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Nursing Intervention for Empowering Quality of Life for Adolescents with Multiple Sclerosis: A quasi –experimental study

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ABSTRACT

Background: Adolescents with multiple sclerosis report lower health-related quality of life as compared to general and other chronic disease populations. The aim of the study was to evaluate the effect of nursing intervention for adolescents with multiple sclerosis on empowering their quality of life.

Methods: 50 adolescents suffered from multiple sclerosis took part in the study. The study was A quasi –experimental design. Data was gathered in multiple sclerosis unit at Ain Shams University Hospital as purposive sample. Data was gathered on Structure interview questionnaire included demographic characteristics and adolescent's knowledge. Medical record and Multiple Sclerosis Quality of Life for Adolescents (MSQOL)-54 (pre-post). Frequencies (f) of categories of dependent and independent variables were determined. The chi-squared test ($\chi 2$) and Cronbach's Alpha coefficient test were applied. The level of statistical significance was set at α=.05

Results: there was positive statistically significant correlation regarding total score level of knowledge of studied adolescents with multiple sclerosis disease and their total score level quality of life scores pre and post nursing intervention.

Conclusion: the majority of studied adolescents had unsatisfactory knowledge in pre nursing intervention meanwhile the most of them had satisfactory knowledge in post nursing intervention. In addition, more than three quarters of studied adolescents had best level score for quality-of-life post nursing intervention compared with the minority pre intervention. Recommendation: It is recommended to provide continuous education training program for adolescents with multiple sclerosis disease.

Keywords: *Empowering, Quality life, Multiple Sclerosis, Adolescents*

INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system. When a patient experiences their first clinical symptoms before the age of 18, they term to have childhood MS. Compared to MS in adulthood, MS in children occurs infrequently. According to the MS International Federation, there are at least 30,000 kids and teenagers living with MS worldwide. According to a recent comprehensive review, the prevalence ranged from 0.69 to 26.92 per 100,000 children, while the occurrences ranged from 0.05 to 2.85 per 100,000 children (Bessing et al., 2022).

An increased incidence of autoimmune diseases in developed countries can also be attributed to the disease's minor increase in incidence in recent years, which is primarily attributable to more effective and suitable diagnostic tools. The most prevalent age for pediatric MS occurrence is adolescence, and after puberty, the incidence substantially increases. Less than 1% of all children with MS experience symptoms before the age of 10. The age of onset affects the gender ratio (Bijani et al., 2022).

The period of life from the age of 10 to 19 year is known as adolescence. It is a distinct period in human development and is crucial for laying the basis for long-term health. Adolescents grow quickly in terms of their physical, cognitive, and emotional development. This has an impact on their emotions, thoughts, decisions, and interactions with others and their society. Even though it's generally accepted that adolescence is a healthy stage of life, there are still a lot of deaths, illnesses, and injuries during this time. A lot of this is treatable or preventable. At this stage, adolescents develop behaviour patterns, such as those related to nutrition, exercise, substance use, and sexual activity, that can either preserve their health and the health of others around them or put it at risk in the future (Odgers & Jensen, 2022).

Health-related quality of life (HRQOL) is an individual's or a group's perceived physical, mental, social, and functional health across time. It is possible to evaluate the effects of the disease or pharmacological and non-pharmacological treatments on these four aspects as well as on wellbeing thanks to the subjective and multidimensional notion of HRQOL. Finding one's purpose in life and pursuing personal development, especially in the wake of a chronic, progressive illness diagnosis, paints a more complete picture of the person and their wellbeing and is intricately linked to HRQOL (Goverover et al., 2022).

The importance of evaluating HRQOL in patients with chronic conditions is stressed by numerous organizations e.g., the European Medicines Agency (Ow et al., 2021). The health-related quality of life (HRQoL) of people with multiple sclerosis (MS) is lower than that of people without the disease and people with other chronic illnesses. Age, sex, socioeconomic position, disability status, depression, and weariness have all been linked to lower health-related quality of life in MS patients. Comorbidity is common in MS, and the most common comorbidities are physical disorders like hypertension, hyperlipidemia, and chronic lung disease, as well as mental health conditions like sadness and anxiety. Comorbidity has been linked to lower HRQoL in other chronic diseases, although its impact on MS is still unclear (Stephens et al., 2021).

Self-care behavior-education can help these patients avoid future balance and motor function issues given the rising prevalence of MS in adulthood. On the other hand, the effectiveness of nursing interventions on balance and motor function in MS patients utilizing Orem's self-care model has few research studied. According to Orem's self-care model, which proposes nursing systems, nurses can play a variety of roles in patient care-related empowerment by using techniques including acting, teaching, and supporting to enhance patients' balance and motor function. In particular, empowering MS patients lowers treatment costs, minimizes early impairments, enhances their quality of life, and boosts their performance in both the individual and societal spheres (Stephens et al., 2021).

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The significance of the study

According to the statistical report of Ain Shams MS unit, the total number of patients admitted to the multiple sclerosis unit was 3,300 within the last ten months (1/12/2018–30/9/2019), and approximately 400 patients per month, and 40 of them were adolescents, representing 10% of them.

Aim of the study

This study aimed to evaluate the effect of nursing intervention for adolescents with multiple sclerosis on improving their quality of life.

This aim was achieved through

The assessment of the overall family, past and present history, types of MS, the knowledge, information sources, neurological examination and para-clinical tests, and quality of life in adolescents.

Designing and implementing a nursing intervention for improving quality of life for adolescents with multiple sclerosis disease based on their actual needs assessment.

Evaluating the effect of a nursing intervention on level knowledge and quality of life for adolescent with multiple sclerosis disease.

Subjects and Methods

Technical Design

The technical design for the study entails the research design, setting, subjects, and tools of data collection (Fig. 1).

Research Design

A quasi-experimental design was used in this study.

Research Setting

This study was conducted in Multiple Sclerosis (MS) Unit at Medical Psychiatric Center affiliated to Ain Shams University Hospital whereas; this unit has a large number of adolescence suffering from multiple sclerosis.

Research Subjects

A purposive sample composed of 50 adolescents suffering from MS and was selected under the following inclusion and exclusion criteria:

The inclusion criteria are

- Age: adolescence age (12-21 years).
- Have a definite diagnosis of MS of any type, confirmed by a neurologist.
- Diagnosed with MS for at least one year.

Exclusive criteria

- Adolescents have other co-morbid serious chronic illnesses as hypertension, diabetes mellitus and coronary artery disease
- Adolescents who receiving other therapies (e.g. psychological therapy).

The total number of the sample was 50 adolescents with multiple sclerosis (pre &post) who meet the criteria.

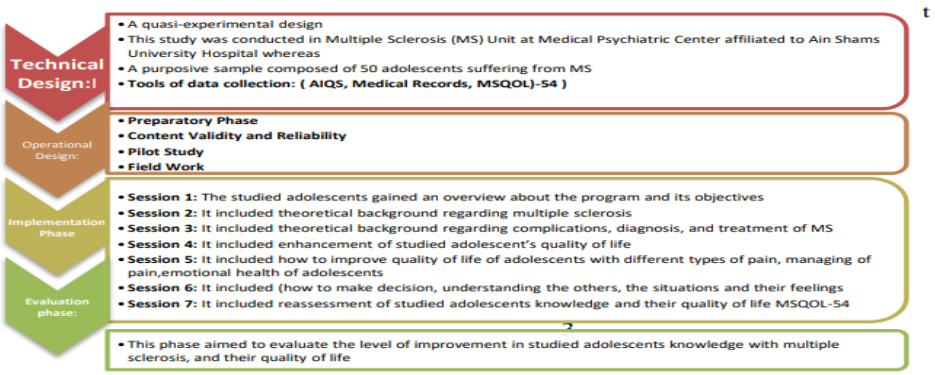

FIG. 1: Flowchart of study stages. Source: author's own

J Popul Ther Clin Pharmacol Vol 30(7):e379–e399; 05 April 2023.

Tools of data collection

Three tools were used for data collection as the following:

Tool (1): A structured Interviewing Questionnaire Sheet (AIQS): the researcher designed this tool. It was written in a simple Arabic Language. It was included two main parts.

The first part was related to demographic characteristics of studied adolescents such as., age, gender, level of education …etc (Q1-Q7)

Second part: It was used to assess adolescents knowledge regarding definition, causes, types, signs and symptoms, complication and treatment of MS …etc. (Q1-Q10) (pre and post nursing intervention):

The structured interviewing questionnaire was filled in by adolescents and took about 20 minutes.

Scoring system: Scoring system was followed to obtain the outcomes of adolescent's knowledge regarding MS. The answers obtained a key model answer that prepared by the researcher

Satisfactory knowledge: score ≥ 60%

Unsatisfactory knowledge score: <60%.

Tool (2): Medical Records: It was used to collect data related to diagnosis, onset of the disease, duration, investigations, types of MS, number of attacks, nature of attack, time of attack, signs and symptoms, treatment,….etc.

Assessing the lab investigations by using medical record of psychiatric Medical Center of Ain Shams University Hospital considering neurological examination results of "Expanded disability status scales " using score system to determine the severity of multiple sclerosis. Where, Mild 0-3, Moderate 3.5 -6, severe above 6. In addition to para-clinical tests according to normal and abnormal considering Magnetic Resonance Imaging (MRI), Spinal test, Visual evoked potential, and cerebro spinal fluid.

Tool (3): Multiple Sclerosis Quality of Life for Adolescents (MSQOL)-54 (pre-post nursing intervention): It was adopted from Acquadro et al., (2003). MSQOL -54 is a standardized scale in an English language; it assess/evaluate a quality of life specifically tailored to MS. The MSQOL-54 form is a comprehensive but relatively brief assessment package consisting of 54 items organized into the 12 sub items and it translated into an Arabic language and was used to assess quality of life for adolescents with multiple sclerosis pre-post the nursing intervention.

Scoring system: There are 12 subscales including, physical health, physical -limitations, emotional -limitations, health perception, pain, emotional well-being, health energy, social relationship, cognitive function, health distress, changes in health, and overall quality of life. The total score for each subscale was 10 marks categorized into three levels, and answers was coded as follow: best = 8-10, fair = 5-7, worse = 1-4. The total score for 12 subscales was 120, and was categorized into three levels as follow: best = 81-120, fair = 41-80, worse = 1-40.

Operational Design

The operational design was included preparatory phase, content validity and reliability, pilot study and field work

Preparatory Phase

This phase included reviewing of recent updating, current, national and international related literature to cover the various aspects of research problem by the using nursing textbooks, articles, magazines and websites. This was necessary for the researcher to be aquatinted with, and oriented about all aspects of the study problems, as well as to assist in development of data collection tools.

B-Content Validity and Reliability

Content Validity

The study tools were reviewed by a panel of 3 experts in the field of pediatric to test the face and content validity. Modifications of the tools were done according to the panel judgment in clarity of same questions, appropriateness of few content and sequence of some items.

Reliability

The reliability was tested by using a Cronbach's Alpha test that was used to measure the internal consistency of the tool (reliability of the used tool or instrument). Where, r =0.86 and 0.87 for questionnaire and MSQOL -54 tool = 0.87.

C-Pilot Study

A pilot study was conducted on 10% (5 adolescents with MS) of the study subjects to evaluate the clarity and applicability of the study tools and to estimate the time needed for its completion. After obtaining the results of the pilot study, the ambiguous items were omitted. Other items were added or modified. Then the final form was developed. The adolescents who participated in the pilot study were excluded from the actual study subjects later.

D-Field Work

The actual fieldwork started from 1 February 2020 to the end of July 2020. The study was carried out in the following four phases. Assessment, planning, implementation and evaluation.

Assessment phase

At this phase, the researcher attended for three days per week (Saturday, Tuesday and Thursday) from 9 am to 2pm in MS Unit at Medical Psychiatric Center affiliated to Ain Shams University Hospital. The aim of the study and steps to be followed was clarified for the adolescence with MS. As well, time allowed and number of sessions for completion of this study was explained.

The structured interviewing questionnaire was distributed for adolescents with MS. Each adolescent took about 20 minutes to fill in the questionnaire. In relation to the studied adolescents with MS (knowledge pre nursing intervention), the researcher from the medical record of the studied adolescents filled in the characteristics and medical data. The time needed to fulfill the medical record was 15 minutes.

MSQOL-54 was adopted from Acquadro et al., (2003). MSQOL -54 is a standardized scale in an English language; it assess/evaluate a quality of life specifically tailored to MS. The MSQOL-54 form is a comprehensive but relatively brief assessment package consisting of 54 items organized into the 12 sub items and it translated into an Arabic language and was used to assess quality of life for adolescents with multiple sclerosis pre-post the nursing intervention.

The weaknesses areas of the adolescents' knowledge and quality of life (QOL) were identified and the objectives were set. Accordingly, the nursing intervention for empowering program was designed by the based on data obtained from pre-assessment tools.

Planning phase

Objective of the nursing intervention program

Improving knowledge, and quality of life of studied adolescents with multiple sclerosis through using nursing intervention program.

Implementation Phase

The studied adolescents were divided into 5 groups; each group was contained 10 adolescents. The nursing intervention was implemented in 7 sessions. Each session was listed one hour. The total program hours was 7 hours for each group. The researcher was used group discussion, brain storming and modified lecture as methods of teaching during sessions. In relation to teaching media, the researcher was used handouts, PowerPoint presentation, pictures and illustrated videos. During the sessions, direct re-enforcement in the form of material rewards as well as, affection and encouragement were provided as positive feedbacks during sessions. The aim of the study and expected outcomes were explained in the first session. Also, the general.

Session 1: The studied adolescents gained an overview about the program and its objectives, which included (introduce myself, identify the importance and the objectives of the program, the purpose of the program and program agenda and outlines of the program. It also included an

assessment the studied adolescents knowledge and QOL through using interviewing questionnaire, medical record and multiple sclerosis quality of life (MSQOL)-54(pre nursing intervention program).

Session 2: It included theoretical background regarding multiple sclerosis, which included (introduction to multiple sclerosis, definition of multiple sclerosis, different types, and causes of multiple sclerosis, signs & symptom of MS).

Session 3: It included theoretical background regarding complications, diagnosis, and treatment of MS, the different ways of diagnosis of MS and its treatment.

Session 4: It included enhancement of studied adolescent's quality of life which include health condition, different health problems of adolescents with multiple sclerosis, physical problems related to emotional &psychological conditions and importance of health with MS.

Session 5: It included how to improve quality of life of adolescents with different types of pain, managing of pain, emotional health of adolescents suffering from multiple sclerosis, social relationship with their family members, friends and colleagues, vitality& activities of daily living such as nutrition, exercises and sleeping.

Session 6: It included quality of life of adolescents suffering from MS regarding (how to make decision, understanding the others, the situations and their feelings, their health and changes in health of adolescents with multiple sclerosis.

Session 7: It included reassessment of studied adolescents' knowledge and their quality of life MSQOL-54 through filling the study tools of data collection including the interviewing questionnaire and MSQOL-54 (post nursing intervention program).

Program booklet

An Arabic handout booklet intended for adolescents with MS. Including all the content of the program, and necessary accurate information about adolescents' knowledge and their QOL, designed to be easy and clear to read and apply, contains important pictures to support and clarify the content

Administrative design

An official written letter approval including the title and purpose to conduct this study was obtained from the Dean of the Faculty of Nursing, Ain Shams University directed to the director of Psychiatric Medical Center at Ain Shams University.

Ethical considerations

The ethical research considerations in this study included the following:

The research approval was obtained from the Ethical Research Committee in Faculty of Nursing Ain Shams University before conduction of the study.

The aim of the study was explained to the study subjects to obtain their cooperation. Written consent was obtained from the participants to ensure their willingness to engage in the study.

An oral consent was also obtained from the studied adolescents with multiple sclerosis. Confidentiality was secured for each participant, where all the gathered data were used for the research purpose only.

Study tools were not include any immoral statements that touch adolescents with multiple sclerosis beliefs, dignity, religion, culture or any other personal issues.

Participants were informed to choose to participate or not and they were informed that they have the right to withdraw from participation in the study at any time without giving any reason.

Statistical design

The collected data were organized; tabulated and analyzed using software. The appropriate statistical tests were used for data handling and graphical presentation, and Statistical Package for Social Sciences (SPSS) version 25. Data were checked for normality and equality of

distribution, data was presented as number and percentage. Relations between different quantitative variables were tested. Data were presented in tables and figures. The statistical analysis includes; percentage (%), standard deviation (SD), Chi-Square test (X2), Proportion probability (P- values), and Cronbach's Alpha coefficient test which revealed that tool consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool.

RESULTS

Table (1): Table showed that, the mean age of the studied adolescents was 18.8 ± 1.89 years, 74% of studied adolescents were females, 40% of them were rural and half of them (50 %) studied adolescents in the university, as regards their ranking, 60% of studied adolescents ranked as first and second. Concerning their occupation, approximately three quarters (74 %) of them were unemployed.

Table (2): Table displayed that, the majority (88%) of studied adolescents were not smokers, regarding their family history, more than one quarter (28%) of them their families had history of multiple sclerosis disease, more than three quarters (78%) had chronic disease, 20% and 22% of them had neurological and auto immune diseases respectively. Concerning past history of studied adolescents with multiple sclerosis disease, very few (4%) of them had collagen diseases, and 8% had Covid-19. Regarding current number of total relapses attacks, this table clarified that 62% had one to three attacks, more than three quarters (78%) of them had relapses of one to three attacks in the previous two years.

Table (3): Table displayed that, 58% of studied adolescents had mild of expanded disability status according to their neurological examination. Regarding para-clinical tests, all studied adolescents (100%) their magnetic resonance imaging were abnormal, more than half (60%) of them their spinal test was abnormal, as well as half (50%) of them had abnormal visual evoked potential test, and the majority (80%) of them had abnormal cerebro spinal fluid test.

Table (4): reveals that there is a difference between Pre and Post Nursing Intervention at p-value < 0.001 according to their Knowledge regarding Multiple Sclerosis Disease

Table (5): More than three quarters (78%) of studied adolescents get their information about multiple sclerosis from a neurologist and 14% from nurse, compared to 2.0% of them from their friends and acquaintances and other sources respectively.

Table (6): Table clarified that, There was high statistical significant difference between all the Sub items of Studied Adolescents' Quality of Life Regarding Pre and Post Nursing Intervention.at p-value <0.001.

Table (7): Table presented that, there was no statistically significant relation p-value >0.05 regarding total score level of knowledge of studied adolescents with multiple sclerosis disease and their socio-demographic characteristics regarding their age, gender, educational level, residence, ranking, and occupation pre nursing intervention compared with highly statistically significant relation post nursing intervention at p-value <0.001. *** There was high statistical significant relation at p-value <0.001 pre and post nursing intervention. While, high statistical significant relation between knowledge and education level with p-value <0.001 in post intervention.

Table (8): Table presented that, there was no statistically significant relation p-value>0.05 Not Significant regarding total score level of quality of life of studied adolescents with multiple sclerosis disease and their socio-demographic characteristics as regards their age, gender, educational level, residence, ranking and occupation pre nursing intervention and post intervention *** compared with highly statistically significant relation at p-value<0.001 post nursing intervention. There was high statistical significant relation at p-value <0.001 pre and post nursing intervention. While, statistical significant relation between QoL and education level with p-value 0.036 in post intervention.

Table (9): Table showed that, there was positive statistically significant correlation regarding total

score level of knowledge of studied adolescents with multiple sclerosis disease and their total score level quality of life scores pre nursing intervention r.=0.218 at p-value >0.071 and post nursing intervention r.=0.589 at p-value <0.001 HS. There was high statistical significant positive correlation at p-value <0.001 pre and post nursing intervention.

Figure (2): About types of multiple sclerosis disease, this table presented that two thirds (66%) of them had relapsing remitting, and 4% and 30% of them had primary progressive, and secondary progressive MS respectively.

Figure (3): this figure showed that 16% of studied adolescents had satisfactory knowledge, compared with the majority (84%) of them had unsatisfactory total knowledge score level pre nursing intervention regarding multiple sclerosis disease. Meanwhile, the majority (92%) of studied adolescents had satisfactory knowledge and 8% of them had unsatisfactory knowledge total score level post nursing intervention regarding multiple sclerosis disease. There was high statistical significant differences at p-value <0.001 pre and post nursing intervention.

Figure (4):illustrated that 6% of studied adolescents total score level of their quality of life was best and 8% of them was worse pre nursing intervention, compared with more than three fourths (78%) of them total score level of their QOL was best and non (0%) of them was worse post nursing intervention.

TABLE 1: Distribution of Studied Adolescents with Multiple Sclerosis Disease according to their Demographic Characteristics

Adolescents' demographic characteristics	(No.=50)	
	No.	%
Sex Male female		74 26
Age (years)		
12-<15	3	6
15-<18	9	18
18-21	38	76
Mean±SD	18.8±1.89	
Residence Urban Rural		60 40
Educational level		
Illiterate	1	2
Primary	6	12
Secondary	18	36
University	25	50
Ranking		
First	15	30
Second	15	30
Third	10	20
Fourth and more	10	20
Occupation		
Unemployed	37	74
Employed	13	26

TABLE 2: Distribution of Studied Adolescents with Multiple Sclerosis Disease according to Family and past, present History.

Adolescents' medical record	(No.=50)	
	No.	%
Smoking		
Yes	6	12
No	44	88
*Family history		
Family history with multiple sclerosis	14	28
Chronic disease	39	78
Neurological disease	10	20
Auto immune disease	11	22
Past history		
Collagen diseases	2	4
Covid-19	4	8
Adolescents age at first attack (years):	14	28
12- < 15	20	40
15 - < 18	16	32
18 - 21	8	16
Adolescents age at diagnosis by multiple sclerosis (years)	12	24
12 - < 15	30	60
15 - < 18		
18 - 21		
Number of relapses attacks (previous 2 years):		
1-3	39	78
4-6	5	10
≥7	6	12
Present History:	31	62
Number of relapses (total attacks currently):	11	22
1-3	8	16
4-6		
≥7		

*Numbers are not mutually exclusive

TABLE 3: Distribution of Studied Adolescents with Multiple Sclerosis Disease according to their Neurological Examination and Para –Clinical Tests.

Adolescents' Examination	(No.=50)	
	No.	%
Neurological examination (Expanded disability status scales)	29	58
Mild:0-3	18	36
Moderate:3.5 -6	3	6
Severe: above 6		
Para-Clinical Tests:		
- Magnetic Resonance Imaging(MRI):		
Normal	0	0
Abnormal	50	100
-Spinal:		
Normal	20	40
Abnormal	30	60
-Visual Evoked Potential Test: (VEP)		
Normal	25	50
Abnormal	25	50

- Cerebro Spinal Fluid Test: (CSF)		
Normal	10	20
Abnormal	40	80

TABLE 4: Distribution of Studied Adolescents according to their Knowledge regarding Multiple Sclerosis Disease Pre and Post Nursing Intervention.

Adolescents' knowledge	Pre-intervention		Post- intervention		X2	P - Value
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory		
	%	%	%	%		
• Definition of multiple sclerosis disease.	2	98	86	14	71.591	0.001**
• Types of multiple sclerosis disease.	8	92	98	2	81.293	0.001**
• Causes of multiple sclerosis disease.	0	100	98	2	96.078	0.001**
• Age which is more exposed to multiple sclerosis disease.	40	60	100	0	42.857	0.001**
• Signs and symptoms of multiple sclerosis disease.	30	70	100	0	53.846	0.001**
• Complications of multiple sclerosis disease.	22	78	100	0	63.934	0.001**
• Diagnosis of multiple sclerosis disease.	10	90	100	0	81.818	0.001**
• Treatment of multiple sclerosis disease.	12	88	100	0	78.571	0.001**
• Prophylactic of multiple sclerosis disease.	8	92	100	0	85.185	0.001**

**p-value <0.001 High Significant

TABLE 5: Distribution of Adolescents according to their Source of Information about Multiple Sclerosis Disease.

Source of Information about Multiple Sclerosis Disease*	No.	%
Neurologist.	39	78.0
Nurse.	7	14.0
Friends and acquaintances.	1	2.0
Internet (e.g faceboo, social group, messenger,..etc).	21	42.0
Mass Media as Radio and Television	2	4.0
Newspapers.	3	6.0
Other sources.	1	2.0

*Numbers are not mutually exclusive

TABLE 6: Distribution the Sub items of Studied Adolescents' Quality of Life Regarding Pre and Post Nursing Intervention.

Sub items of Studied Adolescents' Quality of Life	Pre- Intervention			Post-Intervention			X2	P-value
	Best	Fair	Worse	Best	Fair	Worse		
	%	%	%	%	%	%		
Adolescents Physical Health	72	24	4	78	22	0	0.219	0.640
Adolescents Limitations due to physical problems	20	78	2	88	12	0	46.538	0.001**
Adolescents Limitations due to emotional problems	6	92	2	90	10	0	70.673	0.001**
Adolescents health perception	16	74	10	74	24	2	37.527	0.001**
Adolescents pain	6	58	36	48	52	0	34.219	0.001**
Adolescents emotional well-being	6	80	14	64	36	0	39.373	0.001**
Adolescents Health Energy	6	84	10	60	40	0	34.897	0.001**
Adolescents Social Relationship	26	48	26	70	30	0	26.683	0.001**
Adolescents Cognitive Function	8	82	10	54	44	2	28.117	0.001**
Health Distress	12	70	18	66	34	0	33.923	0.001**
Change in Health	28	46	26	68	32	0	22.590	0.001**
Overall quality of life	20	56	24	70	24	6	29.636	0.001**

TABLE 7: Relation between Studied Adolescent's total Score Level of Knowledge about Multiple Sclerosis and their Socio-demographic Characteristics Pre/Post Nursing Intervention

Adolescents' demographic characteristics/ Total knowledge	Pre-Intervention				Post-Intervention			
	Satisfactory (No.=8)		Unsatisfactory (No.=42)		Satisfactory (No.=46)		Unsatisfactory (No.=4)	
	No.	%	No.	%	No.	%	No.	%
Age (years)								
12-<15 years	1	12.5	2	4.8	2	4.3	1	25.0
15-<18 years	1	12.5	8	19.0	9	19.6	0	0.0
18-21 years	6	75.0	32	76.2	35	76.1	3	75.0
x2	0.832				3.399			
p-value	0.660				0.183			
Gender								
Male	2	25.0	11	26.2	11	23.9	2	50.0
Female	6	75.0	31	73.8	35	76.1	2	50.0
x2	0.005				1.302			
p-value	0.944				0.254			
Educational level								
Illiterate	0	0.0	1	2.4	0	0.0	1	25.0
Primary	1	12.5	5	11.9	4	8.7	2	50.0
Secondary	2	25.0	16	38.1	17	37.0	1	25.0
University	5	62.5	20	47.6	25	54.3	0	0.0
x2	0.810				19.052			
p-value	0.847				<0.001**			
Residence								
Urban	7	87.5	23	54.8	29	63.0	1	25.0
Rural	1	12.5	19	45.2	17	37.0	3	75.0
x2	3.001				2.219			
p-value	0.083				0.136			
Ranking								
First	4	50.0	11	26.2	14	30.4	1	25.0

Second	1	12.5	14	33.3	14	30.4	1	25.0
Third	1	12.5	9	21.4	8	17.4	2	50.0
Fourth or more	2	25.0	8	19.0	10	21.7	0	0.0
x2	2.629				2.899			
p-value	0.452				0.408			
Occupation								
Employed	2	25.0	11	26.2	11	23.9	2	50.0
Unemployed	6	75.0	31	73.8	35	76.1	2	50.0
x2	0.005				1.302			
p-value	0.944				0.254			

p>0.05 Not Significant; *p <0.05 Statistical Significant; **p <0.001 High Statistical Significant

TABLE 8: Relation between Studied Adolescent's Total Score Level regarding their Quality of life with Multiple Sclerosis Disease and their Socio-Demographic Characteristics. Pre/Post Nursing Intervention.

Adolescents' socio-demographic characteristics/ Quality of life	Pre-Intervention						Post-Intervention			
	Best (No.=3)		Fair (No.=43)		Worse (=4)		Best		Fair	
	No.	%	No.	%	No.	%	No.	%	No.	%
Age (years)										
12-<15	0	0.0	2	4.7	1	25.0	2	5.1	1	9.1
15-<18	0	0.0	8	18.6	1	25.0	7	17.9	2	18.2
18-21	3	100.0	33	76.7	2	50.0	30	76.9	8	72.7
x2	3.961						0.245			
p-value	0.411						0.885			
Gender										
Male	1	33.3	11	25.6	1	25.0	9	23.1	4	36.4
Female	2	66.7	32	74.4	3	75.0	30	76.9	7	63.6
x2	0.090						0.787			
p-value	0.956						0.375			
Education level										
Illiterate	0	0.0	1	2.3	0	0.0	1	2.6	0	0.0
Primary	0	0.0	5	11.6	1	25.0	5	12.8	1	9.1
Secondary	0	0.0	15	34.9	3	75.0	10	25.6	8	72.7
University	3	100.0	22	51.2	0	0.0	23	59.0	2	18.2
x2	7.388						8.521			
p-value	0.286						0.036*			
Residence										
Urban	3	100.0	26	60.5	1	25.0	25	64.1	5	45.5
Rural	0	0.0	17	39.5	3	75.0	14	35.9	6	54.5
x2	4.046						1.243			
p-value	0.132						0.265			
Ranking										
First	2	66.7	12	27.9	1	25.0	10	25.6	5	45.5
Second	1	33.3	13	30.2	1	25.0	13	33.3	2	18.2
Third	0	0.0	9	20.9	1	25.0	8	20.5	2	18.2
Fourth and more	0	0.0	9	20.9	1	25.0	8	20.5	2	18.2
x2	2.823						1.826			
p-value	0.831						0.609			
Occupation										

Employed	1	33.3	10	23.3	2	50.0	10	25.6	3	27.3
Unemployed	2	66.7	33	76.7	2	50.0	29	74.4	8	72.7
x2	1.450						0.012			
p-value	0.484						0.913			

p >0.05 Not Significant *p<0.05 Statistical Significant**p <0.001 High Statistical Significant

TABLE 9: Correlation between Studied Adolescents' Total Score Levels of Knowledge and Total Score Level of their Quality of Life Pre & Post Nursing Intervention.

Items	Adolescent's total Score level of knowledge			
	Pre-Intervention		Post-Intervention	
	r-Test	p-value	r-Test	p-value
Adolescents total Score level of quality of life	0.218	0.071	0.589	<0.001**

**Highly statistical significant differences (p<0.001).

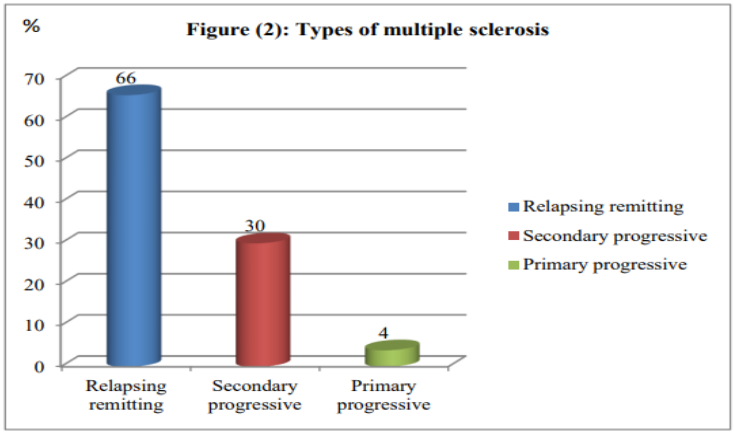

FIGURE 2: Distribution of studied adolescents with multiple sclerosis disease according to types of MS.

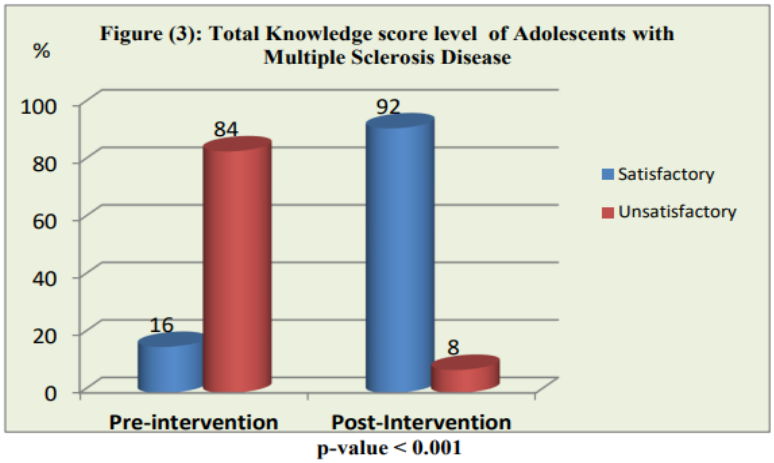

FIGURE 3: Distribution of Studied Adolescents according to their Total Knowledge Score Level regarding Multiple Sclerosis Disease Pre and Post Nursing Intervention.

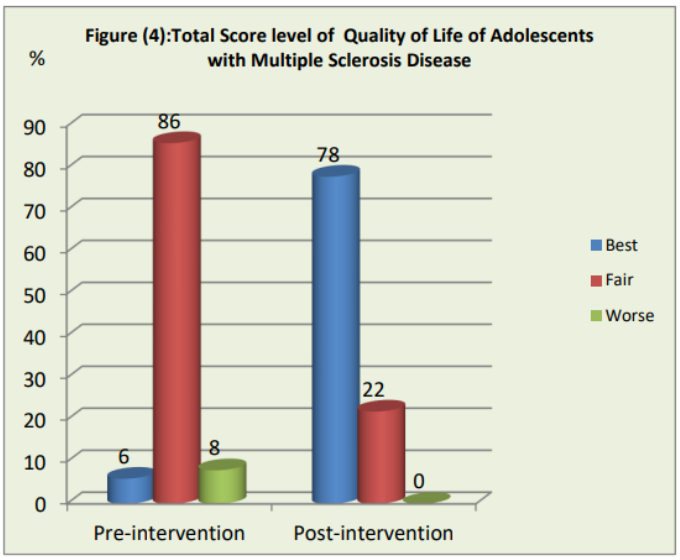

FIGURE 4: Distribution of Studied Adolescents according to their Total Score Level of Quality of Life Pre and Post Nursing Intervention.

DISCUSSION

MS is a progressive and degenerative disease of the myelin sheath for cover cells in the CNS that required to evidence based self-care includes inferring and wisely using the best available scientific in combination with the patient's condition. Many adolescents with chronic conditions experience reduced self-support, independent living, communication skills, and quality of life. Nursing intervention program can be a predictor of a adolescent's ability to change his/her behavior and decision to increase quality of life (Borimnejad, et al., 2018, Sharafi, & Seydi, 2021 and Bessing et al., 2022).

MS is a chronic neurodegenerative disease that gradually impairs CNS function, leading to a wide range of symptoms. MS disease the condition can result in severe disability and reduced quality of life for adolescents living with MS. Consequently, MS requires effective disease management, including pharmacological interventions and/or non-pharmacological symptom management approaches. Health education interventions aim to increase knowledge, understanding and self-management skills, overcoming barriers to positive behavior change, and facilitating shared decision-making and improve quality of life (Harvie, 2021). So, this study aimed to evaluate the effect of nursing intervention for adolescents with multiple sclerosis on empowering their quality of life.

On studying sociodemographic characteristics of the studied adolescents, concerning on their age, the present study illustrated that the mean age of the studied adolescents was 18.8 ± 1.89 years. this finding disagreement with Ibrahim et al., (2020) who conducted study "Effect of Nursing Guidelines Regarding Safety Measures on Occurrence of Injuries among Adolescents with Multiple Sclerosis" and reported that majority of studied adolescents with MS were 16 < 18 years and the mean age of selected adolescents with MS was 15.1± 0.6 years.

As regard to education level, the current study displayed that half of the studied adolescents with MS had university education. This result in the same line with study by Torpil, & Pekçetin (2022) who conducted study about "Effectiveness of Client-Centered Training on Percieved Occupational Performance and Satisfaction in People with Multiple Sclerosis" and reported that half of the studied patients with multiple sclerosis had university education

Regarding gender of the studied adolescents, the present study showed that less than three quarters of the studied adolescents with multiple sclerosis were females. this might be due to the immune

system may be stimulated by sex steroid hormones during puberty. This finding was consistent with study by Wallin et al., (2019) who conducted study about " Global, regional, and national burden of multiple sclerosis 1990–2016" and reported that females more than twice as likely to be affected than males.

Concerning on residence of the studied adolescents with MS, the present study showed that less than two thirds of them living in urban areas. This result might be due to the study was conducted at Ain Shams University Hospitals in Cairo, so that most patients were from urban area. This result in the same line with study by Afrasiabifar et al., (2020) who conducted study about "Orem's self-care model with multiple sclerosis patients' balance and motor function" and showed that nearly of the studied sample with MS living in urban areas. Conversely, this result was in contrast with Flemmen et al., (2020) who conducted study about "Prevalence of multiple sclerosis in rural and urban districts in Telemark county, Norway" and showed that higher prevalence of MS was in the rural areas.

Concerning smoking, the current study reported that most of the studied adolescents were non-smokers, this result consistent with the result of study by Faraji et al., (2018) entitled "Effect of self-care education on social adaptability in patients with multiple sclerosis" and stated that most of the studied sample were non-smokers.

Regarding family history, the current study showed that more than one quarter of the studied adolescents had history of MS. This result matched with study by Khedr et al., (2022) who conducted study about "Perceived stress in multiple sclerosis patients: Relationship with mood states and pain experience" and reported that less than one third of the studied patients had history of multiple sclerosis disease.

As regards to types of MS, the finding of present study revealed that about two thirds of the studied adolescents had relapsing remitting MS, this result was in agreement with study by Bijani et al., (2022) who conducted study about " The effect of peer education based on Pender's health promotion model on quality of life, stress management and self-efficacy of patients with multiple sclerosis" and reported that two thirds of the studied adolescents had relapsing remitting MS.

According to number of relapses during previous 2 years, the current study illustrated that less than two thirds of the studied adolescents had one to three attacks, this result in the same line with study by Abd Elsalam, & Ali, (2022) who conducted study about " Self-Management Guidelines: Effect on Knowledge, Fatigue, Self-Efficacy and Medications Adherence among Patients with Multiple Sclerosis" and showed that less than three quarters of the studied sample had one to three attacks at previous 2 years

On investigating adolescents' medical record, the present study revealed that more than half of the studied adolescents had mild of expanded disability status according to their neurological examination. meanwhile regarding para-clinical tests, the present study revealed that all studied adolescents their magnetic resonance imaging was abnormal, more than half of them their spinal test was abnormal, as well as half of them had abnormal visual evoked potential test, and the majority of them had abnormal cerebro spinal fluid test. These findings were consistent with Omer, & PaÅ, (2022) who conducted study about "Cognitive performance and quality of life in patients with multiple sclerosis" and founded that the majority of the studied sample had mild disability status and abnormal spinal test.

The current study displayed that less than half of studied adolescents had satisfactory knowledge regarding age which is more exposed to multiple sclerosis disease in pre nursing intervention, while all of them had unsatisfactory knowledge regarding causes of multiple sclerosis disease in pre nursing intervention. Meanwhile, all of them had satisfactory knowledge regarding age which is more exposed to multiple sclerosis disease, signs and symptoms, complications, diagnosis, treatment and prophylactic measures of MS in post nursing intervention and less than one fifth of them had unsatisfactory knowledge regarding definition of multiple sclerosis disease in post nursing intervention. This result might be due to increase awareness of the studied adolescents through groups of social media and Facebook and increases number of MS association. This result

similar to study by Mohamadirizi et al., (2017) who conducted study about "The effect of electronic education on knowledge of patients with multiple sclerosis" and reported that mean knowledge score related to multiple sclerosis after the intervention in compared to before the intervention has increased significantly.

Regarding the studied adolescents' Source of Information about MS, the current study clarified that more than three quarters of studied adolescents their source of information about MS disease from the doctor as neurologist, only very few of them had friends, acquaintances and other sources sclerosis. This result was supported with study by Salter et al., (2022) who conducted study about "Sources of Cannabis Information and Medical Guidance for Neurologic Use: NARCOMS Survey of People Living With Multiple Sclerosis" and revealed that less than three quarters of studied adolescents had source of information about multiple sclerosis disease from the doctor as neurologist.

Regarding to total knowledge score of MS Disease, the present study illustrated that less than one fifth of studied adolescents had satisfactory knowledge, while the majority of them had unsatisfactory knowledge in pre nursing intervention. Meanwhile, the majority of studied adolescents had satisfactory knowledge and compared with few of them had unsatisfactory knowledge in post nursing intervention program regarding multiple sclerosis disease. This result was consistent with study by Saad, & Abo Elfetoh, (2021) who conducted study about " Self-Management Program to Adapt with Multiple Sclerosis Problems and Enhance Quality of Life" and showed that less than half of the studied sample had poor knowledge preintervention program, compared with nearly two thirds of them had good knowledge post program, with highly statistically significant difference (p value <0.01).

According to adolescents' physical health related to MS, the result of the current study clarified that more than two thirds of studied adolescents had total best regarding quality of life according to their physical health in pre nursing intervention, compared with more than three quarters of them in post nursing intervention program, meanwhile, very few of them had total worse in pre nursing intervention, and none of them had total worse in post nursing intervention program regarding their quality of life regarding to their physical health. This finding was disagreement with study by Fasczewski et al., (2017) entitled "Assessing self-report physical activity behaviour and quality of life in individuals with multiple sclerosis" and reported that more than half of the studied patient had poor quality of life and recommended to perform educational program to improve health quality of life.

Pertaining to studied adolescents' quality of Life in relation to their limitations due to physical problems, the result of the present study demonstrated that one fifth of studied adolescents had total best QOL regarding their limitations due to physical problems, while very few of them had total worse QOL in pre nursing intervention program, meanwhile, the majority of studied adolescents quality of life had total best regarding their limitations due to physical problems and none of them quality of life had total worse regarding their limitation due to physical problems in post nursing intervention program. There were high statistical significant difference p<0.001 relation between pre and post nursing intervention program regarding QOL in relation to their limitation due to physical problems. this result might be due to the fact that MS disease affect general health of the patients causing fatigue, malaise, and decreased ability to perform activities daily living (ADLs). this finding was congruent with Momenabadi et al., (2019) who conducted study about " Effect of Educational Intervention Based on Health-Promoting Self-Care Behaviors Model on Quality of Life, Resilience, and Sense of Coherence in Patients with Multiple Sclerosis: A Randomized Controlled Trial" and reported that the majority of the studied sample had poor QOL limitations due to their physical problems pre program, this improvement occurs among nearly two thirds of them had good limitation due to physical problems post program, with high statistical significant difference (p value <0.01).

Concerning on studied adolescents' QOL in relation to their emotional problems, the result of

present study illustrated that few of studied adolescents their total score quality of life had total best and very few of them had total worse regarding their limitations due to emotional problems in pre nursing intervention program, while the majority of studied adolescents quality of life had total best and none of them quality of life had total worse regarding their limitations due to emotional problems in post nursing intervention. There were statistically highly significant at $p<0.001$ relation between pre and post nursing intervention regarding their QOL relation to their limitation due to emotional problems. This finding similarly to study by Bessing et al., (2022) who conducted study about "Evaluating the impact of the Understanding Multiple Sclerosis online course on participant MS knowledge, health literacy, resilience, self-efficacy, quality of life, and MS symptom severity" and showed that improved score of limitation due to emotional problems after educational program and there was high statistical significant difference at ($p<0.001$) between pre and post intervention regarding their limitation due to emotional problems.

Concerning to health perception of the studied adolescents, the result of current study showed that less than one fifth of the studied adolescents their total score of QOL was best and few of them their total score of QOL was worse in relation to their health perception in pre nursing intervention, while less than three quarters of them their quality of life was best and very few of them their total score of QOL was in post nursing intervention program, there were high statistical significant difference ($p<0.001$) pre and post nursing intervention. This finding was matched with study by Abdallah et al., (2022) who conducted study about " assessment of health related quality of life among patients with multiple sclerosis at Minia University Hospital" and founded that most of the studied patients had poor quality of life and recommended performing nursing intervention program is very important to improve health perception among patients with MS.

As regards to studied adolescents QOL regarding Pain, the result of the present study showed that few of the studied adolescents total score of QOL was best and less than half of them was worse regarding pain in pre nursing intervention program, while less than half of them their quality of life total score was best and none of them was worse regarding pain in post nursing intervention. This result might be due to that MS can cause a wide range of symptoms and affect any part of the body, as each patient with the disease is affected differently. This result was supported by study of Mrosková et al., (2021) who conducted study about "Quality of Life of Children and Adolescents with Multiple Sclerosis" and concluded that less than two thirds of the studied sample had poor quality of life pre program, while post program, less than half of them had good quality of life regarding pain.

Pertaining to studied adolescents QOL regarding their emotional well –being, the current study demonstrated that few of the studied adolescents total score of QOL was best and less than one fifth of them their QOL total was worse regarding their emotional well-being in pre nursing intervention, while less than two thirds of them their quality of life total score was best and none of them was worse in post nursing intervention. This finding was consistent with study by Bijani et al., (2022) who conducted study about " The effect of peer education based on Pender's health promotion model on quality of life, stress management and self-efficacy of patients with multiple sclerosis" and illustrated that more than two thirds of the studied patients had poor quality of life pre program, while post program more than half of them had good quality of emotional well –being. Moreover, there was high statistical significant difference ($p<0.001$) between pre and post intervention regarding their emotional well –being.

Regarding to studied adolescents QOL regarding their health energy, the current study demonstrated that few of the studied adolescents total score of QOL was best and less than one fifth of them their QOL total was worse regarding health energy compared with more than half of them was best and none of them was best in post nursing intervention. This finding was in same line with study by Mousaei et al., (2021) who conducted study about "Effect of Family-centered Empowerment Model on Self-care

Behaviors of Patients with Multiple sclerosis" and showed that There was high statistical significant difference ($p<0.001$) pre and post intervention regarding their health energy. Also, Hassani et al., (2021) studied "The Role of Self-compassion and Hope in the Relationship between Psychological Wellbeing, Maladaptive Schemas, Resilience, and Social Support in Women With Multiple Sclerosis" and concluded that educational program his positive effect in improvement of social quality of life among patients with MS.

As regards to social relationship, the current study clarified that more than one quarter of studied adolescents their quality of life total score was best and worse regarding their social relationship in pre nursing intervention, while more than two thirds of them their quality of life total score was best and none of them was total worse regarding their social relationship in post nursing intervention. This result was in agreement with study by Faraji et al., (2018) entitled "Effect of self-care education on social adaptability in patients with multiple sclerosis" and stated that there was improvement social interactions for patients with MS after educational program. There were high statistical significant difference ($p<0.001$) pre and post nursing intervention regarding their social relationship.

Regarding to studied adolescents in relation to cognitive function, the present study showed that few of studied adolescents their quality of life was best and less than one fifth of them was worse in relation to cognitive function in pre nursing intervention, while more than half of them their quality of life total score was best and very few of them was worse regarding their cognitive function in post nursing intervention. There was high statistical significant difference ($p<0.001$) between pre and post intervention regarding their cognitive function. This finding in was the same line with Shawli et al., (2019) who conducted study about “Fatigue and Self management among Multiple Sclerosis Patients” and clarified that more than one quarter of the patients with MS patients are suffering severe cognitive fatigue, less than half of them with a medium cognitive fatigue and more than half of them their quality of life total score was best and very few was total worse regarding their cognitive function in post nursing intervention. There were high statistical significant difference ($p<0.001$) between pre and post intervention regarding their cognitive function.

On studying studied adolescents' QOL in relation to their health distress and change in health, the current study revealed that few of the studied adolescents their quality of life total score was best and less than one fifth of them total score was worse regarding their health distress in pre nursing intervention, while nearly two thirds of them their quality of life was total score best and none of them was worse regarding their health distress in post nursing intervention. This outcome was consistent with Habibi et al., (2021) who conducted study about " self-care practices and related factors in patients with multiple sclerosis (MS) based on the health belief model" and showed that post intervention program there was improvement on health distress and change in health quality of life among patients with MS Moreover, There were high statistical significant difference ($p<0.001$) between pre and post intervention regarding their health distress and change in health.

Concerning on total score level of the studied adolescents ' QOL, the present study demonstrated that one of fifth of the studied adolescents was best and nearly one quarter of them was worse pre nursing intervention compared with more than two thirds of them was best and few of them was worse in post nursing intervention and there was high statistical significant difference pre and post nursing intervention at ($p < 0.001$). This outcome supported with study by Penwell-Waines et al., (2017) entitled " Testing the health promotion model for adherence and quality of life in individuals with multiple sclerosis" and founded that quality of life in MS patients was improved post intervention health promotion program compared to pre program. Moreover, this finding was in accordance with a study by Kidd et al., (2017) about "A systematic review of the effectiveness of self-management interventions in people with multiple sclerosis at improving depression, anxiety and quality of life", and

demonstrated that there was significant improvement in QoL over time post intervention.

regarding total knowledge of studied adolescents with multiple sclerosis disease and in relation to socio-demographic characteristics regarding their age, gender, educational level, residence, ranking, and occupation the present study presented that there was no statistically significant at p-value >0.05 pre nursing intervention compared with highly statistically significant relation in post nursing intervention and educational level at p-value <0.001. This finding in same line with study by Claflin et al., (2022) who conducted study about " Assessing the Impact of Online Health Education Interventions From 2010-2020: " and reported that there was high statistical significant difference regarding total knowledge of studied sample with multiple sclerosis disease and their educational level at p-value <0.001.

Regarding to relation between studied adolescents' level of total score level QOL about MS pre/post according to their socio-demographic characteristics, the present study showed that there was no statistically significant relation regarding total QOL of studied adolescents with MS and their socio-demographic characteristics regarding age, gender, educational level, residence, ranking and occupation in pre nursing intervention at p-value>0.05 NS compared with high statistical significant relation in post nursing intervention at p-value<0.001. This result was congruent with study by Abdulla et al., (2021) who conducted study about "Factors that influence quality of life in patients with multiple sclerosis in Saudi Arabia" and proved that there was no statistically significant relation regarding total QOL of studied adolescents with MS and their socio-demographic characteristics regarding age, gender, educational level, residence, ranking and occupation in preprogram p-value>0.05.

On other hand this outcome disagreement with study by Zadeh et al., (2022) who conducted study about " Sense of coherence among patients with multiple sclerosis and its relevant factors" and showed that there is no statistically significant relation regarding total quality of life of studied adolescents with multiple sclerosis disease and educational level at p-value>0.05

The present study showed that there was no statistical significant correlation regarding total level of knowledge of studied adolescents with multiple sclerosis disease and their total quality of life scores in pre nursing intervention (p-value >0.05) compared with high statistical significant positive correlation at p-value <0.001 pre and post nursing intervention. This result accordance with El-Kattan, & El-Zayat, (2019) who studied the " Effects of Self-Care Education Program on Quality of Life of Patients with Multiple Sclerosis," and showed that there was high statistical significant positive correlation between total knowledge of patients and their quality of life score post program (p-value <0.001) post nursing intervention..

CONCLUSION

In light of the current study, it can be concluded that, nursing intervention had positive effect the majority of studied adolescents had unsatisfactory knowledge in pre nursing intervention meanwhile the most of them had satisfactory knowledge in post nursing intervention. Also, more than three quarters of studied adolescents had best level score for quality-of-life post nursing intervention compared with the minority pre intervention. In addition, there was high statistically significant correlation between total score of knowledge of the studied adolescent’ and their total score of quality of life at post- intervention.

RECOMMENDATIONS

Based on the findings of the current study results, the following recommendations were suggested:

1. Provide continuous education training program for adolescents with MS
2. Prepare illustrative booklet about self-care for adolescents with MS
3. The study should be replicated on large sample and in different settings to generalize the results.
4. Additional research is needed to analyze effect of MS disease on quality life for caregiver among family of adolescents.

5. Further research in children and adolescents with MS should also investigate these factors and their impact on QOL in the future
6. Awareness on M.S signs and symptoms for early diagnosis
7. Further research awareness about new technology and modalities in units of M.S.

REFERENCES

1. Abd Elsalam, S., & Ali, R. (2022). Self-Management Guidelines: Effect on Knowledge, Fatigue, Self-Efficacy and Medications Adherence among Patients with Multiple Sclerosis. Egyptian Journal of Health Care, 13(1), 1008-1024.
2. Abdallah, Z.., Mohammed, A., & Rabee, M. (2022). Assessment Of Health Related Quality Of Life Among Patients With Multiple Sclerosis At Minia University Hospital. Minia Scientific Nursing Journal, 11(1), 48-55.
3. Abdulla, F. Albagmi, F., & Al-Khamis, F., (2021). Factors that influence quality of life in patients with multiple sclerosis in Saudi Arabia. Disability and rehabilitation, 1-9.
4. Acquadro, C., Lafortune, I., & Mear, I. (2003). Quality of life in multiple selerosis: translation in French Canadian of the MSQoL-54, Health and quality of life outcomes; 1(1): 70.
5. Afrasiabifar, A., Mehri, Z., & Ghaffarian Shirazi, H. (2020). Orem's self-care model with multiple sclerosis patients' balance and motor function. Nursing Science Quarterly, 33(1), 46-54.
6. Bessing, B., van der Mei, I., Taylor, B., Honan, C., Blizzard, L., & Claflin, S. (2022). Evaluating the impact of the Understanding Multiple Sclerosis online course on participant MS knowledge, health literacy, resilience, self-efficacy, quality of life, and MS symptom severity. Multiple Sclerosis and Related Disorders, 60, 103717.
7. Bijani, M., Niknam, M., Karimi, S., Naderi, Z., & Dehghan, A. (2022). The effect of peer education based on Pender's health promotion model on quality of life, stress management and self-efficacy of patients with multiple sclerosis: a randomized controlled clinical trial. BMC neurology, 22(1), 1-9.
8. Borimnejad, L., Parvizy, S., Haghaani, H., & Sheibani, B. (2018). The effect of family-centered empowerment program on self-efficacy of adolescents with thalassemia major: A randomized controlled clinical trial. International journal of community based nursing and midwifery, 6(1), 29.
9. Claflin, S., Klekociuk, S., Fair, H., Bostock, E., Farrow, M., Doherty, K., & Taylor, B., (2022). Assessing the Impact of Online Health Education Interventions From 2010-2020: A Systematic Review of the Evidence. American Journal of Health Promotion, 36(1), 201-224.
10. El-Kattan, B., & El-Zayat, O. (2019). Effects of Self-Care Education Program on Quality of Life of Patients with Multiple Sclerosis,IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 3 Ser. VII., PP 76-88. Available at: www.iosrjournals.org.
11. Faraji, F., Khosravi, S., Sajadi, M., Farahani, Z., & Rafiei, F. (2018). Effect of self-care education on social adaptability in patients with multiple sclerosis. Iran Red Crescent Med J. 2018 January; 20(1): e55634.
12. Fasczewski, K., Rothberger, S. & Gill, D. (2017). Assessing Self-Report Physical Activity Behavior and Quality of Life in Individuals with Multiple Sclerosis. SAGE journal, 25(7): 964-975. https://doi.org/10.1177/1359105317739965. Accessed date: 6/10/2020.
13. Flemmen, H.., Simonsen, C., Berg-Hansen, P., Moen, S., Kersten, H., Heldal, K., & Celius, E. (2020). Prevalence of multiple sclerosis in rural and urban districts in Telemark county, Norway. Multiple Sclerosis and Related Disorders, 45, 102352.
14. Goverover, Y., Chen, M. H., Botticello, A., Voelbel, G. T., Kim, G., DeLuca, J., & Genova, H. M. (2022). Relationships between changes in daily occupations and health-related quality of life in persons with multiple sclerosis during the COVID-19 pandemic. Multiple sclerosis and related disorders, 57, 103339.
15. Habibi H, Sedighi B, Jahani Y, Hasani M, & Iranpour A., (2021). Self-Care Practices and Related Factors in Patients with Multiple Sclerosis (MS) Based on the Health Belief Model. Scand J Caring Sci. 10(2):78.
16. Harvie, D., (2021). Immersive Education for Chronic Condition Self-Management. Front. Virtual Real. 2: 657761. doi: 10.3389/frvir.
17. Hassani, S., Tizdast, T., & Zarbakhsh, M., (2021). The Role of Self-compassion and Hope in the Relationship Between Psychological Wellbeing, Maladaptive Schemas, Resilience, and Social Support in Women With Multiple Sclerosis. Journal of Client-Centered Nursing Care, 7(3), 195-204.
18. Ibrahim, M., Hegazy, M., & Khalfallah, H. (2020). Effect of Nursing Guidelines Regarding Safety Measures on Occurrence of Injuries

among Adolescents with Multiple Sclerosis. Egyptian Journal of Health Care, 2020 EJHC Vol. 11. No.1. 1067- 1084.
19. Khedr, M., El Sayed, H., & El Wakil, (2022). Perceived stress in multiple sclerosis patients: Relationship with mood states and pain experience. Multiple Sclerosis and Related Disorders, 59, 103650.
20. Kidd, T., Carey, N., Mold, F., Westwood, S., Miklaucich, M., Konstantara, E., & Cooke, D. (2017). A systematic review of the effectiveness of self-management interventions in people with multiple sclerosis at improving depression, anxiety and quality of life. PloS one, 12(10), e0185931.
21. Mohamadirizi, S., Shaygannejad, V., Mohamadirizi, S., & Tolou-Ghamari, Z. (2017). The effect of electronic education on knowledge of patients with multiple sclerosis. Journal of Education and Health Promotion, 6.
22. Momenabadi, V., Kaveh, M., Nakhaee, N., Shirazi, K., Dastoorpoor, M., & Sedighi, B. (2019). Effect of Educational Intervention Based on Health-Promoting Self-Care Behaviors Model on Quality of Life, Resilience, and Sense of Coherence in Patients with Multiple Sclerosis: A Randomized Controlled Trial. Iranian Red Crescent Medical Journal, 21(12). e97240.
23. Mousaei, F., Zendehtalb, H., Zare, M., & Behnam Vashani, H. (2021). Effect of Family-centered Empowerment Model on Self-care Behaviors of Patients with Multiple sclerosis. Evidence Based Care, 11(3), 35-43.
24. Mrosková, S., Klímová, E., Majerníková, Ľ., & Tkáčová, Ľ. (2021). Quality of Life of Children and Adolescents with Multiple Sclerosis—A Literature Review of the Quantitative Evidence. International Journal of Environmental Research and Public Health, 18(16), 8645.
25. Odgers, C. L., & Jensen, M. R. (2022). Adolescent development and growing divides in the digital age. Dialogues in clinical neuroscience, 15(2), 2-8.
26. Omer, Ä., & PaÅ, Z. (2022). Cognitive performance and quality of life in patients with multiple sclerosis. Acta Medica Saliniana, 51(1-2). 23- 29.
27. Ow, N., Mozafarinia, M., & Mayo, N. E. (2021). Quality of life measures in pediatric multiple sclerosis: a systematic review and meta-analysis. Developmental Medicine & Child Neurology, 63(9), 1051-1058.
28. Penwell-Waines, L., Lewis, K., Valvano, A., Smith, S., Rahn, R., & Stepleman, L. (2017). Testing the health promotion model for adherence and quality of life in individuals with multiple sclerosis. Psychology, health & medicine, 22(2), 205-211
29. Saad, M., & Abo Elfetoh, E. (2021). Self-Management Program to Adapt with Multiple Sclerosis Problems and Enhance Quality of Life. Assiut Scientific Nursing Journal, 9(26), 34-54.
30. Salter, A., Cutter, G., Marrie, A., Nichol K., Steinerman, R., Smith, M., & Fox, J. (2022). Sources of Cannabis Information and Medical Guidance for Neurologic Use: NARCOMS Survey of People Living With Multiple Sclerosis. Neurology: Clinical Practice. DOI: 10.1212/CPJ.0000000000001155.
31. Sharafi, O., & Seydi, J. (2021). Investigating the effect of evidence-based education on self–care in patients with multiple sclerosis referred to the Sanandaj MS society in 2019. Scientific Journal of Nursing, Midwifery and Paramedical Faculty, 7(1), 60-68.
32. Shawli, A. Abdulmutalib I, & Al Nagshabandi, E, (2019). Fatigue and Self management among Multiple Sclerosis Patients." American Journal of Nursing Research, vol. 7, no. 4: 550-560. doi: 10.12691/ajnr-7-4-17.
33. Stephens, S., Berenbaum, T., Finlayson, M., Motl, R. W., & Yeh, E.A. (2021). Youth with multiple sclerosis have low levels of fitness. Multiple Sclerosis Journal, 27(10), 1597-1605.
34. Torpil, B., & Pekçetin, S. (2022). Effectiveness of Client-Centered Training on Percieved Occupational Performance and Satisfaction in People with Multiple Sclerosis. Gazi Sağlık Bilimleri Dergisi, 7(1), 65-74.
35. Wallin, M., Culpepper, J., Nichols, E., Bhutta, A., Gebrehiwot, T., Hay, I., & Murray, J. (2019). Global, regional, and national burden of multiple sclerosis 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet Neurology, 18(3), 269-285.
36. Zadeh, H., Pirzadeh, F., & Monjazebi, F. (2022). Sense of coherence among patients with multiple sclerosis and its relevant factors. British Journal of Neuroscience Nursing, 18(Sup1), S26-S30.