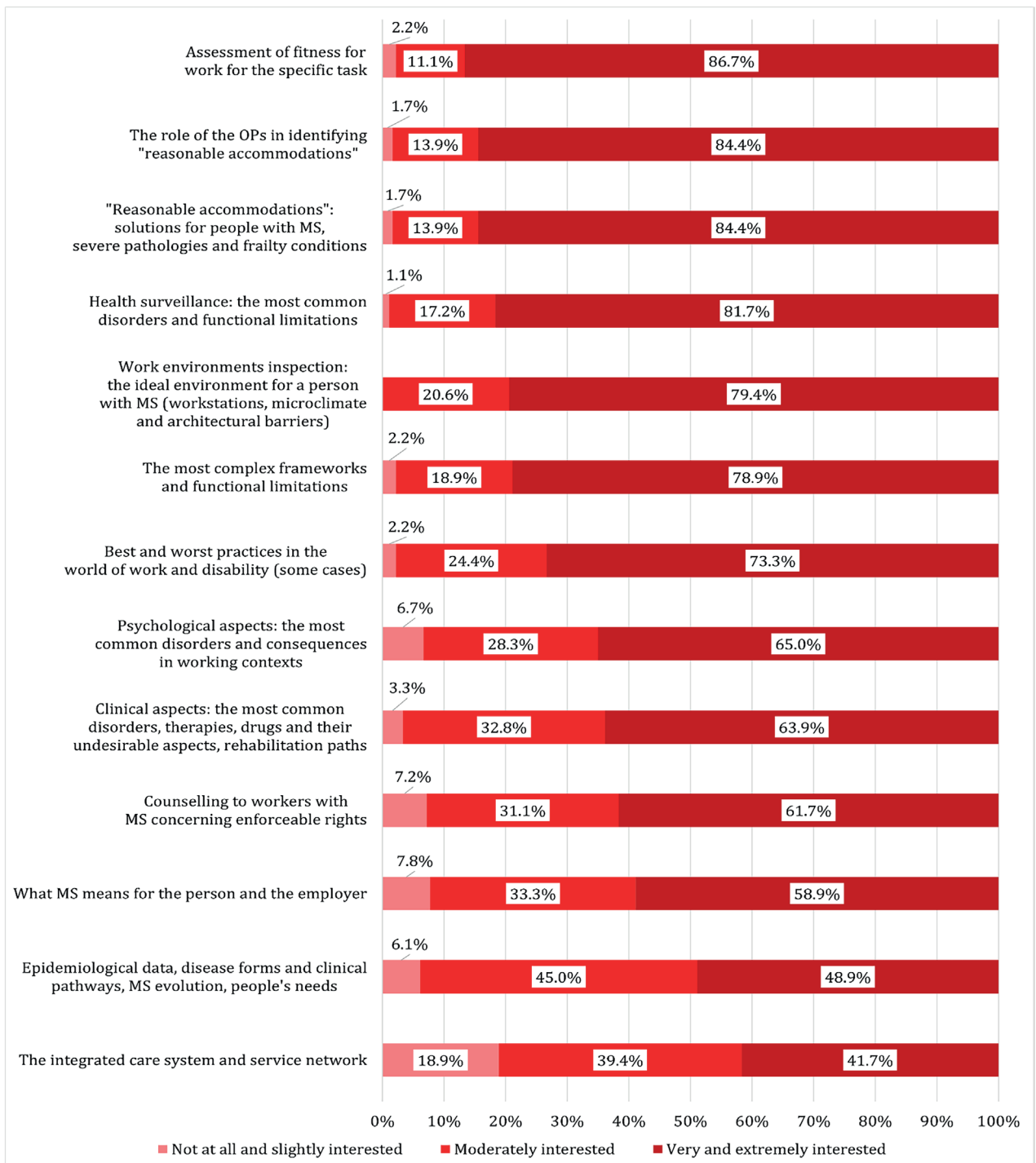
When interested in the CME course, OPs were asked to indicate their interest in different training topics regarding MS management in work contexts. The “Assessment of fitness for work for the specific task”, the “Role of the OPs in identifying reasonable accommodations”, “Reasonable accommodation: solutions for people with MS severe pathologies and frailty conditions” and “Health surveillance, the most common disorders, and functional limitations” were the most interesting topics of training regarding the MS management in work contexts with percentages

of respondents that considered them very and extremely interesting higher than 80% (Figure 3).

### 3.4. Knowledge, Consultation, and Degree of Interest for the Guide “Fitness for Work and Multiple Sclerosis. Guide for Occupational Physicians”

Based on the results of this section of the questionnaire, more than half of the sample (53.1%) was aware of the guide created in 2013 by the collaboration of AISM and SIML, mainly through the SIML itself (56.5%), followed by word of mouth (13.0%). Among OPs that know it, 82.6% consulted it, mainly for managing WwMS (59.2%); the second reason was the need for updating (28.9%).





**Figure 3.** Degree of interest in topics for training in dealing with MS and work contexts. The scale ranged from not at all interested to extremely interested.

The guide was mostly consulted to improve knowledge on the impact of functional limitations on work-related fitness (50,7%), followed by ergonomic aspects related to MS (19.1%) and clinical aspects of MS (16.9%).

Among sections of the guide, the one regarding fitness for work for the specific job in WwMS obtained the highest percentages of respondents that considered it very and extremely interesting (89.4%), followed by legal-regulatory and medical-legal context (69.8%) and the rehabilitation and ergonomic consultancy section (69.7%).

#### 4. DISCUSSION

In recent years, there has been an increasing need for an approach to health and safety protection that includes the struggle against discriminating workers with disabilities. This is also in consideration of the Italian transposition of the Council Directive 2000/78/EC of 27 November 2000, “establishing a general framework for equal treatment in employment and occupation”, regulated by Legislative Decree 216/2003 and effectively finalized with changes made by Law 99/2013 but also with ratification in Italy, through Law 18/2009, of the United Nations Convention on the Rights of Persons with Disabilities (CRPD) [24]. Indeed, the Council Directive 2000/78/EC stated, “...to guarantee compliance with the principle of equal treatment about persons with disabilities, reasonable accommodation shall be provided. This means that employers shall take appropriate measures, where needed in a particular case, to enable a person with a disability to have access to, participate in, advance in employment, or undergo training, unless such measures would impose a disproportionate burden on the employer”.

Subsequently, the CRPD introduced the definition of reasonable accommodation as “means necessary and appropriate modifications and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms”. Furthermore, since 2004 the European Agency for Safety and Health at Work (Eu-Osha) declared that “...a workplace that is accessible and safe

for people with disabilities is also safer and more accessible for all employees, clients and visitors” [25]. Therefore, considering the current regulatory framework, it is evident that Italian legislation over time established that public and private employers are required to adopt reasonable accommodations to ensure workers with disabilities are fully equal with other workers with work-related disabilities.

Taking into account what is established by the Italian legislation on the protection of health and safety at work (Legislative Decree 81/2008), the OP plays a key role in this context since he is, to all intents and purposes, a “global consultant” on the matter [26]. Indeed, in this regard, it should never be forgotten that the OP is involved in the risk assessment and based on it, as well as participating in the identification of prevention and protection tools, he is specifically called to define the health surveillance protocol and therefore to express the fitness for work judgement to the specific task of the worker [24].

Concerning the risk assessment, Legislative Decree 81/2008 establishes that it must discuss all the risks present at work, including those concerning “groups of workers exposed to particular risks” such as “those categories of workers for whom, compared to the average worker, the risks relating to the same danger are comparatively greater due to subjective causes depending on the workers themselves”, as already specified in a circular of the Ministry of Work of 1995, including workers with disability. This has also been recently reinforced by the explicit invitation to “Assess and address risks with a particular focus on groups most affected by the pandemic, such as persons with disabilities”, reported in the EU strategic framework on Health and Safety at Work 2021-2027 [24]. Furthermore, rules already in force, e.g. Legislative Decree n. 75 of the 25 May 2017 and subsequent amendments and, above all, those referred to the regulatory reorganization on disability issues ongoing in Italy and undertaken with Law n. 227 of 22 December 2021, have already introduced some areas of interest also for OP, such as his involvement in the work placement processes of people with disabilities in all public administration.

Undoubtedly, the aspects relating to the protection of reasonable accommodation, already foreseen and strengthened in the forthcoming reorganization

of the legislation, will be an area in which the OP will have to provide his contribution, especially regarding some issues such as the job integration/reintegration and return to work of workers with disability. Therefore, the OP's role in protecting workers with disability emerges clearly. This role requires accurate knowledge and examination of the risks present in the job task and those strictly referred to the work environment that should be correlated to any functional limitations that, in turn, are associated with disabling pathologies. The OP will also be crucial in collaborating to prepare plans for managing emergencies and their optimization based on needs required by the different types of disabilities present [24].

Our survey results show that the management of WwMS is a relatively remote occurrence since more than 90% of OP respondents experimented with it (approximately 48% at least once). These percentages are much higher than those in the previous study [21]. This is probably due to a more significant presence of subjects with MS in the world of work compared to the past and also due to the evolution of therapies that have contributed to promoting job placement and retention. Exposure to occupational risks of WwMS examined by OPs interviewed is in line with the main occupational risks seen in the Italian working population: visual display units and manual handling of loads, both with ergonomic implications.

The assessment of fitness for work of WwMS - generally a complex and challenging activity for the OP - is even more critical in the management of WwMS as it emerges from our study data, where only 10% of the responders have never encountered difficulties in the fitness for work assessment. In this regard, the aspects of the work identified as the basis of the challenges faced by OPs are also in line with the literature. They are mainly attributable to the working posture, job rotation, working hours, and the type of risk present [18-21, 27-31].

Concerning the clinical aspects of MS, those perceived by OPs as most complex for fitness for work assessment are the "Evolution of clinical picture over time" and the "Presence of relapses and remissions". From this arises the declared usefulness of the interaction with some professionals, first the

neurologist, followed by the physiatrist, and of neurological certifications (reports) acquirement (very and completely useful for over 85% of OPs). However, it is necessary to take into account, beyond the management of the specific case, that the peculiarity of MS, with the diverse symptomatology that can affect patients in different functional domains, requires an approach that cannot ignore multidisciplinary and interdisciplinarity, as in general for all complex diseases [32]. It is appropriate to undertake initiatives to implement the multi-interdisciplinary approach to encourage interactions with other professionals (e.g. the physiotherapist, the occupational therapist, the psychologist) to assess fitness for work and identify and implement any reasonable accommodations.

The study shows that over 85% of OPs needed to consult specialist medical reports to optimize their fitness for work, which in almost all cases were presented directly by the workers or requested, through the workers themselves, to the reference clinical specialist centres. A specific availability would seem to emerge within specialist clinical centres for MS in the area, which could be essential for the OP due to particular needs linked to the so-called "difficult or complex fitness for work", which require contact with second-level centres, as also highlighted in previous studies, to better protecting WwMS [22].

As previously reported, taking into account our data, it is not surprising that the training needs, through CME courses, of the OPs interviewed - given a declared sufficient knowledge of the disease - mainly focus on the issues of "assessment of fitness for work for the specific task" and "the role of the OP in identifying reasonable accommodations". Based on the survey results and other points of interest emerging from the study, a CME course was designed and implemented as part of the PRISMA project. It consisted of a synchronous webinar that subsequently merged into an asynchronous webinar in which approximately 900 OPs participated, demonstrating their interest in the topic. Among the tools to support the professional activity of OPs, the availability of guidelines has always been well appreciated by the participants, as has also emerged from the scientific literature about specific SIML initiatives. This is because, in the exercise of any medical

discipline, the availability of guidelines is always considered beneficial [33-35]. For this reason, the elaboration of the guide by AISM-SIML in 2013 offered a helpful tool – although not very well known (only 53% of the OPs interviewed admitted to knowing it) whose consultation took place – in particular for the topic “fitness for work” and to explore the impact of functional limitations on fitness for work.

## 5. CONCLUSION

The interest in the work inclusion and job retention of people with disabilities, implemented by the specific regulatory evolution currently ongoing, in particular the aspects linked to the identification and implementation of reasonable accommodations, will require integration with the OSH protection system and will undoubtedly impact the OP’s activities.

As emerged from this survey, there is a clear need for updating on MS matters, primarily referring to the profiling of the fitness for work of the WwMS for job retention. These results, together with further inputs from the PRISMA project [17-20], strengthen the opportunity for the availability of guidelines or, in any case, operational protocols on the subject, which are of significant usefulness for the OP. It is therefore believed that SIML’s recent initiative to set up a working group on MS and work with a multi- and interdisciplinary approach favors the preparation of guidelines – starting from the update of the 2013 document – with the aim to supporting the work of the OP in his complex role of “global consultant”.

**FUNDING:** The study was realized in the framework of the “PRISMA” Project funded by INAIL (Bric 2019\_ID 24).

**INSTITUTIONAL REVIEW BOARD STATEMENT:** Not applicable.

**INFORMED CONSENT STATEMENT:** Not applicable.

**ACKNOWLEDGEMENTS:** The authors would like to thank SIML and the surveyed occupational physicians for their valuable collaboration, which made this manuscript possible.

**DECLARATION OF INTEREST:** The authors declare no conflict of interest.

**AUTHOR CONTRIBUTION STATEMENT:** Conceptualization of the study: BP; Supervision: BP; Validation: BP, PD, SI; Questionnaire development: BP, SI, PD, GD, AM, AR, ND, PB; Data curation & Formal analysis: BMR, GB; Methodology: BP, BMR, GB, SI, PD; Writing – original draft: BP, PD, SI, BMR, GB; Writing – review & editing: BP, PD, BMR, GB, SI, GD, AM, AR, MAB, MP, EP, TM, MI. All authors reviewed and approved the final manuscript.

## REFERENCES

- Romero-Pinel L, Bau L, Matas E, et al. The age at onset of relapsing-remitting multiple sclerosis has increased over the last five decades. *Mult Scler Relat Disord*. 2022;68:104103. Doi: 10.1016/j.msard.2022.104103
- Brownlee WJ, Hardy TA, Fazekas F, Miller DH. Diagnosis of multiple sclerosis: progress and challenges. *Lancet*. 2017;389(10076):1336-1346. Doi: 10.1016/S0140-6736(16)30959-X
- Hirst C, Ingram G, Pickersgill T, Swingle R, Compston D a. S, Robertson NP. Increasing prevalence and incidence of multiple sclerosis in South East Wales. *Journal of Neurology, Neurosurgery & Psychiatry*. 2009;80(4):386-391. Doi: 10.1136/jnnp.2008.144667
- Lublin FD, Reingold SC, Cohen JA, et al. Defining the clinical course of multiple sclerosis: the 2013 revisions. *Neurology*. 2014;83(3):278-286. Doi: 10.1212/WNL.0000000000000560
- Atlas of MS 2020, The multiple sclerosis international federation. Accessed May 14, 2024. <https://www.atlasofms.org/map/global/epidemiology/number-of-people-with-ms>
- AISM| Associazione Italiana Sclerosi Multipla. Barometro sclerosi multipla Italia, 2023. Accessed May 14, 2024. [https://www.aism.it/sites/default/files/2023-10/barometro\\_2023\\_web.pdf](https://www.aism.it/sites/default/files/2023-10/barometro_2023_web.pdf)
- Trojano M, Bergamaschi R, Amato MP, et al. The Italian multiple sclerosis register. *Neurol Sci*. 2019;40(1):155-165. Doi: 10.1007/s10072-018-3610-0
- Registro Italiano Sclerosi Multipla. Accessed March 8, 2024. <https://www.registroidalianosm.it/index.php?page=centri>
- Klineova S, Lublin FD. Clinical Course of Multiple Sclerosis. *Cold Spring Harb Perspect Med*. 2018;8(9):a028928. Doi: 10.1101/cshperspect.a028928
- Battaglia MA, Bezzini D, Cecchini I, et al. Patients with multiple sclerosis: a burden and cost of illness study. *J Neurol*. 2022;269(9):5127-5135. Doi: 10.1007/s00415-022-11169-w
- Simoens S. Societal economic burden of multiple sclerosis and cost-effectiveness of disease-modifying therapies. *Frontiers in Neurology*. 2022;13. Accessed March 8, 2024. <https://www.frontiersin.org/journals/neurology/articles/10.3389/fneur.2022.1015256>

12. Chataway J, Murphy N, Khurana V, Schofield H, Findlay J, Adlard N. Secondary progressive multiple sclerosis: a systematic review of costs and health state utilities. *Curr Med Res Opin.* 2021;37(6):995-1004. Doi: 10.1080/03007995.2021.1904860
13. Gustavsson A, Svensson M, Jacobi F, et al. Cost of disorders of the brain in Europe 2010. *Eur Neuropsychopharmacol.* 2011;21(10):718-779. Doi: 10.1016/j.euroneuro.2011.08.008
14. Raggi A, Giovannetti AM, Schiavolin S, et al. Development and validation of the multiple sclerosis questionnaire for the evaluation of job difficulties (MSQ-Job). *Acta Neurol Scand.* 2015;132(4):226-234. Doi: 10.1111/ane.12387
15. Comparison of employment among people with Multiple Sclerosis across Europe - D. Ellenberger, T. Parciak, W. Broła, J. Hillert, R. Middleton, A. Stahmann, C. Thalheim, P. Flachenecker, 2022. Accessed March 8, 2024. <https://journals.sagepub.com/doi/10.1177/20552173221090653>
16. Strober DL. Determinants of unemployment in multiple sclerosis (MS): The role of disease, person-specific factors, and engagement in positive health-related behaviors. *Multiple Sclerosis and Related Disorders.* 2020;46. doi:10.1016/j.msard.2020.102487
17. Vitturi BK, Rahmani A, Dini G, et al. Occupational outcomes of people with multiple sclerosis: a scoping review. *BMJ Open.* 2022;12(7):e058948. doi:10.1136/bmjopen-2021-058948
18. Vitturi BK, Rahmani A, Dini G, et al. Work Barriers and Job Adjustments of People with Multiple Sclerosis: A Systematic Review. *J Occup Rehabil.* 2023;33(3):450-462. Doi: 10.1007/s10926-022-10084-1
19. Ponzio M, Podda J, Pignattelli E, et al. Work Difficulties in People with Multiple Sclerosis. *J Occup Rehabil.* Published online November 3, 2023. Doi: 10.1007/s10926-023-10149-9
20. Vitturi BK, Rahmani A, Dini G, et al. Spatial and temporal distribution of the prevalence of unemployment and early retirement in people with multiple sclerosis: A systematic review with meta-analysis. *PLOS ONE.* 2022;17(7):e0272156. Doi: 10.1371/journal.pone.0272156
21. Persechino B, Fontana L, Buresti G, Fortuna G, Valenti A, Iavicoli S. Improving the job-retention strategies in multiple sclerosis workers: the role of occupational physicians. *Industrial Health.* 2019;57(1):52-69. Doi: 10.2486/indhealth.2017-0214
22. Persechino B, Fontana L, Buresti G, et al. Professional activity, information demands, training and updating needs of Occupational Medicine physicians in Italy: National survey. *Int J Occup Med Environ Health.* 2016;29(5):837-858. Doi: 10.13075/ijomh.1896.00736
23. Guida Idoneità alla mansione (per medici del lavoro) | AISM | Associazione Italiana Sclerosi Multipla. Accessed March 8, 2024. [https://www.aism.it/guida\\_idoneita%20alla\\_mansione\\_medici\\_del\\_lavoro](https://www.aism.it/guida_idoneita%20alla_mansione_medici_del_lavoro)
24. Disabilità e lavoro: il paradigma della sclerosi multipla. Accessed March 8, 2024. <https://www.inail.it/cs/internet/comunicazione/pubblicazioni/catalogo-generale/pubbl-disabilita-e-lavoro-paradigma-sclerosi-multipla.html>
25. Factsheet 53 - Ensuring the health and safety of workers with disabilities | Safety and health at work EU-OSHA. Accessed March 8, 2024. <https://osha.europa.eu/en/publications/factsheet-53-ensuring-health-and-safety-workers-disabilities>
26. Apostoli P, Imbriani M. [The occupational physician, global advisor for the protection of workers' health]. *G Ital Med Lav Ergon.* 2013;35(1):5-9
27. Fantoni-Quinton S, Kwiatkowski A, Vermersch P, Roux B, Hautecoeur P, Leroyer A. Impact of multiple sclerosis on employment and use of job-retention strategies: The situation in France in 2015. *J Rehabil Med.* 2016;48(6):535-540. Doi: 10.2340/16501977-2093
28. Padkapayeva K, Posen A, Yazdani A, Buettgen A, Mahood Q, Tompa E. Workplace accommodations for persons with physical disabilities: evidence synthesis of the peer-reviewed literature. *Disabil Rehabil.* 2017;39(21):2134-2147. Doi: 10.1080/09638288.2016.1224276
29. Jansen J, van Ooijen R, Koning PWC, Boot CRL, Brouwer S. The Role of the Employer in Supporting Work Participation of Workers with Disabilities: A Systematic Literature Review Using an Interdisciplinary Approach. *J Occup Rehabil.* 2021;31(4):916-949. Doi: 10.1007/s10926-021-09978-3
30. Persechino B, Fortuna G, Dentici MC, Valenti A, Iavicoli S. Disabilità e lavoro: sintesi dell'evoluzione delle policy, dalla Convenzione ONU alle Strategie dell'Unione Europea. *G Ital Med Lav Ergon.* 43(3):7-18.
31. Moccia M, Fontana L, Palladino R, et al. Determinants of early working impairments in multiple sclerosis. *Front Neurol.* 2022;13:1062847. Doi: 10.3389/fneur.2022.1062847
32. Musculoskeletal disorders in workers with multiple sclerosis: a task-oriented view | Safety and health at work EU-OSHA. Accessed March 15, 2024. <https://osha.europa.eu/en/publications/musculoskeletal-disorders-workers-multiple-sclerosis-task-oriented-view>
33. Iavicoli S, Rondinone BM, Abbritti G, Apostoli P, Soleo L, Persechino B. [Continuing medical education and accreditation for excellence set up by the Italian Society of Occupational Health and Industrial Hygiene (SIMLII): results of a survey among members]. *Med Lav.* 2008;99(2):145-156.
34. Iavicoli S, Persechino B, Rondinone BM, et al. [The ISPESL-SIMLII surveys to develop and address updating and accreditation's projects in Occupational Medicine]. *G Ital Med Lav Ergon.* 2008;30(3):244-248.
35. Iavicoli S, Persechino B, Chianese C, et al. [Survey on educational needs in Occupational Medicine in Italy]. *G Ital Med Lav Ergon.* 2004;26(1):12-18.