

Nurses ' Performance regarding the Care of Patients with Multiple Sclerosis Relapse: A Suggested Guideline

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Abstract

Background: multiple sclerosis is an immune-mediated inflammatory disease that attacks myelinated axons in the central nervous system, destroying the myelin and the axon in the variable degrees. It is lifelong condition that can sometimes cause disability, although it can occasionally be mild. The nurses have a vital role to play at all stages of MS but arguably involvement when patient is newly diagnosed in the most crucial stages. **Aim of study:** this study aimed to assess nurses' performance regarding the care of patients with multiple sclerosis relapse. **Study design:** A descriptive explanatory design. Setting: day care unit at the neurological department affiliated to Ain Shams University Hospital. **Study subject:** A convenient sample of nurses (n =30) working in the selected setting. **Tools:** I Nurses interviewing questionnaire, II Nurses practice observational checklist and III Nurses attitude likert scale. **Results** revealed that 63.3%of the studied nurses had unsatisfactory level of knowledge, 70%of them had unsatisfactory level of practice and 53.3 of them have negative attitude regarding the care of patients with multiple sclerosis relapse. **Conclusion:** less than two thirds of the studied nurses had unsatisfactory level of knowledge, less than three quarters of them had unsatisfactory level of practice and around half of them had negative attitude regarding the care of patients with multiple sclerosis relapse. **Recommendation:** In-service training program must developed based on nurses performance regarding the care of patients with multiple sclerosis relapse

Keywords: Nurses ' performance, multiple sclerosis relapse, suggested guideline.

Introduction:

Multiple sclerosis (MS) is a progressive neurological condition that causes an abnormal response from the immune system against the central nervous system (CNS). The myelin (the covering of the nerve fibers) and the nerve fibers themselves are attacked by the immune system, resulting in inflammation and the formation of scar tissue (sclerosis). The nerve impulses that need to travel through these damaged nerve fibers are disrupted, causing a variety of neurological symptoms (Pietrangelo, 2020).

Multiple sclerosis is an immune-mediated inflammatory disease that attacks myelinated axons in the CNS, destroying the myelin and the axon in variable degrees. The cause of MS is not known, but it likely involves a combination of genetic susceptibility and a presumed nongenetic trigger (e.g., viral infection, low vitamin D levels) that together result in a self-sustaining autoimmune disorder that leads to recurrent immune attacks on the CNS (Luzzio, 2020).

There are three main types of MS: Relapsing-remitting MS is the most common form of MS in which there are unpredictable relapses followed by partial or total remission. Secondary-progressive MS is initially a relapsing-remitting course that then begins to cause the progressive development of disability. Partial remission may occur. Most people with relapsing-remitting MS will eventually develop secondary-progressive MS. However, it may take several years or decades. Primary-progressive MS is less common and progressive from the outset. Symptoms begin gradually worsen immediately, without remission (Moyle, 2020).

Approximately 85% to 90% of people diagnosed with MS have relapsing-remitting MS. This type of MS is characterized by unpredictable but clearly defined periods (relapses) during which symptoms are apparent, followed by periods of partial or complete recovery (remission). Relapses are also known as attacks, exacerbations, or flare-up (O'Connor, 2017).

An MS relapse is defined as the onset of new symptoms or the worsening of pre-existing

symptoms, attributable to demyelinating disease, lasting for more than 24 hours and preceded by improving or stable neurological status for at least 30 days from the onset of the previous relapse, in the absence of infection, fever or significant metabolic disturbance (Tanim et al.,2016).

People with relapsing-remitting MS are most likely to have a relapse, but people with both progressive types of MS may also experience occasional relapses. Relapses are the outward sign of increased inflammatory activity within the central nervous system (CNS), which results in demyelination (Jia et al., 2020).

Although there is no cure for MS, there are treatments available to reduce the progression of the disease, to treat an acute relapse, and ongoing management of symptoms. Corticosteroids or adrenocorticotrophic hormone are necessary to minimize inflammation and reduce the extent of exacerbation or relapse. Also, Immunosuppressive agents provide stabilization throughout the course of the condition. Beta-interferon (Betason) for relieving quick-advancing symptoms for some patients (National Health Service (NHS), 2018).

Multiple sclerosis nurses often have a high degree of decision-making in the management of relapses, including educating patients about the signs of a relapse, evaluating possible relapses either via phone or in the clinic, and deciding how to proceed with treatment. MS nurses also play a substantial role in monitoring adherence, once medication is started nurse must be know how to assess treatment responsiveness and what side effect (Ross, 2016).

Significance of the study:

A total of 2.8 million people are estimated to live with MS worldwide (35.9 per 100,000 population), the mean age of diagnosis is 32 years. Females are twice as likely to live with MS as males. Although, about 85% of people are initially diagnosed with relapsing-remitting MS where they experience periods of relapse and remission, whereas 12% are initially diagnosed with progressive MS. The remaining 3% are given an unknown disease course at initial diagnosis. For everyone with

the condition, MS makes life unpredictable (Tafti et al., 2020).

A community-based survey in Egypt, has found an MS prevalence of 13.74/100,000. A retrospective meta-analysis in different referral centers of Egypt has found 648 patients with definite MS. The most frequent presenting symptom was weakness (57%), followed by sensory symptoms (19.9%), visual symptoms (15.9%), and ataxia (15.8%). 73.45% of these patients had a relapsing-remitting course, primary-progressive course was seen in 17% of patients, and 9.55% had the secondary-progressive course (Heydarpouret al., 2015).

The nurse as part of the multidisciplinary team in the field of MS has emerged as an important member of the health care team, playing a vital role in the ongoing care for patients and their families. Nursing care in MS is a collaborative effort whose goal is self-awareness and self-responsibility; its activities involve supporting a great deal of self-care by patients, families, and care partners. (Costello & Halper, 2016).

So the present study aimed to assess the nurses' performance regarding the care of patients with multiple sclerosis during relapse and to suggest nursing guideline. Hopefully, the study results give insight about the effectiveness of nursing care provided and what change could be considered to improve care delivery through suggested evidence based nursing guidelines accordingly in guaranteeing high quality clinic care to achieve desired patients outcomes.

Aim of the Study:

The aim of the study was to assess the nurses' performance regarding the care of patients with multiple sclerosis relapse through the following:-

- I. Assess nurses' level of knowledge regarding the care of patients with multiple sclerosis relapse.
- II. Assess nurses' level of practice regarding the care of patients with multiple sclerosis relapse.
- III. Assess nurses' attitude regarding care of patients with multiple sclerosis relapse.

- IV. Develop a suggested nursing guideline regarding the care of patients with multiple sclerosis relapse.

Research questions:

The current study was formulated to answer the following questions:

- I. What is the level of knowledge regarding the care of patients with multiple sclerosis relapse?
- II. What is the level of practice regarding the care of patients with multiple sclerosis relapse?
- III. What is the level of attitude regarding the care of patients with multiple sclerosis relapse?
- IV. What is the suggested nursing guideline for caring of the patients with multiple sclerosis relapse?

Subject and Methods

The current study was portrayed under the four main designs as the following:

A) Research design:

Research design: A descriptive exploratory design was conducted to achieve the aim of this study. A descriptive design is defined as a description of new situations, events, or concepts, examine relationships among variables, it is concerned with description of a phenomenon of interest and focuses on a single group or population characteristics without trying to make interference (Grove & Gray, 2019).

B) Setting:

This study was conducted in the day care unit at the Neurological Department affiliated to Ain Shams University Hospital in the second floor. This unit is specialized in treating patients with multiple sclerosis relapses. The day care unit includes one large room consist of 8 chaise longue, 4 monitors, 2 portable oximeter, 7 oxygen access and a crash car, a defibrillator shared with stroke unit they used in emergency situations.

B) Subjects:

A convenient sample of all available nurses (30 nurses) who worked in day care unit

at the Neurological Department and caring for patients with MS relapses affiliated to Ain Shams University hospital after obtaining their oral consent to participate in this study.

C) Tools of data collection:

Data were collected using the following tools:

I. Nurses Interviewing questionnaire:-

This tool were developed by investigator in Arabic language after reviewing the recent related literatures, (Ross, 2016; Roman & Menning, 2017). It included four parts as the following:-

Part 1: It was concerned with assessment of demographic characteristics of the studied nurses, it included seven questions as age, gender, marital status, educational levels, years of experience and attendance of training courses related care of patients with multiple sclerosis relapse; nursing guidelines for caring of MS relapses.

Part 2: It was concerned with assessment of nurses' knowledge regarding the multiple sclerosis relapse. It was included 51 questions divided into six sections, the questions were in the form of multiple choice questions (MCQ) and true or false (T&F) classified as the following:

Section (1) Assessment of nurses' knowledge regarding anatomy and physiology of nervous system, it composed of nine MCQ questions.

Section (2) Assessment of nurses' knowledge regarding MS, it composed of five (MCQs) questions.

Section (3) Assessment of nurses' knowledge regarding MS relapses, it composed of five (MCQs) and 1 question (T&F).

Section (4) Assessment of nurses knowledge regarding MS relapses medication, it composed of nine (MCQs) questions.

Section (5) Assessment of nurses' knowledge regarding nursing management regarding medication, it composed of 10 (MCQs) and 5 questions (T&F).

Section (6) Assessment of nurses' knowledge regarding nursing management toward MS

relapses, it composed of 13 (MCQs) and 4 questions (T&F).

Scoring system:

The questionnaire composed of 51 questions, every correct answer was given one grade, while the incorrect answer was given zero.

The total score of the questionnaire was 51 grades and categorized as follow:

* Satisfactory level of knowledge if total score was $\geq 80\%$ = (≥ 41 grades).

* Unsatisfactory level of knowledge if total score was $< 80\%$ = (< 41 grades).

II. Nurses practice observational checklist:

This tool was developed by investigator based on relevant literature review (**Subei and Ontaneda 2015 and National Health Service 2018**), it used to assess nurses performance regarding the care of patients with multiple sclerosis relapse . It was composed of 8 skills as the following :

- Nursing assessment of patients with MS relapses consisted of two sections, it composed of 70 steps as follow:
 - Section1: health history assessment of patients with MS relapses (8 steps)
 - Section 2: physical assessment of patients with MS relapses, it composed of (62 steps).
- Nurses role toward different treatment approaches, it composed of 57 steps (nurses' role before administration 22 steps ,during drug administration 25 steps and after drug administration 10 steps)
- Supportive care for patients with MS relapses, it composed of following symptoms:
 - Pain managements, it composed of 10 steps .
 - Fatigue management, it composed of 6 steps.
 - Mobility and physical activity management, it composed of 15 steps.
 - Bladder management, it composed of 19 steps.
 - Bowel management, it composed of 8 steps.

- Psychological and emotional support it, composed of 10 steps.

Scoring system:

Each step that was done correctly took one, while zero grade was given to in correct step, The total score of the nurse practice checklists was 195 grades and classified as the following:

- Satisfactory level of practice if total score was $\geq 80\%$ = (≥ 156 grades).

- Unsatisfactory level of practice if total score was $< 80\%$ = (< 156 grades).

III. Nurses' attitude likert scale:-

This tool was developed by investigator after reviewing recent related literatures (**Ross, 2016 & Tafti et al., 2020**) and written in Arabic language to assess nurses attitude regarding the care of patients with multiple sclerosis relapse. The scale composed of 35 statements, each statement had three responses (agree, sometimes and disagree) and classified as the following:

- a. Nurses' attitude regarding multiple sclerosis relapse (five statements)
- b. Nurses' attitude regarding medical treatment for patients with multiple sclerosis relapse (five statements)
- c. Nurses' attitude regarding the care of patients with multiple sclerosis relapse (25 statements)

Scoring system:

The response options elicited was on 3 point Likert scale ranged from (1) disagree, (2) uncertain & (3) agree for each statement. The negative sentences (Feeling depressed when dealing with patients with MS relapse because it is a chronic disease -Feeling very afraid when any severe side effects appear for a patient with MS relapse -Feeling that disgusted when changing and taking care of the urinary catheter for my relapsing MS patient -Feeling that more nervous than usual after doing work with MS sclerosis patient)

The total score of attitude likert scale, classified as the following:

- ≥ 80 % of total grades was considered positive attitude.
- < 80 % of total grades was considered negative attitude

I) Operational design

The operational design included; preparatory phase, validity and reliability of the tools, pilot study and field work.

A) Preparatory phase

It included reviewing of related literatures of various aspects of the study using book, articles, internet and magazines to develop tools for data collection.

B) Validity of tools

Testing validity of the proposed tools by using face and content validity. **Face validity** aimed at inspecting the items to determine whether the tools measure what supposed to measure. **Content validity** was conducted to determine whether the content of the tools covered the aim of the study. The tools were developed by the investigator and reviewed by five experts, three of them were professors and two were assistant professors in Medical Surgical and Critical Care Nursing at Faculty of Nursing, Ain Shams University. The experts reviewed the tool for clarity of sentences, relevance, accuracy, comprehensiveness, simplicity and applicability, minor modification was done as rephrasing some. Finally, the final forms were developed.

C) Reliability of tools

Reliability of the developed tools was done by using Cronbach alpha test. The reliability test score for nurses' self-administered questionnaire was 0.792, the reliability test score for nurses' practice observational checklist was 0.814 and the reliability test score for nurses' attitude likert scale was 0.822.

D) Pilot study

The pilot study was conducted one week before collection of the data. It was carried out on (10%) of study nurses which were three

nurses. there were no modifications were done. the participants were included in the study sample.

E) Field work

The collection of data of the current study lasted over a period of 5 months; data were collected beginning from April 2022 to the end of august 2022, through the following:

The investigator visited the selected setting during the actual work at long day shift from 8am to 8pm 3 days weekly until the assessment data completed. The aim and nature of the study were explained to studied nurses and were obtained verbal consent to gain their permission and cooperation to conducted the study. The data were collected individually from the studied nurses in the selected setting. The average number of nurses who were assessed by the researcher was four to five nurses per day.

The investigator filled the observational checklist in the morning, afternoon shifts during actual nurses' care of patients with MS relapses. The observational checklist was used prior to administration of the questionnaire to ensure the maximal realistic observations of the nurses' practice and minimize the possibility of bias. Observational checklist was filled by the investigator during nurses' routine care for patients with MS relapses, checklist took about 30-45 minutes for each period of nurses practice. The self-administered knowledge questionnaire and attitude scale was filled by the studied nurses individually. It took 30-40 minutes during their free time, the answer recorded by the nurses themselves

Ethical considerations:

- The investigator clarified the objective and aim of the study to the subject included in the research study.
- A written approval was obtained from the scientific ethics research committee of the Faculty of Nursing Ain Shams University.
- The study subjects' oral consent to participate in the study was obtained.
- All data was confidential and used only for their benefit and for research purpose.

- The study subjects was informed that, they had the freedom to withdraw from the study at any time.

II) Administrative design:

An official permission was taken from the Nursing and Medical Directors of day care unit at Ain Shams University after explaining the aim of the study to gain their approval.

Statistical design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables and Pearson correlation test (r- test) to the correlation between the study variables.

Degrees of significance of results were considered as follows: P-value > 0.05 Not significant (NS), P-value ≤ 0.05 Significant (S) and P-value ≤ 0.01 Highly Significant (HS).

Results:

Table (1) shows that, 53.3% of the studied nurses their age ranged between 25-<35 years, the mean and standard deviation of age was 32.6 ± 7.82 . As regard to gender and marital status, 83.3% of them were female and married, respectively. Also, 46.7% of the studied nurses had 1-<5 years of experience, the mean and standard deviation of years of experience was 10.24 ± 4.91 . Moreover, 100.0% of them didn't have training courses for the care of patients with multiple sclerosis relapse. In addition, 100.0% of them didn't have nursing guidelines for caring of patients with multiple sclerosis relapse.

Table (2) shows that, 53.3% of the studied nurses had satisfactory level of knowledge regarding the multiple sclerosis disease and the nursing care for patients with multiple sclerosis relapse.while, 56.7% and 66.7% of them had unsatisfactory level of knowledge regarding

the anatomy, function of nervous system and treatment of multiple sclerosis relapse, respectively Also, 76.7% and 73.3% of the studied nurses had unsatisfactory level of knowledge regarding the multiple sclerosis relapse and nursing care in relation to the treatment of multiple sclerosis relapse, respectively.

Figure (1) shows that, 63.3% of the studied nurses had unsatisfactory level of total knowledge regarding care of patients with multiple sclerosis relapse, while, 36.7% of them had satisfactory level of knowledge

Table (3) illustrates that, 86.7% of the studied nurses had unsatisfactory level of total practices regarding patients' assessment Also, 76.7%, 60.0% and 66.7% of them had unsatisfactory level of total practices regarding pre, during and post administration, respectively. Also, 80.0% and 90.0% of them had unsatisfactory level of total practices regarding pain and fatigue management, respectively. Likewise, 76.7% of them had unsatisfactory level of total practices regarding mobility and physical activity management. In addition, 60.0% and 66.7% of them had unsatisfactory level of total practices regarding during and post administration, respectively. Furthermore, 83.3% and 76.7% of them had unsatisfactory level of total practices regarding bowel management and psychological, emotional and social support, respectively.

Figure (2) shows that, 70.0% of the studied nurses had unsatisfactory level of total practices regarding care of patients with multiple sclerosis relapse, while, 30.0% of them had satisfactory level of practice.

Figure (3) shows that, 53.3% of the studied nurses had negative attitude regarding the care of patients with multiple sclerosis relapse. while, 46.7% of them had positive attitude.

Table (4) indicates that, there was highly statistically significant positive correlation between total knowledge score, total practices score and total attitude score regarding care of patients with multiple sclerosis relapse among the studied nurses at (P= < 0.01).

Table (1): Frequency and percentage distribution of the studied nurses according to their demographic data (n=30).

Items	No.	%
Age (year)		
18-<25	3	10.0
25-<35	16	53.3
35-<45	5	16.7
45-<60	6	20.0
Mean± SD	32.6 ± 7.82	
Gender		
Male	5	16.7
Female	25	83.3
Marital status		
Single	5	16.7
Married	25	83.3
Years of experience		
1-<5	14	46.7
5-<10	5	16.6
≥ 10	11	36.7
Mean± SD	10.24 ± 4.91	
Attending training courses for the care of patients with multiple sclerosis relapse		
No	30	100.0
There is a special nursing guidelines caring of patients with multiple sclerosis relapse		
No	30	100.0

Table (2): Frequency and percentage distribution of the studied nurses according total knowledge domains regarding care of patients with multiple sclerosis relapse (n=30).

Items	Satisfactory		Unsatisfactory	
	No.	%	No.	%
Anatomy and function of nervous system	13	43.3	17	56.7
Multiple sclerosis disease	16	53.3	14	46.7
Multiple sclerosis relapse	7	23.3	23	76.7
Treatment of multiple sclerosis relapse	10	33.3	20	66.7
Nursing role regarding pharmacological management of multiple sclerosis relapse	8	26.7	22	73.3
Nursing care for patients with multiple sclerosis relapse	16	53.3	14	46.7

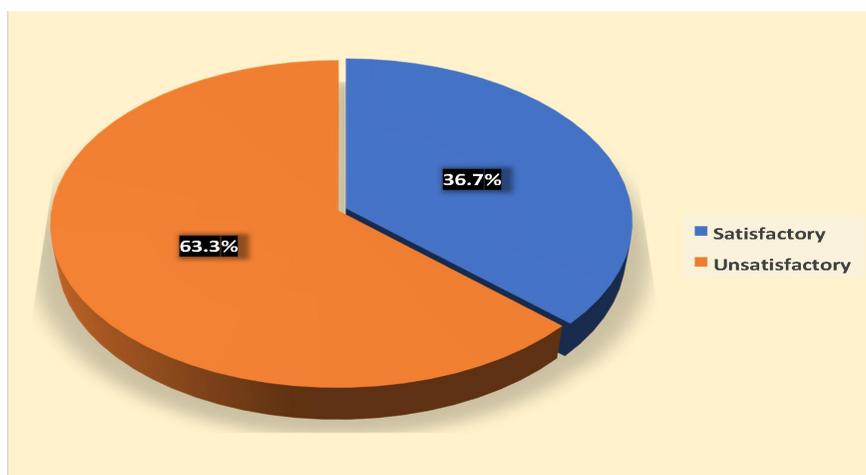
**Figure (1):** Percentage distribution of the studied nurses total knowledge regarding care of patients with multiple sclerosis relapse (n=30).

Table (3): Frequency and percentage distribution of the studied nurses' practices regarding the care of patients with multiple sclerosis relapse (n=30).

Items	Satisfactory		Unsatisfactory	
	No.	%	No.	%
Patient assessment	4	13.3	26	86.7
Medication administration	7	23.3	23	76.7
Pre				
During	12	40.0	18	60.0
Post	10	33.3	20	66.7
Pain management	6	20.0	24	80.0
Fatigue management	3	10.0	27	90.0
Mobility and physical activity management	7	23.3	23	76.7
Urinary catheter care – bladder management	4	13.3	26	86.7
Bowel management	5	16.7	25	83.3
Psychological, emotional and social support	10	33.3	20	66.7

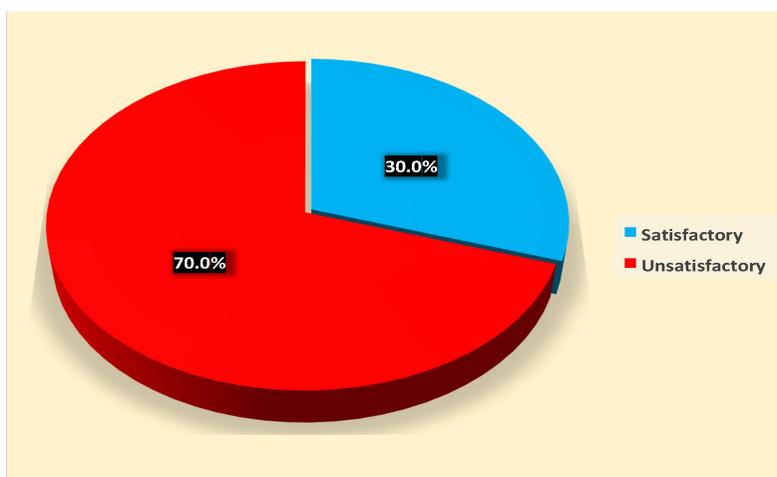
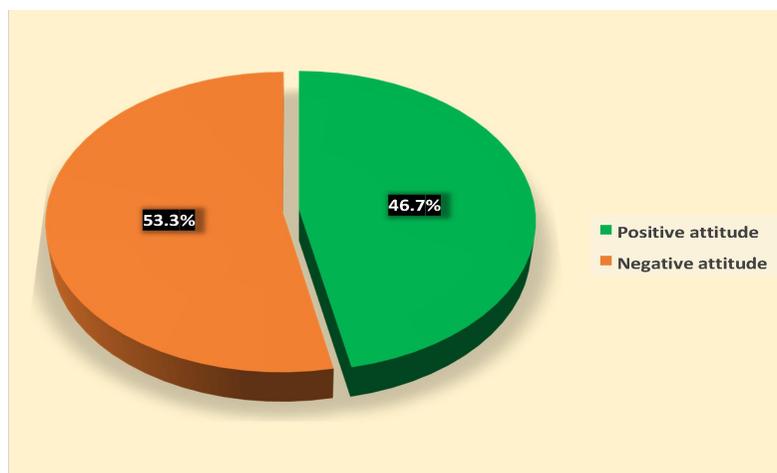
**Figure (2):** Percentage distribution of the studied nurses' total practices regarding care of patients with multiple sclerosis relapse (n=30).**Figure (3):** Percentage distribution of the studied nurses according to their total attitude regarding the care of patients with multiple sclerosis relapse (n=30).

Table (4): Correlation between total knowledge score, total practices score and total attitude score regarding care of patients with multiple sclerosis relapse among the studied nurses (n=30).

Items	Total knowledge		Total attitude	
	r	P-Value	r	P-Value
Total knowledge			0.576	0.000**
Totalpractices	0.511	0.000**	0.496	0.000**

****highly significant at $p < 0.01$.**

Discussion:

In 2017, approximately 2.3 million people were affected with MS worldwide, with prevalence varying widely in different regions and among populations. Moreover, approximately 18,900 people have died from MS, increased from 12,000 in 1990. The MS usually presents between the age of 20 and 50 years and it is twice more common in women than men. There is no cure for MS. Current treatments attempt to improve function following an attack and prevent new attacks. The medications used to treat MS, although modestly effective, can have adverse side effects and be poorly tolerated; physical therapy can also help improve function. (**Dobson & Giovannoni, (2019)**). The study was carried out aiming to assess the nurses' performance regarding the care of patients with multiple sclerosis relapse

According to the demographic characteristics of the present study revealed that, the mean age of the studied nurses was (32.6 ± 7.82 years), this finding is consistent with **Lotfietal., (2020)** in study entitled "Sociodemographic Characteristics of Patients with Multiple Sclerosis Disease in Morocco" who found that the majority of the participant their age was ranged from 25-39 years.

In relation to gender, the current study showed that more than three quarters of the nurses in the studied nurses were females. This finding is consistent with **Nickerson et al., (2015)** in study entitled with " Impact of multiple sclerosis relapse: The NARCOMS participant perspective" who found that, the most of the studied sample were females. This result may be due to nursing profession in the

past was limited to females only and recently become for both genders.

As regard to educational level, the more than one thirds of studied nurses were diploma nurses. This finding goes in the same line with **Ross et al., (2012)** in study entitled with " Assessing relapses and response to relapse treatment in patients with multiple sclerosis: a nursing perspective " who stated that the majority of studied subjects were diploma education. From the investigator opinion because the graduated nurse's staff from technical nursing Institute at Ain Shams University hospital joined them to meet the needed nurse's staff.

As regard marital status the current study revealed that more than two third of studied nurses were married. This is may be due to cultures of community and the marriage is part from the religious and community cultures.

Regarding past experience the present study displayed that less than half of studied nurses had 1-<5 years' of experience in intensive care unit. This finding is in agreement with **Abd-Elmageed, (2021)** in study entitled with "Nurses Performance Regarding Caring for Patients with Seizure" who found that, the mean age of experience is around 5 years. from the investigator opinion that might be due to increasing workload and stress on the nurses in Intensive Care Unit, the nurses don't continue for a long period of time in the day care unit at the Neurological Department.

Concerning the training courses, the current study revealed that all of the studied nurses had no training courses regarding the care of patients with multiple sclerosis relapse. This study finding may duo to lack of educational program plan in the studied setting,

and lack of awareness about vital role of the care of patients with multiple sclerosis relapse.

Concerning nurses' level of knowledge regarding the care of patients with multiple sclerosis relapse, the current study revealed that, the slightly more than half of the studied nurses had satisfactory level of basic knowledge regarding the multiple sclerosis disease and the nursing care for patients with multiple sclerosis relapse.

This finding is in disagreement with **Strupp et al., (2014)** in study entitled " Palliative care for severely affected patients with multiple sclerosis: when and why? Results of a Delphi survey of health care professionals" who found that, there was, the most of participants had lack of knowledge about Palliative care (PC) for patients with multiple sclerosis relapse

Concerning nurses' level of knowledge regarding the anatomy, function of nervous system and treatment of multiple sclerosis relapse. The current study showed that more than half of nurses had unsatisfactory level of knowledge about the anatomy, function of nervous system and treatment of multiple sclerosis relapse. this might be due to absence of an Arabic guidelines book in the unit to be used as guidance for nurses.

This finding was supported by **Cameron et al., (2019)** in study entitled " Factors influencing multiple sclerosis disease-modifying treatment prescribing decisions in the United Kingdom: A qualitative interview study " who reported that, nearly half of the studied nurses had inadequate knowledge regarding nervous system and treatment of multiple sclerosis relapse.

In relation to nurses' level of knowledge regarding the multiple sclerosis relapse and nursing care in relation to the treatment of multiple sclerosis relapse. The current study revealed that, more than two thirds of the studied nurses had unsatisfactory level of knowledge regarding the multiple sclerosis relapse and nursing care in relation to the treatment of multiple sclerosis relapse. This finding might be due to insufficient training courses regarding care of patients with multiple sclerosis relapse.

This finding is in agreement with **While et al., (2019)** in a study entitled " The role of specialist and general nurses working with people with multiple sclerosis " who stated that the majority of the nurses had need information regarding multiple sclerosis relapse

Regarding total level of knowledge, the current study showed that, slightly two thirds of the studied nurses had unsatisfactory level of total knowledge regarding care of patients with multiple sclerosis relapse. This might be due to lack of knowledge about care of patients with multiple sclerosis relapse and decrease nurses' years of experience in the day care unit at the Neurological Department

This finding is in disagreement with **Köpke,et al, (2012)** in study entitled with Implementation of a patient education program on multiple sclerosis relapse management " who reported that, most nurses had good knowledge regarding multiple sclerosis relapse and treatment.

This current study finding is in accordance with **Afrasiabifar et al., (2016)** who studied Fatigue and Self-management among MS Patients, and found that in the intervention group, T-test showed a significant difference before and after the intervention, and a significant difference was observed in the direction of increasing knowledge. This emphasizes that nurses awareness is extremely improved by nurse's orientation and continuous learning

In relation to nurses' practices regarding the care of patients with multiple sclerosis relapse, the current study revealed that, the majority of the studied nurses had unsatisfactory level of practices regarding patient assessment and urinary catheter care – bladder management. This result might be due to absence of an English and Arabic guidelines procedures' books in the day care unit to be used as guidance for nurses and all staff graduated from nursing institute.

This finding goes in the same line with the finding of **Mehri, Z., (2016)** in study entitled with "The Effect of Orem's Self-Care Model on Fatigue in Patients With Multiple Sclerosis: A Single Blind Randomized Clinical

Trial Study” who found less than half of participants lack practice regarding self-care willingness and skills. Before the intervention, Which improved to the majority participants had good practices for patients with multiple sclerosis relapse post intervention with statistically significant difference between them at $P < 0.05$).

This finding was supported with study finding conducted by **Abdallah et al. (2016)** entitled effect of educational program on nurses performance caring for patients with cerebro-vascular stroke who concluded that inadequacy of the nurses performance regarding caring of patients with CVS pre the program implementation. Mean while, most of study sample had got Statistically significant improvement in their performance post program implementation

According nurses' practice regarding pre, during and post medication administration, the current study was revealed that, slightly more than two thirds of the studied nurses had unsatisfactory level of practices. This result might be due to lack of training courses attendance. This finding was supported by **Del Río-Muñoz, et al., (2022)** in the study entitled “Preferences Toward Attributes of Disease-Modifying Therapies: The Role of Nurses in Multiple Sclerosis Care” who stated that, the majority of the studied nurses had unsatisfactory level of practices related to drug administrations.

In relation to nurses' practice regarding pain, fatigue, mobility and physical activity management. The current study revealed that, the majority of the studied nurses had unsatisfactory level of practices regarding pain, fatigue, mobility and physical activity management. This result reflects the efficacy of non-pharmacological intervention in conjunction with pharmacological treatment for symptoms management this is supported with study conducted by **Fouad et al (2007)** entitled effect of non-pharmacological nursing intervention for pain management patients outcome.

As well as, this study finding was supported by **Motl, et al., (2019)**, in the study entitled with “Physical activity and quality of

life in multiple sclerosis: Intermediary roles of disability, fatigue, mood, pain, self-efficacy and social support” who stated that, less than one half of the studied nurses had unsatisfactory level of practices related to pain, fatigue, mobility and physical activity management for patients with multiple sclerosis relapse.

Concerning with level of total practice regarding bowel management and psychological, emotional and social support, the current study revealed that, the more than three quarters of the studied nurses had unsatisfactory level of practices regarding bowel management and psychological, emotional and social support .This result may be due to the majority of the studied nurses had diploma in nursing and decreased years of experience in the day care unit.

The finding goes in the same line with **Ahmed, (2021)** in study entitled with " Assessment of Nurses' Knowledge and Practice Regarding Care for Patients with Spinal Cord Injury in the Critical Care Unit" and reported that, who stated that more than half of the studied nurses had unsatisfactory level of total practices related to care of Patients with Spinal Cord Injury in the Critical Care Unit.

Concerning with attitude of nurses regarding the care of patients with multiple sclerosis relapse, the current study showed that, more than half of the studied nurses had negative attitude . From the investigator's point of view this might be due to increase nurses workload in neurological department, their focus on cognitive and psychomotor domains and their negligence of this affective domain.

These findings are in disagreement with findings of the study about Behavioral aspects of nurse practitioners associated with optimal multiple sclerosis care in Spain " which implemented by **Saposnik,et al., (2021)**, who found that, more than half of the nurse practitioners had positive attitude about optimal multiple sclerosis care in Spain

Concerning correlations between nurses' level of knowledge, practice and attitude of the studied nurses. The current study found that, there was highly significant positive correlation

between total knowledge score, total practices score and total attitude score regarding the care of patients with multiple sclerosis relapse among the studied nurses at ($P = < 0.01$). From the investigator's point of view that because increase nurses level of knowledge affects positively on their practice and attitude toward care of patients with multiple sclerosis relapse.

This study finding goes in the same line with the finding of **Abd-Elrhman, (2021)** in study entitled with "Assessment of the Health Team Performance in the First 24 Hours Regarding Patients with Stroke" who found there was a highly statistically significant relation between nurses' knowledge, practice, attitude and their demographic data.

Conclusion:

less than two thirds of the studied nurses had unsatisfactory level of knowledge, less than three quarters of them had unsatisfactory level of practice and around half of them had negative attitude regarding the care of patients with multiple sclerosis relapse. In addition, there was highly statistically significant positive correlation between total score of knowledge, practice and attitude among the studied nurses caring of patients with multiple sclerosis relapse

Recommendation:

1. In-service training program must developed based on nurses performance regarding the care of patients with multiple sclerosis relapse.
2. Availability of a simplified & comprehensive manual Arabic booklet including the suggested nurses guidelines for caring of patients with multiple sclerosis relapse.
3. Further research is needed to investigate factors affecting Nurses ' performance regarding the care of patients with multiple sclerosis relapse.
4. Replication of the study on larger sample selected from different geographical areas of Egypt is recommended to generalize study.

5. Further study should be suggested to evaluate affect of implementing developed training program based on the studied nurses ' performance about the care of patients with multiple sclerosis relapse on morbidity and mortality rate among such group of patients.

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