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# Multiple Sclerosis and Related Disorders

Original article

## Health related quality of life and perceived social support in French and Lebanese MS patients: A comparative study

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### ABSTRACT

**Background:** The perception of diagnosis announcement, the social support and the coping strategies seem to be determining factors for the quality of life of multiple sclerosis (MS) patients, with possible transcultural variations. This study explores these psychosocial dimensions in Lebanese and French MS patients.

**Methods:** For this cross-sectional multi-center study, 8 questionnaires were used to assess quality of life, family support, coping strategies, mood, fatigue, stress, and hopelessness in MS patients. 7 were translated into Arabic and then back translated into French. These were administered to a group of Lebanese MS patients and compared to an MS sample from France. The data was collected for both populations and analyzed.

**Results:** A total of 107 patients were included, 46 Lebanese and 61 French. The majority of MS patients were young females with a high level of education, relapsing remitting form of MS and a low level of disability. Both populations exhibited comparable quality of life and answers on the questionnaires regarding mood disorders, hopelessness, and perceived stress. However, the French patients had significantly more fatigue. Perceived social support given by family was considered greater in the French group compared to the Lebanese one. Also, maladaptive coping strategies (such as self-distraction, denial, behavioral disengagement, substance use, self-blame, venting) were used more frequently by the French population compared to the Lebanese, and this correlated with higher anxiety scores. Diagnosis communication was overall brief, informative, and satisfying in both populations.

**Conclusion:** This study highlighted transcultural differences between French and Lebanese MS patients mainly in social support and coping strategies.

## 1. Introduction

Multiple sclerosis (MS) is the leading cause of nontraumatic neurological disability among young adults (Walton et al., 2020 Dec, Heydarpour et al., 2015). It typically begins at an age when patients develop

their personal and professional projects. Therefore, it is not surprising that the disclosure of the diagnosis is an important step in the MS journey and may impact the patient's future plans. It is a critical process and a decisive step in the construction of the therapeutic project, especially since the diagnosis is surrounded by uncertainties.

**Abbreviations:** MS, Multiple sclerosis; MSPSS, Multidimensional Scale of Perceived Social Support; PSS, Perceived Stress Scale; Brief-COPE, Coping Orientation to Problems Experienced - brief version; FSS, Fatigue Severity Scale; HADS, Hospital Anxiety and Depression Scale; BHS, Beck Hopelessness Scale; WHOQOL-BREF, World Health Organization Quality of Life Abridged version; MENA, Middle East and North Africa.

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The patient's perception of the diagnosis announcement and the social support could affect their quality of life and possibly the disease course. Besides, receiving "bad news" can have a substantial effect on the patient's emotional state (Dennison et al., 2009 Mar 1). For this reason, some neurologists still use non-specific terms such as "inflammatory disease" or "demyelinating disease of the central nervous system" before disclosing a diagnosis of MS (Heesen et al., 2003 May, Papathanasopoulos et al., 2008 Dec). However, Brown et al. (Brown et al., 2009) found that patients who were insufficiently informed and unable to participate actively in the management of the disease were at increased risk of depression. Thus, a satisfying and effective communication of the diagnosis creates a trusting bond with the neurologist and seems to be essential to improve patients' acceptance of the disease and compliance to the chronic treatment (Elian and Dean, 1985 Jul 6, Fallowfield and Jenkins, 2004 Jan 24, Janssens et al., 2006 Nov 1, Haberfellner and Markut, 1946, Janssens et al., 2004, Messina et al., 2015).

Receiving a MS diagnosis leads to a self-discovery process that may include, especially initially, feelings of anxiety and depression (Gordano et al., 2011 Aug 15). When faced with a chronic unpredictable illness like MS, multiple coping mechanisms can arise that can be very destructive or adaptive and beneficial (Kern et al., 2009 Jun 1, Suh et al., 2010 Apr 1, Arnett, 2006 May 1, Grech et al., 2018 May). These reactions can occur in patient with pre-existing psycho-emotional disorders. Family members and friends find it difficult sometimes to understand these paradoxical attitudes which accumulate over time. This can cause relational difficulties, conflicts, a risk of isolation, and a decreased quality of life. Then again, the ultimate goal of treating this chronic disease is improving the quality of life.

Multiple studies suggest that people with MS have a lower quality of life compared with the general population (Mitosek-Szewczyk et al., 2014 Mar, Algahtani et al., 2017 Oct, Murphy et al., 1998 Oct, McCabe and McKern, 2002 Dec 1). In France, fatigue and cognitive problems seem to have the biggest burden on MS patients (Lebrun-Frenay et al., 2017 Aug). Multiple factors may impact these aspects of the disease. For instance, Lebanese patients with MS had lower depression and anxiety scores and higher scores of quality of life when they used positive coping strategies (Farran et al., 2016 Mar). Also, the importance of social support was highlighted by the research work of numerous investigators in the MENA region and worldwide (Farran et al., 2016 Mar, Yamout et al., 2013 May, Rimaz et al., 2014 Aug 15, Ratajska et al., 2020 Nov).

Few studies have been published to date about transcultural variations in coping mechanisms after the announcement of the diagnosis, the perception of the subsequent social support, and their influence on the quality of life, the mood disorders, and the level of disability. Each population has distinctive healthcare systems, cultural backgrounds, beliefs, habits, and rituals. Improving the quality of life of MS patients requires a better understanding of its determinants, which may differ among different countries (Pluta-Fuerst et al., 2011 Apr). And this valuable knowledge will ultimately shape a better targeted clinical management of these patients. These aspects prompted us to take an interest in the psychosocial dimensions of the quality of life in MS and the possible differences between French and Lebanese patients.

This study aimed to investigate the real-world health-related quality of life of patients with MS in France and Lebanon, compare it among these countries, and determine the factors associated with it. It also analyzed the differences in coping mechanisms, fatigue, mood disorders, social support, perceived stress and feelings of hopelessness. These insights could optimize the management of MS.

## 2. Methods

This was a multi-center, cross-sectional study conducted between July 2018 and July 2019.

Patients were recruited from the outpatient neurology clinics of one Lebanese hospital and two French hospitals: Hotel Dieu de France, Fondation Ophthalmologique Adolphe de Rothschild, and Centre

Hospitalier Universitaire de Dijon. The data was obtained from 8 questionnaires translated to Arabic and then back translated to French to guarantee consistency, except for the World Health Organization Quality of Life Abridged version (WHOQOL-BREF) questionnaire already available in Arabic. Translation and back translation highly correlated (coefficient 0.80). The following questionnaires were used:

- Multidimensional Scale of Perceived Social Support (MSPSS): The MSPSS questionnaire is a 12-item questionnaire that identifies the patient's perceived level of social support with family, friends, and significant others (Zimet et al., 1988).

- Perceived Stress Scale (PSS): PSS is a 10-item questionnaire examining how unpredictable, uncontrollable, and overloaded respondents find their lives over the previous four weeks, with a total score ranging from 0–40. Higher scores indicate increased perceived stress (Cohen et al., 1983 Dec).

- Coping Orientation to Problems Experienced - brief version (Brief-COPE): Brief-COPE is a 28-items questionnaire that we used to explore the patients' coping mechanisms. It explores dysfunctional/maladaptive coping strategies (self-distraction, denial, behavioral disengagement, substance use, self-blame, venting) and adaptive strategies including: problem-focused strategies (active coping, planning, instrumental support) and emotion-focused strategies (emotional support, positive reframing, humor, acceptance, religion) (Carver, 1997).

- Fatigue Severity Scale (FSS): FSS is a 9-item questionnaire that rate the severity of the respondents' fatigue symptoms from 1 to 7 (Krupp et al., 1989 Oct).

- Hospital Anxiety and Depression Scale (HADS): HADS questionnaire is a 14-items questionnaire useful as a screening tool for anxiety and depression in patients with MS (Litster et al., 2016 Nov, Hind et al., 2016 Dec). It consists of two subscales, one measuring anxiety, the other measuring depression, each having seven items with separate scores. Each item was answered by the patient on a 4-point (0–3) scale, so the possible scores ranged from 0 to 21 for each of the two subscales (Mitosek-Szewczyk et al., 2014 Mar).

- Beck Hopelessness Scale (BHS): The BHS includes twenty items with a possible range of scores from 0 to 20. A score of 10 or higher indicates potential suicide risk, as shown in the original validation study (Hopelessness and eventual suicide 1985 May).

- World Health Organization Quality of Life Abridged version (WHOQOL-BREF): WHOQOL-BREF is a 26-item questionnaire that evaluates the perception of quality of life in different domains (physical health, psychological health, social relationships, and environment). Raw domain scores are transformed to a 0–100 scale. A higher score reflects a higher perception of quality of life (Development of the World Health Organization 1998 May).

- The Communication of Multiple Sclerosis Diagnosis: The Patients' Perspective: We used a 17-item questionnaire assessing the satisfaction of MS patients with the information provided during the diagnosis communication (Messina et al., 2015).

Inclusion criteria for the patient interviews were a diagnosis of MS by the McDonald 2017 criteria, age of 18 years or older, knowledge of the official language of the country of residence (Arabic in Lebanon, French in France) and available medical records for all included patients. Exclusion criteria were severe cognitive problems, aphasia, substance abuse, psychiatric disorders (other than treated depression), any other associated neurologic or severe medical condition (like cancer), pregnancy or breastfeeding.

Eligible patients with MS were approached by the authors who outlined the objectives and nature of the study and obtained written informed consent from willing participants. The local ethical committee approved this study. The main objective was to compare the perception of social support, communication of the diagnosis and the quality of life across different cultures in French and Lebanese patients with MS. Data was collected, and the two groups were compared.

All statistical analyses were performed using SPSS 23.0 for Windows. A p-value of 0.05 was considered statistically significant. The chi-

squared test was performed to compare proportions of categorical data, and the independent *t* tests for numeric variables to compare Lebanese and French MS groups. If the normality assumption was violated, non-parametric Mann-Whitney U tests were run for numerical variables. Correlation matrices yielding Spearman correlation coefficients were used to explore the association between clinical (EDSS, disease duration), psychological (MSPSS, PSS, HADS, BHS), fatigue (FSS) and quality of life (WHOQOL-BREF) variables. As a precaution against the inflation of Type I error, the familywise FDR correction was applied to the analyses described above. Results surviving familywise FDR correction are reported as significant. To investigate whether psychological variables were significant predictors of the use of adapted or maladaptive strategies, two multiple regression analyses were performed per group with the types of coping strategy (adaptive, maladaptive) as continuous dependent variables. Therefore, the regression models included demographic and clinical variables (age, education level, disease duration, EDSS) and psychological variables (MPSS, PSS, Brief-COPE, FSS, HADS, BHS and WHOQOL-BREF scores) as predictor variables, and they were entered simultaneously into each model with forward stepwise regression analysis.

### 3. Results

#### 3.1. Patients' sociodemographic and disease-related characteristics

A total of 107 patients were enrolled: 61 French patients and 46 Lebanese patients. All patients were analyzed according to the questionnaires they completed. All of the Lebanese patients completed all of the questionnaires, 37 of the French patients (60.7%) completed all of the questionnaires. The missing data concerned mainly the last questionnaire given to the patients (The Communication of Multiple Sclerosis Diagnosis: The Patients' Perspective) probably due to loss of interest by the end of the survey. The majority of patients were young (mean age of 41 years old), women (78.8%), with a high level of education (mean of 13.4 years of studies, 49% completing secondary studies). Most of them had a relapsing remitting MS (83.2%), and low level of disability (Mean EDSS of 2.6). No significant differences were detected between the Lebanese and French patients regarding nearly all variables, except for the EDSS of the French population that was higher. The majority was treated with disease modifying therapy (82.1%), largest proportion receiving interferons (27.7%), and more patients received interferons in the Lebanese population compared to the French population (44.2% vs 15.5%). Clinical and demographical data of patients are summarized in [Table 1](#).

#### 4. Quality of life

Overall, the two populations showed comparable total score of quality of life. However, the French population reported lower scores regarding the physical health domain (mean (SD), 55.91 (20.06)) compared with the Lebanese population (mean (SD), 66.23 (17.83)) ([Table 2](#)).

Higher WHOQOL total scores significantly correlated with higher MSPSS scores in the French group ( $r = 0.408$ ), and lower FSS ( $r = -0.506$  and  $-0.593$ ), HADS anxiety ( $r = 0.35$  and  $-0.592$ ) and depression subscales ( $r = -0.684$  and  $-0.847$ ), PSS ( $r = -0.409$  and  $-0.691$ ), and BHS scores ( $r = 0.584$  and  $-0.588$ ) in both French and Lebanese groups ([Tables 3](#) and [4](#)).

#### 5. Coping mechanisms

Overall, Lebanese and French patients used more adaptive than maladaptive strategies ( $p < 0.0001$ ). Emotion-focused strategies were used more frequently in the Lebanese group compared to the French group (Median score of 2.50/4 versus 2.30/4). However, maladaptive strategies were used more frequently in the French group compared to

**Table 1**  
Demographic and clinical characteristics of Lebanese and French MS patients.

|   | French patients (N = 61)                             | Lebanese patients (N = 46)                   | P-value | All patients (N = 107)                  |
|---|--|--|---------|---|
| Gender                                  |  |  |         |   |
| Male (N (%))                            | 10 (17.2)  | 12 (26.1)                                    | NS      | 22 (21.2)                               |
| Female (N (%))                          | 48 (82.8)  | 34 (73.9)                                    | NS      | 82 (78.8)                               |
| Age (Mean (SD))                         | 39.8 (10.2)  | 42.6 (10.2)                                  | NS      | 41.4 (11.9)                             |
|   |  | <a href="#">Giordano et al., 2011 Aug 15</a> |         |   |
| Marital status                          |  |  |         |   |
| Single (N (%))                          | 20 (33.9)  | 14 (30.4)                                    | NS      | 34 (32.4)                               |
| Married (N (%))                         | 32 (54.2)  | 29 (63)                                      | NS      | 61 (58.1)                               |
| Widow (N (%))                           | 1 (1.7)  | 1 (2.2)                                      | NS      | 2 (1.9)                                 |
| Separated or Divorced (N (%))           | 6 (10.2)   | 2 (4.4)                                      | NS      | 8 (7.6)                                 |
| Education in years (Median (SD))        | 12 (2.7)   | 15 (2.7)                                     | NS      | 13.4 (2.9)                              |
|   |  | <a href="#">Dennison et al., 2009 Mar 1</a>  |         |   |
| MS subtype                              |  |  |         |   |
| RRMS (N (%))                            | 48 (82.8)  | 36 (83.7)                                    | NS      | 84 (83.2)                               |
| SPMS (N (%))                            | 9 (15.5)   | 5 (11.6)                                     | NS      | 14 (13.9)                               |
| PPMS (N (%))                            | 1 (1.7)  | 2 (4.7)                                      | NS      | 3 (2.9)                                 |
| DMT                                     |  |  |         |   |
| Interferons (N (%))                     | 9 (15.5)   | 19 (44.2)                                    | 0.007   | 28 (27.7)                               |
| Glacitamer acetate (N (%))              | 4 (6.9)  | 0 (0)  | NS      | 4 (3.8)                                 |
|   |  |  |         | <a href="#">Heesen et al., 2003 May</a> |
| Dimethyl Fumarate (N (%))               | 5 (8.6)  | 1 (2.3)                                      | NS      | 6 (5.9)                                 |
| Teriflunomide (N (%))                   | 6 (10.3)   | 1 (2.3)                                      | NS      | 7 (6.9)                                 |
| Fingolimod (N (%))                      | 5 (8.6)  | 8 (18.6)                                     | NS      | 13 (12.9)                               |
| Ocrelizumab (N (%))                     | 3 (5.2)  | 2 (4.6)                                      | NS      | 5 (4.9)                                 |
| Rituximab (N (%))                       | 7 (12.1)   | 3 (6.7)                                      | NS      | 10 (9.9)                                |
|   |  | <a href="#">Elian and Dean, 1985 Jul 6</a>   |         |   |
| Natalizumab (N (%))                     | 12 (20.7)  | 3 (6.7)                                      | NS      | 15 (14.9)                               |
|   |  | <a href="#">Elian and Dean, 1985 Jul 6</a>   |         |   |
| Alemtizumab (N (%))                     | 1 (1.7)  | 0 (0)  | NS      | 1 (1.0)                                 |
|   |  |  |         | <a href="#">Walton et al., 2020 Dec</a> |
| Azathioprine (N (%))                    | 2 (3.4)  | 0 (0)  | NS      | 2 (2.0)                                 |
|   |  |  |         | <a href="#">Heydarpour et al., 2015</a> |
| Monthly methylprednisolone (N (%))      | 2 (3.4)  | 0 (0)  | NS      | 2 (2.0)                                 |
|   |  |  |         | <a href="#">Heydarpour et al., 2015</a> |
| None (N (%))                            | 2 (3.4)  | 6 (13.0)                                     | NS      | 8 (7.9)                                 |
|   |  | <a href="#">Kern et al., 2009 Jun 1</a>      |         |   |
| Disease duration in years (Median (SD)) | 9 (10.2)   | 8 (7.3)                                      | NS      | 10.7 (7.8)                              |
|   | <a href="#">Fallowfield and Jenkins, 2004 Jan 24</a> |  |         |   |
| EDSS (Median (SD))                      | 2.5 (1.9)  | 1 (2.3)                                      | <0.001  | 2.6 (2.2)                               |

Expanded Disability Status Scale (EDSS), Multiple Sclerosis (MS), Disease Modifying Therapy (DMT).

The results of the 8 questionnaires are presented in sequence below.

the Lebanese group (Median score of 4.00/8 versus 3.25/8) ([Table 2](#), [Fig. 1](#)).

Hierarchical multiple regressions were used to identify sets of variables that significantly predicted the use of adaptive or maladaptive coping strategies in each group. Final models yielded by the forward stepwise regression analysis are summarized in [Table 5](#) (only significant variables are presented). For adaptive coping strategy, the model was statistically significant for French patients,  $F(1, 49) = 4.619$ ,  $p = .03$  and for Lebanese patients,  $F(1, 42) = 18.62$ ,  $p < .001$ . The WHOQOL score was the only predictor for the French population. For the Lebanese population, the BHS score (lower score) significantly contributes to explanation of the use of adaptive coping strategy (29% of the variance).

**Table. 2**  
MPSS, PSS, Brief-COPE, FSS, HADS, BHS and WHOQOL-BREF questionnaires' scores in Lebanese and French patients.

|   | French patients |       | Lebanese patients |       | P-Value |
|---|-----------------|-------|-------------------|-------|---------|
|   | Mean            | SD    | Mean              | SD    |         |
| <b>Multidimensional Scale of Perceived Social Support (MSPSS) questionnaire</b>               |                 |       |                   |       |         |
| MSPSS total score   | 5.37            | 1.42  | 4.92              | 1.58  | 0.173   |
| MSPSS family score  | 5.32            | 1.62  | 4.01              | 1.98  | 0.0004  |
| MSPSS friends score   | 5.13            | 1.66  | 5.44              | 1.86  | 0.0997  |
| MSPSS significant other score   | 5.68            | 1.58  | 5.44              | 1.86  | 0.7054  |
| <b>Perceived Stress Scale (PSS) questionnaire</b>   |                 |       |                   |       |         |
| PSS total score   | 18.53           | 7.84  | 15.85             | 7.07  | 0.075   |
| PSS perceived helplessness  | 12.16           | 5.30  | 10.50             | 4.72  | 0.1     |
| PSS perceived self-efficacy   | 6.37            | 3.20  | 5.35              | 3.41  | 0.18    |
| <b>Coping Orientation to Problems Experienced - brief version (Brief-COPE) questionnaire</b>  |                 |       |                   |       |         |
| BRIEF-COPE adaptive   | 4.78            | 1.28  | 5.07              | 1.07  | 0.21    |
| Brief-COPE emotion-focused  | 2.29            | 0.66  | 2.56              | 0.49  | 0.02    |
| Brief-COPE problem-focused  | 2.56            | 0.76  | 2.50              | 0.69  | 0.67    |
| Brief-COPE maladaptive  | 3.98            | 1.00  | 3.35              | 0.82  | 0.001   |
| <b>Fatigue Severity Scale (FSS) questionnaire</b>   |                 |       |                   |       |         |
| FSS mean score  | 5.08            | 1.64  | 4.30              | 1.78  | 0.0133  |
| <b>Hospital Anxiety and Depression Scale (HADS) questionnaire</b>                             |                 |       |                   |       |         |
| HADS anxiety subscale   | 8.93            | 4.20  | 7.478             | 4.49  | 0.0538  |
| HADS depression subscale  | 6.45            | 4.27  | 5.391             | 4.06  | 0.24    |
| <b>Beck Hopelessness Scale (BHS) questionnaire</b>  |                 |       |                   |       |         |
| BHS total score   | 7.85            | 5.47  | 5.83              | 5.19  | 0.0505  |
| <b>World Health Organization Quality of Life Abridged version (WHOQOL-BREF) questionnaire</b> |                 |       |                   |       |         |
| WHOQOL total score  | 88.47           | 15.46 | 92.20             | 14.33 | 0.21    |
| WHOQOL physical health  | 55.91           | 20.06 | 66.23             | 17.83 | 0.007   |
| WHOQOL psychological health   | 58.98           | 22.63 | 63.95             | 16.20 | 0.369   |
| WHOQOL social relationships   | 63.22           | 23.36 | 66.30             | 17.65 | 0.7532  |
| WHOQOL environment  | 63.04           | 20.19 | 59.65             | 15.62 | 0.07    |

Regarding the maladaptive coping strategy, the model was also statistically significant for both population: French population,  $F(1, 52) = 9.22, p = .004$ ; Lebanese population,  $F(1, 44) = 20.23, p < .001$ . While the only significant predictor was the HADS-D score for the French population (12% of the variance), the only predictor for the Lebanese population was the HADS-A score (34% of the variance).

## 6. Perceived social support

The total score of the MSPSS questionnaire was comparable between the Lebanese and French group. However, perceived social support given by family was considered greater in the French group (mean (SD), 5.32 (1.62) compared to the Lebanese group (mean (SD), 4.01 (1.98) (Table 2). When patients were asked about their social support, the majority reported a positive point of view. Higher MSPSS total scores correlated with lower scores of HADS anxiety ( $r = -0.336$ ) and depression ( $r = -0.31$ ) subscales and higher scores of WHOQOL total score ( $r = 0.408$ )

**Table. 3**  
Spearman's correlations between disease characteristics and questionnaires' scores in French patients.

|                      | 2      | 3     | 4      | 5       | 6        | 7         | 8         | 9         |
|----------------------|--------|-------|--------|---------|----------|-----------|-----------|-----------|
| 1. Disease duration  | 0.328* | 0.149 | 0.255  | -0.009  | 0.065    | -0.177    | -0.071    | 0.262     |
| 2. EDSS              | -      | 0.062 | 0.149  | -0.182  | 0.052    | -0.18     | -0.273    | -0.023    |
| 3. MSPSS total score | -      | -     | -0.134 | -0.336* | -0.31*   | 0.408*    | -0.163    | -0.213    |
| 4. FSS total score   | -      | -     | -      | 0.07    | 0.496*** | -0.506*** | 0.238     | 0.478***  |
| 5. HADS-A score      | -      | -     | -      | -       | 0.466*** | -0.35*    | 0.645***  | 0.364*    |
| 6. HADS-D score      | -      | -     | -      | -       | -        | -0.684*** | 0.472***  | 0.626***  |
| 7. WHOQOL score      | -      | -     | -      | -       | -        | -         | -0.409*** | -0.584*** |
| 8. PSS total score   | -      | -     | -      | -       | -        | -         | -         | 0.283     |
| 9. BHS score         | -      | -     | -      | -       | -        | -         | -         | -         |

\*  $p < .05$ , \*\*  $p < .01$

\*\*\*  $p < .001$

Expanded Disability Status Scale (EDSS), Multidimensional Scale of Perceived Social Support (MSPSS), Fatigue Severity Scale (FSS), Hospital Anxiety and Depression Scale – Anxiety subscale (HADS-A), Hospital Anxiety and Depression Scale – Depression subscale (HADS-D), World Health Organization Quality of Life Abridged version (WHOQOL), Perceived Stress Scale (PSS), Beck Hopelessness Scale (BHS).

in the French group (Table 3). However, it only correlated with lower BHS scores ( $r = -0.435$ ) in the Lebanese group (Table 4).

## 7. Perceived Stress

Both groups exhibit comparable answers showing relatively low perceived stress ( $p > 0.05$ ), with a median PSS score of 18/40 for the French group and 15/40 for the Lebanese group (Table 2). Higher PSS scores were associated with higher HADS anxiety ( $r = 0.645$  and  $0.73$ ) and depression ( $r = 0.472$  and  $0.589$ ) subscales scores, and lower WHOQOL scores ( $r = 0.409$  and  $-0.691$ ) in the French and Lebanese groups (Tables 3 and 4). It also correlated with higher FSS scores ( $r = 0.371$ ) and lower BHS scores ( $r = 0.393$ ) in the Lebanese group (Table 4).

## 8. Fatigue

The French patients had significantly more fatigue (Median FSS score of 5.56/7) compared to the Lebanese patients (Median FSS Score of 4.61/7) (Table 2). Higher FSS scores correlated with higher HAD depression subscale score ( $r = 0.496$  and  $0.477$ ) in the French and Lebanese groups, PSS score ( $r = 0.371$ ) in the Lebanese group and BHS score ( $r = 0.478$ ) in the French group, as well as lower WHOQOL scores ( $r = -0.506$  and  $-0.593$ ) in the French and Lebanese groups (Tables 3 and 4).

## 9. Anxiety and depression

Both populations exhibit comparable HADS depression subscale scores, but the French patients showed a tendency for higher scores on the HADS anxiety subscale (mean (SD) 8.93 (4.20) vs 7.478 (4.49),  $p = 0.0538$ ) (Table 2).

Higher HADS anxiety subscale scores correlated with higher HADS depression subscale ( $r = 0.466$  and  $0.606$ ), PSS ( $r = 0.645$  and  $0.73$ ), and BHS ( $r = 0.364$  and  $0.425$ ) scores, and lower WHOQOL scores ( $r = -0.35$  and  $-0.592$ ) in French and Lebanese groups, as well as lower MSPSS scores ( $r = -0.336$ ) in the French group (Tables 3 and 4).

## 10. Hopelessness

In our study, both populations showed comparable results with slightly higher BHS scores in the French population but not of statistical significance (mean (SD) 7.85 (5.47) vs 5.83 (5.19),  $p = 0.0505$ ) (Table 2). Higher BHS scores correlated with HADS anxiety ( $r = 0.364$  and  $0.425$ ) and depression ( $r = 0.626$  and  $0.673$ ) subscales scores and lower WHOQOL ( $r = 0.584$  and  $-0.588$ ) scores in both French and Lebanese groups. It also correlated with higher FSS scores ( $r = 0.478$ ) in the French group, and higher PSS scores ( $r = 0.393$ ) and lower MSPSS scores ( $r = -0.435$ ) in the Lebanese group (Tables 3 and 4).

**Table. 5**

Spearman's correlations between disease characteristics and questionnaires' scores in Lebanese patients.

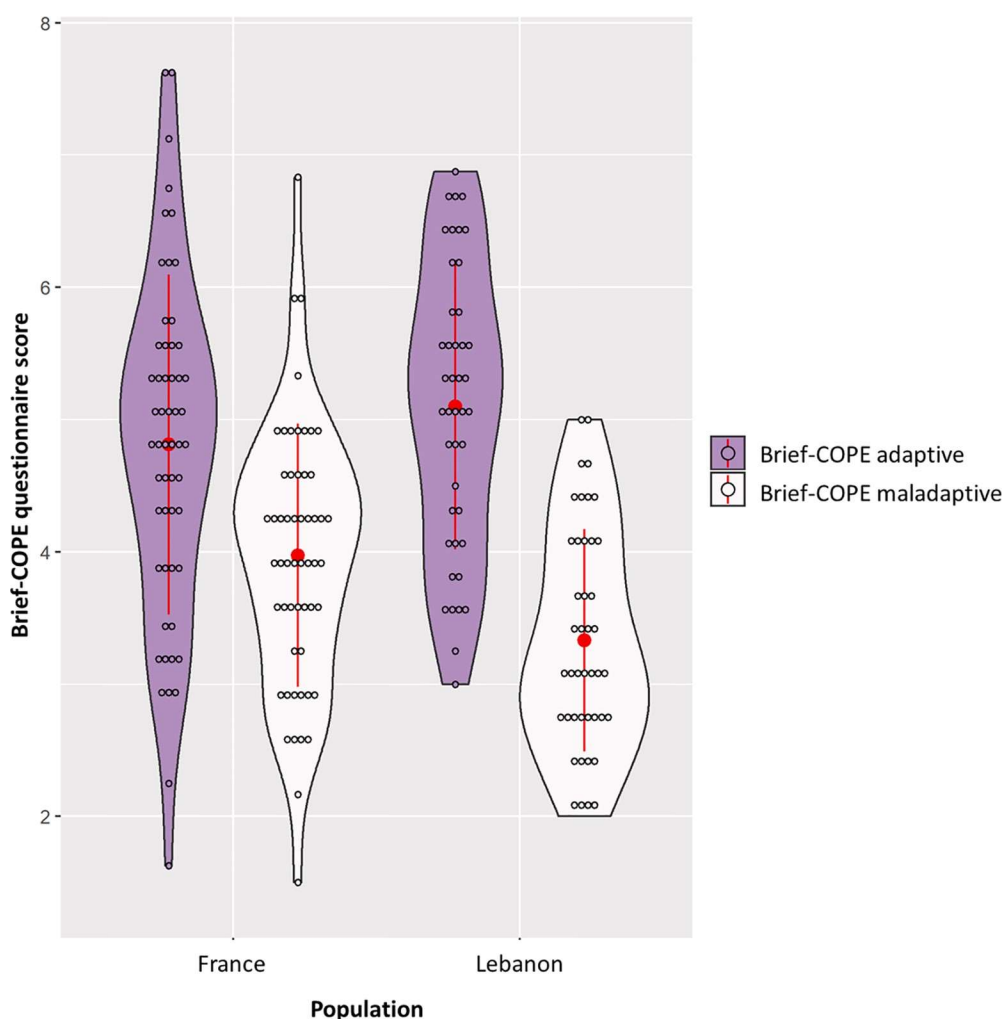
|                      | 2      | 3      | 4      | 5      | 6        | 7         | 8         | 9         |
|----------------------|--------|--------|--------|--------|----------|-----------|-----------|-----------|
| 1. Disease duration  | 0.389* | -0.312 | 0.011  | 0.049  | 0.178    | -0.218    | 0.126     | 0.205     |
| 2. EDSS              | -      | -0.153 | 0.294  | -0.101 | 0.229    | -0.341    | 0.042     | 0.252     |
| 3. MSPSS total score | -      | -      | -0.114 | -0.072 | -0.303   | 0.273     | -0.068    | -0.435**  |
| 4. FSS total score   | -      | -      | -      | 0.209  | 0.477**  | -0.593*** | 0.371*    | 0.224     |
| 5. HADS-A score      | -      | -      | -      | -      | 0.606*** | -0.592*** | 0.73***   | 0.425*    |
| 6. HADS-D score      | -      | -      | -      | -      | -        | -0.847*** | 0.589***  | 0.673***  |
| 7. WHOQOL score      | -      | -      | -      | -      | -        | -         | -0.691*** | -0.588*** |
| 8. PSS total score   | -      | -      | -      | -      | -        | -         | -         | 0.393*    |
| 9. BHS score         | -      | -      | -      | -      | -        | -         | -         | -         |

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

Expanded Disability Status Scale (EDSS), Multidimensional Scale of Perceived Social Support (MSPSS), Fatigue Severity Scale (FSS), Hospital Anxiety and Depression Scale – Anxiety subscale (HADS-A), Hospital Anxiety and Depression Scale – Depression subscale (HADS-D), World Health Organization Quality of Life Abridged version (WHOQOL), Perceived Stress Scale (PSS), Beck Hopelessness Scale (BHS).



**Fig. 1.** Coping strategies in Lebanese and French multiple sclerosis patients. The thickness of the violin plot indicates the density, showing the distribution of the scores of the Coping Orientation to Problems Experienced - brief version (Brief-COPE) questionnaire. The red circle represents the mean and the red line the standard deviation.

### 11. Diagnosis communication

Overall, almost all the patients (99%) remember the disclosure of the diagnosis (99%), and around 86% of the Lebanese patients and 64% of the French patients were satisfied with it. Most of the patients received the diagnosis of possible MS (57%), accompanied by at least one relative

(73%), during their hospitalization (57%). The preferred timing and place to receive the diagnosis is during hospitalization after diagnostic tests (40%). 47% of the patients were told they have MS in less than 15 minutes. However, most of the patients (73%) found that their doctor understood their emotional state and answered all their needs.

**Table. 5**  
Hierarchical Multiple Regression Analysis

| Adaptive strategies |         |            |       |           |        | Maladaptive strategies |         |            |       |           |        |
|---------------------|---------|------------|-------|-----------|--------|------------------------|---------|------------|-------|-----------|--------|
| French MS group     |         |            |       |           |        |                        |         |            |       |           |        |
| Predictors          | $\beta$ | SE $\beta$ | $R^2$ | Adj $R^2$ | $p$    | Predictors             | $\beta$ | SE $\beta$ | $R^2$ | Adj $R^2$ | $p$    |
| WHOQOL score        | .02     | .39        | .08   | .07       | .03    | HADS-D score           | .09     | .38        | .14   | .12       | .007   |
| Lebanese MS group   |         |            |       |           |        |                        |         |            |       |           |        |
| Predictors          | $\beta$ | SE $\beta$ | $R^2$ | Adj $R^2$ | $p$    | Predictors             | $\beta$ | SE $\beta$ | $R^2$ | Adj $R^2$ | $p$    |
| BHS score           | -.11    | -.55       | .31   | .29       | < .001 | HADS-A score           | .11     | .60        | .36   | .34       | < .001 |

World Health Organization Quality Of Life (WHOQOL), Hospital Anxiety and Depression Scale – Anxiety subscale (HADS-A), Hospital Anxiety and Depression Scale – Depression subscale (HADS-D), Beck Hopelessness Scale (BHS).

## 12. Discussion

This is the first study exploring the differences between Lebanese and French people with MS. The results showed that both had comparable characteristics overall, with the majority having a high level of social support, a low level of perceived stress and a good quality of life. Our findings fall in line with previous studies from developed countries and the Middle East and North Africa (MENA) area (Yamout et al., 2013 May, Alsaadi et al., 2017 Dec 11, Ayatollahi et al., 2007 Mar, Effat et al., 2016 Jan 1, Alshubaili et al., 2007 Sep 18, Mitchell et al., 2005 Sep).

Lebanon has a mainly collectivistic social structure, and that would usually infer a higher degree of social support, particularly when coping with a stressful event (Rego and Cunha, 2009 Mar 1, Kim et al., 2008 Sep). However, our study's findings inversely showed a higher level of family support perceived in the French population. This could be maybe explained by a higher level of disability in our French sample. Nevertheless, the difference in EDSS scores remains modest, and thus further studies with larger samples are needed to verify this hypothesis.

The impact of several psychosocial variables and coping mechanisms on the quality of life of people with MS was also explored. The importance of these factors was previously highlighted in multiple studies (Mitchell et al., 2005 Sep, Farran et al., 2020 Jan, Wynia et al., 2008 Aug). For instance, fatigue was associated with depression and had an impact on the quality of life of patients, a result expected and previously demonstrated (Brown et al., 2009, Yamout et al., 2013 May, Farran et al., 2020 Jan, Ashjazadeh et al., 2016 Mar 14, Lysandropoulos and Havrdova, 2015 Oct, Lobentanz et al., 2004 Jul, Pittion-Vouyovitch et al., 2006 Apr). Fatigue remains one of the most disabling symptoms in MS with no efficacious treatment to date. This might explain why French patients with MS, demonstrating more fatigue than the Lebanese population, had lower scores on the physical domain of quality of life in our sample.

Almost all observed variables showed an impact on the quality of life of the patients (Tables 3 and 4). Indeed, it is not surprising that depression, anxiety, fatigue, perceived stress and social support have an individual and moreover combined influence on the quality of life. Also, adaptive coping correlated with a better quality of life while maladaptive coping did not show a direct impact on the quality of life. One explanation may be that the effect of maladaptive coping on the quality of life is mediated by the effect of anxiety.

It was particularly interesting that the coping mechanisms differed between the two samples. Overall, adaptive strategies were mostly used in both populations. Nevertheless, Lebanese patients leaned more towards emotion-based strategies, an affinity appropriately reflecting the workings of the Lebanese society. Moreover, emotion-focused coping strategies regulate negative emotions such as anxiety. One could speculate that this might explain why the French population is slightly more anxious than the Lebanese population. French patients also used more maladaptive strategies, which were associated with higher levels of anxiety. Other studies showed an association between negative coping strategies and a poor quality of life (Grech et al., 2018 May, Farran et al., 2016 Mar, Goretti et al., 2009 Feb). Interventions targeting coping mechanisms in people with MS are therefore needed, focusing on enhancing adaptive strategies and reducing maladaptive strategies,

especially in the French population.

One should be careful interpreting our results regarding diagnosis communication and its perception. The time elapsed since diagnosis should be considered, for patients with more recent diagnosis might be more accurate in their responses and thus worth interpretation. Future studies are needed to study the impact of diagnosis communication on the quality of life of people with MS.

This study has several strengths. It is the first study comparing the French and Lebanese people with MS. It paved the way for the validation of seven questionnaires related to perception of diagnosis communication and psychosocial variables in people with MS in Arabic. The limitations of the study include the small sample size and the recruitment of patients being monocentric in Lebanon. However, it included Lebanese MS patients from different regions including rural areas and different socio-economical statuses. Nonetheless, a larger study is needed to elucidate the characteristics of these populations in order to eventually develop targeted care plans.

## 13. Conclusion

Comparison between the French and Lebanese people with MS showed transcultural differences mainly regarding fatigue, perceived social support and coping strategies. This study explored the utility of seven translated Arabic questionnaires assessing the psychosocial dimensions of MS. Further studies are needed to validate the questionnaires and develop a more holistic approach to improve the quality of life of people with MS.

## Authors participation

All authors have participated to concept and design of the study, acquisition and analysis of data, drafted and critically reviewed the manuscript, and approved the final version.

## Conflict of interest

A. Tourbah has received consulting and lecturing fees, travel grants and research support from Medday Pharmaceuticals, Biogen, Novartis, Hikma, and Roche.

K. Abou Khaled has received lecturing fees from Novartis and Roche.

M. Ibrahim, A. Henry, C. Bensa, T. Moreau and M. Montreuil have nothing to declare.

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