



The Quality of Life for Patients with Multiple Sclerosis at King Fahd Neurological Outpatient Clinic

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Abstract

Background: Multiple sclerosis is a long-term, inflammatory condition that results in the loss of myelin in the central nervous system cause of neurological disability and adversely affecting the quality of life. **Aim of the study:** This study aimed to to assess the quality of life for patients with multiple sclerosis at King Fahd neurological outpatient clinic. **Research design:** A descriptive design was used in this study. **Sample:** A purposive sample included 210 adult patients with multiple sclerosis **Setting:** King Fahd neurological outpatient clinic, Saudi Arabia. **Data collection tools:** One tool included six parts, **1st part:** Demographic characteristics, **2nd part:** Past history of patients, **3rd part:** Knowledge of patients about multiple sclerosis, **4th part:** Multiple Sclerosis Quality of Life (MSQOL)-54 Instrument. **Results:** 21.9 % had poor total knowledge about the disease, whereas 49.0 % of the studied patients had an average level of total knowledge about multiple sclerosis and 43.3 % of the studied patients had a low quality of life related to multiple sclerosis, while 38.1% had an average overall quality of life concerning multiple sclerosis. **Conclusion:** Nearly half of the patients had an average level of total knowledge about multiple sclerosis, while over one-fifth had poor knowledge. Over two-fifths of the patients had a low quality of life, and more than one-third had a moderate quality of life. Additionally, there was a significant relationship between patients' knowledge and their overall quality of life regarding multiple sclerosis. **Recommendations:** Provide health education program for patients about multiple sclerosis to improve their quality of life.

Keywords: *Multiple sclerosis, Needs, Outpatient Clinic, Patients and Quality of life.*

Introduction:

Multiple sclerosis (MS) is among the most prevalent nervous system disorders, impacting individuals globally, with a particular tendency to affect young people, women, and those living in northern regions. While MS has a genetic component, it is not directly inherited. This potentially disabling disease targets the brain and spinal cord (central nervous system). In MS, the immune system attacks the myelin sheath that protects nerve fibres, leading to communication issues between the brain and the rest of the body. Over time, the condition can cause irreversible damage or deterioration of the nerves (*Baskaran et al., 2023*).

Multiple sclerosis affects 30 per 100,000 patients worldwide, primarily young adults aged 20 to 40s, with women being twice as likely as males to be affected. In recent years, the prevalence of MS has increased primarily in northern and central European countries, about 2.5 million people worldwide suffer from multiple

sclerosis. The Equator region has the lowest frequency of MS, with a prevalence of 2 -15 per 100 000 persons (*Alghamdi, et al., 2023*).

The exact cause of multiple sclerosis is unknown. It is classified as an autoimmune disease, where the body's immune system mistakenly attacks its own tissues. This malfunction damages the myelin, the fatty substance that insulates and protects nerve fibers in the brain and spinal cord. Risk factors for MS include being between the ages of 20 and 40, female, a heavy smoker, and exposure to certain infectious viruses, such as the Epstein-Barr virus (*Bebo et al., 2022*).

Signs and symptoms of MS frequently impact movement, manifesting as numbness or weakness in one or more limbs, usually on one side of the body, and electric-shock sensations triggered by specific neck movements. Other movement-related symptoms include tremors, lack of coordination, and an unsteady gait. Vision problems are common as partial or complete vision loss, prolonged double vision, and blurred vision. Additional symptoms include slurred speech, fatigue, dizziness, tingling or pain in different parts of the body, and issues with sexual, bowel, and bladder functions (*Blok et al., 2023*).

Quality of Life (QOL) is a subjective assessment of a patient's overall life satisfaction, influenced by mood, coping mechanisms, life experiences, emotional support, and the disease state. According to the National Multiple Sclerosis Society (NMSS), MS reduces QOL by hindering the ability to work, engage in leisure activities, and perform daily living tasks. QOL encompasses physical and occupational functions, psychological state, spiritual well-being, and marital and social interactions. Since there is no cure for MS, it is essential for healthcare providers to incorporate QOL considerations into treatment plans, addressing physical limitations, mental and emotional challenges, and psychosocial impairments (*Al Qadire et al., 2023*).

Nurse plays a crucial role in offering continuous support to the patient and aiding in the prevention and management of symptoms. Nurses can provide information, support, and advice throughout the disease progression, help manage fatigue by reinforcing energy conservation techniques taught by occupational therapists, and ensure mobility equipment is accessible and correctly used by the patient. Additionally, nurses can assist in managing bowel and bladder dysfunction through toileting regimens and education on continence management techniques (*Abdallah et al., 2022*).

Significance of the study

Globally, the incidence of MS has been drastically changing in recent years. According to a recent national descriptive research, Saudi Arabia's estimated overall prevalence of MS is 40/100 people. 8,722 MS patients participated in a study in Finland, and of those, some (66.7%) had relapsing-remitting MS, some (13.5%) had secondary progressive MS, and 7.9% had primary progressive MS. As a result, there were between 10,000 and 11,000 patients, yielding a crude prevalence of 180–200/100,000 (*Alghamdi et al., 2023*).

Community Health Nurse (CHN) serve as educators, counselors, and advocates, nurses teach patients practical approaches for managing disease symptoms and medication side effects, stressing the importance of adherence to treatment, nurses help patients implement self-care strategies such as self-injection; symptom management; strategies focused on diet, exercise, and coping with stress. Self-care strategies can enhance patients' health and give them a sense of control over their illness (*Abdallah, et al., 2022*).

Aim of the Study

This study aimed to assess the quality of life needs for patients with multiple sclerosis at King Fahd neurological outpatient clinic through:

1. Measuring knowledge for patients about multiple sclerosis at King Fahd neurological outpatient clinic.
2. Evaluating patients with multiple sclerosis needs and problems.
3. Measuring quality of life for patients with multiple sclerosis at King Fahd neurological outpatient clinic.

Research Questions:

1. What is the level of knowledge among patients with multiple sclerosis regarding their disease?
2. What is quality of life for patients with multiple sclerosis?
3. Is there a relation between patients with multiple sclerosis socio- demographic characteristics, knowledge and their QOL?
4. Is there a relation between patients with multiple sclerosis knowledge and their QOL?

Subjects & Methods**I- Technical Design:**

The technical design included research design, setting, subject and tools for data collection.

Research Design:

A descriptive research design was applied to achieve the aim of the study.

Setting:

The study was conducted at the King Fahd Neurological Outpatient Clinic in Saudi Arabia. This clinic, located on the ground floor of King Fahd Hospital, offers services to patients with multiple sclerosis two days a week, during both morning and afternoon shifts. It consists of a comfortable waiting area and consultation room equipped with essential medical equipment and computer to save patient data electronically.

Sampling & Sample size: A purposive sample of 210 patients was selected from the total of 400 patients who attended the aforementioned setting in the previous year. The selection was based on the following criteria:

Inclusion criteria:

- Patients aged between 18 and 60 years.
- Patients who consent to participate in the study.

Exclusion criteria:

- Patients with mental illness.

The sample size was calculated by use power analysis and based on the following formula:

$$N = \frac{N \times p(1-p)}{\{N-1 \times (d^2 \div z^2)\} + p(1-P)}$$

Where:

P= 0.5

1-P= 0.5

D= 0.05

Z=1.96

- Type I error with significant level (α) = 0.5.
- Type II error by power test = 90%. (*Suresh & Chandrashekar, 2015*).

$$N = \frac{400 \times 0.5(1-0.5)}{\{400-1 \times (0.0025 \div 3.8416)\} + 0.5(1-0.5)}$$

N = 209. **748804** \approx 210

Tool of data collection:

The required data was collected through the following tool:

Tool I: Interview Questionnaire: It was developed by the investigator based on a review of relevant and recent scientific literature and was written in clear Arabic to collect data on the following aspects and contains six parts:

Part (I): Demographic characteristics of patients consisted of 8 items as age, gender, marital status, qualification, place of residence, work nature, number of family members and income.

Part (II): Past history and current complain of patients including previous chronic illnesses and surgical interventions consisted of 9 closed-ended questions as diabetes mellitus, cardiovascular disease, hypertension, anemia, renal disease, hepatic disease, gastrointestinal disease, past surgeries, and the duration since diagnosis with multiple sclerosis.

Part (III): Knowledge of patients about multiple sclerosis consisted of 11 closed ended questions as meaning of multiple sclerosis, popularity, causes, manifestation, diagnosis, types of MS, type of MS that the patient diagnosed, treatment, aim of the treatment, prevention and living with the disease.

Scoring system:

Each statement was assigned score according to patient's response were: Complete correct was scored 2 grades, incomplete correct was scored 1 grade and incorrect or don't know was scored 0. Total score were 22 grades from 11 questions. The total scores each item summed up and then converted into percent score as the following:

- **Good knowledge ($\geq 75\%$) = ≥ 17 grades, was considered high score.**
- **Average knowledge ($50 - < 75\%$) = $11 - < 17$ grades, was considered moderate score.**
- **Poor knowledge ($< 50\%$) = < 11 grades, was considered poor.**

Tool II: Multiple Sclerosis Quality of Life (MSQOL)- 54 Instrument: This tool was adapted from Samohyl (2014), consisted of 5 subitems:

A- Physical domain consisted of 10 closed end questions as: The inability to perform work, needing care until the end of life, having the ability to perform ADLs.

B- Psychological domain consisted of 15 closed end questions as: Feeling enjoyment in life, finding meaning in life, suffering from fatigue due to illness, experiencing a lack of moral support from family.

C- Family and social domain consisted of 10 closed end questions as: Feeling satisfied with relationships with others, missing participation in social activities such as visiting relatives and friends.

D- Spiritual domain consisted of 10 closed end questions as: Life has become short, suffering from loss of hope, losing confidence in oneself, lacking desire and a sense of stability.

E- Marital domain consisted of 9 closed end questions as: Feeling that my husband or wife suffers from dependence on them, experiencing difficulty in performing marital duties.

The total scoring system of patients' quality of life:

The items were assessed using a 5-point Likert scale, ranging from "Never" to "Always," with reversed scoring for negative statements. The scoring system assigned points as follows: Never = 0, Rarely = 1, Sometimes = 2, Usually = 3, and Always = 4. The quality of life for patients with multiple sclerosis was categorized based on their responses:

- **High quality of life ($\leq 75\%$) corresponding to a score of ≤ 40 .**
- **Moderate quality of life ($50 - >75\%$) with a score between 27 and >40 .**
- **Low quality of life ($> 50\%$) corresponding to a score greater than 27.**

Validity:

A panel of five experts from the Faculty of Nursing, including members from the Community Health Nursing and Medical-Surgical Nursing Departments, reviewed the tools for clarity, relevance, comprehensiveness,

understanding, and applicability to assess their content validity. Minor modifications were made based on their feedback.

Reliability:

The tool was evaluated to ensure it provides stable and consistent results over time. To assess its reliability, the study tools were tested using Cronbach's alpha, which yielded a score of 0.625 for the knowledge questionnaire about MS and 0.89 for the multiple sclerosis quality of life (QOL) questionnaire.

Ethical Considerations:

Official permission to conduct the study was granted by the Scientific Research Ethics Committee of the Faculty of Nursing at Helwan University. Participation was voluntary, and participants were provided with comprehensive information about the study and their role before signing the informed consent form. Ethical considerations included explaining the study's purpose and nature, the option to withdraw at any time, and ensuring the confidentiality of information, which would not be shared with others without participants' consent. The study also respected ethics, values, culture, and beliefs.

II- Operational Design:

The operational design includes preparatory phase, pilot study and fieldwork.

The Preparatory Phase:

This involved reviewing relevant literature and theoretical knowledge related to various aspects of the study, utilizing books, articles, online periodicals, and magazines.

Field work:

- The investigator conducted interviews with 210 multiple sclerosis patients at the previously mentioned setting. Data collection began with the investigator introducing herself to the patients, explaining the study's purpose and its potential impact on their quality of life, and obtaining their consent to participate before collecting any data .
- The investigator assessed patients' knowledge, health needs, physical health problems, and quality of life regarding multiple sclerosis using questionnaire sheets.
- Interviews were conducted during the morning and afternoon shifts, with each session taking about 30 minutes patient to complete the questionnaire.
- Data collection occurred two days a week (Sunday and Tuesday) as per the investigator's availability. This process spanned six months, from November 2023 to April 2024, and took place from 9 am to 1 pm and from 3 pm to 7 pm in the morning and afternoon shifts at the specified setting.

III- Administrative Design:

An official letter from the Dean of the Faculty of Nursing at Helwan University was issued, and permission was obtained from the director of King Fahd Hospital in Saudi Arabia, where the study was conducted.

IV- Statistical Analysis:

The data collected were synthesized, analyzed, and presented as tables and figures using the Statistical Package for Social Sciences (SPSS) version 20.0. Qualitative variables were presented as frequencies and percentages, while quantitative variables were presented as means and standard deviations. Significance tests were used to identify associations between study variables. The Chi-square (χ^2) test was employed to compare proportions between two qualitative parameters. Spearman's rank correlation coefficient (r) was used to evaluate the correlation between two variables. A 95 % confidence interval was set, with an accepted margin of error of 5 %. Therefore, the p-value was considered significant as follows:

- **P value ≤ 0.05 was considered significant.**
- **P value ≤ 0.001 was considered as highly significant.**
- **P value > 0.05 was considered insignificant.**

Results:

Table (1): Frequency Distribution of the Studied Patients according to their Demographic Characteristics (n=210).

Characteristics of studied patients	No	%
Age/years		
18-30	57	27
30>40	120	57
40>50	27	13
50-60	6	3
Mean ±SD	38.63± 8.79	
Gender		
Male	120	57
Female	90	43
Qualification		
Illiterate	3	1.5
Secondary education	87	41.5
University education	120	57
Place of residence		
Urban	120	57.1
Bedouins	90	42.9
Work nature		
Working	60	28.6
Not working	150	71.4
Number of family members		
1<3	30	14.3
3<5	180	85.7

Table (1): Shows that, the mean age of the studied patients was 38.95 ± 8.53 years. Additionally, 57.0% had a university education, 57.1% were from urban areas, and 71.4% were not working.

Table (2): Frequency Distribution on the Studied Sick Based on Their illness History Concerning Previous Chronic illnesses and Surgical Interventions (N=210).

Disease history	Yes		No	
	No	%	No	%
Diabetes mellitus	10	4.8	200	95.2
Cardiovascular illness	60	28.5	150	71.5
Hypertension	63	30	147	70
Anemia	71	33.9	139	66.1
Renal illness	10	4.8	200	95.2
Hepatic illness	10	4.8	200	95.2
Gastrointestinal illness	119	56.7	91	43.3
Surgical interventions	72	34.2	138	65.8
Time on diagnosis with MS				
1 - < 6 months	50		23.8	
6 months > 1 years	75		35.7	
≥ 1 year	85		40.5	

Table (2): illustrates that 28.5% on the studied sick had cardiovascular illness, 56.7% had gastrointestinal illness, and none had malignant or benign cancer. Additionally, 40.5% on the sick were diagnosed with MS more than one year ago.

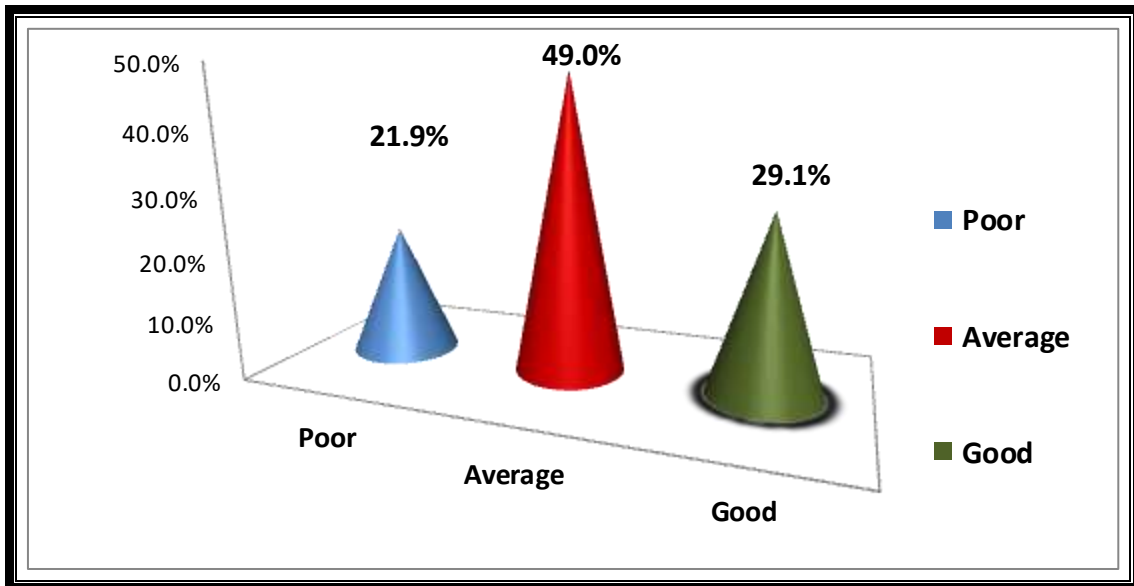


Figure (1): Frequency Distribution of the Studied Patients According to Their Total Knowledge of Multiple Sclerosis (N=210).

Figure (1): Indicates that, 49.0% of the studied patients had an average level of total knowledge about multiple sclerosis, whereas 21.9% had poor total knowledge about the disease.

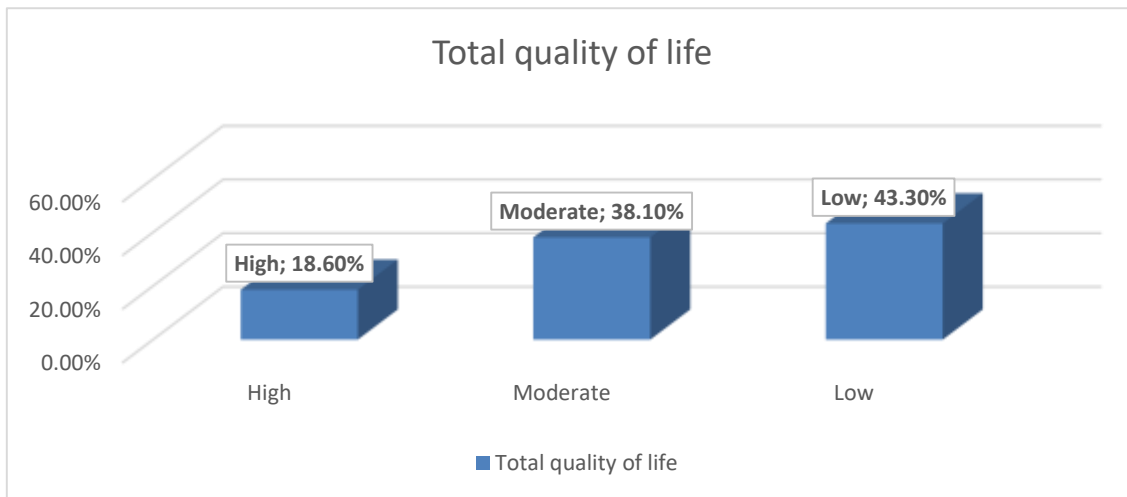


Figure (2): Frequency Distribution of the Studied Patients Based on Their Overall Quality of Life in Relation to Multiple Sclerosis (N=210).

Figure (2): Illustrates that, 43.3% of the studied patients had a low quality of life related to multiple sclerosis, while 38.1% had an average overall quality of life concerning MS.

Table (3): Frequency Relation between the Total Knowledge of the Studied Patients and Their Demographic Characteristics (N=210).

Demographic characteristics	Total knowledge						x ²	P-value
	Good		Average		Poor			
	No	%	No	%	No	%		
Age/years								
18-30	10	16.4	30	29.1	7	15.2	1.660	0.061
30>40	44	72.2	53	51.5	33	71.7		
40>50	6	9.8	17	16.5	4	8.7		
50-60	1	1.6	3	2.9	2	4.4		
Gender								
Male	41	67.2	60	58.3	19	41.3	1.325	0.086
Female	20	32.8	43	41.7	27	58.7		
Qualification								
Illiterate	0	0	0	0	3	6.5	10.267	0.000**
Secondary education	18	29.5	37	35.9	32	69.6		
University education	43	70.5	66	64.1	11	23.9		
Place of residence								
Urban	44	72.1	60	58.3	16	34.8	2.004	0.059
Bedouins	17	27.9	43	41.7	30	65.2		
Working nature								
Working	39	63.9	11	10.7	10	21.7	4.019	0.027*
Not working	22	36.1	92	89.3	36	78.3		

Non sig. p >0.05 Sig. p<0.05* High sig. p<0.001** (Statistically significant difference).

Table (3): Shows a highly statistically significant relationship between the overall knowledge of the studied patients and their qualifications (p<0.001**). Additionally, there is a statistically significant relationship between the overall knowledge of the studied patients and the nature of their work (p<0.05*). However, there is no statistically significant relationship between overall knowledge and age, gender, or place of residence (p>0.05).

Table (4): Frequency relationship between the overall quality of life of the studied patients and their demographic characteristics (n=210).

Demographic characteristics	Total Quality of life						x ²	P-value
	High		Moderate		Low			
	No	%	No	%	No	%		
Age/years								
18-30	20	51.3	22	27.5	15	16.5	3.976	0.028*
30>40	17	43.6	50	62.5	53	58.2		
40>50	2	5.1	8	10	17	18.7		
50-60	0	0	0	0	6	6.6		
Gender								
Male	24	61.5	54	67.5	42	46.2	0.984	0.128
Female	15	38.5	26	32.5	49	53.8		
Qualification								

Illiterate	0	0	1	1.2	2	2.2	3.874	0.031*
Secondary education	12	30.8	20	25	55	60.4		
University education	27	69.2	59	73.8	34	37.4		
Place of residence								
Urban	23	58.9	50	62.5	47	51.6	1.273	0.065
Bedouins	16	41.1	30	37.5	44	48.4		
Working nature								
Working	21	53.8	5	6.3	4	4.4	8.765	0.002**
Not working	18	46.2	75	93.7	87	95.6		

Non sig. >0.05 Sig. <0.05* High sig. <0.001** (Statistically significant difference).

Table (4): Indicates a statistically significant relationship between the overall quality of life of the studied patients and their age and qualifications ($p < 0.05^*$). Additionally, there is a highly statistically significant relationship between overall quality of life and the nature of their work ($p < 0.001^{**}$). However, there is no statistically significant relationship between overall quality of life and gender or place of residence ($p > 0.05$).

Table (5): Correlation between Overall Knowledge and Overall Quality of Life of the Studied Patients (n=210).

Total Knowledge	Total Quality of life						X ²	P-value
	High		Moderate		Low			
	No	%	No	%	No	%		
Good	23	59	27	33.8	11	12.1	9.886	<0.01**
Average	10	25.6	43	53.7	50	54.9		
Poor	6	15.4	10	12.5	30	33		

Non sig. >0.05 Sig. <0.05* High sig. <0.001** (Statistically significant difference).

Table (5): Indicates a highly statistically significant relationship between patients' overall knowledge and their overall quality of life related to multiple sclerosis ($p < 0.001^{**}$).

Discussion:

Multiple sclerosis (MS) is a long-term inflammatory disease that affects the central nervous system, typically targeting young adults. This condition is characterized by unpredictable episodes of inflammation and damage to the myelin sheath and nerve fibres in the brain and spinal cord. These episodes lead to the formation of lesions along the nerve fibres, causing symptoms as weakness, sensory loss, and ataxia, which are directly linked to the damage of myelin and axons (*Thau, et al., 2023*).

Regarding the demographic characteristics of studied patients, the findings of the current study revealed that the mean age of studied sample was 38.95 ± 8.53 and slightly more than half of them had university education. These findings were supported by *Luetic et al., (2022)* whose study entitled, (Clinical and demographic characteristics of male MS patients included in the national registry-RelevarEM. Does sex or phenotype make the difference in the association with poor prognosis in Argentine?), which conducted in Argentina they revealed that the mean age in their study sample was 41.22 years old and more than half of their study sample were highly educated. From investigator point view, this may be interpreted that the disease usually strikes young adults and the onset of disease usually occur over 25 years old, the study was conducted in urban area in which people interested in education more than Bedouins area

Regarding working nature and marital status, the current study showed that nearly three-quarters of the patients were not working, and the majority were married, the study's findings are consistent with those of *Gil-González et al. (2020)* in their systematic review "Quality of Life in Adults with Multiple Sclerosis," which found that more than half of their participants were unemployed due to physical and cognitive health

issues, and nearly three-quarters were married. From investigator point view, this can be attributed to multiple sclerosis patients often experiencing motor skill abnormalities, easy fatigability, and cognitive impairments, which adversely affect their ability to work.

Regarding the distribution of the studied patients according to their disease history, including previous chronic diseases and surgical interventions, the current study revealed that more than one-quarter of the patients had cardiovascular disease and over half had gastrointestinal disease. This finding is consistent with *Alhazzani et al. (2018)* in their study "Quality of Life Assessment Among Multiple Sclerosis Patients in Saudi Arabia," which reported that 33% of their patients had chronic diseases such as hypertension and diabetes mellitus. From the investigator point of view, that these chronic diseases are likely influenced or exacerbated by their condition of multiple sclerosis .

The current study also revealed that almost all of the multiple sclerosis patients studied did not have associated malignant or benign cancer, and two-fifths had been diagnosed more than a year ago. This finding contradicts *Buttmann et al. (2016)*, whose study, titled "Malignancies after Mitoxantrone for Multiple Sclerosis," conducted in Germany revealed that 20.5% of their sample had malignancies, such as breast cancer and colorectal cancer, with the majority having been diagnosed with MS more than a year ago.

The following paragraphs, answered research question number Q1: What is the level of knowledge among patients with multiple sclerosis regarding their disease?

Regarding total patient knowledge about multiple sclerosis, nearly half of the studied patients had an average level of knowledge, while more than one-fifth had poor knowledge of the disease. These findings are consistent with *Alqwaify et al. (2020)* in their study titled "The Quality of Life in Patients with Multiple Sclerosis in Qassim", who reported that about two-thirds of their studied patients had poor overall knowledge of multiple sclerosis, while approximately one-quarter had average knowledge. From the investigator point of view, this may be attributed to a lack of previous exposure to such information, inadequate educational resources, and inadequate health education from healthcare providers.

The following paragraphs, answered research question number Q2: What is quality of life for patients with multiple sclerosis?

Regarding total quality of life of patients with multiple sclerosis, the current study revealed that over two-fifths of the patients had a low quality of life due to factors such as immobility, social problems, dependence on others, psychological issues, and depression.

The study supports *Alqwaify et al. (2020)*, who found that half of the MS patients had a poor quality of life in all dimensions, affected by factors like psychological state, pain, vitality, sexual dysfunction, fatigue, financial problems, employment issues, and community perception. Patients viewed depression and cognitive decline as major determinants of their quality of life, often more important than physical impairments.

The study is also supported by *Abdallah et al. (2022)* in their study "Assessment of Health-Related Quality of Life Among Patients With Multiple Sclerosis at Minia University Hospital", who found that more than three-fifths of their sample had a poor overall quality of life across all aspects of MS. From the investigator point of view, this was attributed to the chronic nature of the disease, reduced mobility, poor coping mechanisms, sexual dysfunction, and psychological health issues.

The following paragraphs, answered research question number Q3: Is there a relation between patients with multiple sclerosis sociodemographic characteristics, knowledge and their QOL?

Regarding the relationship between demographic characteristics and total knowledge of patients, the current study demonstrated a highly statistically significant correlation between patients' total knowledge and their educational qualifications. From the investigator point of view, this suggests that a higher level of education enables patients to read and comprehend more about the disease.



The study aligns with the findings of Sabanagic-Hajric et al. (2022) in their research titled "Quality of Life in Multiple Sclerosis Patients: Influence of Gender, Age, and Marital Status." conducted in Bosnia and Herzegovina, they found that lower educational attainment is linked to poorer knowledge and performance in MS patients.

Regarding the relationship between patients' total knowledge and their working nature, the current study found a statistically significant correlation. From the investigator point of view, working patients had more adequate knowledge than non-working patients, which may be attributed to the fact that employed individuals often, have higher levels of education and may engage in more reading than those who are not employed.

The following paragraphs, answered research question number Q4: Is there a relation between patients with multiple sclerosis knowledge and their QOL?

The study is consistent with the findings of Aulaban et al. (2019) in their research titled "Multiple Sclerosis Patients Knowledge in Saudi Arabia." They demonstrated that there was a statistically significant difference between patients' employment status and their level of knowledge, with employed patients having a satisfactory level of knowledge compared to unemployed patients.

Regarding the relationship between patients' total knowledge and their age, gender, and place of residence, the current study found no statistically significant correlation. From the investigator point of view, this could be due to the lack of differences in knowledge and facilities between urban and Bedouin areas and the uniform level of knowledge about MS across all age groups.

The study aligns with the findings of Aulaban et al. (2019) They showed that there was no statistically significant difference between patients' place of residence and their level of knowledge. Additionally, there was no statistically significant relationship between patients' age and their knowledge about multiple sclerosis questionnaires.

Regarding the relationship between patients' demographic characteristics and their total quality of life, the current study demonstrated a statistically significant correlation between patients' age and quality of life. From the investigator point of view, elderly patients had a poorer quality of life compared to younger patients, which may be due to greater disabilities, psychological depression, lack of socialization, and higher dependence on others in older patients, leading to a lower quality of life.

The study aligns with *Alqahtani (2018)* in their research titled "Quality of Life Assessment among Multiple Sclerosis Patients in Saudi Arabia." They found a statistically significant difference in the total quality of life based on patients' educational qualifications. Patients with higher education levels (e.g., secondary level or above) scored higher in every measurement compared to those with lower education levels.

Regarding the correlation between patients' total knowledge and their quality of life concerning multiple sclerosis, the current study found a highly statistically significant difference. From the investigator point of view, higher education was associated with a better quality of life, likely due to a better understanding of the disease leading to more effective coping with physical impairments, managing psychological issues, enhancing social relationships, and improving spiritual and religious activities.

The study is supported by *Faraclas et al. (2022)* in their research titled "Health-Related Quality of Life in People with Multiple Sclerosis: How Does This Population Compare to Population-Based Norms in Different Health Domains?" Conducted in USA, they found a highly statistically significant correlation between patients' knowledge and their quality of life. Patients with more knowledge were better at coping, managing physical impairments, and handling frustration and depression.

Conclusion

Based on the results of the present study, it can be concluded that nearly half of the patients had an average level of total knowledge about multiple sclerosis, while over one-fifth had poor knowledge. Over two-fifths of the patients had a low quality of life, and more than one-third had a moderate quality of life. There were significant relationships between patients' knowledge and their educational qualifications and work nature, as well as between their quality of life and their age, educational qualifications, and work nature. Additionally, there was a significant relationship between patients' knowledge and their total quality of life regarding multiple sclerosis that answer the research questions.

Recommendations:

Based on the study result, it could be recommended that:

1. Provide health education program for patients about multiple sclerosis to improve their quality of life.
2. Design booklets about for patients with multiple sclerosis quality of life needs which include all information to improve their quality of life.
3. Apply posters and put in King Fahd Neurological Outpatient Clinic about care patients with multiple sclerosis to improve their quality of life.
4. Further research should be applied on large sample and in other different settings for generalization.

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