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Assessment of Nurses' Knowledge of Multiple Sclerosis in Morocco

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Abstract

Nurses are essential in early detection, education, symptom management, treatment administration, and care coordination for patients with multiple sclerosis (MS). This role requires both theoretical and practical knowledge. This study evaluates the knowledge level among nurses regarding multiple sclerosis in Morocco. We conducted this cross-sectional study on 326 nurses in Morocco using a purposive sampling method, which involves selecting nursing specialties that have direct contact with patients with MS, aiming to target the most relevant professionals for the study. The data are collected using an anonymous questionnaire distributed individually to participants. We opted for multivariable logistic regression models to analyze the data. The results highlighted a significant deficit in nurses' knowledge of MS. Only 28.8% recognized it as a chronic disease, while nearly half identified it as autoimmune, inflammatory, or neurodegenerative. Commonly reported symptoms included sphincter abnormalities (56.4%), visual disorders (44%), spasticity (27.6%), sexual problems (26%), and cognitive issues (23.9%). Concerning risk factors, 46% attributed MS primarily to genetics, while 40% were unaware of any factors. Nearly half (47%) believed MS therapy is symptomatic, and only 33% were familiar with disease-modifying therapies (DMTs). 90% of nurses lacked continuous MS training. The study found significant associations between nurses' knowledge and variables such as department of work ($p = 0.045$), gender ($p = 0.041$), and profile ($p = 0.039$). Lack of knowledge about MS may negatively influence early diagnosis and management of MS. To address this issue, we recommend improving the foundational training of healthcare professionals and introducing continuous education programs.

Keywords: knowledge, Morocco, multiple sclerosis, nurse

Abstrak

Menilai Pengetahuan Perawat tentang* Multiple Sclerosis *di Maroko. *Perawat berperan penting dalam deteksi dini, pendidikan, manajemen gejala, pemberian pengobatan, dan koordinasi perawatan untuk pasien dengan* multiple sclerosis (MS). *Peran ini membutuhkan pengetahuan teoritis dan praktis. Penelitian ini menilai pengetahuan perawat tentang* MS *di Maroko. Kami melakukan studi* cross-sectional *ini pada 326 perawat di Maroko dengan menggunakan metode* purposive sampling, *yang melibatkan pemilihan spesialisasi keperawatan yang kemungkinan memiliki kontak langsung dengan pasien* MS, *dengan tujuan untuk menargetkan profesional yang paling relevan untuk penelitian ini. Data dikumpulkan dengan menggunakan kuesioner anonim yang didistribusikan secara individual kepada peserta. Kami memilih model regresi logistik multivariabel untuk menganalisis data. Penelitian ini menyoroti kekurangan yang signifikan dalam pengetahuan perawat tentang* MS. *Hanya 28,8% yang mengenali* MS *sebagai penyakit kronis, sementara hampir separuhnya mengidentifikasinya sebagai autoimun, inflamasi, atau neurodegeneratif. Gejala yang umum dilaporkan termasuk kelainan sfingter (56,4%), gangguan penglihatan (44%), spastisitas (27,6%), masalah seksual (26%), dan gangguan kognitif (23,9%). Mengenai faktor risiko, 46% mengaitkan* MS *terutama dengan faktor genetik, sementara 40% tidak mengetahui faktor apapun. Hampir setengah (47%) meyakini terapi* MS *bersifat simtomatik, dan hanya 33% yang akrab dengan* disease-modifying therapies (DMT). *Lebih jauh lagi, 90% perawat tidak memiliki pelatihan* MS *berkelanjutan. Penelitian ini menemukan hubungan yang signifikan antara pengetahuan perawat dan variabel seperti departemen kerja ($p = 0,045$), jenis kelamin ($p = 0,041$), dan profil ($p = 0,039$). Kurangnya pengetahuan tentang* MS *dapat berdampak negatif pada diagnosis dini dan manajemen penyakit ini. Untuk mengatasi masalah ini, kami merekomendasikan untuk meningkatkan pelatihan dasar bagi para profesional kesehatan dan memperkenalkan program pendidikan berkelanjutan.*

Kata Kunci: *Maroko,* multiple sclerosis, *pengetahuan, perawat*

Introduction

Multiple Sclerosis (MS) is an acquired, chronic, autoimmune, neurodegenerative disease of the central nervous system. MS is the most common cause of neurological disability in young adults, with considerable social and economic consequences affecting an estimated 2.8 million people worldwide. In Morocco, the Atlas of MS estimated the prevalence rate at 20/100,000 (Lotfi et al., 2022a, 2022b; Multiple Sclerosis International Federation [MSIF], 2020). The diagnosis of MS is based on the 2017 McDonald Criteria: clinical signs, magnetic resonance imaging (MRI), and laboratory findings. There are three types of drugs used in MS therapy: disease-modifying therapies (D-MTs), which slow down or stop MS relapse; medicaments used to treat acute relapses; and drugs that treat MS-related symptoms (McGinley et al., 2021; MSIF, 2023).

Nursing professionals are on the front lines of service delivery. They provide a wide range of services at all the healthcare system levels, represent more than 50% of the health workforce worldwide, and provide vital services for the entire health system (World Health Organization [WHO], 2020, 2022). This role requires both theoretical and practical knowledge.

The complexity of the current MS treatment algorithm necessitates the establishment of multidisciplinary MS care units in which the neurologist and the MS nurse specialist are the key personnel in managing all patients with MS (Manuli et al., 2020; Sorensen et al., 2019). At every stage of the disease—diagnosis, long-term management, and ongoing monitoring—nurses, practitioners, and other allied healthcare professionals play a critical role in patient care (Oh et al., 2019). MS-specialist nurses assist in the diagnostic process by educating patients about the early signs and symptoms of MS, facilitating timely referrals to neurologists for evaluation, and providing emotional support during the diagnostic work-up. They can also help coordinate diagnostic tests, such as MRI scans and lumbar punctures, and explain the results to patients clearly and in an understandable way. Once a diagnosis is confirmed, MS-specialist nurses play a vital role in initiating treatment and educating patients about their medication options, including D-MTs. They can provide detailed information about the benefits and potential side effects of every treatment option, assist patients in navigating insurance coverage and financial assistance programs, and support them in making informed decisions regarding their treatment plans.

MS is a chronic and progressive disease requiring ongoing management and support. MS-specialist nurses collaborate closely with neurologists and other healthcare professionals to develop individualized care plans tailored to each patient's needs. They monitor disease activity, assess treatment efficacy, and help patients manage symptoms and complications associated with MS, such as fatigue, pain, spasticity, and bladder dysfunction. They also provide counseling and support to help patients cope with the emotional and psychosocial challenges of living with a chronic illness.

Education is a cornerstone of MS management, and MS-specialist nurses play a central role in providing patients with the knowledge and skills they need to manage their condition effectively. They educate patients about healthy lifestyle behaviors, symptom management strategies, medication adherence, and strategies for coping with the physical and emotional impact of MS. By empowering patients to take an active role in their care, MS-specialist nurses help improve treatment outcomes and quality of life for individuals living with MS.

Thus, nurses can play a crucial role in preventing complications and improving outcomes in people with MS through rapid diagnosis, rapid intervention, and regular proactive monitoring of treatment efficacy and activity (Hobart et al., 2019). This role requires theoretical and practical knowledge about pathophysiology,

etiology, risk factors, diagnosis, treatment, and complications of MS.

In Morocco, there are no nurses specializing in neurology or the management of patients with multiple sclerosis. The number of nurses practicing in Morocco is 22,666, of which more than 70% are versatile nurses (nurses who provide comprehensive nursing care to individuals of all ages, sick or healthy, families, or members of a group of people) (Ministère de la santé, 2019).

Furthermore, our bibliographic analysis reveals a notable absence of studies investigating nurses' knowledge of the clinical, therapeutic, and epidemiological aspects of MS in Morocco. This research gap underscores a significant deficiency in understanding the preparedness of Moroccan nurses to provide care and support for patients with this complex neurological condition. Critical areas of MS care remain insufficiently explored, including the extent of nurses' comprehension of the disease's biology, symptoms, and available treatments, an issue that may compromise the quality of patient care and education. Moreover, there is limited information on the availability and efficacy of MS-specialist training programs for nurses in Morocco. The impact of cultural attitudes and systemic constraints within Morocco's healthcare framework on nurses' ability to deliver MS care has not been examined. Furthermore, regional disparities in nurses' knowledge, particularly between urban and rural healthcare settings, remain unstudied, further emphasizing the need for comprehensive research in this domain.

Given the importance of this knowledge in diagnosis, early management, and prevention of disability in MS patients, our study aims to fill this gap and propose recommendations to promote the nurse's knowledge regarding the management of MS. Thus, the present study aims to assess the nurse's knowledge and attitudes about MS in Morocco.

Methods

We conduct a cross-sectional study involving 326 nurses in Morocco. A purposive sampling method was employed to select participants most likely to provide valuable insights. This targeted approach specifically focuses on nursing professionals involved in the diagnosis and management of patients with MS.

Inclusion criteria of this study are nurses selected for the study were required to demonstrate expertise or knowledge aligned with the study's objectives. Furthermore, they needed to be actively involved in the diagnosis and management of patients with MS. Exclusion criteria were nurses who were not involved in the diagnosis or management of patients with MS were excluded from the study. Additionally, those considered unlikely to provide valuable or specific information relevant to the study's objectives were also excluded.

The Moroccan Ministry of Health approved the conduct of this study (reference no. 8366-3/3/2021). We conducted this research under institutional ethics committee norms, with approval number FST/LGB/2018/15; JAN.2018-SEPT.2018. After describing the study objective, the value of each person's contribution, and their right to reject participation, we also received written informed consent from participants. The data is anonymous and devoid of any personal details.

We executed this research using a questionnaire including characteristics of Moroccan nurses (age, profile, marital status, seniority in the health ministry, department or service of work, and province) and a validated MS Knowledge Questionnaire (MSKQ) (Giordano et al., 2010) (general knowledge about MS, symptoms and diagnosis, patient education and support, treatment, and management). For scoring, each correct answer is worth 1 point. Subscale scores can be calculated for each domain (e.g., general knowledge, symptoms, and diagnosis).

Regarding interpretation, high scores indicate strong knowledge of MS.

For data analysis, we used IBM SPSS, version 20. To determine the relationship between qualitative variables, we employed the chi-square test. We use the Fisher and Student tests to examine the relationship between quantitative and qualitative variables. The data is presented as a means with its corresponding standard deviations (SD). The association between specific factors and nurses' knowledge of MS was examined using multivariable logistic regression models. With 95% confidence intervals (CI) and p-values, we reported the data as odds ratios (OR). The significance level for each p-value was 5%, and it was two-sided.

Results

The findings indicate that most nurses are women. In addition, it is a young population with an average age of 30.7 ± 6.7. The majority of the nurses surveyed (69%) work in hospitals. Concerning the seniority in the service, the results showed that almost half (48%) of the nurses have been working in the service for between 1 and 5 years. In addition, more than half (57.7%) of the surveyed are versatile nurses, and almost 59% are married (Table 1).

Table 1. Socio-professional Characteristics of Nurses (N = 326)

Socio-professional Characteristics	n	%	p
Gender			
Men	140	42.9	= .0.0716
Women	186	57.1	
Age (mean age = 30.7 ± 6.7)			
< 30	184	56.4	
30-39	110	33.7	≤ .0001
40-49	16	4.9	
50 and over	16	4.9	
Profile			
Versatile Nursing	200	61.3	
Mental Health Nurse	60	18.4	≤ .0001
Family and Community Health Nurse	40	12.2	
Emergency Nurses	26	8	
Marital status			
Married	192	58.9	
Single	122	37.4	≤ .0001
Divorced	10	3.1	
Widower	2	0.6	
Seniority (year)			
< 1	90	27.6	
1-4	96	29.4	
5-10	44	13.5	≤ .0001
10-19	80	24.5	
20 and over	16	4.9	
Work establishment			
Hospital center	224	68.7	
Primary Healthcare establishment	102	31.3	
Department of work			
Emergency	40	12.3	
Surgery	72	22	
Medicine	68	20.8	≤ .0001
Psychiatry	45	13.8	
Primary Healthcare network	101	31.3	

Table 2. Participants' Knowledge and Perceptions (N = 326)

Variable	Modality	n	(%)	p
Physiopathology	Autoimmune	180	55.2	≤ .0001
	Inflammatory CNS	126	38.7	
	Chronic	94	28.8	
	Infection	10	3	
	Destruction of the myelin	142	43.6	
	Dysfunction of the CNS	90	27.6	
	Overactivity of brain neurons	14	4.3	
Diagnosis	MRI	180	55.2	≤ .0001
	Clinical signs	128	39.2	
	Visual evoked potentials	50	15.3	
	The finding of lumbar puncture	32	9.8	
Risk Factors	Genetic	196	60.1	≤ .0001
	Environmental	130	39.9	
MS Treatment	Symptomatic treatment	154	47.2	≤ .0001
	Disease-modifying-therapy	108	33.1	
	Etiologic treatment	44	13.5	
Symptoms	Bowel &bladder disorders	184	56.4	≤ .0001
	Visual issues	144	44.2	
	Pain	140	42.9	
	Spasticity	90	27.6	
	Sexual disorders	84	26	
	Fatigue	80	24.5	
	Cognition issues	78	23.9	
	Tremor	40	12.3	
	Depression	60	18.4	
	Sensory issues	120	36.8	

Significance tests by odd ratio tests, and Student test, test de Fisher

The findings revealed that only 28.8% of the nurses identified MS as a chronic disease. In comparison, 55.2% recognized it as an autoimmune disease, 55.2% regarded it as an inflammatory disease, and 50% considered it as a neurodegenerative disease. Sphincter abnormalities (56.4%), visual disorders (44%), spasticity (27.6%), sexual problems (26%), and cognitive disorders (23.9%) were the most common clinical symptoms of MS stated by nurses. Nearly a quarter of respondents needed to be made aware of the clinical signs of MS. Regarding risk factors, 46% of respondents believed that the condition was caused mainly by genetics. In comparison, almost 40% were unaware of any risk factors. In terms of their knowledge about the disease's therapy, 47% of nurses stated that it is symptomatic, while only 33% reported being aware of DMTs. In addition, 90% of the nurses surveyed had no continuous training on neurodegenerative illnesses, such as MS (Table 2).

The analysis indicates relationship between nurses' knowledge and the following variables: department of work (p = 0.045), gender (p = 0.041), and profile (p = 0.039) (Table 2). Almost 56% of male nurses have accurate physiotherapy knowledge, compared to only 34% of female nurses. Additionally, 74% of physiotherapists stated that MS is caused by genetic factors, while only 32% of mental health nurses held the same view (Table 3).

Discussion

Several pertinent academic databases, such as PubMed, Scopus, and Google Scholar, were searched thoroughly and methodically.

Keywords and Boolean operators, such as "multiple sclerosis", "nursing knowledge", and

Table 3. Complete Multivariable Logistic Regression Model for the Association between Specific Factors and Nurses' Knowledge about MS (N = 326)

Variable	Modality	OR (CI)	p
Physiopathology	Gender	3.072 (1.048-9.001)	0.041
	Profile*	1.490 (0.967-2.295)	0.070
	Seniority (year)	0.976 (0.922-1.032)	0.395
	Department of work	0.738 (0.451-1.208)	0.227
	Province	0.875 (0.594-1.290)	0.502
Diagnosis (MRI)	Gender	1.472 (0.371-5.834)	0.582
	Profile*	1.057 (0.614-1.820)	0.842
	Seniority (year)	0.967 (0.903-1.036)	0.346
	Department of work	0.625 (0.333-1.175)	0.145
	Province	0.908 (0.569-1.450)	0.687
Risk Factors (genetic)	Gender	0.731 (0.296-1.807)	0.497
	Profile*	1.447 (1.019-2.056)	0.039
	Seniority (year)	0.989 (0.941-1.040)	0.673
	Department of work	0.666 (0.438-1.014)	0.058
	Province	1.019 (0.730-1.420)	0.913
MS Treatment (DMT)	Gender	0.891 (0.218-3.646)	0.873
	Profile*	1.261 (0.691-2.299)	0.891
	Seniority (year)	0.942(0.858-1.022.)	0.149
	Department of work	0.616 (0.317-0.195)	0.152
	Province	0.686 (0.411-1.147)	0.151
Symptoms	Gender	2.516 (0.526-12.030)	0.248
	Profile*	1.627 (0.867-3.052)	0.129
	Seniority (year)	1.009 (0.939-1.085)	0799
	Department of work	0.432 (0.190-0.982)	0.045
	Province	0.874 (0.496-1.540)	0.641

Significance tests by odd ratio, Student, and Fisher tests
*Profile: Versatile Nursing, Mental Health Nurse, Family, Community Health Nurse, Emergency Nurse.

"training", were used in conjunction with the search technique to guarantee a comprehensive yet focused retrieval of literature. No studies that specifically addressed the confluence of nursing knowledge and training relevant to the treatment of people with MS were found despite a thorough search. This gap in literature emphasizes how urgently more research is needed to examine and create evidence-based plans for improving nursing education and nursing competence.

The results indicate a predominance of female nurses, and that over half of the nurses surveyed are under 28 years old. The Moroccan Ministry of Health shows that female nurses represent 67% of the workforce, and their average age is 42 years (Ministère de la santé, 2019). The fact that female nurses represent a significant majority of the workforce is consistent with global trends in nursing. This gender disparity has historical roots but continues to persist due to various factors such as societal expectations, cultural norms, and historical gender roles.

In this context, the results showed that almost half of nurses have seniority between 1 and 5 years. The majority of respondents work in hospitals. This finding is consistent with data reported by the Moroccan Ministry of Health: 22,618 nurses work in the hospital network, compared to 10,547 in the primary healthcare network (Ministère de la santé, 2019). MS-specialist nurses are essential at all stages of the disease: diagnosis, long-term management, and monitoring of the patient's condition (Oh et al., 2019). In addition, clinical nurse spe-

cialists play a crucial role in supporting patients, families, and caregivers as they navigate through the challenges of a diagnosis and manage symptoms throughout their illness (Leary et al., 2015; Meehan & Doody, 2020).

The literature indicates the need for specialist knowledge and training in MS for nurses (Meehan & Doody, 2020). In addition, several countries provide both fundamental and ongoing training to meet the obligations of health establishments in MS management. This training will enable staff to acquire theoretical and practical knowledge essential for effective MS care. The main target of this training are nurses, caregivers, psychologists, and speech therapists. Considering that most nurses are women with a relatively young average age of 30.7 years, training programs should account for the preferences, needs, and learning styles characteristic. Utilizing interactive and technology-driven learning methods may be particularly effective for engaging younger nurses.

Ninety percent of the participants had yet to receive MS training. However, knowledge levels were higher among those who had received specialist training in neurodegenerative diseases (NDD). In this context, a study on the attitudes and knowledge of nurses regarding the care of individuals with neurodegenerative diseases revealed that nurses lacked knowledge, communication skills, management strategies, and confidence in providing care. The study suggested that knowledge and attitudes improved following the implementation of training programs (Evripidou et al., 2019).

According to our study findings, the nursing staff's knowledge of MS was unsatisfactory: half of the respondents (53%) do not consider MS an NDD. The participating personnel has varying levels of knowledge about the disease's origin. As much as 55.2% of the participants identified MS as an autoimmune disease, 39% considered it as an inflammatory disease of the central nervous system (CNS), and only 29% recognized it as a chronic pathology. MS is an autoimmune, inflammatory, and neurodegenerative disease of the central nervous system (Lassmann, 2018; Raymond et al., 2017).

By understanding MS as an autoimmune, inflammatory, and neurodegenerative disease of the central nervous system, MS-specialist nurses conduct thorough assessments that consider the multifaceted nature of the disease. They evaluate physical symptoms alongside cognitive function, emotional well-being, and social support systems to formulate personalized care plans tailored to the unique requirements of each patient. Furthermore, with a deep understanding of the autoimmune and inflammatory components of MS, nurses collaborate with healthcare teams to initiate and manage DMTs aimed at modulating the immune response and reducing disease activity. They monitor treatment efficacy, manage side effects, and educate patients about the importance of medication adherence.

Additionally, MS is characterized by a wide range of symptoms including motor, balance, and sensory disorders, as well as ocular, psychic, cognitive, general, digestive, urinary, and sexual disorders (Vejux et al., 2021). However, the first symptoms mentioned by the participants were sphincter disorders of the bladder and intestine (56.4%), followed by visual disorders (44.2%). For 24% of respondents, MS is characterized by memory problems. However, it is important to note that despite the multifaceted nature of the disease, individuals with MS can lead fulfilling lives with appropriate management and support. MS-specialist nurses play a crucial role in addressing the diverse array of symptoms and challenges associated with the disease.

The findings showed that 46% of the participants indicated that hereditary factors favor MS, and 40% were ignorant of the risk factors favoring the beginning and progression of MS. However, certain aspects may promote the appearance of this pathology, namely immune,

genetic, and environmental factors (Amezcua & McCauley, 2020; Bargiela & Chinnery, 2019; Gavasso et al., 2024; Vejux et al., 2021; Waubant et al., 2019). In addition, 29% of the participants had no idea about the age group most affected by this disease, and 48.5% said that MS affects people under 45 years. In this context, research shows that, with a median age of 32 years, MS generally affects young individuals between 20 and 40 years (Lotfi et al., 2023a, 2023b; MSIF, 2020).

By understanding the complex interplay of immune, genetic, and environmental factors in the pathogenesis of MS, nurses can provide holistic care that addresses both the physical and psychosocial aspects of the disease. They can educate patients about the importance of adherence to DMTs, facilitate access to screening services, and promote healthy lifestyle behaviors to mitigate environmental risk factors. Additionally, nurses can provide emotional support and counseling to help patients navigate the challenges associated with living with a chronic autoimmune condition like MS. Regarding the diagnosis of this disease, 56% declare that the diagnosis of MS is based on MRI, and 20% have no idea about the methods for diagnosing MS. In this sense, the most recent revision of the McDonald criteria is used to diagnose MS based on the patient's clinical, radiological (MRI), and laboratory results (Yamout et al., 2020). Nurses should be familiar with the clinical manifestations of MS, including symptoms such as optic neuritis, sensory disturbances, motor weakness, and cerebellar dysfunction. They can assist in conducting thorough neurological assessments, documenting symptoms, and monitoring disease progression with time. Nurses must possess fundamental knowledge regarding MRI imaging and its application in distinguishing characteristic CNS MS lesions. They can make patients feel less anxious or concerned about having imaging treatments done by educating them about the value of MRI scans in the diagnosis process. Nurses should be aware of ancillary procedures that may confirm the diagnosis, such as cerebrospinal fluid analysis, to check for oligoclonal bands or rule out other potential reasons for neurological symptoms. Nurses can educate patients on what to expect during and after the test and assist with the preparation for cerebrospinal fluid collection procedures.

For nurses' knowledge of MS treatment, the results show that almost half of the respondents report that MS treatment is symptomatic, 33% report that MS is treated with DMT, 20% have no idea about the treatment of the disease, and only 13.5% judge that MS has an etiological treatment. So far, there is no etiological treatment despite the research carried out. However, we use three medication classes in MS therapy: DTM, which slows or prevents MS relapses; medications for treating acute relapses; and medications for treating MS-related symptoms (MSIF, 2023). Nurses should understand how DMTs operate to manage MS. These drugs aim to slow the course of the disease, lessen disease activity, and alter the underlying disease process. Patients can learn from nurses about the many kinds of DMTs that are available, how they work, any possible adverse effects, and how crucial it is to follow a treatment plan. When managing acute MS relapses, nurses should be aware of corticosteroid usage and other immunomodulatory treatments. These drugs aid in reducing inflammation and hastening the signs of a relapse.

Patients can learn from nurses about the warning signs and symptoms of relapses, the value of prompt treatment, and the possible advantages and disadvantages of acute relapse therapies. Nurses must be well-versed in the wide range of drugs and therapies available to treat common symptoms, including exhaustion, stiffness, pain, bladder and bowel problems, cognitive decline, and mood disorders. They can collaborate with patients and other medical specialists to develop personalized symptom management plans that meet each patient's needs and preferences. Nurses must be aware

of the latest research to identify the underlying causes of MS, develop individualized treatment plans, and ultimately find a cure. To empower patients to be informed and involved in their healthcare journey, nurses may educate patients on the most recent developments in MS research, clinical trials, and innovative treatment methods. In addition to helping patients make shared decisions, nurses are essential in teaching patients about MS treatment choices and offering emotional support.

The findings of this study are limited by the use of purposive sampling, which may restrict the generalizability of the results, as the sample might not fully represent all nurses in Morocco. Additionally, the study depends on self-reported knowledge, which may be subject to biases, including the tendency to overestimate or underestimate one's actual knowledge. Lastly, the cross-sectional design provides only a snapshot of knowledge at a specific time, limiting the ability to assess changes over time or the effects of interventions.

Conclusion

MS is a complex neurological disease that needs in-depth knowledge to effectively care for and assist patients. Our results show that nurses lack knowledge about MS characteristics such as physiopathology, risk factors, symptoms, treatment, and diagnosis. Therefore, we must improve this knowledge to ensure early diagnosis and better management. Identifying knowledge gaps related to MS among nurses is a crucial step in designing and implementing targeted educational interventions. Thus, there is a need to develop specialized training programs or workshops specifically focused on MS for nurses in general and particularly for those working in the primary care network, given their essential role in the early diagnosis of MS. These programs should cover different aspects of the disease, including its etiology, symptoms, diagnostic criteria, therapeutic options, and management strategies. It is also essential to give nurses opportunities for continuing education so they may remain informed about developments in MS research, treatments, and medications. Clinical practice guidelines for MS care can help nurses better understand the best methods for managing their MS patients. Furthermore, nurses can obtain practical knowledge and expertise in managing MS patients through collaboration with MS specialists, such as neurologists or MS nurse specialists.

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