Nurse-Led Educational Intervention on Health Literacy and Fatigue in Multiple Sclerosis Patients

Saima Zafar[1], Sarfraz Masih[2], Madiha Mukhtar[3]

[1]*MSN Scholar, Lahore School of Nursing, The University of Lahore, Pakistan*
[2]*Professor, Lahore School of Nursing, The University of Lahore, Pakistan*
[3]*Associate Professor, Lahore School of Nursing, The University of Lahore, Pakistan*

**Corresponding Author: Saima Zafar, Email: saimafaraz63@gmail.com*

Keywords:

Education Intervention; Health Literacy; Fatigue Management; Multiple Sclerosis.

ABSTRACT

Objective: The purpose of study is to determine the effect of nurse led educational intervention on health literacy and fatigue among multiple sclerosis patients in Lahore General Hospital, Lahore
Study Design: One-group pre-post quasi-experimental study.
Place and Duration of Study: This study was conducted at Lahore General Hospital Lahore from Marc 2024 to October 2024.
Methodology: This study employed a one-group pre-post quasi-experimental design on a sample of 100 MS patients, using purposive sampling. The research included three phases: a pre-intervention phase for baseline data collection, an intervention phase consisting of 16 educational sessions aimed at improving health literacy, fatigue management, and a post-intervention phase to reassess the same variables. Data were analyzed using SPSS version 25
Results: The result of study showed that participants were primarily young adults (45% aged 18-30) and evenly split by gender (50% male, 50% female). The majority were unmarried (78%) and illiterate (49%). Post-intervention results showed significant improvements in health literacy (from median 29 to 57, $p < 0.001$), and fatigue levels (from median 55 to 31, $p < 0.001$). Notably, while age and education did not significantly impact health literacy post-intervention, marital status did show that unmarried participants had improved outcomes.
Conclusion: The study concluded that education intervention significantly improved health literacy and fatigue level of multiple sclerosis patients. Future researchers should focus on long term intervention and its long-term effects.

INTRODUCTION

Multiple sclerosis (MS) is a chronic disorder that affects the central nervous system, with symptoms such as immunological dysfunction, inflammation, and gradual neurological decline. (1). It is a major contributor to non-traumatic neurological impairment in persons under sixty and is more prevalent in women (2). The worldwide incidence of MS has increased, perhaps because to improved methods for diagnosis (3).

In multiple sclerosis, myelin sheaths are attacked by the immune system, resulting in lesions, demyelination, and neurodegeneration. It has several causes, including environmental factors including viral infections and vitamin D insufficiency as well as hereditary factors (4). Although symptoms might vary greatly, autonomic dysfunction, sensory abnormalities, tiredness, and muscular weakness are common. (5).Health literacy is important in treating MS because it helps patients comprehend their treatment choices and self-care techniques (6). Health literacy deficits are associated with worse outcomes and greater healthcare expenses (7). By learning more about health, MS sufferers can better take care of themselves and improve their general health.

A common and terrible side effect of multiple sclerosis is fatigue, which differs from regular tiredness and could seriously limit daily activities. (8). It results from factors including CNS inflammation, disturbed sleep, and the effort required to regulate symptoms (9). Since it is closely related to depression and anxiety, good tiredness management is essential for both physical and mental health (10).

MS addresses psychological, emotional, social, and physical components as well as Symptoms include mobility issues, persistent pain, and cognitive impairment significantly affect daily activities and independence (11). Most of the time, stress and uncertainty about the course of the disease compromise emotional well-being (12). Further decreasing of quality of life include social isolation, financial problems, and ruined relationships (13). For patients with MS, using educational initiatives to address health literacy and weariness may assist to improve outcomes.

This research presents a comprehensive approach to patient empowerment by concurrently addressing these concerns, in contrast to previous techniques that typically treat them in isolation. This innovative approach promotes proactive and informed patient behaviours, potentially enhancing quality of life and self-care while reducing healthcare costs.

The intervention significantly improved health literacy knowledge and fatigue level of MS patients in term of physical, cognitive and psychosocial aspect. The fatigue severity level of patients was also improved. This research is highly significant for patients as it improved overall quality of life of patients.

METHODS

The research used a one-group pre-post quasi-experimental design to evaluate the effect of a nurse-led educational intervention on health literacy and tiredness in MS patients. The dependent variables were health literacy, exhaustion, and degree of fatigue, whereas the independent variable was the educational intervention. A sample size of 100 cases has been calculated with a 95% confidence interval, a 9% margin of error, and an anticipated percentage of knowledge (pre-post difference) concerning health literacy and fatigue set at 70% using formula: $n = \frac{z^2_{1-\alpha/2} P(1-P)}{d^2}$.

Data Collection and Questionnaire: Data were collected purposively from sample size of 100 MS patients at Lahore General Hospital. Patients were divided into five groups. First, pre data was collected from participants using self administered questionnaire. After that nurse led education was given to each group in four sessions. Intervention was completed in twelve weeks. Each session was completed in one week. After completion of intervention, post data was collected from MS patients using the same questionnaire. Various validated tools, including the Multiple Sclerosis Health Literacy Questionnaire, Modified Fatigue Impact Scale, and Fatigue Severity Scale were employed for assessment. The intervention spanned 16 educational sessions covering topics related to MS management, fatigue, and emotional well-being.

Data Analysis: Pre- and post-intervention data were analyzed using SPSS, with Wilcoxon Signed Rank and Chi-Square tests applied to compare the results, considering a p-value of less than 0.05 as statistically significant.

RESULTS

Table 4.1: Demographic information of participants

Study Variable	Category	Frequency (F)	Percentage (%)
Age	<18-30 Years	45	45.0
	31- 40 Years	40	40.0
	41- 45 Years	9	9.0
	> 45 Year	6	6.0

Gender	Male	50	50.0
	Female	50	50.0
Marital Status	Married	20	20.0
	Unmarried	78	78.0
	Widow/Divorced	2	2.0
Education Level	Illiterate	49	49.0
	Primary school	51	51.0
Residence	Rural	27	27.0
	Urban	56	56.0
	Town	17	17.0

Table 4.1 provides the demographic information of the study participants. Among 100 enrolled multiple sclerosis patients, 45 (45.0%) were aged between 18 and 30 years, 40 (40.0%) were aged between 31 and 40 years, 9 (9.0%) were aged between 41 and 45 years, and 6 (6.0%) were over 45 years of age. In terms of gender distribution, the cohort was evenly split, with 50% male and 50% female participants. Marital status revealed that 20 (20.0%) of the patients were married, 78 (78.0%) were unmarried, and 2 (2.0%) were widowed or divorced. Regarding educational attainment, 49 (49.0%) of the subjects were illiterate, while 41 (41.0%) had completed primary school, and 10 (10.0%) had completed high school. The living arrangements of the patients indicated that 27 (27.0%) resided in rural areas, 56 (56.0%) lived in urban areas, and 17 (17.0%) were situated in towns.

Table 4.2: Health literacy knowledge in pre and post intervention group of MS patients

Health Literacy	**Pre Median (IQR)**	**Post Median (IQR)**	**Wilcoxon Signed Ranks Test**	**p-value**
Multiple Sclerosis Health Literacy	29(26-33)	57(51-61)	-8.628[b]	<0.001*

Table 4.2 indicates a significant improvement in health literacy knowledge following the intervention. Before the intervention, the median health literacy score was 29 (IQR: 26-33), while after the intervention, it increased to 57 (IQR: 51-61). The change in scores was statistically significant, as indicated by the Wilcoxon Signed Ranks Test result of -8.628b and a p-value of <0.001, confirming that the intervention had a highly positive impact on the participants' health literacy knowledge.

Table 4.3: Fatigue among pre and post intervention group

Fatigue	**Pre Median (IQR)**	**Post Median (IQR)**	**Wilcoxon Signed Ranks Test**	**p-value**
Modified Fatigue Impact Scale (MFIS)	55(51-59)	31(25-35)	-8.413[c]	<0.001*
MFIS Physical	25(22-27)	14(11-18)	-8.164[c]	<0.001*
MFIS Cognitive	28(25-30)	17(13-18)	-8.257[c]	<0.001*
MFIS Psychosocial	6(5-7)	3(2-4)	-8.068[c]	<0.001*

Table 4.3 demonstrates a significant reduction in fatigue levels among multiple sclerosis patients following the intervention. Overall fatigue dropped from a median of 55 to 31, and physical fatigue decreased from 25 to 14. Cognitive and psychosocial fatigue also saw improvements, with cognitive fatigue reducing from 28 to 17 and psychosocial fatigue from 6 to 3. All changes were statistically significant, with p-values of less than 0.001, indicating a substantial impact of the intervention on reducing fatigue in multiple sclerosis

patients.

Table 4.4: Fatigue Severity among MS patients before and after intervention

Fatigue Severity	**Pre Median (IQR)**	**Post Median (IQR)**	**Wilcoxon Signed Ranks Test**	**p-value**
Fatigue Severity Scale	55(49-57)	38(34-44)	-8.583^{c}	<0.001*

Table 4.5 highlights the significant reduction in fatigue severity among participants before and after the intervention. The median fatigue severity score, measured using the Fatigue Severity Scale (FSS), decreased from 55 (IQR: 49-57) pre-intervention to 38 (IQR: 34-44) post-intervention. The Wilcoxon Signed Ranks Test result of -8.583c and a p-value of <0.001 indicate a statistically significant reduction in fatigue severity following the intervention. This demonstrates the effectiveness of the intervention in alleviating fatigue severity in participants.

DISCUSSION

The aim of the present study was to determine the effect of nurse led educational intervention on health literacy knowledge and fatigue of 100 multiple sclerosis patients. The data collected from MS patients show that health literacy knowledge of participants was improved after education intervention as median health literacy score was improved from 29 (IQR: 26-33) to 57 (IQR: 51-61). This research finding is consistent with the previous researches suggesting that educational intervention improves the health literacy knowledge of MS patients. This was supported by a study conducted in Iran, who showed that peer led educational intervention improved the health literacy knowledge of MS patients (14). Similarly, Robles et al in a quasi-experimental study reported that mean knowledge of MS patients was improved after educational intervention (15). In addition, Dehghani (6) conducted a thematic analysis to define and clarifying the consequences of health literacy in multiple sclerosis patients. with aim of defining and clarifying attributes, antecedents, and consequences of health literacy in multiple sclerosis (MS) patients. This analysis showed that health literacy in patients with MS is a multi – dimension and varies over time. Amil Bujan et al also supported this finding and reported in a n experimental pre post study reported that post intervention knowledge of MS patient was higher than pre-intervention(16). An experimental study conducted Jahrom also had consistent findings and showed that the mean score of health literacy was significantly higher (p = 0.005) in the intervention group (145.38 ± 26.66) than the control group (129.18 ± 22.35) (17). Studies found that health education programs improved health literacy among chronic disease sufferers, therefore enabling improved self-management (6). As with the present studies, they discovered, however, that demographic factors had little effect on improvements. Health literacy and self-efficacy among carers of multiple sclerosis patients were investigated in relation to a health intervention grounded on the family-centered empowerment paradigm. Interventions grounded on a family-centered empowerment approach have been found to raise carers' health literacy and self-efficacy, thus enabling them to administer more specialized and effective treatment and so produce better quality care (18).

The study demonstrated a significant reduction in fatigue, shown by the median Modified Fatigue Impact Scale (MFIS) score decreasing from 55 to 31, and the Fatigue Severity Scale (FSS) score falling from 55 to 38. These findings are consistent with Qomi et al whose findings reported that after education intervention, the fatigue severity level was lowered in intervention group as compared to control group (19).

The improvements are statistically significant ($p < 0.001$), supporting studies that indicated educational programs focusing on self-care, energy conservation, and physical activity management may reduce fatigue levels in MS patients (9). The reduction of fatigue is associated with improved cognitive and psychosocial performance, as shown by the subscales in current study. A study conducted in Demerdash hospital also have similar findings and reported significant improvement in the reported multiple sclerosis patients' fatigue severity scores means level in the post-test than that of the pre-test (20). Similarly, Brisht et al. also have consistent findings and reported that average fatigue severity score decreased in Multiple Sclerosis patients after education intervention (21). In addition, Rooney et al. conducted a systematic review on effectiveness of fatigue management interventions in reducing the severity and impact of fatigue in people with progressive MS. All the studies concluded that nonpharmacologic interventions were effective in reducing the severity and impact of fatigue in progressive MS populations (22).

CONCLUSION

The nurse-led intervention plays a crucial role in enhancing health literacy and reducing fatigue among multiple sclerosis patients. These findings underscore the importance of implementing more comprehensive interventions to improve patients' knowledge and fatigue levels. Future research should focus on larger populations and include diverse organizations to further enhance the quality of life for MS patients. Expanding educational outreach, increasing access to health literacy programs, and designing tailored interventions for vulnerable groups are essential strategies to improve overall health outcomes and align with national health policy objectives.

Limitations of Study

The primary limitation of the study was its confinement to a single hospital, which restricts the generalizability of the findings. Additionally, the study was conducted within a limited timeframe, which may have impacted the depth of data collection and analysis.

Strengths of Study

The study is evidence based and showed improvement in health literacy and fatigue level of patients and also showed the role of nurses in patient education and care. The study showed improvement in health literacy and fatigue level, which contributes to enhance the quality of life of MS patients.

Weakness of the study

Conducting the study in a single hospital restricts the applicability of findings to other settings and populations. The sample size was relatively small, which may limit the statistical power and robustness of the conclusions. The study was conducted over a limited time period, which may have restricted the ability to observe long-term effects of the intervention.

Acknowledgement

I would like to acknowledge my supervisors, family and friends for the support they provided throughout my research.

Conflict of Interest

The study has no conflict of interest to declare by authors.

Source of Funding: None

Ethical Approval: REC-UOL-/164/08/24.

REFERENCES

1. Rodrigues CA, Soares MD, Jesus G, Ladeira FJPRCR. Major depressive disorder: A rare presentation of multiple sclerosis. 2022;1(2):100030.
2. Feigin VL, Nichols E, Alam T, Bannick MS, Beghi E, Blake N, et al. Global, regional, and national burden of neurological disorders, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. 2019;18(5):459-80.
3. Hernández-Ledesma AL, Rodríguez-Méndez AJ, Gallardo-Vidal LS, Trejo-Cruz G, García-Solís P, de Jesús Dávila-Esquivel FJMs, et al. Coping strategies and quality of life in Mexican multiple sclerosis patients: Physical, psychological and social factors relationship. 2018;25:122-7.
4. Hayes CE, Ntambi JMJI. Multiple sclerosis: lipids, lymphocytes, and vitamin D. 2020;2(3).
5. Daltrozzo T, Hapfelmeier A, Donnachie E, Schneider A, Hemmer BJFin. A systematic assessment of prevalence, incidence and regional distribution of multiple sclerosis in Bavaria from 2006 to 2015. 2018;9:871.
6. Dehghani A. Health literacy in multiple sclerosis patients: A concept analysis using the evolutionary method. Journal of Caring Sciences. 2021;10(1):49.
7. Bessing B, van der Mei I, Taylor BV, Honan CA, Blizzard L, Claflin SB. 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. 2022;60:103717.
8. Claflin SB, Klekociuk S, Campbell JA, Bessing B, Palmer AJ, van der Mei I, et al. Association between MS-related knowledge, health literacy, self-efficacy, resilience, and quality of life in a large cohort of MS community members: A cross-sectional study. Multiple Sclerosis and Related Disorders. 2021;54:103158.
9. Neate SL, Bevens W, Jelinek PL, Gray KM, Weiland T, Nag N, et al. A multiple sclerosis lifestyle behavior online course: Qualitative analysis of participants' motivations, expectations and experiences. Frontiers in Public Health. 2022;10:1022185.
10. Bevens W, Reece J, Jelinek P, Weiland T, Nag N, Simpson-Yap S, et al. The feasibility of an online educational lifestyle program for people with multiple sclerosis: A qualitative analysis of participant semi-structured interviews. Digital Health. 2022;8:20552076221123713.
11. Giordano A, Messmer Uccelli M, Pucci E, Martinelli V, Borreani C, Lugaresi A, et al. The Multiple Sclerosis Knowledge Questionnaire: a self-administered instrument for recently diagnosed patients. Multiple Sclerosis Journal. 2010;16(1):100-11.
12. Palotai M, Cavallari M, Healy BC, Guttmann CR. A novel classification of fatigue in multiple sclerosis based on longitudinal assessments. Multiple Sclerosis Journal. 2020;26(6):725-34.
13. Chalah MA, Kauv P, Créange A, Hodel J, Lefaucheur J-P, Ayache SS. Neurophysiological, radiological and neuropsychological evaluation of fatigue in multiple sclerosis. Multiple sclerosis and related disorders. 2019;28:145-52.
14. Dehghani A. A comparative study of the effect of peer-led and lecture-based education on health literacy in patients with multiple sclerosis. International Journal of Community Based Nursing and Midwifery. 2021;9(1):76.
15. Robles-Sanchez MA, Amil-Bujan P, Bosch-Farré C, Coll-Martínez C, Arévalo MJ, Anglada E, et al. An expert patient program to improve the empowerment and quality of life of people with multiple sclerosis: protocol for a multicenter pre-post intervention study. Frontiers in neurology. 2023;14:1172640.
16. Amil-Bujan P, Bosch C, Coll Martinez C, AREVALO MJ, Anglada Clofent E, Menéndez R, et al. An expert patient program to improve the empowerment and quality of life of people with multiple sclerosis: protocol for a multicenter pre-post intervention study. 2023.
17. Dehghani A, Pourfarid Y, Hojat M. The effect of telenursing education of self-care on health-promoting behaviors in patients with multiple sclerosis during the COVID-19 pandemic: A clinical trial study. Multiple Sclerosis and Related Disorders. 2023;70:104507.
18. Jafari Y, Tehrani H, Esmaily H, Shariati M, Vahedian-shahroodi M. Family-centred empowerment program for health literacy and self-efficacy in family caregivers of patients with multiple sclerosis. Scandinavian journal of caring sciences. 2020;34(4):956-63.
19. Qomi M, Rakhshan M, Ebrahimi Monfared M, Khademian Z. The effect of distance nurse-led fatigue management on fatigue, sleep quality, and self-efficacy in patients with multiple sclerosis: a quasi-experimental study. BMC neurology. 2023;23(1):71.
20. Abd'Elamgied Salime RA, Ibrahiem Elzehiri DA, Ibrahim RAS. Effect of nursing intervention on fatigue for multiple sclerosis patients. Tanta Scientific Nursing Journal. 2022;24(1):200-23.
21. Bisht B, Darling WG, Grossmann RE, Shivapour ET, Lutgendorf SK, Snetselaar LG, et al. A multimodal

intervention for patients with secondary progressive multiple sclerosis: feasibility and effect on fatigue. The Journal of Alternative and Complementary Medicine. 2014;20(5):347-55.
22. Rooney S, Moffat F, Wood L, Paul L. Effectiveness of fatigue management interventions in reducing severity and impact of fatigue in people with progressive multiple sclerosis: A systematic review. International journal of MS care. 2019;21(1):35-46.